

**Read, write, develop:  
The social and economic impact of literacy in South Africa**

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Through this study I had the opportunity to contribute to my two biggest passions, literacy and the economic development of my country. This was my primary motivation, knowing that I was working towards making an impact in two areas close to my heart.

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## Abstract

The topic of literacy has received a decent amount of attention over the years both academically and from various institutions and forums across the globe. The increased focus on addressing illiteracy drove the global illiteracy rate down from 40% in 1970 to 25% in 1990. Initiatives to promote universal literacy began as far back as the early 1950s yet the latest available data on literacy from UNESCO Institute for Statistics (UIS) indicates that 750 million adults in the world are still illiterate. With a world population of approximately 7.6 billion, that translates to one in every 10 people. Regionally, sub-Saharan Africa (SSA) and Southern Asia host the world's lowest literacy rates with a combined 20 countries holding literacy rates of below 50% while Central, Eastern and South-Eastern Asia, Europe and Northern America have literacy rates close to or at 100%. South Africa was rated number 50 out of 50 countries that participated in the Progress in International Reading Literacy Study (PIRLS) of grade four learners in 2016. Against this background, this study sought to provide insight on the social and economic impact of literacy in South Africa with a focus on how literacy influences unemployment, the HIV prevalence rate, crime and income inequality. The study employed fixed and random effects techniques to estimate a panel data of nine (9) provinces between 2008 and 2017. A provincial average of 90.79% for the literacy rate was derived from the data ranging from a minimum of 81.13% to a maximum of 98.10%. Gauteng had the highest literacy rate while the Northern Cape had the lowest. Gauteng also came out as the province with the highest average GDP per capita (GDPPC) while the Northern Cape had the lowest average crime and unemployment rates. The provincial averages for the dependent variables were 25.70% for the unemployment rate, 17.50% for the HIV rate, 1.13% for the crime rate and ZAR63,029 for GDPPC. The results showed that literacy was positively related to unemployment, HIV and GDPPC which indicate that increases in the literacy rate resulted in higher unemployment and HIV prevalent rates and higher income per capita across the nine provinces in South Africa. When the crime rate was analysed as the dependent variable, the results showed a positive correlation with literacy in the absence of unobserved variables and a negative correlation with literacy when unobserved variables were included. On the back of this study's results, which indicated a positive relationship between literacy and unemployment as well as GDPPC, policymakers need to consider an expanded view and focus of literacy by including financial, health and technology literacy and investing in those in addition to functional literacy. Furthermore, government needs to initiate a nationwide literacy campaign which targets communities with high illiteracy rates across the country. This campaign would focus on reducing illiteracy with the primary objective

of educating the community not only about HIV but the importance of HIV testing as well. Lastly, literacy campaigns need to integrate education on how the community can work with the police to combat crime as greater community participation could lower the crime rate.

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## **List of Abbreviations**

ANA	Annual National Assessments
CR	Crime Rate
DBE	Department of Basic Education
FE	Fixed effects
GDPPC	GDP per capita
HR	HIV Rate
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IR	Income Rate
LR	Literacy Rate
NDP	National Development Plan
PIRLS	Progress in International Reading Literacy Study
RE	Random Effects
SPI	Social Progress Index
SANLI	South African National Literacy Initiative
SAPS	South African Police Service
SDG	Sustainable Development Goals
SSA	Sub-Saharan Africa
UR	Unemployment Rate
UN	United Nations

## **Chapter 1: Introduction**

### **1.1 Background of the study**

The topic of literacy has received attention over the years both academically and from various institutions and forums across the globe. The increased focus on addressing illiteracy drove the global illiteracy rate down from 40% in 1970 to 25% in 1990 (Chowdhury, 1995). Initiatives to promote universal literacy began as far back as the early 1950s yet the latest available data on literacy from UNESCO Institute for Statistics (UIS) indicates that 750 million adults in the world are still illiterate (UIS, 2017). With a world population of approximately 7.6 billion, that translates to one in every 10 people. In terms of the gender split, two-thirds of the world's illiterate population are female (UIS, 2017). In 1985 the literacy rates of women were 81% and 53% for Latin America and the Caribbean respectively and 35% for Africa (Stromquist, 1990). Regionally, sub-Saharan Africa (SSA) and Southern Asia host the world's lowest literacy rates with a combined 20 countries holding literacy rates of below 50% while Central, Eastern and South-Eastern Asia, Europe and Northern America have literacy rates close to or at 100% (UIS, 2017).

While South Africa possesses high literacy rates relative to its SSA counterparts, with the functional literacy rate at 85.4% and adult literacy rates at 94.4% in 2016, there still remain disparities between provinces, races and gender (Stats SA, 2016). The functional literacy rate is defined as the literacy rate of adults over the age of 20 with a level of education of a grade seven or lower (Stats SA, 2016). Adult literacy, on the other hand, disregards the level of education and rather focuses on the individual's ability to read and write in at least one language (Stats SA, 2016). Both definitions appear to be simplistic approaches to defining literacy as they limit it to basic reading and writing skills and do not consider health, financial and technology information comprehension.

According to Stats SA (2016), the functional illiteracy rate in South Africa declined from 27.3% in 2002 to 14.6% in 2016 however, the adult literacy rates in the Northern Cape (89.8%), North West (90.1%) and Limpopo (90.7%) came below the national average of 94.4%. South Africa was rated number 50 out of 50 countries who participated in the Progress in International Reading Literacy Study (PIRLS) of grade four learners in 2016. The top five spots were occupied by the following sovereigns in chronological order: Russia, Singapore, Hong Kong, Ireland and Poland. The study revealed that approximately 78% of South African grade four

learners fail to reach international benchmarks and therefore lack basic reading skills by the end of the fourth grade compared to only 4% of learners globally (Howie, Combrinck, Roux, Mokoena, & McLeod, 2017). Results from the 2014 Annual National Assessments (ANA), where over 7.3 million South African learners in grades one to six as well as grade nine wrote national numeracy and literacy assessments, revealed that grade nine learners, although literate, struggled to interpret sentences and lacked adequate editing skills when drafting letters (DBE, 2014).

Literacy is included in the basket of indicators used to assess the economic development of a country (Verner, 2005). Unlike economic growth, which is driven by market forces, economic development is a product of long-term investments that facilitate long-run economic growth (Feldman, Hadjimichael, Lanahan, & Kemeny, 2016). Education and literacy are two such investments in the drive for economic development. The establishment of various frameworks globally, including the United Nations (UN) Sustainable Development Goals (SDGs) and South Africa's National Development Plan (NDP), address both education and literacy (Lehohla, 2016).

The South African government has made education the focal point of the NDP in order to advance economic development. It has done this by prioritising reading comprehension by establishing an early grade reading strategy and addressing infrastructure backlogs negatively affecting basic education (National Treasury, 2019). The UN has played a vital role in eradicating illiteracy across the globe. From 1967 to 1973, the UN conducted the Experimental World Literacy Programme (EWLP), a campaign that aimed to examine the economic and social impact of literacy and tackle the problem of illiteracy that the world was facing at the time (UNDP, 1976). Eleven countries were included in the campaign, seven of which were African, namely, Guinea, Algeria, Tanzania, Ethiopia, Mali, Madagascar and Sudan. While the EWLP was not particularly successful, it was worthwhile. Even though less than a third of the socio-economic changes promoted by the different programmes were implemented by participating countries, a handful of these countries went on to expand functional literacy after the programme ended (UNDP, 1976).

Linking literacy and economic development, this study evaluates the impact of literacy on society and the broader economy based on existing academic literature. This is further expanded through the examination of this relationship in the South African context, subdivided by province. The data used in the study were sourced from Stats SA for the years spanning from 2008 to 2017 and assume that the entire South African population is covered as far as the data permits.

## 1.2 Problem definition and research questions

The literacy rate is regarded as a key social indicator of development. High literacy rates are associated with low levels of poverty (Stats SA, 2016). Illiteracy is the result of social inequalities mostly affecting those living in rural areas or those who do not speak the official languages (Stromquist, 1990). Robertson (2017) indicates that countries that had low literacy rates in the period spanning from 1980 to 1984 are still in poverty in the 21<sup>st</sup> century with per capita GDP levels of \$1.5 thousand to \$3.2 thousand in 2017. Torres (1994) explains that tackling the issue of illiteracy means effectively dealing with poverty as poverty remains a major obstacle to literacy. If this holds true, then increasing literacy rates should lower social problems, such as high rates of criminal activity and Human Immunodeficiency Virus (HIV) infections. This includes income inequality and economic challenges, such as weak earning potential, low growth, which is characterised by a high unemployment rate, and low productivity.

Before World War I, South Africa's white population had a literacy rate of 96% while the literacy rate of non-whites was at a low 7%. Although this has improved significantly over the years, the racial literacy gap remains high, as has the per capita GDP gap between whites and non-whites (Robertson, 2017). On a gender basis, South African women are still more likely to be functionally illiterate than men across all age groups except for the 20–39 year range where, in 2016, only 4.5% of women were functionally illiterate compared to 6.3% of men (Stats SA, 2016).

If we are able to better understand the benefits of literacy and how literacy can be used to combat South Africa's social and economic problems, a greater focus can be placed on literacy in terms of policymaking by addressing the provincial, racial and gender gaps mentioned above. Addressing these issues can allow South Africa to increase its average literacy rates across provinces and bring it closer to realising its full development potential.

This study therefore, aims to answer the following question: To what extent does literacy drive social and economic development? The specific questions include;

- Does literacy rate affect unemployment across the South African provinces?
- Does literacy rate affect health awareness, particularly HIV infection rates across the South African provinces?
- What is the effect of literacy rates on criminal activity across the South African provinces?

- What is the effect of literacy rates on income inequality across the South African provinces?

### **1.3 Statement of research objectives and hypotheses**

The purpose of this study is to gain an understanding of the social and economic impact of literacy in South Africa. The specific objectives include:

- To examine the effect of literacy rates on unemployment across South African provinces.
- To examine the effect of literacy rates on health awareness, particularly HIV infection rates across South African provinces.
- To examine the effect of literacy rates on criminal activity across South African provinces.
- To examine the effect of literacy rates on income inequality across South African provinces.

Therefore, the null hypotheses associated with the above objectives are as follows:

H<sub>0</sub>: There is no significant relationship between the literacy rate and the unemployment rate.

H<sub>0</sub>: There is no significant relationship between the literacy rate and the HIV infection rate.

H<sub>0</sub>: There is no significant relationship between the literacy rate and the crime rate.

H<sub>0</sub>: There is no significant relationship between the literacy rate and income inequality.

### **1.4 Justification of the study**

Literacy is an important aspect of economic development. When people are literate, they are able to be economically active participants in society, make better decisions for themselves and for their families, obtain employment and advance the economy. Literacy is also important for the acquisition of modern production skills and the possibility of generating an income (Bhola,

1984). Therefore, the aim of this study is to provide insight into the impact of literacy on social and economic outcomes.

Although education has received a significant amount of attention on various platforms, such as the SDGs globally and the NDP in South Africa, literacy on its own has not received as much focus. The *World Declaration on Education for All*, a product of the 1990 Jomtien Conference, focused mainly on primary education and very little on adult literacy (Easton, 2014). Goal four of the SDGs mentions literacy, stating the following: “By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy” (Lehohla, 2016, p. 4). The ninth chapter of the NDP document outlines 2030 goals to improve education and training outcomes aiming for “about 80% of schools and learners [to] achieve 50% and more in literacy, mathematics and science in grades 3, 6, 9” (Lehohla, 2016, p. 3). This study focuses on how attaining these goals and having an increased focus on improving literacy rates can have a positive impact on society and the economy.

The gap identified in the existing literature includes the lack of coverage of the impact of literacy in a South African context as well as a quantitative approach in determining this impact. Four dependent variables were selected for this study to understand their relationship with literacy through quantitative analysis. These variables were based on key issues facing South Africa that prevent socio-economic development. The first issue is unemployment with the unemployment rate in South Africa reported at a high 26.7% in quarter four of 2017 (Stats SA, 2018). The second is health where the World Health Organization (WHO) identified one hundred principal health indicators subdivided into four key categories, namely, health status, risk factors, coverage of service and health systems indicators (WHO, 2018). Previous literature has largely focused on health status, more specifically, life expectancy and infant mortality rate (Morgado, 2014) as variables for analysis. Considering that South Africa holds one of the highest HIV rates in the world with approximately one person in every five globally reported as HIV positive residing in South Africa, HIV remains a major issue in this country (Matsoso, 2017). The last two issues are crime and inequality. According to Stats SA (2016/17), 7.2% of South African households experienced crime incidents in 2017 while South Africa’s Gini coefficient remains one of the highest in the world at 0.63 in 2015 (The World Bank, 2018).

This research adds to the existing literature by highlighting the social and economic benefits of literacy with a specific focus on South Africa. It aims to provide policymakers, NGOs, civil society groups and education-based organisations with insight and justification to focus on improving literacy rates across all provinces in South Africa. As Torres (1994) states, literacy

strategies can only be effective when accompanied by profound social and economic changes and the policymakers and the organisations mentioned have the power to activate these changes.

### **1.5 Organisation of the study**

This dissertation is organised into five chapters with the present chapter covering the introduction. The second chapter covers the literature review which provides insight on previous academic work conducted on the topic of literacy. This is followed by Chapter 3 which covers the methodology adopted to answer the research question. Chapter 4 lays out the discussion of the findings and lastly, Chapter 5 concludes the dissertation and provides recommendations for policymakers and future research.

## **Chapter 2: Literature Review**

### **2.1 Introduction**

This chapter covers the literature review, the purpose of which is to gain an understanding of previous work that has been conducted on the socio-economic impacts of literacy. The literature review unpacks what the literacy rate does to the key factors of focus, namely, the unemployment, HIV and crime rates as well as income inequality in South Africa. The section starts with a definition of literacy to clarify what is meant by the term in the context of this study. This is followed by an overview of literacy rates in South Africa and thereafter an overview of social and economic development in South Africa. A theoretical framework outlining supporting theories on how literacy enhances socio-economic outcomes is then introduced, followed by a review of empirical literature examining the impact of literacy. The section concludes with a chapter summary.

### **2.2 Definition of Literacy**

UNESCO defines a literate person as someone “who can, with understanding, both read and write a short simple statement in his or her everyday life” (UNESCO, 2005, p. 153). Similarly, Stats SA describes literacy as the “ability to read and write in at least one language” (Stats SA, 2016, p. 19). According to Martinez and Fernandez (2010), based on the UNESCO definition, a person is said to be functionally literate when his/her competency level of reading and writing is beyond basic literacy. Research indicates that a minimum of four years of primary school education is required for children to be able to retain literacy skills (Bhola, 1984).

Literacy is key to driving economic growth and development. Research shows that countries need literacy rates of at least 40% to grow sustainably while literacy rates of 70% to 80% are required for industrialisation (Robertson, 2017). Supporting this is data which show that, of 40 countries with adult literacy rates of below 70%, none had manufacturing reaching 20% of value added to the economy in 2015. Korea on the other hand, managed to attain this in 1972 after increasing its literacy rate from 22% in 1945 to 87% in 1970 (Roberson & Lopez, 2017).

State leaders in SSA recognise the role that literacy plays in driving democracy and national development and the impact of illiteracy on gender, geographical, ethnic and disability disparities. This is reflected by the inclusion of literacy policies into the National Development

Plans (NDPs) of various countries within the region, including South Africa, Kenya, Zimbabwe, Botswana and Uganda (Maruatona, 2008)

### **2.3 Overview of Literacy rates in South Africa**

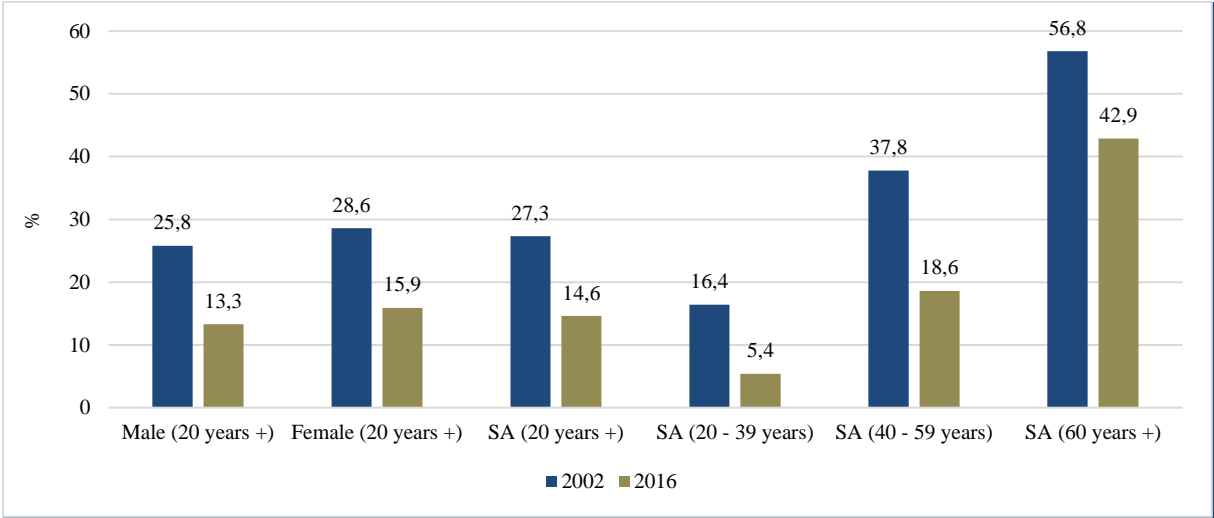
The roots of the varying illiteracy rates over the years in South Africa can be traced back to its history in terms of the education landscape. The 1920s and 1930s saw a rise in literacy schools and night classes to combat the issue of high illiteracy rates. These schools and classes were eventually forced to shut down due to the Bantu Education Act of 1953 (Sibiya, 2004). In 1945, an estimated 80% of the black adult population and approximately 70–75% of the Indian and Coloured population combined were illiterate (Prinsloo, 1999). Up until 1953, schooling for Black South Africans was mostly provided by missionaries with minimal and inconsistent support from the government (Prinsloo, 1999). These schools aimed to teach the Black population about Christianity and how to read and write however, they too were halted by the Bantu Education Act (Prinsloo, 1999).

The end of the apartheid era brought with it a new democratic government whose focus was on the provision of basic education to all South Africans, regardless of race. This included the establishment of the Constitution of the Republic of South Africa, Act No 108 of 1996 Section 29(1), which states that: “Everyone has the right to a basic education, including adult basic education” (Sibiya, 2004, p. 3). According to the South African Institute of Race Relations (IRR) data spanning over the period beginning in 2001 and ending in 2002, the illiteracy rate of black adult Souths African was 35% over the period (Sibiya & Van Rooyen, 2005). Furthermore, in 2003, 12 million black South Africans, making up 27% of the population, had minimal to zero access to education (Sibiya, 2004).

The Department of Basic Education (DBE) was established for the purpose of providing governance of the primary and secondary school system in South Africa as well as supervision of adult literacy programmes. The DBE is responsible for management and implementation of national education policies and laws with implementation executed at the provincial level as well as school level. This is achieved through the Provincial Education Departments and the School Governing Bodies, respectively (Section27, 2017). In June 2000, the DBE embarked on a large-scale literacy campaign called the South African National Literacy Initiative (SANLI), with the primary objective of reducing the functional illiteracy rate in South Africa. The campaign also sought to drive inclusive societal participation and educate voters on the

forthcoming 2004 elections. Over 400,000 learners took part in the programme by the end of 2003 (Sibiya & Van Rooyen, 2005). In 2008, the DBE launched the *Kha Ri Gude (Let Us Learn)* Mass Literacy Campaign which proved to be a success, resulting in 4.2 million literates in 2016 (DBE, 2016). In 2015, the DBE launched the Read to Lead Campaign, a four-year campaign which aims to improve children’s reading abilities and ensure that all learners are able to read at appropriate levels for their age (DBE, 2019). The DBE’s end goal for the campaign is to increase the average learner’s performance in literacy or language to 75% by the time it is concluded. The long-term objective is to promote a culture of reading both inside and outside of school. As of 2016, approximately 14.6% of South African adults (Figure 1) were functionally illiterate (Stats SA, 2016).

**Figure 1: Percentage of functionally illiterate South Africans aged 20 years and older**



Source: Stats SA, 2016 (pg. 19)

**2.4 Overview of Social and Economic Development in South Africa**

Apartheid, a system which legalised racial segregation in South Africa, lasted over 40 years under the ruling of the National Party (NP) from 1948. The system was socially, economically and politically unequal and racist, favouring the white population at the expense of the black population that was the majority (Fiske & Ladd, 2004). This included the provision of education with the Bantu Education Act of 1953 enacted to racially segregate educational resources. Under apartheid, the government spent a tenth of what was allocated to white learners on black learners (Fiske & Ladd, 2004). Black schools were denied satisfactory facilities, textbooks, infrastructure and quality teachers (Fiske & Ladd, 2004). This provision of inferior education

and inadequate resources, along with the enforcement of Afrikaans as a medium of instruction in schools, led to the Soweto uprising, student protests that began in Soweto and spread across the country in 1976, triggering the beginning of the end of the apartheid era (Prinsloo, 1999). Apartheid started to unravel in the mid-1980s due to mass resistance in the country, economic circumstances and increasing resistance from the international economy expressed through the enforcement of sanctions (Fiske & Ladd, 2004). This ultimately led to the end of apartheid and to South Africa’s first democratic elections in 1994 for all South Africans of all races.

Although the 1994 elections directed South Africa towards becoming a more inclusive country, the “rainbow nation” is still experiencing subdued growth and deep social issues 25 years into this new democracy. South Africa’s economy grew by a mere 0.8% in 2018 and the World Bank has projected growth of 1.3% and 1.7% in 2019 and 2020 respectively (World Bank, 2018). This low growth, coupled with increasing population growth, has resulted in GDP per capita (GDPPC) growth close to zero since 2014, countering efforts to reduce poverty (World Bank, 2018). Additionally, the unemployment rate remains high, reportedly at 27.1% in 2018 (World Bank, 2018).

In 2017, South Africa ranked number 113 out of 189 countries on the UNDP’s Human Development Index (HDI), a measure of a country’s basic human development achievements (UNDP, 2018). The country’s HDI value in 2017 was 0.699, up 13.1% from 1990 (Table 1) when HDI was first created and above the 0.537 average of sub-Saharan African countries (UNDP, 2018).

**Table 1: South Africa’s HDI and component indicators based on UNDP data (1990–2017)**

	HDI Value	Life Expectancy at Birth	Expected Years of Schooling	Mean Years of Schooling	GNI per Capita (2011 PPP\$)
<b>Sub-Saharan Africa 2017</b>	<b>0.537</b>	<b>60.7</b>	<b>10.1</b>	<b>5.6</b>	<b>3,399</b>
<b>South Africa 2017</b>	<b>0.699</b>	<b>63.4</b>	<b>13.3</b>	<b>10.1</b>	<b>11,923</b>
South Africa 2015	0.692	62.0	13.3	10.1	12,073
South Africa 2010	0.649	55.9	12.8	10.1	11,639
South Africa 2005	0.614	52.6	12.9	10.0	10,590
South Africa 2000	0.630	56.3	13.0	8.9	9,340
South Africa 1995	0.649	61.2	13.0	8.2	8,885
South Africa 1990	0.618	62.1	11.4	6.5	9,391

Source: UNDP, 2018 (pg.3)

In 2018, South Africa obtained a Social Progress Index (SPI) score of 66 out of 100, ranking 77th out of 146 countries. The GDPPC under the years in review was \$12,237, placing South Africa in 69th place out of 146 countries. SPI measures the general wellbeing of society and

the quality of life in different countries premised on three foundations: *Basic Human Needs*, *Foundations of Wellbeing* and *Access to Opportunities* (SPI, 2018). Overall, South Africa underperformed compared to 15 of its peer countries with a similar GDPPC. The key driver of the weak performance was the poor performance of two of the three dimensions, namely, *Basic Human Needs* and *Foundations of Wellbeing*. The underlying factors that influenced the weak outcome of these two dimensions included insufficient nutrition and a lack of basic medical care, inadequate clean water and sanitation, and poor access to quality education and quality healthcare (SPI, 2018).

To address issues of socio-economic development, the South African government renamed the Department of Welfare as “The Department of Social Development” (DSD) in 2000 and instituted the Economic Development Department (EDD) following the 2009 general elections. The EDD was established to assist the government to accelerate the economy’s transformation agenda and provide oversight of the key state entities involved in economic development (EDD, 2016). The DSD focuses on the development and monitoring of the implementation of social policy that aids in the reduction of poverty (DSD, 2009). According to South Africa’s National Treasury 2019 budget review, approximately 68% of the government’s consolidated expenditure is allocated to social commitments, such as education, health, basic services and social grants (National Treasury, 2019). In terms of education, South Africa currently has various laws and regulations that govern basic education funding, which include the National Education Policy Act (Act No. 27 of 1996), the National Norms and Standards for School Funding (NNSFF, as amended in 2006), the South African Schools Act (Act No. 84 of 1996), the Employment of Educators Act (Act No. 76 of 1998) and the Education Laws Amendment Act (Act No. 24 of 2005) (Section27, 2017).

The budget on government spending for social protection initiatives to reduce poverty and inequality is set to rise by 24% from ZAR193 million in 2018/19 to ZAR239 million by 2021/22 (National Treasury, 2019).

## **2.5 A Theoretical framework: Literacy and Development**

Development is possible when human basic needs, including food, water, health and education, are met. In 1976, the UN’s International Labour Organization (ILO) introduced the basic needs approach to economic development (Streeten, 1979). The approach, rather than focusing on income and growth, seeks to provide people with opportunities for overall wellbeing that will offer them complete physical, mental and social development. The approach incorporates

nonmaterial needs, including independence, political freedom, participation in decision making and a sense of purpose.

One of the premises of the basic needs approach is that focusing on social factors, such as infant mortality and educating females, should lead to the reduction of fertility rates and subsequently, the size of families in a faster and cheaper manner than raising household income (Streeten, 1979). This premise is supported by various researchers, including Weinberger, Lloyd and Blanc (1989), Parsuraman et al. (1998) and Arokiasamy, McNay and Cassen (2004) who have highlighted the inverse relationship between the education of females and the fertility rate. With fewer children, parents are able to better provide for them financially and to send them to better schools, allowing them to attain quality education.

Similarly, migrating from the focus on growth in Gross National Product (GNP) terms, the UNDP established the Human Development Report in 1990, placing people at the forefront of development. The report introduced the HDI as a measure of human development, encompassing life expectancy, literacy and decent living standards. The move away from the focus on income was driven by the fact that even fast-growing countries with high GNP were still not addressing socio-economic challenges experienced by certain parts of their population. This highlights that GNP growth, although necessary, is insufficient for human development. With development comes opportunities and choices, such as living a healthy life, acquiring knowledge and having access to food and sanitation (UNDP, 1990).

The basic needs and human development approaches highlight that economic and social progression can be achieved by ensuring that the minimum living standards are met for all humans. Bringing this back to the current study's research problem, the two approaches highlight the necessity of education and literacy in achieving social and economic development. The ability to read and write affords individuals access to knowledge which, in turn, empowers them and allows them to participate in key decision making in their families and greater society. This highlights that, as much as literacy is a personal skill, its effects have a positive impact on society that drive development.

The contribution of literacy in enhancing economic development can also be explained by the Human Capital Theory. Human capital refers to the skills and knowledge possessed by the workforce (Goldin, 2014). The Human Capital Theory is a construct that explains the socio-economic evolution of a country through the investment made in its people to increase their productivity (Adams, 2016). The theory supports the notion that education is a form of capital and therefore, the higher the levels of education individuals possess, the higher their productivity, income and contribution to the economy thus alleviating the poverty rate (Adams,

2016). One of the pioneers of the concept of human capital, Theodore Schultz, believes that investment in human capital through expending on key human elements, such as education and health, results in an increase in a country's national output (Schultz, 1961). Schultz (1961) describes the two aspects of human resources as quantitative, which includes the number of employees and hours worked, and qualitative that includes knowledge, skills and other attributes that contribute to improving individuals' capabilities and, in turn, their productivity. Therefore, if the increased expenditure on enhancing these capabilities improves productivity, then the attributes will result in a positive rate of return (Schultz, 1961). If literacy is considered as one of these attributes, then expenditure on improving the levels of literacy should result in improved productivity and thus a wealthier nation.

## **2.6 Empirical Literature**

The empirical literature on literacy and development can be broadly categorised into qualitative and quantitative approaches. Several studies examining literacy in a development context, including those of Sjöström and Sjöström (1982), Rockhill (1987), Martinez and Fernandez (2010) and Bown (1990), have taken a qualitative approach, commonly conducted through interviews, surveys and observations, to analyse this relationship. There is therefore, merit in studying the relationship from a quantitative perspective and understanding the extent to which literacy positively affects the economy and society by analysing its impact on different variables that are factors of development such as employment, income inequality, health and crime.

In their study, Sjöström and Sjöström (1982) assessed the Ethiopian-run Yemissrach Dimts Literacy Campaign (YDLC) between 1974 and 1976. The purpose of the assessment was primarily to analyse the outcomes and successes of the campaign and, secondly, to understand the campaign's role within a broader socio-economic and political framework. The evaluation was conducted by way of interviews, classroom observations and achievement testing. The results indicated that learners became literate after one to two years of participating in the campaign. Brown (1990) examined 43 project case studies to establish the impact that the literacy of adult women has on the economy and the greater society. The outcomes of Brown's study are elaborated upon later in this section of the dissertation.

### *2.6.1 Literacy and Education*

Since literacy refers to the capability of reading and writing, and education the acquisition of knowledge, it is clear that one does not need to be literate to be educated nor educated to be literate. However, the influence that education plays in improving literacy cannot be ignored as has been proven in several studies. Torres (1994) emphasises that literacy does not exist in isolation but is part of the right to education and a key aspect of basic education. This then becomes a key challenge for South Africa where the quality of education remains poor, especially so in historically disadvantaged areas (Lehohla, 2016). A study by Chowdhury (1995), reviewing the status of literacy in developing countries, aimed to highlight the difference in literacy rates across social status, age, gender and geography. The study focused on the relationship between literacy and primary school education (Chowdhury, 1995). The findings indicated that illiteracy rates in rural areas were consistently higher than in urban areas due to lower primary school enrolment rates in rural areas in comparison to urban areas. Expanding on this, Torres (1994) explains that illiteracy is not only a result of a lack of school access but also the poor quality of formal and informal channels of education. The lack of schooling or access to quality education can also have a negative impact on literacy rates in the long run as was seen in the results from the first International Adult Literacy Survey (IALS) conducted in 1994 in which seven countries were surveyed. The survey results showed a significant relationship between literacy skill, level of education and age, with illiteracy increasing with age. This is in line with data from Stats SA (2016) which indicates that people over the age of 60 are the most likely to be functionally illiterate. The IALS also revealed that children of highly literate and educated parents had a better foundation in terms of literacy and also attended better schools (Sloat & Willms, 2000). In support of this, Chugger (2009) found that improving the literacy levels of parents increases the probability of their children's school enrolment as well as elementary school completion. Further to this, the study found that an improvement of maternal literacy increases the girl child's likelihood of school enrolment and in certain instances, school completion as well. Unfortunately, females still have higher rates of illiteracy than males which, Torres (1994) argues, reflect the lack of understanding and management of the needs of women and girls with regards to education and literacy. Chowdhury (1995) found that, in spite of the improvement of access to primary school education for girls in developing countries, inequality still prevailed in the provision of primary school education for girls versus boys. Research shows that, in some societies, boys receive preferential treatment over girls in school enrolment (Stromquist, 1990). While boys are encouraged to get an education in these societies, girls are expected to assist their mothers in

various household duties. If these barriers to education for girls continue to exist, the literacy gap between men and women will remain a problem.

### *2.6.2 Literacy and Women*

The interrelationship between literacy and women has been the focus of many studies in the recent past. Brown (1990) studied the effects of improving literacy rates amongst women and found various outcomes on a personal, social and economic level. Personal outcomes included empowerment and participation in decision making; the social outcomes included improved child nutrition and improved willingness to send children to school while the economic impacts included a readiness to use banks, improved mobilisation of credit and improved participation in economic groups (Bown, 1990). Rockall (1987) conducted a study on the power of literacy in the lives of Hispanic females residing in Los Angeles, a theme of which was the role of male dominance in influencing literacy rates of females. The study revealed that most men discouraged their wives from becoming literate as it threatened the family's power dynamics. This highlights that the ability to read and write empowers individuals, in this instance, women, to seek and comprehend various sources of information. This is important as most of the household responsibilities that women are likely to tend to, such as shopping, attending to health care issues and the schooling of children, require a competent level of literacy (Rockhill, 1987). Existing literature has also shown that the rate of return of investing in the education of women is higher than that of men. When a woman is educated, she has fewer children, a healthier family and understands the value in investing in quality education for her children and herself to increase her earning potential (Stromquist, 1990).

### *2.6.3 Literacy and Employment*

While Martinez and Fernandez (2010) found that an increase in schooling resulted in an increase in the unemployment rate based on data from Ecuador and the Dominican Republic, other existing literature suggests otherwise. Clark and Susie (2013), for instance, highlight how literacy skills, which facilitate learning and education, are important to economic well-being. This is accredited to the decreased likelihood of obtaining full-time employment or receiving a promotion when literacy and numeracy skills are poor (Clark & Susie, 2013). In support of this are findings by Rahman (2013) of a significant negative relationship between the literacy rate and the unemployment rate, noting that an increase in the literacy rate lowers the unemployment rate and thus drives economic development.

There is great economic value in investing in human capital whether it be in the form of literacy or education. The value gained not only includes increased productivity but increased real earnings per wage earner as well (Schultz, 1961). In a study on the determinants of literacy, Verner (2005) found that income and literacy have a weak, nonlinear relationship up to a threshold after which the relationship becomes positive. The study also found that literacy improves productivity and one's chances of increasing income as well as a country's quality of human capital which translates to economic growth.

On the topic of the association between literacy and unemployment, Schultz (1961) highlights how farmworkers, who presumably had low levels of education, earned less than industrial workers of the same age, race and gender when they migrated to non-farm jobs. Furthermore, he noted that all things being equal, non-white urban men earned less than their white counterparts and black farm owners earned less than *their* white counterparts due to differences in education and health status of the two groups. South Africa is a prime case of a country where such inequalities still exist. As a dual economy, South Africa is divided into a small portion of the economy which is highly skilled and productive on one side and a large portion which is low-skilled with low productivity on the other (The World Bank, 2018). It is this difference that has resulted in the country's high-income inequality gap. In addition to this, The World Bank (2018) has shown that, when other variables are controlled, poverty reduces one's chances of obtaining employment by 20%. The inequality gap and poverty rate are expected to be reduced over the years as improvements are made to the quality of and access to education for the poor. South Africa's poverty rate is expected to decline from 40% in 2015 to 33% in 2030 while the Gini coefficient is projected to decline to 0.595 in 2030 from 0.628 in 2017 (World Bank, 2018).

#### *2.6.4 Literacy and Economic Growth*

In his study on the relationship between GDP, GDPPC, the literacy rate and the unemployment rate, Rahman (2013) observes that there is no significant relationship between GDP and GDPPC, the literacy rate and the unemployment rate. However, findings showed that there is a significant positive relationship between GDPPC and the literacy rate and a significant negative relationship between the literacy rate and the unemployment rate. The results conclude that increasing a country's literacy rate will reduce its unemployment rate and increasing the GDPPC will lead to the economic development of that country. However, using Latin American countries and South Africa as examples of countries with low to moderate GDPPC in spite of

literacy average rates of above 80%, Robertson (2017) cautions that high literacy levels alone do not always translate to high GDPPC.

Martinez and Fernandez (2010) highlight that literacy and a longer time spent on schooling, acquiring higher levels of education, results in an improvement in productivity and thus enhances economic growth. Therefore, for income gaps to be reduced, the quality of education and literacy need to be improved so that those who are currently lacking in these areas are upskilled so that they can have access to better employment opportunities and higher income (Martinez & Fernandez, 2010).

#### *2.6.5 Literacy and Health*

While being literate equips one with skills for better employment allowing for contribution to GDP, the role of an individual's state of health cannot be ignored in driving growth. The assumption is that an employee in good health is likely to be more productive and present at work, therefore contributing to economic growth. However, research appears to suggest otherwise as seen in a study by Morgado (2014) which examined the association between health and economic growth in a Portuguese context. The outcome of the study shows that economic growth results in good health based on the premise that a high income affords one better health. The inverse however, did not hold as findings reflected that good health does not drive growth. Therefore, if literacy is believed to have a positive impact on health, then these findings infer that this does not translate to growth but is rather to the benefit of individuals on a personal basis.

In examining the social and economic impacts of literacy, Martinez and Fernandez (2010) outlined four categories of impact, namely, health, education, economics as well as social integration and cohesion. The study highlights the negative impact that illiteracy has on general health, hygiene and sexual and nutrition awareness due to the inability to comprehend, process and absorb messages. In line with this, evidence from a survey carried out by Ciampa et al. (2012) reflects the difficulty experienced by individuals with low literacy in effectively communicating with health professionals. Similarly, on the issue of health and literacy, Morrisroe (2014) highlights that, compared to people with adequate levels of literacy, people with low levels of literacy are up to 18 times less likely to correctly identify their medication and also have difficulty understanding their prescriptions. In line with this, Martinez and Fernandez (2010) show that people with poor literacy skills experience great difficulties in understanding messages related to risk prevention or the promotion of healthy conduct. This

supports the notion that the ability to read and write empowers people to take charge of their health and, in the instance of mothers, their children's health as well. Research indicates that literacy rates of 75% and above are commonly associated with low child morbidity and low infant mortality as well as overall healthy children (Bhola, 1984).

As highlighted by Van Rooyen (2005), literacy enables access to information on one's health status and the ability to understand written instructions on medication and when to take children for their vaccinations. On the topic of literacy in relation to HIV, Ciampa et al. (2012) interviewed women from female-headed households in rural Mozambique. The survey aimed to examine the relationship between literacy, knowledge of HIV, numeracy and health-seeking behaviour. The results indicate that, while weak literacy and numeracy skills are positively correlated with less knowledge of HIV, they were not necessarily associated with lower rates of HIV testing or antenatal care (Ciampa, et al., 2012). This finding highlights the importance of literacy in building knowledge on HIV which could aid in preventing infection.

#### *2.6.6 Literacy and Crime*

While literature investigating the direct relationship between literacy and crime is limited, there are several studies that have examined the association between the two in an indirect manner, mostly through the effects of literacy on education or unemployment. According to Morrisroe (2014), for instance, illiteracy risk factors, such as poor education and unemployment, encourage criminal activity. Morrisroe (2014) highlights that youth who are either unemployed, not pursuing an education or not receiving any other form of skills training are 20 times more likely to be found guilty of committing a crime. Morrisroe's shortcoming, however, was a failure to describe the type of criminal activities that were being referred to. Lochner (2004) clarifies this by distinguishing between blue-collar crime, which includes crimes such as drug dealing, theft, break-ins and assault, and white-collar crime referring to crimes such as embezzlement, money laundering and fraud, which require a certain level of skill and literacy. By distinguishing between the two, Lochner indicates that there is a negative relationship between education and blue-collar crime while the opposite holds true in the case of white-collar crimes as they increase with increased education. Taking this into consideration, it is thus imperative to bear in mind both the negative and positive impacts of literacy on crime. For purposes of this study, the focus of crime is in the context of blue-collar crime which is associated with low levels of education and literacy as well as unemployment. In investigating the association between crime and unemployment, Reilly and Witt (1992) found a strong positive relationship

between the two. This can be linked back to literacy by referring to the earlier mentioned findings of Rahman (2013) of a significant negative relationship between the literacy rate and the unemployment rate.

**Table 2: Summary of Empirical Literature**

Authors	Country	Findings
<b>LITERACY AND EMPLOYMENT</b>		
Martinez and Fernandez (2010)	Ecuador and the Dominican Republic	An increase in schooling resulted in the unemployment rate increasing.
Clark and Susie (2013)	United Kingdom	There is a decreased likelihood of obtaining full-time employment or receiving a promotion when literacy and numeracy skills are poor.
Rahman (2013)	Arab and OECD countries	There is a significant negative relationship between the literacy rate and the unemployment rate.
<b>LITERACY AND ECONOMIC GROWTH</b>		
Rahman (2013)	Arab and OECD countries	There is a significant positive relationship between GDPPC and the literacy rate
Chowdhury (1995)	Multiple (Developing)	Illiteracy rates in rural areas were consistently higher than in urban areas.
Verner (2005)	Multiple (Developed and Developing)	Income and literacy have a weak, nonlinear relationship. Literacy improves productivity and one's chances of increasing income as well as a country's quality of human capital.
Schultz (1961)	United States	All things being equal, non-white urban men earned less than their white counterparts and black farm owners earned less than their white counterparts due to differences in education and health status of the two groups.
Robertson (2017)	Frontier markets (Africa)	High literacy levels alone do not always translate to high GDPPC.
<b>LITERACY AND HEALTH</b>		
Morgado (2014)	Portugal	Economic growth results in good health based on the premise that a high income affords one better health.
Ciampa et al. (2012)	Mozambique	While weak literacy and numeracy skills are positively correlated with less knowledge of HIV, they were not necessarily associated with lower rates of HIV testing or antenatal care.
Morrisroe (2014)	United Kingdom	Compared to people with adequate levels of literacy, people with low levels of literacy are up to 18 times less likely to correctly identify their medication and also have difficulty understanding their prescriptions.

(Bhola, 1984)	Multiple (developing)	Literacy rates of 75% and above are commonly associated with low child morbidity and low infant mortality as well as overall healthy
Martinez and Fernandez (2010)	Ecuador and the Dominican Republic	Illiteracy has a negative effect on general health, hygiene and sexual and nutrition awareness. People with poor literacy skills experience great difficulties in understanding messages related to risk prevention or the promotion of healthy conduct
<b>LITERACY AND CRIME</b>		
Morrisroe (2014)	United Kingdom	Illiteracy risk factors, such as poor education and unemployment, encourage criminal activity. Youth who are either unemployed, not pursuing an education or not receiving any other form of skills training are 20 times more likely to be found guilty of committing a crime.
Lochner (2004)	United States	There is a negative relationship between education and blue-collar crime while the opposite holds true in the case of white-collar crimes.
Reilly and Witt (1992)	Scotland	There is a strong positive relationship between crime and unemployment.

## 2.7 Chapter summary

In summary, although literacy alone cannot completely eradicate poverty, studies show that increasing literacy rates can yield great socio-economic benefits. Previous studies on literacy have focused on countries with high illiteracy rates such as Niger and India. Save for contributions from Sibiya and Van Rooyen (2005), and Sibiya (2004), South Africa has received little attention on the topic of literacy in the context of development from an academic literature perspective. Furthermore, very few studies have examined the association between literacy and crime rates. Therefore, in addition to examining the impact of literacy on health, economic growth and income inequality, it would be beneficial to understand whether literacy could be used as a measure to combat crime in South Africa. Crime, in the sense of this study, refers to blue-collar crime which has been found in previous literature to be negatively correlated with education and literacy. This study therefore aims to add to the limited South African literature by analysing South African data in order to illustrate how literacy can be used as a gateway to social and economic development.

## **Chapter 3: Methodology**

### **3.1 Introduction**

This chapter addresses the methodology adopted to answer the research question to understand the extent to which literacy drives socio-economic development. The first section covered in this chapter is the research approach and design which addresses the sources from which the data was derived, the sample of the study and the sample period, an overview of the empirical model employed, definitions of the variables and the estimation approach. The sub-section that follows is one that explores the limitations pertaining to the methodology.

### **3.2 Research Approach and Design**

This study aims to contribute to the existing body of literature on the topic of literacy through quantitative analysis. The choice to select the quantitative approach was due to its ability to test the relationship between the variables under the study sufficiently and produce findings that can be generalised (Carr, 1994). Through quantitative analysis, the study investigates the relationship between literacy and each of the dependent variables. While quantitative analysis is not particularly superior to qualitative analysis, it is generally considered to be more appropriate for causal effects as indicated by the research questions (Carr, 1994).

#### *3.2.1 Data source, sample and sample period*

The research employs annual secondary quantitative data over the period spanning from 2008 to 2017 across the nine provinces in South Africa (Table 3). The sample period starts in 2008, 14 years into South Africa's new democracy and is over ten years to allow for fair assessment over a reasonable enough timeframe to make inferences. Most importantly, the choice of the start period of the data is constrained by the unavailability of data prior to 2008 for a majority of the variables examined at the provincial level. Functional literacy, unemployment, HIV and GDP per capita data were sourced from Stats SA while data on crime statistics were sourced from the South African Police Service (SAPS). All data were sourced directly from the official websites of Stats SA and SAPS. Functional literacy data were sourced from Stats SA's annual *General Household Survey (GHS)* which focuses on six key areas, including education and aims to measure the country's level of development. The survey targets private households across the country as well as hostels (Stats SA, 2016). Unemployment data were derived from

Stats SA's *Quarterly Labour Force Survey* which records labour market activities of individuals living in South Africa who are 15 years and above (Stats SA, 2018). Crime statistics were sourced from the SAPS's official website. The SAPS records crime statistics when the police are made aware of the crime regardless of when the act was committed (SAPS, 2017). Lastly, GDP per capita was calculated using GDP data per province from Stats SA and population statistics as per Table 3.

**Table 3: South African Population by Province in Millions (2008/09 – 2017/18)**

	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
<b>RSA</b>	<b>49,65</b>	<b>50,33</b>	<b>51,03</b>	<b>51,76</b>	<b>52,52</b>	<b>53,30</b>	<b>54,12</b>	<b>54,97</b>	<b>55,84</b>	<b>56,75</b>
Eastern Cape	6,48	6,48	6,48	6,48	6,48	6,48	6,48	6,49	6,49	6,50
Free State	2,71	2,72	2,74	2,75	2,77	2,79	2,81	2,83	2,85	2,87
Gauteng	11,39	11,69	11,99	12,30	12,62	12,95	13,29	13,64	14,00	14,37
KwaZulu-Natal	10,11	10,20	10,29	10,39	10,49	10,60	10,72	10,84	10,97	11,11
Limpopo	5,26	5,31	5,36	5,41	5,47	5,53	5,59	5,65	5,72	5,80
Mpumalanga	3,84	3,90	3,96	4,03	4,10	4,16	4,24	4,31	4,39	4,46
Northern Cape	1,10	1,11	1,12	1,13	1,15	1,16	1,17	1,19	1,20	1,22
North West	3,34	3,39	3,45	3,50	3,56	3,62	3,68	3,74	3,81	3,87
Western Cape	5,42	5,53	5,65	5,77	5,89	6,02	6,14	6,27	6,41	6,55

Source: South African Police Service, Crime Statistics 2017/2018

### 3.2.2 Empirical Model

In examining the economic and social impact of literacy across the nine provinces in South Africa, the model used two economic indicators, namely, unemployment rate (UR) and income rate (IR) while social indicators were proxied as HIV rate (HR) and crime rate (CR). The relationships are modelled as follows;

$$UR_{i,t} = \theta_0 + \theta_1 LR + \theta_2 X_{i,t} + \epsilon_{i,t} \dots\dots\dots 1$$

$$HR_{i,t} = \alpha_0 + \alpha_1 LR + \alpha_2 Z_{i,t} + \eta_{i,t} \dots\dots\dots 2$$

$$CR_{i,t} = \beta_0 + \beta_1 LR + \beta_2 W_{i,t} + \epsilon_{i,t} \dots\dots\dots 3$$

$$IR_{i,t} = \omega_0 + \omega_1 LR + \omega_2 U_{i,t} + \xi_{i,t} \dots\dots\dots 4$$

where  $UR_{i,t}$ ,  $HR_{i,t}$ ,  $CR_{i,t}$ , and  $IR_{i,t}$  denote unemployment rate, HIV infection rate, crime rate and income rate (or GDP/PC) for province  $i$  in years  $t$ . The first ( $\theta_0$  in the case of equation 1) and the last ( $\epsilon_{i,t}$ ) variables represent the constant and error terms respectively. LR represents the literacy rate and  $X$ ,  $Z$ ,  $W$  and  $U$  represent a vector of control variables for equations 1, 2, 3 and 4 respectively. The full definitions of the control variables are presented in Table 4.

**Table 4: Control Variables**

Equations	Dependent Variable	Control Variable 1	Control Variable 2	Control Variable 3	Control Variable 4
1	Unemployment rate	HIV Rate	GDP Growth	Population size	Access to internet
2	HIV rate	Unemployment	GDPPC	Medical Aid Access	Food Inadequacy
3	Crime rate	Unemployment	Informal Dwelling	Population size	Police Service
4	Income rate	Unemployment	GDP Growth	Population size	Sanitation

The empirical model for this study consists of five variables, four of which are dependent variables and the fifth is independent. A panel data model approach was assumed for the analysis with data across the years of the sample period as the time series and the South African population grouped into the nine provinces as the unit of analysis. Panel data are appropriate for multilevel modelling because they allow for the inclusion of variables at the different levels of the analysis (Torres-Reyna, 2007). Additionally, panel data have numerous advantages over time series data. This includes improved effectiveness of economic estimates due to panel data's capability to accommodate additional degrees of freedom, better ability to capture the intricacies of human behaviour and capacity to allow the user to control the impact of variables that are either absent or unobserved such as those outlined in Table 4 (Hsiao, 0000).

### 3.2.3 Definition and Measurement of Variables

The independent variable is the functional literacy rate (LR) which is defined as the literacy rate of adults over the age of 20 with a maximum of a grade seven level of education (Stats SA, 2016). This sub-section discusses how LR affects each of the four socio-economic outcomes.

First of the dependent variables is the unemployment rate which is defined as the percentage of individuals between the ages of 15 and 64 who are without work (Stats SA, 2018). In the absence of the building blocks of education, such as being able to read and write, young people are not likely to acquire formal qualifications which limit their opportunities for employment. With their limited skills and lack of education, these individuals will often have a negative experience acquiring employment and, in the instance that they do, may be restricted to casual or manual labour work (Bynner, 2002).

Secondly, the health rate for the study refers to the HIV prevalence estimate which refers to the percentage of individuals living with HIV in South Africa. Through literacy, people can equip themselves with information that allows them to ask relevant questions and make better-informed decisions with regards to their health (Tang, Wu, Chen, Pan, & Yang, 2019). Therefore, those who are well informed are more likely to be proactive in their search for medical information, more likely to take preventative measures toward protecting themselves

from infections and have a higher likelihood of visiting a doctor and undergoing the required medical examinations (Tang, Wu, Chen, Pan, & Yang, 2019).

Thirdly, the crime rate refers to the rate of contact crimes recorded in any particular year by the SAPS. Contact crimes are crimes against a person and form part of the SAPS's four categories of community-reported crimes. The other three categories are contact-related crimes, property-related crimes and other serious crimes (SAPS, 2017). The widest category is contact crimes which includes seven sub-categories, including crimes related to murder, sexual offences, assault and robbery (SAPS, 2017). In theory, Adler's individual psychology school of thought views criminals as lacking a sense of social interest (Shon & Barton-Bellessa, 2015) while, literacy empowers individuals and drives active citizenship. From a crime theory point of view, Alder acknowledges that various structural forces such as poverty, which is often associated with illiteracy and race, potentially impact how one's personality develops. Furthermore, Alder believes that gangs are formed as a result of juveniles seeking a sense of acceptance and belonging which they obtain through fellow delinquents (Shon & Barton-Bellessa, 2015).

Lastly, income inequality is captured by GDP per Capita, an indicator commonly used as a measure of people's average living standards (OECD, 2016). Drawing from the theory of persistent income inequality, a connection can be drawn between the influence of literacy, particularly from a parental level, on income inequality. The premise of this theory is that the development of human capital is driven by the level of income earned by parents such that high-income families are able to invest in human capital better than poorer families, a trend that is transferred from generation to generation (Durlauf, 1992). As such, the income of parents has an impact on the choice of the neighbourhood that the children grow up in. A neighbourhood with access to good schools, for instance, will grant the children better education and better future income prospects than children from poor families. This is aligned with the proposition that literate parents have a better appreciation of a solid foundation and thus send their children to better schools, giving them access to quality education which will subsequently benefit the children later on in life (Sloat & Willms, 2000).

As highlighted earlier, panel data allow for the control of additional hidden factors that may influence the outcome of the tests. As such, 16 control variables were identified with each dependent variable affected by four control variables in addition to the literacy rate.

### *3.2.3.1 Unemployment rate control variables*

The control variables for and drivers of the unemployment rate include the HIV rate, GDP growth rate, population and access to the internet. Apart from literacy, numerous other factors can have an impact on unemployment. Poor health status, more specifically, a worsening HIV status can have a negative effect on productivity. When someone is HIV positive, symptoms such as fevers, chronic diarrhoea and fatigue are heightened as the disease becomes more severe. This results in decreased productivity or an inability to adequately perform at work (McKelvey, 2010). Similarly, as the disease progresses, the infected individual becomes absent from work more often and therefore reduces his/her contribution and value add to the employer (Fox, et al., 2004). Furthermore, due to the increased probability of the loss of employees to AIDS, employers may opt to rather invest in equipment that will replace employees (Masanabo, 2010).

Economic theory highlights the inverse relationship between GDP and unemployment (Maqbool et al., 2013). Very low or negative GDP growth drives economies into recession. This results not only in the inability of companies to make investments but also forces them to retrench employees (Stats SA, 2013). The Keynesian Theory, on the other hand, embraces the notion that a decline in wages will lead to a drop in the cost of input and thus the final cost of the product, all things being equal. The decreased cost of the product will, in turn, stimulate demand and increase output and employment. Therefore, a decline in demand, as would be the case in times of economic recession, would require wage cuts. However, this could lead to resistance from the labour force and possibly drive them to leave the labour market (Keynes, 1936).

In some instances, population growth can prove to be problematic as a larger population means an increased number of individuals who have requirements that need to be catered for. This is exacerbated in cases where urban migration occurs in large numbers as it increases the burden placed on already constrained resources (Demena, 2005).

It is a common belief that access to digital information breaks down barriers and results in improved living standards. However, the digital divide, defined as “the separation between those who have access to digital information and communications technology (ICT) and those who do not” has created issues in achieving this outcome (Dewan & Riggins, 2005, p. 28). The digital divide means that those who have access to ICT are able to take advantage of opportunities presented online, such educational training programmes, which can lead to better employment opportunities, while those who do not have access are excluded (Dewan & Riggins, 2005).

### *3.2.3.2 Health/HIV rate control variables*

The control variables for and drivers of the HIV rate include unemployment, GDP per capita, access to medical aid and food inadequacy.

The social exchange theory views social relations as an exchange between people seeking to maximise their benefits within the realms of justice, with the expectation to reciprocate the benefits they have received (Pam, 2013). An example of such is prostitution, which is commonly a result of unemployment. Prostitution increases the risk of HIV infection due to the frequent engagement of unprotected sex which brings in more money for prostitutes (Masanabo, 2010). Similarly, women who are unemployed may turn to sleeping with multiple partners in exchange for money and gifts (Dinkelmana, Lama, & Leibbrandtb, 2007).

The sexual behaviour model describes the reason why the poor are less likely to regulate their behaviour when they are faced with the risk of HIV (Holmqvist, 2009). Essentially, the rich have a lower risk of mortality compared to the poor and, as such, may place greater value on their own lives and are therefore less likely to put their lives at risk (Holmqvist, 2009).

Over a billion of the world's population, primarily in low to mid-income countries, are not able to access the health services they require due to unaffordability (Harris, et al., 2011). The basic needs theory supports the notion that access to good health care will lead to improved health status and general quality of life. The same applies for adequate food and nourishment. Poor people are generally malnourished and this makes them susceptible to HIV and other infections (Temah, 2009).

### *3.2.3.3 Crime rate control variables*

The control variables for and drivers of the crime rate include unemployment, dwelling conditions, size of the population and satisfaction with police service. The relationship between crime and unemployment can be understood from two main viewpoints, motivational and rational choices. The former refers to the frustration of being unemployed while desiring a certain financially unattainable standard of living that pushes one towards a life of crime. The latter refers to one ascertaining the costs and benefits of committing a crime. In the case of unemployment, the benefits may appear to outweigh the costs, as an individual would see him/herself as having gained something he/she did not own while incarceration, as a result of crime, would not result in a loss of a salary (Britt, 1994).

The social disorganisation theory looks into the impact of a person's social environment on

the person's behaviour. Low economic status, high unemployment and frequent residential mobility can lead to disorder in the community and disintegration which can, in turn, drive an increase in acts of a felony (Kaylen & Pridemore, 2013).

The Theory of Relative Deprivation is based on the concept that people may have the tendency to experience feelings of deprivation which prevents them from owning certain resources or living a particular lifestyle due to their past or social standing (Fajnzylber, Lederman, & Loayza, 2002). These feelings breed a sense of discontent as those individuals may believe they deserve those resources or that lifestyle. People living in informal dwellings, for instance, may feel that they deserve formal housing. This may lead them to turn to crime in order to attain that which they desire (Fajnzylber, Lederman, & Loayza, 2002).

Anonymity is likely to increase with an increase in population size due to a lack of social controls. Larger cities are more prone to crime as the offenders know that they have a smaller chance of being recognised and thus being held accountable for their wrongdoing by members of the community. This is particularly so with juvenile offenders where, in smaller towns, members of the community would report them to their parents should they get caught. Theory also highlights that there are larger groups or communities of criminals available in larger cities for new criminals and delinquents to join, further perpetuating the rate of crime (Braithwaite, 1975). On the contrary, Harries (2006) notes that, while a high population density provides opportunities for the occurrence of crime, specifically property crimes, areas that are highly populated also offer natural surveillance in the form of a higher number of witnesses and the increased likelihood of the crimes being reported to the police.

The level of a victim's satisfaction with the police service acts as a key indicator of progress in tackling crime. If the victims of crime are satisfied with how the police manage reported crimes, then they will be more willing to work with the police in combatting crime (StatsSA, 2017/18). This partnership between the police and the community allows the police to manage the expectations of those communities in which they serve (Muniz, 2012). This partnership has two models of law enforcement, the community and broken windows policing approaches. The former refers to a collaboration between the police and the community in developing crime prevention strategies. The latter is in reference to the police maintaining order in the community by focusing on minor crimes in the hopes of preventing them from leading to more serious crimes (Muniz, 2012).

#### *3.2.3.4 Income inequality rate control variables*

The control variables for and drivers of income inequality include unemployment, GDP growth, population size and level of sanitation. Economic theory proposes that a lower inflation rate and a decrease in wages would encourage employers to hire more people which would ultimately stimulate economic growth (Maqbool, Mahmood, Sattar, & Bhalli, 2013). Keynesian economics, on the other hand, opposes this stance, stating that employers will not simply hire more employees for the production of goods if those goods cannot be sold due to weak demand from consumers (Keynes, 1936).

The translation of economic growth into income distribution and thus the reduction of poverty is dependent on where the growth occurs. If growth takes place in the rural areas, it will result in an increase in incomes of the poor, driving improved income distribution and higher reduction of poverty than if it were in the urban areas where production is capital intensive, rather than labour intensive (Ranis, Stewart, & Ramirez, 2000).

The Optimum Theory of Population stipulates that an increase or decrease in the size of the population above or below the ideal level will reduce the income per capita. The optimum population is defined as the ideal population that will yield the maximum returns or income per capita taking other available resources into consideration (Chand, n.d.).

A lack of access to clean water and sanitation leads to exposure to diseases, such as cholera and diarrhoea, and results in time wastage due to water having to be collected away from home, which creates an obstacle to earning a living. This is more so for women and girls who are often allocated the task of collecting water and caring for family members who fall ill due to this lack (UN-Water, n.d.).

#### *3.2.4 Estimation Approach*

Traditional linear regression is not effective when group-level characteristics that are not accounted for have an impact on an outcome variable (Dieleman & Templin, 2014). As such, random effects (RE) and fixed effects (FE) estimators can be employed to address this challenge. RE and FE improve the estimation of clustered data by doing away with bias and increasing efficiency (Dieleman & Templin, 2014). The main assumption under the RE model is that the individual-specific effects are not correlated with the explanatory variables (Diggle, Heagerty, Liang, & Zeger, 2002). When this assumption is true, then the RE estimation is considered impartial and reliable (Dieleman & Templin, 2014). Furthermore, the RE model divides the total residual variance into two parts, namely, the between panel variance and the

within panel variance which makes it an efficient model (Clarke, Crawford, Steele, & Vignoles, 2010).

The FE model assumes that unobserved individual-specific effects are correlated with the independent variables (Dieleman & Templin, 2014). Unlike RE, FE eliminates all between panel variations and only utilises within-panel variations, therefore the estimator evaluates the manner in which changes in *the outcome variable, within* each panel, are associated with changes in the explanatory variables, *within* each panel (Dieleman & Templin, 2014). FE models are appropriate when analysing the effect of variables that vary over time (Torres-Reyna, 2007).

The decision of whether to select RE or FE can be determined by running a Hausman Specification Test. The Hausman Specification Test assesses whether there is a correlation between the individual errors and the regressors. Under the null hypothesis, the error terms are not correlated with the regressors and thus the RE is the preferred model while the alternative favours the FE (Torres-Reyna, 2007).

### **3.3 Limitations to the Methodology**

Data for income inequality were insufficient due to infrequent collection. As such, GDP per capita was used as a proxy for income inequality. Data for the following control variables: access to internet, food inadequacy and satisfaction with the police service were missing for the early years as this data was not collected by Stats SA at the time.

## **Chapter 4: Discussion and Findings**

### **4.1 Introduction**

The purpose of this chapter is to present the results from the data described in the previous chapter and provide an in-depth analysis thereof. The objectives of this study were to examine the effect of literacy rates on unemployment, health awareness, criminal activity and income inequality across South Africa's nine provinces. Therefore, the analysis aims to address the research objectives and draw similarities and discrepancies between this study's findings and findings of previous research as outlined in the literature review. The chapter starts with an evaluation of the descriptive statistics which is followed by a review of the socio-economic profiles of South Africa's nine provinces, the regression diagnostics and lastly, the regression results.

### **4.2 Descriptive Statistics**

The descriptive statistics of the independent, dependent and control variables over the study period are presented in Table 5. LR, which is the independent variable, had an average of 90.79% per province. LR ranged from 81.13% to 98.10% and had a minute standard deviation of only 0.42%. The provincial averages for the dependent variables were 25.70% for UR, 17.50% for HR, 1.13% for CR and ZAR63,029 for IR with standard deviations close to zero for the first three. A wide range can be seen from IR with the minimum GDPPC at ZAR26,848 and the maximum at ZAR113,853, highlighting the high level of income inequality that South Africa is faced with. The control variables show that, over the study period, South Africa experienced an average provincial growth rate of 1.4%. In terms of internet access, an estimated 40.32% of South Africans had access provincially. Turning to health and sustenance, an average of a low 16.23% of South Africans per province had access to medical aid while 16,14% experienced food inadequacy. With regards to safety and police satisfaction, a provincial average of 54.71% was satisfied with the police service. In terms of living conditions, an estimated 12.37% of the South African population per province was housed in informal dwellings while 74.49% had access to sanitation. Lastly, the mean population per province was 5.8 million.

**Table 5: Descriptive Statistics**

	Mean	Median	Std. Dev.	Min	Max	N
LR	<b>0.9079</b>	<b>0.9025</b>	<b>0.0420</b>	<b>0.8113</b>	<b>0.9810</b>	<b>90</b>
UR	0.2570	0.2637	0.0413	0.1653	0.3430	90
HR	0.1750	0.1832	0.0541	0.0773	0.2761	90
CR	0.0113	0.0114	0.0051	0.0000	0.0192	90
IR (GDPPC)	63,029.21	59,865.88	18,371.27	26,848.65	113,853	90
GR	0.0150	0.0200	0.0179	-0.0366	0.0444	90
Internet Access	0.4032	0.4160	0.1652	0.0830	0.7400	81
Medical Aid	0.1623	0.1485	0.0599	0.0750	0.2930	90
Food Inadequacy	0.1614	0.1660	0.0499	0.0530	0.2660	81
Police Service	0.5471	0.5805	0.1156	0.2500	0.7190	72
Informal Dwelling	0.1237	0.1045	0.0570	0.0370	0.2370	90
Sanitation	0.7449	0.7660	0.1501	0.3210	0.9670	90
Population	5,805,578	5,386,511	3,473,933	1,084,471	1.40E+07	90

Notes: LR=Literacy rate; UR=Unemployment rate; HR=HIV rate; CR=Crime rate; IR=Income rate; GDPPC=GDP per capita, GR=Growth rate

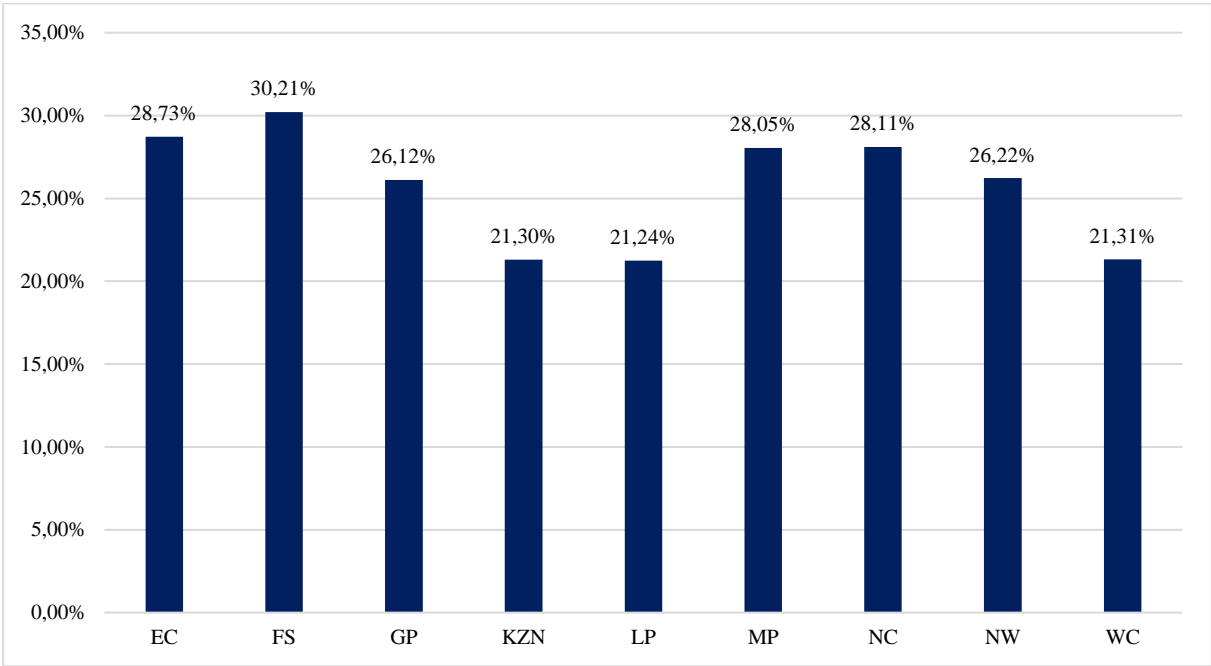
### 4.3 Socio-Economic Profile of South African Provinces

This section reviews the socio-economic profiles of the different provinces in South Africa based on the dependent and independent variables. The profiles are reviewed in the context of the population size as captured in Table 3 with Gauteng and KwaZulu-Natal being the top two largest populations and Free State and Northern Cape the bottom two across the full 10 years under review.

#### 4.3.1 Unemployment rate (UR)

The South African economy has experienced consistently high unemployment rates over the past 10 years with the national figure reported at 26.7% in the fourth quarter of 2017, compared to the study's average of 25.70% as captured in Table 5. Figure 2 below is a depiction of the comparative unemployment rates across the nine provinces over the study period. The province with the highest unemployment rate over the period was the Free State at 30.21% followed by the Eastern Cape at 28.73%, each 4.51% and 3.03%% higher than the study's average respectively. Limpopo recorded the lowest rate at 21.24% over the period, 1.46% lower than the average. Of the remaining provinces, Northern Cape (28.11%), Mpumalanga (28.05%), North West (26.22%) and Gauteng (26.12%) were above the average rate and Western Cape and KwaZulu-Natal below the average at 21.31% and 21.30% respectively.

**Figure 2: South African Average Unemployment Rate by Province (2008–2017)**

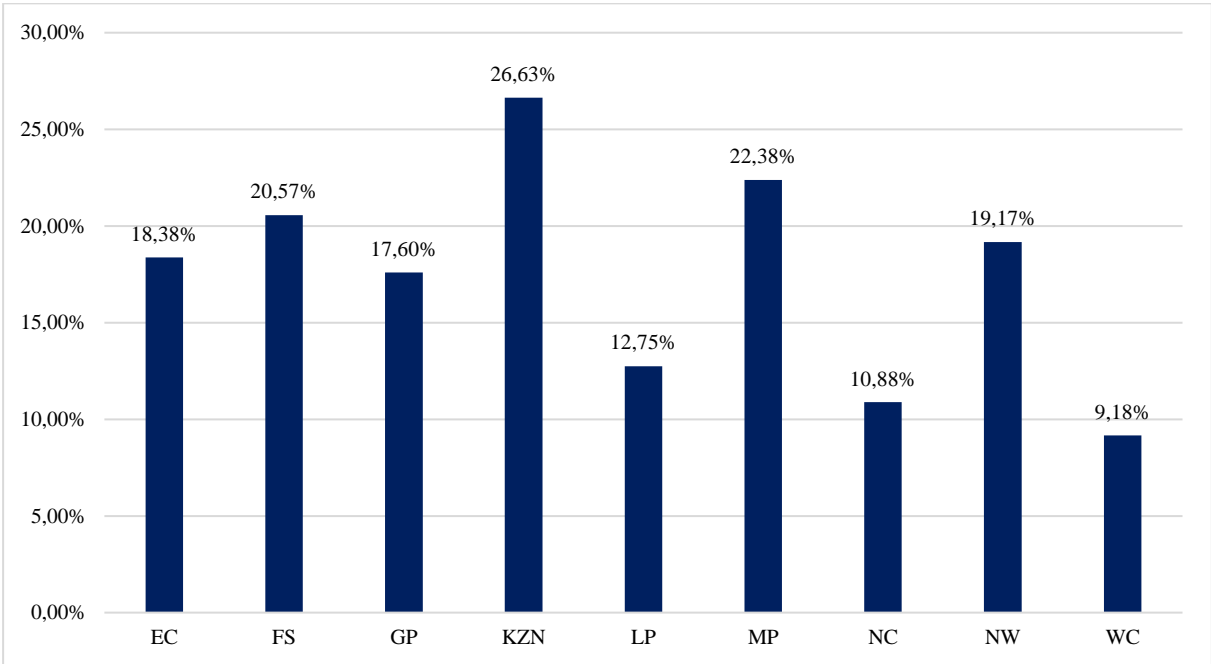


Source: Author’s estimate from Research data

**4.3.2 HIV rate (HR)**

In terms of health, South Africa has been regarded as a country with one of the highest HIV infection rates in the world (Matsoso, 2017). These high numbers are largely driven by KwaZulu-Natal which recorded the highest infection rate over the study period at 26.63%, 9.13% higher than the study average of 17.50% (Table 5). The province that reported the lowest infection rate was the Western Cape at 9.18%, 8.32% lower than the average. In between were Mpumalanga (22.38%), Free State (20.57%), North West (19.17%), Eastern Cape (18.38%) and Gauteng (17.60%) all of which were above the average rate and Limpopo (12.75%), Northern Cape (10.88%) and Western Cape (9.18%) which fell below the average.

**Figure 3: South African Average HIV Rate by Province (2008–2017)**

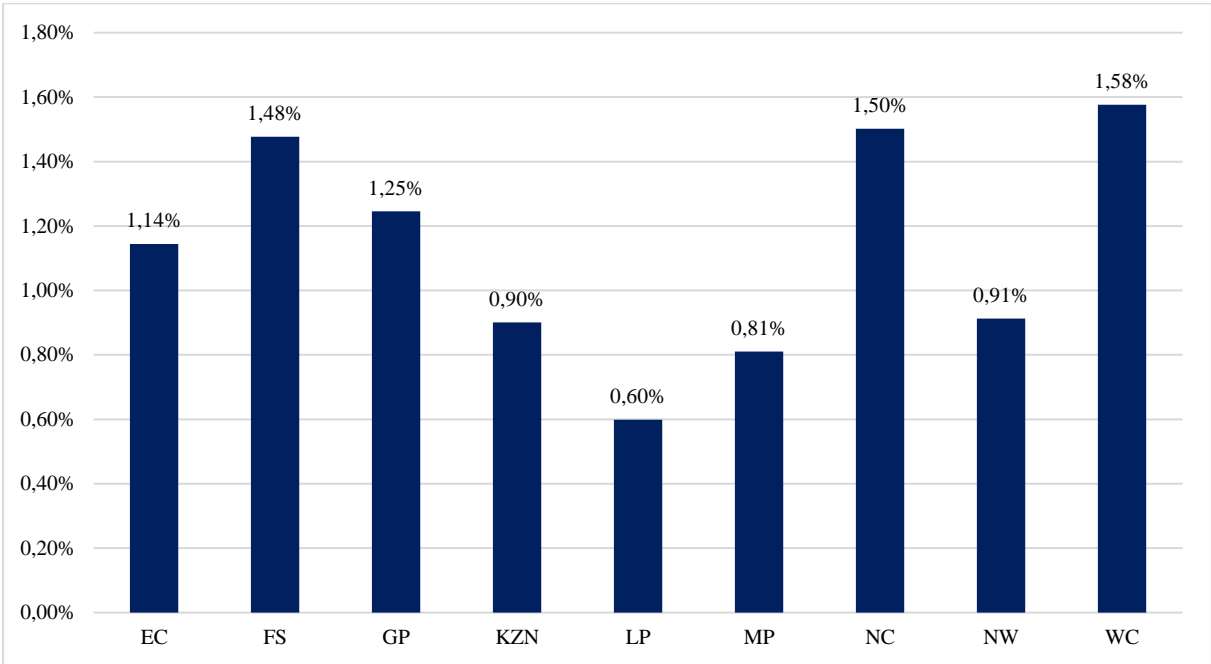


Source: Author’s estimate from Research data

**4.3.3 Crime Rate (CR)**

The Western Cape was the province that recorded the highest crime rate over the study period at 1.58% followed by the Northern Cape at 1.50%, 0.08% and 0.37%% higher than the study’s average of 1.13% respectively. The province with the lowest crime rate was Limpopo with a crime rate of 0.6%, 0.53% lower than the average. Following on from the Northern Cape and in descending order, the rest of the provinces ranked as follows: Free State (1.48%), Gauteng (1.25%), Eastern Cape (1.14%), North West (0.91%), KwaZulu-Natal (0.90%) and Mpumalanga (0.81%).

**Figure 4: South African Average Crime Rate by Province (2008–2017)**

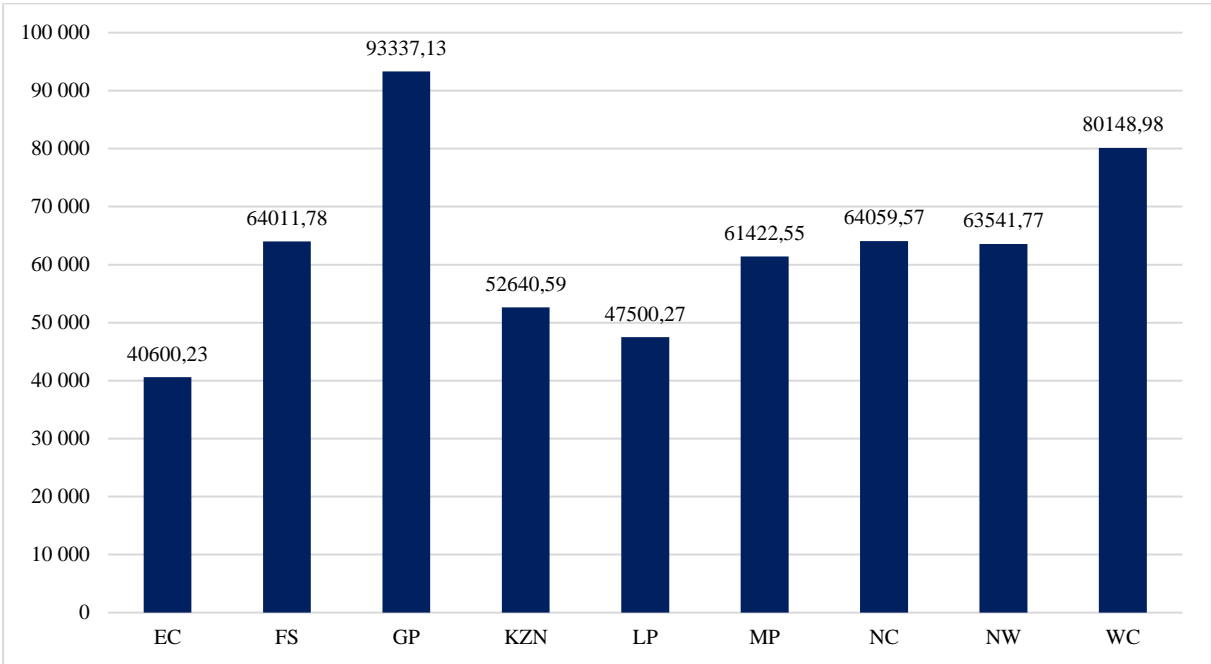


Source: Author’s estimate from Research data

**4.3.4 GDP per capita (IR/GDPPC)**

Gauteng, the largest province in South Africa by population size, had the highest GDP per capita at ZAR93,337. The Western Cape, which is the third-largest province by population size had a GPD per capita of ZAR80,149, ZAR30,307 higher than the study’s average of ZAR63,030. The province with the lowest GDP per capita was the Eastern Cape at ZAR40,600, ZAR23,460 lower than Limpopo which had a GPD per capita of ZAR47,500 at ZAR15,530 lower than the average. In the mid-range, Northern Cape, the province with the smallest population size, had an average GPD per capital of ZAR64,060 followed by the Free State (ZAR64,012) and North West (ZAR63,542) all ranking above the average while Mpumalanga (ZAR61,423) and Kwa-Zulu Natal (ZAR 52,641) fell below the average.

**Figure 5: South African Average GDP per Capita by Province in ZAR (2008–2017)**

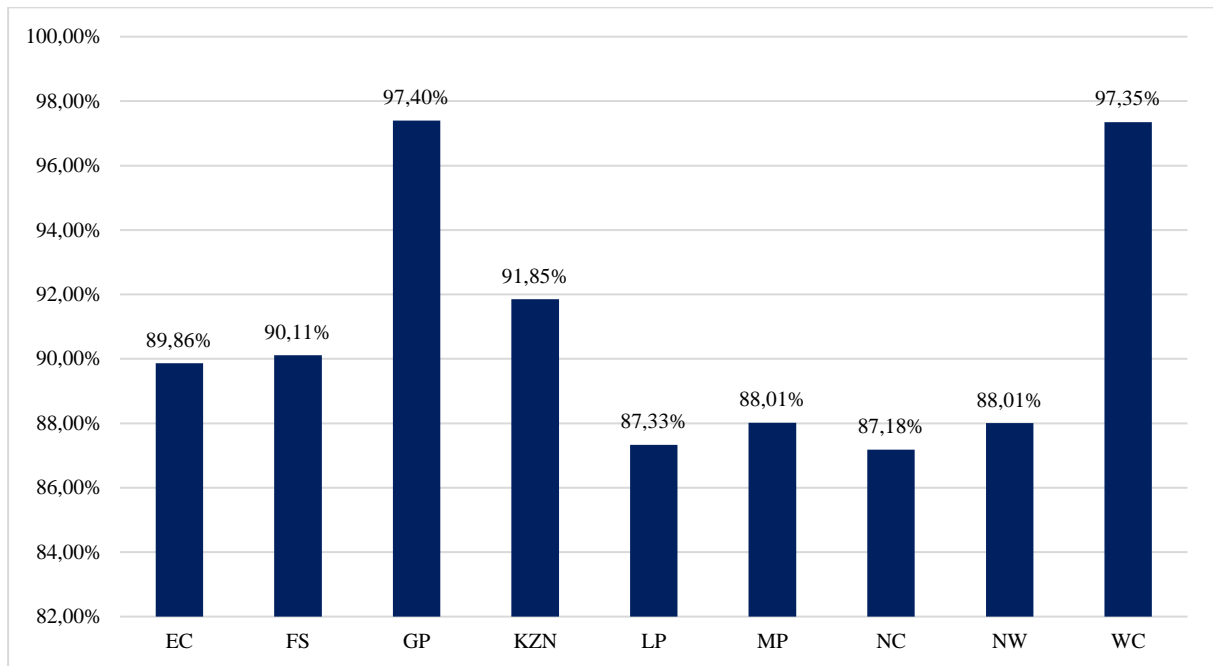


Source: Author’s estimate from Research data

4.3.5 Literacy rate (LR)

The average literacy rate for this study came out at 90.79% as recorded in Table 5. Gauteng had the highest literacy rate with only an estimated 2.6% illiterates (97.4% literacy rate) over the sample period. The Northern Cape had the lowest literacy rate, estimated at 87.18% over the period. Looking at the polar ends of each of the dependent variables in relation to these two provinces, Gauteng is the province with the highest GDP per capita while the Northern Cape had the lowest average crime and unemployment rates. The Western Cape, which had the second-highest crime rate, had the second-highest literacy rate at 97.35%. KwaZulu-Natal had the highest HIV infection rate and the third-highest literacy rate at 91.85%. The Free State, which had the highest unemployment rate, had the fourth-highest average literacy rate which fell just under the overall average at 90.11%. The remaining provinces of Eastern Cape (89.86%), Mpumalanga (88.01%), North West (88.01%) and Limpopo (87.33%) all fell below the overall average literacy rate of 90.79%.

**Figure 6: South African Average Literacy Rate by Province (2008–2017)**



*Source: Author's estimate from Research data*

#### **4.4 Regression Diagnostics**

The purpose of the regression diagnostics is to ensure the validity of the regression estimates. For validity, the error variables must be normally distributed and homoscedastic and there must be no multicollinearity amongst the independent variables.

##### *4.4.1 Correlation Analysis*

The correlation analysis serves to test for the presence of multicollinearity which is said to exist when there is a high correlation between the independent variables. This study follows the conventional threshold of a 0.7 or higher correlation coefficient which indicates the existence of multicollinearity with the potential to substantially bias the estimates from the regression analysis (Kennedy, 2008; Dormann et al., 2013). From the estimated correlation coefficients presented in Table 6, is the correlation matrix. The following instances of high correlation using the 0.7 threshold are highlighted as follows:

- i. LR and Internet Access (0.7279) which form part of equation 1;
- ii. LR and Medical Aid (0.7692) which form part of equation 2;
- iii. LR and Sanitation (0.7051) which form part of equation 4;
- iv. Internet Access and GDPPC (0.8728) ;
- v. Medical Aid and Sanitation (0.7744) ;

- vi. Medical Aid and GDPPC (0.7853) which form part of equation 2;
- vii. Sanitation and CR (0.8027).

The relationships above indicate that multicollinearity exists in equations 1, 2 and 4 (refer to Table 4). Due to the potential biases associated with the inclusion of highly correlated variables in the same estimation, a stepwise approach where highly correlated variables (highlighted from i to iv) are introduced into the model interchangeably was employed to address this challenge.

**Table 6: Correlation Matrix**

	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>1. LR</b>	1.0000												
<b>2. UR</b>	-0.1439	1.0000											
<b>3. HR</b>	-0.1027	0.2011	1.0000										
<b>4. GR</b>	0.0472	-0.1643	-0.0750	1.0000									
<b>5. Population</b>	0.6159	-0.4242	0.3611	0.1026	1.0000								
<b>6. Internet Access</b>	<b>0.7279</b>	0.2141	-0.0562	-0.2780	0.1935	1.0000							
<b>7. Medical Aid</b>	<b>0.7692</b>	0.0828	-0.2976	0.1755	0.1785	0.5986	1.0000						
<b>8. Food Inadequacy</b>	-0.1822	0.4902	0.3249	-0.2334	-0.3076	0.1097	-0.0583	1.0000					
<b>9. Police Service</b>	-0.0946	-0.1949	-0.2645	0.3942	-0.0552	-0.5191	0.1009	-0.1664	1.0000				
<b>10. Informal Dwelling</b>	0.4626	0.2295	-0.1147	-0.1257	0.0052	0.4747	0.6783	0.3212	-0.1026	1.0000			
<b>11. Sanitation</b>	<b>0.7051</b>	0.2578	-0.2255	0.0679	0.0387	0.6191	<b>0.7744</b>	0.1540	-0.0233	0.5329	1.0000		
<b>12. CR</b>	0.3632	0.2670	-0.4450	0.1768	-0.3323	0.2491	0.6476	0.0769	0.2597	0.4484	<b>0.8027</b>	1.0000	
<b>13. GDPPC</b>	0.6708	0.1598	-0.1801	-0.1529	0.0826	<b>0.8728</b>	<b>0.7853</b>	0.0397	-0.3701	0.6745	0.6453	0.3787	1.0000

Source: Author's estimate from Research data

#### 4.4.2 Diagnosis for Homoscedasticity

Table 7 provides the outcomes of the homoscedasticity tests for the different models being examined. The tests were run for each of the four equations without and with the inclusion of the controls. For the model with a control variable, the observed instances of multicollinearity from the four regression specifications in Chapter 3 resulted in a variation of the four (4) equations in addressing the multicollinearity. Overall, 11 regression models are estimated (three models for equation 1; three models for equation 2; two models for equation 3 and three models for equation 4). The tests for heteroskedasticity were therefore performed on all 11 models. The Breusch-Pagan test was adopted to test for homoscedasticity under the null hypothesis of constant variance (homoscedasticity). It can be observed that the null hypothesis was rejected at 5% in three instances, equations 1(b), 1(c) and 4(b), hence, these three equations were estimated by correcting for the presence of heteroskedasticity in the error terms.

**Table 7: Breusch-Pagan (Homoscedasticity) Test Outcomes**

Equation	Dependent Variable	Independent Variable(s)	P-value (Breusch-Pagan)	Outcome of $H_0$
1 (a)	UR	LR	0,9778	Fail to reject
1 (b)	UR	LR, HR, GR, Population	0.0144	Reject
1 (c)	UR	HR, GR, Population, Internet Access	0.0120	Reject
2 (a)	HR	LR	0,3978	Fail to reject
2 (b)	HR	LR, UR, IR, Food Inadequacy	0.7820	Fail to reject
2 (c)	HR	UR, Food Inadequacy, Medical Aid	0.8038	Fail to reject
3 (a)	CR	LR	0,0999	Fail to reject
3 (b)	CR	LR, UR, Informal Dwelling, Population, Police Service	0.8655	Fail to reject
4 (a)	IR	LR	0,0971	Fail to reject
4 (b)	IR	LR, UR, GR, Population	0.0221	Reject
4 (c)	IR	UR, GR, Population, Sanitation	0.5058	Fail to reject

Source: Author's estimate from Research data

#### 4.4.3 Hausman Test

The Hausman test was undertaken to determine whether the fixed effects model or the random effects model is adopted. The tests are performed on the 11 variations of the models as done with the heteroskedasticity. Under the Hausman test, the null hypothesis states that the unique errors are not correlated with the regressors and thus favours the random effects model. The alternative hypothesis states that they are correlated and therefore favours the fixed effects model (Torres, 1994). The random effects model is used when the p-value is greater than 0.05 and the fixed effects model is used when the p-value is lower than 0.05.

In instances where the Hausman test assumptions were not met and the model returned a negative test statistic, the Sargan-Hansen test was employed. Table 8 specifies which model between the fixed and random effects is appropriate for each equation based on either the Hausman or the Sargan-Hansen test. The regression analyses thereafter are based on these outcomes.

**Table 8: Model Specification**

Equation	Dependent Variable	Independent Variable(s)	P-value	Outcome of H <sub>0</sub> (Model)
1 (a)	UR	LR	0.0239	Reject (FE)
1 (b)	UR	LR, HR, GR, Population	0.1548*	Fail to reject (RE)
1 (c)	UR	HR, GR, Population, Internet Access	0.8817*	Fail to reject (RE)
2 (a)	HR	LR	0.4279	Fail to reject (RE)
2 (b)	HR	LR, UR, IR, Food Inadequacy	0.8080*	Fail to reject (RE)
2 (c)	HR	UR, Food Inadequacy, Medical Aid	0.8305*	Fail to reject (RE)
3 (a)	CR	LR	0.6033	Fail to reject (RE)
3 (b)	CR	LR, UR, Informal Dwelling, Population, Police Service	0.000*	Reject (FE)
4 (a)	IR	LR	0.1163	Fail to reject (RE)
4 (b)	IR	LR, UR, GR, Population	0.000*	Reject (FE)
4 (c)	IR	UR, GR, Population, Sanitation	0.000*	Reject (FE)

Notes: \*Sargan-Hansen test results using *xtoverid* command in STATA. Source: Author's estimate from Research data

## 4.5 Regression Results

### 4.5.1 Unemployment rate and Literacy Rate

Table 9 below presents the results obtained from equation 1 which models the effect of the literacy rate on the unemployment rate. The estimation of equation 1 is undertaken twice. The first estimation (1a) uses LR as the only independent variable while the second estimation includes the control variables specified in Table 4. However, due to the observed strong collinearity between LR and internet access, the second estimation is further undertaken twice, the first (1b) includes LR but excludes internet access while the second (1c) excludes LR but includes internet access. The estimated coefficients of determination (R-squared) indicate that 9.26%, 27.09% and 41.06% of changes in unemployment rates across the nine provinces in South Africa are collectively explained by the independent variables in equations 1(a), 1(b) and 1(c) respectively.

The coefficients for LR in equations 1(a) and 1(b) are observed to be positive and significant at 1% and 10% respectively indicating that the literacy rate drives up unemployment in South Africa. The results show that for every single unit increase in LR, UR increases by 0.422 and 0.310 units in equations 1(a) and 1(b) respectively. This contradicts the findings by Rahman (2013) who found a significant negative relationship between the literacy rate and unemployment rate. Apart from Rahman's study focusing on a single year for each of the regions, the other difference between this and Rahman's study is the nature of the data. Because Rahman compared countries as opposed to different provinces in the same country, the data range widely. Looking at the Arab countries, for instance, the literacy rate ranges between

51.6% and 94.5%, compared to the 87.1% to 97.4% range of this study while the unemployment rate ranges between 2% and 66% compared to this study's 21.2% to 30.2% range.

The unexpected positive relationship between LR and UR in this study can be explained by the dynamics of South Africa as a country. Firstly, South Africa is faced with the challenge of a surplus of unskilled to low-skilled job seekers which is a result of the historically low investment in education (GCIS, n.d.). This implies that literacy alone may not be adequate to gain employment in a labour market that requires skilled workers. Secondly, the number of job seekers has increased substantially over the years on the back of an increased number of educated Africans, more specifically, African women (GCIS, n.d.). Furthermore, South Africa is a young population where those 15 years and younger comprised 29.6% of the population in 2017 (Stats SA, 2017). This means that there is a higher supply of young people entering the working-age than there is employment available (GCIS, n.d.).

**Table 9: Regression Results for UR**

	1 (a): FE		1 (b): RE		1 (c): RE	
UR	Coef.	t	Coef.	z	Coef.	z
Constant	-0.126 (0.134)	-0.94	0.498* (0.282)	1.76	0.794*** (0.284)	2.80
LR	0.422*** (0.148)	2.86	0.310** (0.150)	2.07		
HR			0.528** (0.217)	2.43	0.298 (0.234)	1.27
GR			-0.051 (0.149)	-0.35	0.004 (0.114)	0.04
Population			-0.644*** (0.327)	-1.97	-0.643** (0.310)	-2.08
Internet Access					0.0634*** (0.017)	3.69
F (1,80)	8.16***					
Prob > F	0.0054					
Wald $\chi^2$ (4)			13.00**		23.59***	
Prob > $\chi^2$			0.0113		0.0001	
R-Squared	0.0926		0.2709		0.4106	
Provinces	9		9		9	
Observations	90		90		81	

Notes: LR=Literacy Rate; HR=HIV Rate; GR=GDP Growth rate, \*\*\*, \*\* & \* denotes significance at 1%, 5% and 10% respectively. Source: Author's estimate from Research data

In equations 1(b) and 1(c), a positive coefficient is observed for HR, but significance is only achieved in equation 1(b) at 5% and indicates that increases in the HIV rate results in higher

unemployment. This can be explained by the negative impact that HIV infection has on a person's overall health and productivity and therefore the likelihood of searching for or obtaining employment (McKelvey, 2010). On the topic of the impact of HIV on employment, McKelvey (2010) examined the relationship based on the data of 13 emerging market countries and found that HIV is associated with an approximately 13% decrease in employment. Furthermore, Masanabo (2010) highlights how the increasing probability of the loss of employees to AIDS may drive employers to invest in equipment that will replace workers rather than employing more people.

GR is insignificant in both equations 1(b) and 1(c) while population is significant at 5% with a negative coefficient in both equations. This outcome of an increase in the population driving a decrease in unemployment is in contradiction to existing research by Demena (2005) which outlines how an increase in the population can lead to unemployment due to the size of the adult population outweighing the number of jobs available. On the contrary, and consistent with this study's results, research by Bloom and McKenna (2015) found an increase in the population drove the creation of more jobs to cater for the needs of a larger population group. According to the authors, an estimated 734 million jobs need to be created between the period starting in the year 2010 to 2030 across six regions, including sub-Saharan Africa, to accommodate the growing population. This number is in line with the number of jobs created between 1990 and 2010 where population growth was identified as a key driver of employment growth across the six regions. As such, population growth is anticipated to remain the key driver of employment growth in the 30 years spanning from 2010 to 2030 (Bloom & McKenna, 2015).

While internet access is excluded from equation 1(b) due to its high collinearity with LR, its inclusion in equation 1(c) results in a positive coefficient with significance at a 1% level. This contradicts the notion that access to the internet can lead to better employment opportunities through upskilling by way of online courses (Dewan & Riggins, 2005). However, the positive relationship between unemployment and internet access can be explained by the fact that web-oriented solutions can cause a decline in demand for administrative employees (Tsvetinov, 1999). Therefore, as more small businesses have access to internet, for instance, fewer workers will be required to fulfil administrative roles.

#### *4.5.2 Health/HIV rate and Literacy Rate*

Table 10 provides a summary of the results obtained from equation 2 where the effect of the literacy rate on the HIV rate is measured. The estimation of equation 2 is undertaken twice. The first estimation (2a) uses LR as the only independent variable while the second estimation

includes the control variables. Due to the observed strong collinearity between LR and medical aid access as well as medical aid access and IR, the second estimation is further undertaken twice, the first (2b) includes LR but excludes medical aid access while the second (2c) excludes LR and IR but includes medical aid access. The estimated coefficients of determination (R-squared) indicate that only 0.70%, 1.20% and 16.5% of the changes in unemployment rates across the nine provinces are collectively explained by the independent variables in equations 2(a), 2(b) and 2(c) respectively.

**Table 10: Regression Results for HR**

	2 (a): RE		2 (b): RE		2 (c): RE	
<i>HR</i>	<i>Coef.</i>	<i>z</i>	<i>Coef.</i>	<i>z</i>	<i>Coef.</i>	<i>z</i>
Constant	-0.096*** (0.035)	-2.76	-0.182*** (0.028)	-6.53	0.148*** (0.023)	6.32
LR	0.298*** (0.031)	9.55	-0.020 (0.022)	-0.87		
UR			0.002 (0.012)	0.16	0.076** (0.030)	2.57
IR			0.390 (0.026)	15.23		
Food Inadequacy			0.018 (0.008)	2.33	0.101*** (0.018)	5.54
Medical Aid					-0.045 (0.045)	-1.02
Wald $\chi^2$	91.12***		826.60***		52.57***	
Prob > $\chi^2$	0.000		0.000		0.000	
R-Squared	0.007		0.012		0.165	
Provinces	9		9		9	
Observations	90		81		81	

*Notes: LR=Literacy Rate; UR=Unemployment Rate, IR=Income rate \*\*\*, \*\* & \* denotes significance at 1%, 5% and 10% respectively. Source: Author's estimate from Research data*

The coefficient for LR in equation 2(a) is positive and significant at 1% but insignificant in equation 2(b). For every one unit increase in LR, HR increases by 0.298. This unexpected positive relationship between literacy and HIV can be explained by the positive association between HIV testing and level of education and thus literacy as an extension thereof (Haile, Chambers, & Garrison, 2007). This is supported by a 2003 survey conducted in South Africa by Haile, Chambers and Garrison (2007) where results showed that a positive relationship existed between knowledge of HIV transmission and level of education and HIV testing. However, in spite of the increased levels of testing amongst educated individuals, research by

USAID (2001) shows that knowing one's HIV status does not necessarily translate to a change in behaviour. Research conducted in Zimbabwe, for instance, indicated that 88% of men and 77% of women were aware of AIDS but still perceived a low to no risk of contracting the disease themselves and consequently did not change their sexual behaviour which does not lower the transmission of the disease (USAID, 2001). This partly supports the positive relationship between literacy and HIV. Contrary to this are the results of a Mozambiquan study by Ciampa et al. (2012) which indicated that, while weak literacy and numeracy skills were positively correlated with less knowledge of HIV, they were not necessarily associated with lower rates of HIV testing. Overall, the positive relationship between literacy and the HIV rate can be attributed to the higher likelihood of literates being tested than illiterates thus contributing to data and information available on HIV prevalence rates.

A positive coefficient is observed for UR, but significance is only achieved in equation 2(c) at 5%. This is consistent with the results derived from equation 1(b). For every unit increase in UR, HR increases by 0.076 units implying that, when unemployment increases, HIV increases. This is due to the positive association between the high unemployment rate and high-risk sexual conduct and therefore the dispersion of HIV (USAID, 2001).

IR is observed as insignificant in equation 2(b) and excluded in equation 2(c) to manage the issue of multicollinearity. Food inadequacy is insignificant in equation 2(b) and is positive and significant at a 1% level in equation 2(c). The positive coefficient in equation 2(c) indicates that, for every one unit rise in food inadequacy, HR increases by 0.018. This is supported by the notion that malnutrition increases susceptibility to HIV and other infections (Temah, 2009). Medical aid is excluded in equation 2(b) and is insignificant in equation 2(c).

#### *4.5.3 Crime rate and Literacy Rate*

Table 11 provides a summary of the results obtained from equation 3 which examines the impact that LR has on CR. The estimation of equation 3 is also undertaken twice, the first estimation (3a) uses LR as the only independent variable while the second estimation includes the control variables. The estimated coefficients of determination (R-squared) indicate that 12.70% and 39.9% of the changes in the crime rate across the nine provinces are collectively explained by the independent variables in equations 3(a) and 3(b) respectively.

**Table 11: Regression Results for CR**

	3 (a): RE		3 (b): FE	
CR	Coef.	z	Coef.	t
Constant	-0.035** (0.017)	-2.12	0.211*** (0.074)	2.86
LR	0.051** (0.018)	2.80	-0.026** (0.011)	-2.44
UR			-0.018** (0.007)	-2.40
Informal Dwelling			0.011* (0.006)	1.87
Population			-0.179** (0.079)	-2.26
Police Service			-0.001 (0.002)	-0.85
Wald $\chi^2$ (1)	7.82***			
Prob > $\chi^2$	0.0052			
F (5,58)			7.70***	
Prob > F			0.000	
R-Squared	0.127		0.399	
Provinces	9		9	
Observations	90		72	

Source: Author's estimate from Research data

Notes: LR=Literacy Rate; UR=Unemployment Rate, \*\*\*, \*\* & \* denotes significance at 1%, 5% and 10% respectively.

LR is observed as positive and significant at 5% in equation 3(a) and negative and significant at 5% in equation 3(b). This conflict in findings could be attributed to the inclusion of control variables in equation 3(b) whereas equation 3(a) only examined LR in isolation. In equation 3(a), a unit increase in LR results in a 0.051 increase in CR. This could be driven by the migration of criminals from smaller areas to larger cities as explained by Braithwaite (1975) with an inference that the increase in population results in an increase in literates driving the crime rate up. In equation 3(b) a unit increase in LR increases CR by 0.026 units. This inverse correlation is in line with literature by Morrisroe (2014) which highlights how youth who are not pursuing an education or not receiving any other form of skills training are 20 times more likely to be found guilty of committing a crime. Consistent with this are findings by Lochner (2004) of a negative correlation between education and blue-collar crime.

UR is negative and significant at 5% in equation 3(b) with the coefficient indicating that a unit increase in UR decreases CR by 0.018. Therefore, when unemployment increases, crime decreases. This is in contradiction to the motivational rationale for crime which can be viewed

as the frustration of unemployment leading towards a life of crime in order to obtain what criminals do not have (Britt, 1994). Additionally, a study by Kaylen and Pridemore (2013) highlights that high unemployment can lead to community disorder and disintegration which can, in turn, drive an increase in acts of crime (Kaylen & Pridemore, 2013).

Informal dwellings are positive and significant at 10% in equation 3(b). An increase of informal dwellings by one unit results in a 0.011 unit increase in crime. This can be explained by the Theory of Relative Deprivation, more specifically, how those living in informal dwellings may feel they deserve better living conditions which may lead them to crime in order to attain what they believe they deserve (Fajnzylber, Lederman, & Loayza, 2002).

Population is negative and significant at 5% in equation 3(b). CR moves by 0.179 units with every one unit move in population in the opposite direction. This is in line with Harries (2006) who notes that areas with a higher population have a higher number of witnesses and thus a higher likelihood of the crimes being reported to the police, decreasing the crime rate.

Police service is negative and significant at 1% in equation 3(b) with every one unit move in police service resulting in a 0.001 unit move in CR in the opposite direction. This is an indication that the more the community is satisfied with the service provided by the police, the more cooperative they will be in working with the police to fight crime (StatsSA, 2017/18).

#### *4.5.4 Income Inequality and Literacy Rate*

Table 12 provides a summary of the results obtained from equation 4 which examines the impact LR has on IR. The estimation of equation 4 is undertaken twice. The first estimation (4a) uses LR as the only independent variable while the second estimation includes the control variables. Due to the observed strong collinearity between LR and sanitation, the second estimation is further undertaken twice, the first (3b) includes LR but excludes sanitation while the second (3c) excludes LR but includes sanitation. The estimated coefficients of determination (R-squared) indicate that 43.70%, 71.50% and 84.40% of the changes in the income rate across the nine provinces are collectively explained by the independent variables in equations 4(a), 4(b) and 4(c) respectively.

The coefficient for LR in equation 4(a) is positive and significant at 1% with every one unit increase in LR, increasing IR by 0.583. The same relationship exists in equation 4(b) where a one unit increase in LR increases IR by 0.336. This is consistent with the findings of Rahman (2013) where a significant positive relationship between GDPPC and the literacy rate was observed. This is further supported by Martinez and Fernandez (2010) who highlight that improving the quality of education and literacy can reduce the income gap through the increased

likelihood of accessing better employment opportunities or receiving a promotion due to better education and good literacy.

A positive coefficient is observed for UR, but significance is only achieved in equation 4(c) at 5% where a one unit move in UR translates to a 0.071 unit move in IR in the same direction. This is consistent with research by Björklund (1991) which indicated that the higher unemployment increases, the more the unequal distribution of individual gross income increases. This is supported by Wiczer (2017) who noted that losing employment is associated with loss of income in the first instance and less remuneration when re-entering the job market in the second. Therefore, while an employed person continues to earn an income, the unemployed person earns none and, by the time the unemployed finds employment, he/she may be starting on a lower base. This may therefore, create an income gap.

GR is observed as insignificant in both equations 4(b) and 4(c). Population is positive and significant at a 1% level in equations 4(b) and 4(c). A one unit move in population results in a 2.740 unit move in IR in equation 4(b) and 3.011 in equation 4(c). This is consistent with Garza-Rodriguez et al. (2016) who found that population has a positive and significant effect on GDPPC in the long run. Underpinning this is the revisionist school of thought which posits that a higher population increases the supply of human capital and therefore contributes to economic growth (Rodriguez et al., 2016).

This study's results of the positive association between population and IR can be explained by the Optimum Theory of Population which states that an increase or decrease in the size of the population above or below the ideal level will reduce the income per capita (Chand, n.d.). Therefore, the inference in the case of this study is that a decrease in the population to an optimum level reduces GDPPC.

Sanitation is excluded from equation 2(b) and is positive and significant at a 1% level in equation 4(c) where a one unit move in sanitation results in a 0.139 unit move in IR in the same direction. Lack of access to clean water and sanitation increases one's susceptibility to diseases such as cholera and diarrhoea which could, in turn, lead to job losses due to long-term absence from work and subsequent loss of income (UN-Water, n.d.). This could further exacerbate the income gap.

**Table 12: Regression Results for IR**

	4 (a): RE		4 (b): FE		4 (c): FE	
<i>IR</i>	<i>Coef.</i>	<i>z</i>	<i>Coef.</i>	<i>t</i>	<i>Coef.</i>	<i>T</i>
Constant	0.426*** (0.055)	7.80	-1.977*** (0.391)	-5.05	-2.038*** (0.266)	-7.66
LR	0.583*** (0.060)	9.74	0.336*** (0.068)	4.97		
UR			0.056 (0.040)	1.40	0.071** (0.029)	2.40
GR			0.067 (0.052)	1.27	0.042 (0.039)	1.08
Population			2.740*** (0.448)	6.11	3.011*** (0.284)	10.57
Sanitation					0.139*** (0.013)	10.54
Wald $\chi^2$ (1)	94.96***					
Prob > $\chi^2$	0.000					
F (4,77)			48.27***	104.28***		
Prob > F			0.000	0.000		
R-Squared	0.437		0.715	0.844		
Provinces	9		9	9		
Observation	90		90	90		

Source: Author's estimate from Research data

Notes: LR=Literacy Rate; UR=Unemployment Rate, GR=Growth rate \*\*\*, \*\* & \* denotes significance at 1%, 5% and 10% respectively.

## **Chapter 5: Conclusion and Recommendations**

### **5.1 Introduction**

This chapter culminates the dissertation and provides a summary of the findings from the study. It also addresses the policy implications that are brought about as a result of the findings. The chapter then presents recommendations for future research and lastly, concludes with a set of limitations of the study.

### **5.2 Summary of Main Findings**

This study sought to gain insight on the social and economic impact of literacy in South Africa with a focus on how literacy influences unemployment, the HIV prevalence rate, crime and income inequality. The research question asked, “To what extent does literacy drive social and economic development?” The findings indicated that literacy has a significant impact on social factors, such as the HIV rate and the crime rate, as well as economic factors, such as the unemployment rate and income inequality, as examined in this study. Therefore, the null hypothesis stated earlier in this dissertation that there is no significant relationship between the literacy rate and the unemployment rate, HIV infection rate, crime rate and income inequality is rejected in favour of the alternative hypothesis.

On the social factors, the results showed that an increase in the literacy rate results in an increase in the HIV prevalence rate. Similarly, results indicated that an increase in literacy will also drive the crime rate up in the absence of other factors that influence crime. However, when these other influencing factors are taken into consideration, the results showed that an increase in the literacy rate will result in a decrease in the crime rate. In terms of the economic indicators used in the study, results indicated that an increase in the literacy rate will result in an increase in the unemployment rate and an increase in the literacy rate also results in an increase in the income rate. Overall, while the existing literature highlights the benefits of literacy, the results of this study showed that an improvement in the literacy rate in South Africa can have both positive and negative effects on the country’s social and economic development.

Further analysis shows that, when control variables were included, a positive relationship between the HIV rate and unemployment was observed while the growth rate was observed to have no significant influence on the unemployment rate. The results also suggest that an

increase in the population size drives the unemployment rate down while access to the internet increases the unemployment rate.

After testing for the impact of the unobserved variables on the HIV rate as the dependent variable, results showed that HIV has a positive relationship with unemployment while income was observed to have no significant influence on the HIV rate. Furthermore, food inadequacy proved to have a positive relationship with HIV rate and lastly, access to medical aid was found to have no significant impact on the HIV rate.

When the crime rate was analysed as the dependent variable, unemployment was found to have a negative relationship to the crime rate while a positive relationship was observed between informal dwelling and crime. Lastly, both population size and satisfaction with police service were found to be negatively correlated with crime.

The last dependent variable examined was GDP per capita (GDPPC) which was used interchangeably with income or income rate (IR) throughout this dissertation. Results indicated that GDPPC is positively correlated with literacy. GDPPC was observed to be positively correlated with unemployment, population and level of sanitation while the growth rate was found to have no significant influence on GDPPC.

### **5.3 Policy Implications**

This study has examined the influence of literacy in a manner that outlines not only its economic but also its social returns to highlight the importance of literacy as a tool to drive socio-economic development. From the DBE to the NDP and Adult Basic Education and Training (ABET), South Africa seemingly has solid policies in place that put literacy at the forefront. However, South Africa was still the worst performer of 50 countries in the 2016 PIRLS and the 2014 ANA results. This also indicated that illiteracy is indeed still a major issue faced by the country.

The findings of this dissertation and the literature reviewed have a substantial impact on existing policies relating to literacy in South Africa. In order to achieve goal four of the SDGs and the NDP's goals to have 80% of schools and learners achieve a minimum of 50% in literacy, the government needs to revisit some of its strategies. Firstly, the government needs to access global resources which can aid in improving literacy. This could be done by way of skills transfer from teachers in the sovereigns that performed well in PIRLS through a form of a bilateral agreement. Secondly, data indicate that there are still some provinces with literacy rates below 90%. The DBE needs to focus on those provinces to bring them up to par with

provinces closer to 100% literacy rates. This could be done by ensuring that the respective provincial governments allocate sufficient funds specifically towards literacy enhancing projects, programmes and campaigns. This should include the establishment of libraries in all schools with the focus not on sophisticated infrastructure but on the availability of books that learners can read for leisure in order to improve their literacy skills. Additionally, a reading period should be made mandatory with attendance and active participation contributing to the final year mark. The DBE also needs to consider implementing a buddy system where former Model C schools are partnered with rural schools. This would allow for a transfer of skills from the former Model C school learners to rural school learners. This could be achieved through a short term exchange programme where rural school learners are able to attend the former Model C schools in a rotational basis and thereafter take their new skills back to their rural schools to teach their fellow classmates.

Considering this study's results which indicated a positive relationship between literacy and unemployment as well as GDPPC in South Africa, policymakers need to consider an expanded view of literacy by including financial, health and technology literacy and investing in those in addition to functional literacy so that children and illiterate adults are able to acquire entrepreneurial skills. This would prevent the issue of literacy driving unemployment up as the expanded focus on literacy would introduce skills that would offer greater opportunities to obtain better employment or the creation of new businesses. Furthermore, the curriculum for teaching qualifications needs to include the same areas of financial, health and technology literacy to equip teachers with the right skills to advance their learners.

The study results indicated a positive relationship between literacy and the HIV rate under the inference that literate people are more likely to test for HIV than illiterates. This provides an opportunity for the government to initiate a nationwide literacy campaign similar to SANLI and Kha Ri Gude Mass Literacy Campaign which would target communities with high illiteracy rates across the country. This new campaign would focus on reducing illiteracy with the primary objective of educating the community not only about HIV but the importance of HIV testing as well. Success would be measured by an increase in the literacy rate and an increase in the HIV testing rate. Lastly, literacy campaigns need to integrate education on how the community can work with the police to combat crime as greater community participation could lower the crime rate.

## **5.4 Recommendations for future studies**

In studying the impact of literacy on economic development, future studies could conduct this research on a regional level with a variety of countries in order to have a better comparison of results as opposed to comparing different provinces in the same country where the same policies are observed.

A more focused approach which separates literacy into different components could also provide better results of the real impact of literacy on socio-economic issues. The relationships between technology literacy and unemployment, financial literacy and income inequality, health literacy and HIV and lastly, functional literacy and crime could be examined separately, for instance.

In examining income inequality, analysing the actual income gap rather than GDPPC could give better insight into the impact of literacy on income inequality. Future studies could also replace the control variables used in this study with others that have data for the full sample period.

## **5.5 Limitations**

The definition of functional literacy is in reference to adults over the age of 20 years whereas the minimum working age, as based on the definition of unemployment, is 15 years. This misalignment could have an impact on the two economic variables of unemployment and GDPPC due to the unaccounted-for population between the ages of 15 and 20 who may be illiterate.

Due to the limited availability of data across a longer period, the study only covered a 10-year period from 2008 to 2017. Data for income inequality, for instance, were insufficient as they have historically been collected at irregular intervals as opposed to on an annual basis. As such, GDP per capita was used as a proxy for income inequality. Additionally, data for internet access, food inadequacy and police service satisfaction was missing for the early years as it was not collected by Stats SA at the time.

Lastly, the majority of the data used in the study were sourced from Stats SA which could be viewed as a simplistic approach to investigating this intricate topic of the real socio-economic impact of literacy as it purely focuses on numerical data which may not fully reveal underlying drivers.

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