

PRIVATE SECTOR IMPACT INVESTMENT IN WATER PURIFICATION INFRASTRUCTURE IN SOUTH AFRICA

by

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DECLARATION

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ABSTRACT

Access to safe drinking water (also called potable water) is a basic human right. Humanity is, however, facing a significant decline in the quantity and quality of available fresh water. The consequences of water crises on human health and economic activity are widespread and likely to deteriorate in future. Presently, millions of South Africans lack acceptable access to potable water, particularly those living in rural and peri-urban areas. Private sector involvement is increasingly needed to address the large and growing financing gap in water infrastructure. Given the limited academic research, the researcher conducted an extensive study on the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa.

A qualitative research approach was selected to explore and describe the topic under investigation. To address the primary and secondary research objectives, a conceptual framework was developed, validated and revised. Secondary data were collected and analysed by means of a comprehensive literature review. The result of this literature review was the development of the proposed conceptual framework which outlined the motives of impact investors, ten barriers and seven opportunities in impact investing in general. Furthermore, six barriers and seven opportunities specific to impact investments in water purification infrastructure were presented. An interview guide was developed based on these factors. A combination of judgement and snowball sampling was used to identify 20 experts in the impact investment market and local water provision process. Semi-structured personal interviews were then conducted with the experts.

The transcribed interviews were coded using directed content analysis to identify common and contradicting responses which were used to revise the conceptual framework. The findings indicate that most South African impact investors are finance-first investors (they prioritise financial returns over social and/or environmental impact). The critical barriers to impact investments included the shortage of investment-ready deals and the lack of detailed and clearly formulated social and/or environmental impact objectives. Major barriers to impact investing in water purification infrastructure in South Africa centred on the lack of lifecycle support, the possibility of political interference and low financial return expectations. A primary opportunity that was identified in impact investing in general was the prospect to earn a financial return while making major social and/or environmental impact. The large public financing gap in water infrastructure and investing in a convergence of sectors through innovative technologies

in water purification infrastructure were the foremost opportunities outlined in impact investing in water purification infrastructure.

Based on the results, the researcher made recommendations for impact investors, other role players in the impact investment market, government officials and other policy makers, educators and the media. The main recommendation was to improve lifecycle support to facilitate the growth of small and medium-sized social enterprises in South Africa thereby increasing the number of investment-ready deals. Other recommendations included the development of a standardised format to social and/or environmental impact reporting and the implementation of regulatory reforms to encourage more private sector impact investments.

Keywords: impact investing, private sector funding, water infrastructure, water purification, barriers, opportunities, sub-Saharan Africa, South Africa

OPSOMMING

Toegang tot veilige drinkwater is 'n basiese mensereg. Die samelewing word egter blootgestel aan 'n skerp daling in die hoeveelheid en gehalte van beskikbare vars water. Hierdie waterkrisis het omvangryke gevolge vir mense se gesondheid en ekonomiese bedrywighede en sal na verwagting verdere afmetings in die toekoms aanneem. Tans is miljoene Suid-Afrikaners uitgelewer aan onaanvaarbaar lae vlakke van toegang tot drinkbare water, veral diegene wat in landelike of buitestedelike gebiede woon. Daar is 'n toenemende behoefte aan die privaatsektor se betrokkenheid om die groot en stygende finansieringsgaping ten opsigte van waterinfrastruktuur in die land te oorbrug.

Op grond van die huidige gebrek in akademiese navorsingskennis, was die hoofdoel van hierdie studie om dryfvere, hindernisse en geleenthede wat verband hou met privaatsektor impakinvestering in watersuiweringsinfrastruktuur in Suid-Afrika te ondersoek.

'n Kwalitatiewe navorsingsproses is gevolg. 'n Konseptuele raamwerk is ontwikkel, vir geldigheid getoets, en aangepas ten einde die primêre en sekondêre navorsingsdoelwitte te ondersoek. Sekondêre data is ingesamel as deel van 'n omvattende literatuuroorsig. Die faktore wat beleggers motiveer om te belê met die doel om 'n impak te maak op die samelewing en/of die omgewing is in die konseptuele raamwerk uitgelê wat gebaseer was op die literatuuroorsig. In die raamwerk word tien hindernisse en sewe geleenthede in algemene impakinvestering uitgewys. 'n Verdere ses hindernisse en sewe geleenthede word genoem wat spesifiek verband hou met impakinvestering in watersuiweringsinfrastruktuur. 'n Onderhoudsgids is ontwikkel op grond van hierdie faktore. 'n Kombinasie van oordeel- en sneeubalsteekproefneming is gebruik om 20 kundiges in die impakinvesteringmark asook die plaaslike watervoorsieningsproses te identifiseer. Semigestruktureerde persoonlike onderhoude is met die kundiges gevoer. Die onderhoude is getranskribeer en gekodeer met behulp van gerigte inhoudsontleding om beide gemeenskaplike en teenstrydige response van die deelnemers te identifiseer, wat gebruik is as riglyn om die konseptuele raamwerk aan te pas.

Die bevindinge dui aan dat die meeste Suid-Afrikaanse impakinvesteerders as 'finansies-eerste' investeerders geklassifiseer kan word, waar finansiële opbrengs belangriker geag word as samelewing en/of omgewing impak. Onvolledige en onduidelik uiteengesette impakdoelwitte asook 'n gebrek aan transaksies wat investeringsgereed is ten opsigte van die samelewing en/of omgewing 'n kritieke hindernis in impakinvestering. Gebrek aan lewensiklusondersteuning, die

moontlikheid van politieke inmenging en 'n verwagte swak finansiële opbrengs verteenwoordig die grootste hindernisse ten opsigte van impakinvestering in watersuiweringsinfrastruktuur in Suid-Afrika. Die voorste geleentheid van belang in die algemene impakinvestering was 'n vooruitsig van 'n finansiële opbrengs gekoppel met 'n beduidende impak op die samelewing en/of omgewing. Die twee vernaamste watersuiweringsinfrastruktuur investeringsgeleenthede was die ernstige openbare sektor finansieringstekort sowel as belegging in 'n verskeidenheid sektore deur middel van vernuwende tegnologie in watersuiweringsinfrastruktuur.

Na aanleiding van die bevindinge, word 'n aantal aanbevelings relevant tot impakinvesteerders, ander rolspelers in die impakinvesteringsmark, regeringsinstansies, beleidsmakers, opvoedkundiges en die media gemaak. Die belangrikste aanbeveling is om die lewensiklus van klein- en mediumgroot maatskaplike ondernemings in Suid-Afrika te ondersteun ten einde die groter aantal transaksies te verhoog. Ander aanbevelings sluit in die aangaande ontwikkeling van 'n standard formaat vir verslaglewering oor die samelewing en/of die omgewing impak en regulatoriese hervorming ten einde stukrag aan impakinvestering deur die privaatsektor te gee.

Trefwoorde: impakinvestering, privaatsektorfinansiering, waterinfrastruktuur, watersuiwering, struikelblokke, Afrika Suid van die Sahara, Suid-Afrika

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LIST OF ABBREVIATIONS

B-BBEE	-	Broad-Based Black Economic Empowerment
CEO	-	Chief Executive Officer
CSI	-	Corporate social investment
DWA	-	Department of Water Affairs
DWS	-	Department of Water and Sanitation
GDP	-	Gross Domestic Product
GIIN	-	Global Impact Investing Network
GIIRS	-	Global Impact Investing Rating System
IRIS	-	Impact Reporting and Investment Standards
PPPs	-	Public-private partnerships
POU	-	Point-of-use
RI	-	Responsible investing
SADC	-	Southern African Development Community
SAIIN	-	Southern African Impact Investing Network
SANS	-	South African National Standard
SSA	-	Sub-Saharan Africa
WHO	-	World Health Organization

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

In the time it takes one to read the next two pages over 50 people globally would have died from diseases linked to unsafe drinking water (Gleick, 2002:4). The disease burden caused by insufficient water and sanitation infrastructure is estimated to result in approximately five million deaths per annum globally. Of this group, two million mortalities occur from water-related diarrhoea alone (Montgomery & Elimelech, 2007:17; Gleick, 2004:11; Prüss, Kay, Fewtrell & Bartram, 2002:537).

Although many academic and industry discussions centre on both water and sanitation infrastructure, the focus in this research will be on the former. In this introductory chapter, the status of water infrastructure will be reviewed from a global and sub-Saharan African (SSA) perspective. In sketching the background of the study, the following topics will be discussed: acceptable access to potable water, the consequences of unacceptable access to water infrastructure, the infrastructure necessary to provide acceptable access, the responsibility of developing and maintaining water infrastructure and the role of private sector impact investors in funding water infrastructure. Next, prior research on the topic, the problem statement of the study, research questions and research objectives will be presented alongside the research design and methodology. The chapter will conclude with the contribution and the orientation of the study.

1.2 BACKGROUND TO THE STUDY

One of the world's biggest grand challenges is the lack of acceptable access to potable (drinking) water. 'Acceptable access' can be measured in terms of distance, availability and quality. According to the World Health Organization (WHO), a water source should be located within one kilometre of the user's place of residence and should provide a minimum of 20 litres per person per day (Zolnikov & Salafia, 2016:273). The WHO also provides detailed guidelines on what could be considered safe drinking water (WHO, 2011). In South Africa, water that complies with the South African National Standard (SANS) 241 Drinking Water Specification is defined as potable water. According to Hodgson and Manus (2006:673), water of this standard does not pose a significant risk to health over a lifetime of consumption, including the different sensitivities that may occur between life stages (i.e. babies and infants, the immunocompromised and the elderly). In this study 'acceptable access' to potable water is thus defined

by the standard set by the WHO for access and the standard detailed in the SANS 241 Drinking Water Specification. Unfortunately, millions of people do not have acceptable access to potable water globally. The extent of this situation will be discussed in the following section.

1.2.1 Acceptable access to potable water from a global and SSA perspective

Although approximately 71 per cent of the earth's surface is covered by water, a mere 0.5 per cent of this water is available to drink or to use in our day-to-day activities (How much water is there on Earth, 2015; Heagerty, 2010:3). However, it is estimated that between 547 million and one billion people globally lack acceptable access to potable water (Adams, Boateng & Amoyaw, 2015:673; WHO, 2014a:8).

In a world where new generations of cell phones are released on a bi-annual basis and where astronauts are living in space, it is disconcerting that so many people are still living without acceptable access to potable water. One of the worst affected areas on the planet is SSA (WHO, 2014a:12). According to Cheung (2010:142), millions of individuals in this region must walk vast distances to fetch water in containers, often from rivers or dams. Potable water is a resource that is taken for granted by much of humanity (Agoramoorthy, 2014:1481). However, many people are becoming gradually more aware of the impact that population growth, climate change and poor resource management has on the growing global water crisis.

South Africa has a semi-arid climate and some regions are currently affected by drought, making water increasingly scarce (Turton, du Plessis, Walker & Swanepoel, 2016:15; DWS, 2015:69). Inadequate development and management of water infrastructure by government has resulted in major water loss through leaking pipes (van Vuuren, 2014:35). As such, millions of South Africans, mostly in peri-urban and rural areas lack acceptable access to potable water (Statistics South Africa, 2016:66). The waste of an already scarce water supply is extremely concerning. Furthermore, in the 2014 Blue Drop report, the quality of potable water was determined to have decreased (DWS, 2014).

Peri-urban dwellers often fall outside the scope of national water supply schemes and are therefore some of the worst affected individuals (Peter-Varbanets, Zurbrugg, Swartz & Pronk, 2009:249). The full extent of the current crisis regarding acceptable access to potable water in South Africa and specifically in peri-urban areas will be provided in Chapter Two Section 2.2.2.

The consequences related to unacceptable access to potable water include severe health risks, limited food production, lost education hours, and a likely restriction of socio-economic development (Adams *et al.*, 2015:674; Back, 2013:29; Sivakumar, 2011:531; Cheung, 2010:142; Singh, 2008:353; Jury & Vaux, 2007:2; Rijsberman, 2006:6). These and other consequences will be discussed in more detail in Chapter Two Section 2.3.

A wide range of infrastructure is necessary to provide acceptable access to adequate quantities of water and water of acceptable quality. The WHO and UNICEF (2012:17) recognise piped water into dwellings, public taps or standpipes, boreholes, protected dug wells, protected springs and rainwater harvesting as infrastructure necessary to provide access to drinking water to the proportion of people who do not have acceptable access to potable water. Connor (2015:8) adds that acceptable access also entails that the water sources should be sustainable. Jacobsen, Webster and Vairavamoorthy (2013:8) list water purification infrastructure as an area where more development and maintenance is required to increase access to water of acceptable quality. Water purification is a multi-step process where contaminants are removed from raw water so that it is safe for human consumption (Deng, Aouad, Braff, Schlumpberger, Suss & Bazant, 2015:77; Usman, 2014:7). The process includes filtration, desalination and disinfection of the feed stream. The result is potable water which can be consumed, bottled and/or distributed. Outcomes from investments in water purification infrastructure can be measured more directly than investments made at other stages of the water provision process such as the building of new dams. Therefore, the focus of this study will be on investments in water purification infrastructure.

Conventional water purification infrastructure used in centralised systems for disinfection, desalination and decontamination provides solutions to the dual problems of water quality and water supply. However, the water purification process is expensive and therefore precludes its use in most peri-urban and rural areas of the developing world (Shannon, Bohn, Elimelech, Georgiadis, Mariñas & Mayes, 2008:301). A decentralised water provision system offers an alternative to a centralised system and typically consists of point-of-use (POU) water treatment infrastructure. POU infrastructure allows people to treat water for themselves (Patil, Ahmad, Kausley, Balkunde & Malhotra, 2015:91). A detailed discussion of the infrastructure necessary to provide acceptable access to potable water is provided in Chapter Two Section 2.4.

Water infrastructure in South Africa has not been developed and maintained over recent years to the extent that it should have been (Ruiters & Matji, 2016:291). Given the current status of

much of the water purification infrastructure, it comes as no surprise that millions of people are still left without acceptable access to potable water in the country. There are many role players in the provision of acceptable access to potable water but the local government should be regarded as the main entity responsible for the development and maintenance of water infrastructure.

1.2.2 The development, maintenance and financing of water purification infrastructure

As pointed out, the responsibility to build and maintain water infrastructure to promote the realisation of the human right of water for all ultimately lies with the government of a country (Connor, 2015:14). Unfortunately, low prioritisation and poor co-ordination within government ministries have led to the deterioration of water infrastructure in many SSA countries, including South Africa (Orr, Cartwright & Tickner, 2009:15).

The deterioration of water infrastructure and lack of funding is extensive. To give perspective, an estimated US\$103 billion will be needed per annum to finance water, sanitation and wastewater treatment projects globally (Rodriguez, van den Berg & McMahon, 2012:8). To improve water infrastructure alone, US\$17 billion per annum will be required (Yamada, Mart & Logerot, 2011:10). Correspondingly, US\$21.9 billion will be needed each year to close the water and sanitation infrastructure gap in Africa (Foster & Briceño-Garmendia, 2010:7). Taking the rapid population growth into account and the growing financing gap, it is highly likely that more funding will be required in 2017 and beyond.

These financing gaps are evidence that governments in many SSA countries are not able to provide enough capital to cover the development and maintenance costs associated with water infrastructure. The private sector can fulfil an important role in the financing of water-related projects. Private sector investors who invest in so-called social infrastructure, such as water purification infrastructure or electricity provision, are called impact investors.

1.2.3 Brief introduction to impact investing in water purification infrastructure

As pointed out in Chapter Three Section 3.2, there is no generally accepted definition of the term ‘impact investing’. However, impact investing has been viewed by some role players as an investor who invests to earn a measurable and positive social and/or environmental impact alongside a market-related, risk-adjusted financial return (Global Impact Investing Network, 2016; Battilana & Lee, 2014:406; Harji & Jackson, 2012:11). To achieve these dual goals, an impact investor has to make an intentional investment in one or more real assets (Brest & Born,

2013b:24). As will be discussed later, impact investing is one of the strategies which an investor can use along with screening and shareholder activism to invest in a responsible manner (Viviers, Ractliffe & Hand, 2011:218).

Impact investors face some barriers as the investments they make are often associated with low liquidity, are structured over long investment horizons, are sometimes perceived as risky with little chance for short-term gains and are often subject to political interference (Chitonge, 2013:48; Rodriguez *et al.*, 2012:13; Simon & Barmeier, 2010:13). Impact investments, including those in water infrastructure, provide a wealth of opportunities for investors such as the opportunity to earn market-related, risk-adjusted returns; the fact that there is a growing interest in and acceptance of impact investing as a responsible investing (RI) strategy; and the opportunity to generate social and/or environmental impact (Burand, 2014:58; Höchstädter & Scheck, 2015:450; Vaccaro, 2014:5; Viviers *et al.*, 2011:219; Bugg-Levine & Goldstein, 2009:33).

1.2.4 Prior academic research on the topic

Despite significant growth in impact investing in recent years, limited academic research has been conducted on the topic (amongst others, Clarkin & Cangioni, 2016:135). Some developments in the field are discussed in the following section.

Previous academic research on impact investing has focused on bringing conceptual clarity and a better understanding of the impact investing process, the development of the impact investment market globally and the opportunities and challenges that surround it (Höchstädter & Scheck, 2015:449; Ormiston, Charlton, Donald & Seymour, 2015:1; Burand, 2014:57; Viviers *et al.*, 2011:214). Attention has also been given in the extant literature to the measurement of social and/or environmental impact (Brandstetter & Lehner, 2015:87; Jackson, 2013a:95).

Studies involving water infrastructure in SSA have focused on the funding gap and suggestions on reducing the deficit (Chitonge, 2013:41; Ruiters, 2011:4). A number of previous masters and doctoral students have focused on public-private partnerships (PPPs) as a means of funding water infrastructure development (Barnard, 2014; Moyo, 2013; Trotter, 2013; Manish, 2009; Valencia Gluyas, 2004; Maharaj, 2003; Maiwada, 2003). Policy and institutional frameworks to attract private sector participation in developing regional water infrastructure in the Southern African Development Community (SADC) was explored by Takawira (2010). The intersection

was that most of these studies were conducted on private sector financing of infrastructure in developing markets. The topic and main findings of these masters and doctoral studies are presented in Table 1.1.

Table 1.1: Masters and doctoral studies on private sector funding of water infrastructure

Researcher	Title	Main findings
Barnard (2014)	The scope for private sector involvement in infrastructure development and finance in South Africa	There is definitely scope for private sector involvement in the management and sourcing of finance for local government in South Africa.
Moyo (2013)	An assessment of private sector participation as a viable alternative for improved urban water provision in Zimbabwe: The case of Harare municipality	Private sector participation through PPPs for water services delivery is a viable option for improved urban water provision for Harare.
Ruiters (2011)	Funding models for the financing of water infrastructure in South Africa: A framework and comparative analysis of alternatives	The research identified 14 funding models for the financing of water infrastructure development projects. Government provision is still the most heavily relied on. Further innovation in water infrastructure investment, including closing the circle between public and private sector capital is required.
Takawira (2010)	What should be done to attract private sector participation in the SADC regional strategic water infrastructural development programme?	Although the water sector in the SADC has done much to promote regional co-operation, the investment climate to attract private sector involvement in regional water projects is not yet conducive.
Manish (2009)	Institutional and regulatory economics of public-private partnerships in infrastructure: Evidences from stochastic cost frontier analysis and three case studies [Dehli, Manila and Tirupur] of urban water utilities	PPPs in water supply can be a reform option if institutions and regulations are well designed. To successfully negotiate and manage PPP contracts the government must possess certain basic capabilities. In other words, PPPs do not imply that government ceases to play a role in water supply.
Valencia Gluyas (2004)	Public-private participation in water infrastructure in Mexico	Private financing has been utilised to deliver infrastructure projects, but Mexico has experienced insufficient private finance for their infrastructure projects. The Mexican government has been playing a key role in the implementation and promotion of infrastructure projects with private finance.
Maharaj (2003)	Sustainable private sector participation in water supply and sanitation: An investigation of the South African experience with international comparative case studies	The evidence indicates that there is minimal public support for the privatisation of water and sanitation services in any form in South Africa. The strongest case for private sector participation occurring in South Africa is the immediate sources of financing that private sector companies provide to alleviate the infrastructure backlogs.

Source: Researcher's own construction based on the cited sources

The business models, strategies and key sources of funding to provide water infrastructure, specifically in South Africa, have been examined by Ruiters (2011), Dowling (2007) and Macintosh (2004). Botha (2015) investigated water-related reporting and disclosure requirements of socially responsible companies listed on the Johannesburg Stock Exchange.

Given that many impact investments take the form of private equity and debt, a study by Fryer (2014) focused on the influence of public policy on private equity impact investing.

While there have been some academic contributions on private sector involvement in the financing of water infrastructure (such as those listed in Table 1.1), methods to fund this type of infrastructure and impact investments in general, there is still a gap in understanding the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure.

1.3 PROBLEM STATEMENT

Given the need to improve acceptable access to potable water and the lack of academic research on the topic, the researcher set out to investigate the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa.

Investments in water purification infrastructure were the focus of this study because the financial, social and environmental outcomes of this type of infrastructure can be measured more directly than at other stages of the water provision process. The water provision process and its different stages are described in Chapter Two Section 2.2.2.

South Africa was selected as the research context as the country is one of the largest economies in SSA, it has an advanced financial market and yet many of its citizens do not have acceptable access to potable water. South Africa also has the largest impact investment market on the African continent. According to Mudaliar, Moynihans, Bass, Roberts and DeMarsh (2016a:6), the South African impact investment market boasts the most impact investment deals with the largest amounts of capital allocated on the continent.

1.4 RESEARCH QUESTIONS

A number of research questions were formulated to guide the researcher in completing the study, namely:

- What are the key role players' perceptions of the definition and motives of impact investing with reference to impact investments in water purification infrastructure?
- What are key role players' opinions of the barriers to impact investing in general and in water purification infrastructure in South Africa?

- What are key role players' views on the opportunities in impact investing in general and in water purification infrastructure in South Africa?

The key role players in this study include experts in the impact investment market and experts in the water provision process.

The answers to these questions will bring clarity and a better understanding of private sector impact investment in water purification infrastructure with particular reference to the South African context.

1.5 RESEARCH OBJECTIVES

In the following section details on the primary and secondary research objectives will be provided.

1.5.1 Primary research objective

In accordance with the problem statement, the primary objective of this study was to develop, validate and revise a conceptual framework outlining the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa. The conceptual framework was empirically verified with a group of local expert impact investors, other expert role players in the impact investment market and experts in the water provision process in South Africa.

1.5.2 Secondary research objectives

To give effect to the primary research objective, the following secondary objectives were formulated:

- to select the most suitable research design and methodology for the study;
- to conduct a thorough review of relevant literature on acceptable access to potable water;
- to conduct an extensive review of the extant literature on impact investing in general;
- to conduct a detailed review of the relevant literature on impact investing in water purification infrastructure;
- to develop, validate and revise a conceptual framework regarding private sector impact investment in water purification infrastructure in South Africa; and
- to provide pertinent conclusions and recommendations to a range of stakeholders in the impact investment market and the water provision process in South Africa.

1.6 BRIEF OVERVIEW OF THE RESEARCH DESIGN AND METHODOLOGY

Given the lack of research on the topic, a qualitative research approach was selected. This approach was chosen to explore and describe the phenomenon of impact investing in water purification infrastructure in South Africa. A qualitative approach allowed the researcher to follow a combination of deductive and inductive reasoning processes.

To conduct an extensive review of private sector impact investment in general and in water purification infrastructure in South Africa in particular, several secondary sources were consulted. These sources included academic journal articles, industry reports, books and previous postgraduate theses. A conceptual framework centring on the motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa was developed from the literature review.

To verify the conceptual framework, primary data had to be collected. Three samples were selected using judgement and snowball sampling techniques. The samples consisted of eight local expert impact investors, five other expert role players in the impact investment market and seven experts in the water provision process in South Africa.

An interview guide was formulated from the conceptual framework and modified for the various samples. Cognisance was given to the credibility, transferability, dependability and confirmability of the research instrument. The researcher was also mindful of ethical considerations. The primary data were collected in the form of semi-structured interviews with the identified experts. The semi-structured interviews were audio-recorded and professionally transcribed.

The data were coded manually and in ATLAS.ti into distinct categories. Directed content analysis was used to identify similar and contrasting themes.

1.7 CONTRIBUTION OF THE STUDY

The researcher found that although some previous academic studies have focused on the privatisation of water infrastructure, water policy and funding models for water infrastructure, no masters or doctoral studies have centred exclusively on impact investment in water purification infrastructure in South Africa. As such, the findings of this study could make a significant contribution to the body of knowledge on impact investing in the academic arena.

This study's main contribution was to develop, validate and revise a conceptual framework outlining the motives, barriers and opportunities associated with impact investment in water purification infrastructure in South Africa. The conceptual framework that was developed from an extensive literature review, was verified with experts to provide practical recommendations for multiple stakeholders. These stakeholders include impact investors, other role players in the impact investment market, government and other policy makers, educators and the media.

Many of the motives, barriers and opportunities were applicable to international impact investors, but not to their South African counterparts. The main barriers were related to the lack of investment-ready deals, a shortage of lifecycle support in the South African impact investment market and the risk of political interference. Furthermore, an in-depth discussion on the definition of impact investing was provided to bring conceptual clarity to the term. Another important discussion centred on the moral dilemma of making a return from the provision of a basic human right. These results are discussed in detail in Chapter Six and the recommendations are provided in Chapter Seven.

Impact investors, other role players in the impact investment market, government and policy makers could benefit from a better understanding of the implications of unacceptable access to potable water in South Africa. A sound knowledge of the motives, barriers and opportunities could help unlock more financing for water purification infrastructure in South Africa through private sector impact investing. The individuals without acceptable access to potable water could also benefit if more financing becomes available for the development and maintenance of water purification infrastructure in South Africa.

Educators and journalists also have a significant influence on the next generation of role players in the private and public sectors. They could also benefit from practical recommendations on how to use their influence to address the many grand challenges South Africa faces.

As discussed in Section 1.2.2, governments in the SSA region are unable to meet the growing water infrastructure financing requirements and the private sector is yet to make significant contributions to the financing of water infrastructure. The motives, barriers and opportunities identified and verified in the conceptual framework could provide a better understanding of the dynamics of impact investing. The findings could therefore also allow impact investors to make more informed investment decisions. Ultimately, an impact investment should not only produce financial returns, but also create social and/or environmental impact thereby aiding society. The

empirical evidence could therefore contribute towards understanding the dilemma of acceptable access to potable water in South Africa and how to finance it so that the people who need it the most will be supported.

1.8 ORIENTATION OF THE STUDY

This thesis comprises seven chapters.

Chapter One: Introduction and background to the study

In this chapter a brief overview of the background to the study was provided, followed by an explanation of the problem statement, research questions and research objectives. The research design and methodology were also presented.

Chapter Two: Acceptable access to potable water

The focus of this chapter will be on the current landscape of water infrastructure in SSA in general and South Africa in particular. The review will include the consequences of unacceptable access to potable water and the infrastructure necessary to provide acceptable access to potable water. The key role players in the development and maintenance of water infrastructure in South Africa will also be reviewed.

Chapter Three: Impact investing: The motives, process, barriers and opportunities

Impact investing is a key construct of this study. In this chapter the term ‘impact investing’ will be defined and the size of the global and local impact investment market will be explored. The main role players and the impact investing process will also be discussed. The barriers and opportunities in impact investing in general will also be identified.

Chapter Four: Impact investing in water purification infrastructure

In the last of the literature review chapters the focus will be on the barriers and opportunities in impact investing in water purification infrastructure in South Africa. A section will also be devoted to the moral dilemma of making a return from providing a basic human right, which in the context of this study, is water provision.

Chapter Five: Research design and methodology

In this chapter, the research design of the study will be outlined. The research paradigm and research types will be described. Thereafter, the collection and analysis of secondary data will be reviewed. The conceptual framework highlighting the motives, barriers and opportunities associated with impact investing in general and in water purification infrastructure will be presented. A summary of this conceptual framework is provided in Table 1.2.

Table 1.2: Summary of identified motives, barriers and opportunities to impact investing in general and in water purification infrastructure in South Africa

Motives	Barriers to impact investing in general in South Africa	Barriers to impact investing in water purification infrastructure in South Africa	Opportunities in impact investing in general in South Africa	Opportunities in impact investing in water purification infrastructure in South Africa
Measurable, positive social and/or environmental impact Market-related, risk-adjusted financial returns	Small size of the impact investment market Shortage of investment-ready deals Lack of high-quality impact investments with established track records Perception that impact investments cannot yield market-related returns Large amounts of competing capital Limited number of specialised intermediaries Difficulties in exiting impact investments Illiquidity of impact investments Divergent views on what constitutes social and/or environmental impact Lack of bespoke social and environmental metrics to measure impact	Negative perceptions of private sector involvement Possibility of political interference Financial risks inherent to water sector investments Moral dilemma associated with making a return from providing a basic human right Lack of skilled government and engineering personnel Specific barriers associated with community-level water purification systems	Opportunity to earn market-related, risk-adjusted returns Growing interest and acceptance of impact investing as a responsible investment strategy Asset owners are demanding more responsible investing and investments Increasing amount of capital flowing into South Africa Positive changes in the regulatory environment Opportunities to generate social and/or environmental impact More financial instruments available for social and environmental problems which could lower risk	New infrastructure needed Growth potential in the water market leading to increased opportunities Large public financing gap Substantial financial returns from investing in water infrastructure Increased interest of institutional investors in water purification infrastructure Innovations in water purification infrastructure driving costs down Opportunities to create social and/or environmental impact

Source: Researcher's own construction

Next, the collection and analysis of primary data will be described. In the concluding sections, the criteria for good qualitative research and the ethical considerations will be reviewed and contextualised to the study.

Chapter Six: Empirical results

Firstly, the biographical details of the interviewees will be presented. Next, the empirical results will be scrutinised and described in 12 sections according to identified themes. Following a review of these themes, a revised conceptual framework of the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa will be reported.

Chapter Seven: Summary, conclusions and recommendations

In this final chapter, a summary and conclusions of the completed research and recommendations based on the research findings will be provided. The limitations of the study and suggestions for future research will also be presented. The chapter will conclude with a reflection of the study.

CHAPTER TWO

ACCEPTABLE ACCESS TO POTABLE WATER

2.1 INTRODUCTION

Water is an essential resource for life on earth. Unfortunately, a large percentage of the world's population is affected by insufficient, unsanitary or unsafe water (Bartram & Cairncross, 2010:1). In this chapter, the grand challenge of providing acceptable access to potable water and its consequences will be discussed. Attention will be given to the SSA region in general and South Africa in particular. As introduced in Chapter One Section 1.2, 'acceptable access' to drinking water refers to water that meets the standards set by WHO in terms of access, and the standards detailed in SANS 241 Drinking Water Specification. The infrastructure and governance necessary to provide acceptable access to drinking water will also be explored. In the closing sections of this chapter, the financing gap associated with water purification infrastructure and private sector investment in such infrastructure will be reviewed.

2.2 POTABLE WATER SCARCITY AND PROVISION

Unacceptable access to potable water is a global problem for millions of individuals. The SSA region is one of the worst affected areas (Shandra, Sommer, Coburn & Restivo, 2015:130). Even in some of the more developed countries in SSA, like South Africa, the lack of access to potable water has become a serious concern (Isa, 2016).

2.2.1 Potable water scarcity and provision in sub-Saharan Africa

According to Waldman, Mintz and Papowitz (2013:593), 39 per cent of Africa's population live without acceptable access to drinking water. Moreover, just under 50 per cent of those who are the most affected live in SSA (WHO, 2014a:12). Similarly, a study conducted by Pickering and Davis (2012:2392) revealed that 84 per cent of SSA's population lacked access to piped water into their yards for domestic and drinking use. Furthermore, many affected individuals in SSA have to walk for longer than 15 minutes to fetch water (Cheung, 2010:142).

These undesirable circumstances are not limited to the least developed countries in SSA. South Africa is also facing crumbling water infrastructure amidst severe droughts (El Chami & El Moujabber, 2016:104; Isa, 2016).

2.2.2 Acceptable access to potable water in South Africa

South Africa is a water-scarce country and where there is water, it is unevenly distributed (DWS, 2015:69). According to the Department of Water and Sanitation (DWS), approximately 28 per cent of towns in South Africa already experienced water shortages in 2015, and climate change is said to make the situation worse in future.

A study conducted in 2012 by the DWS and the South African Water Research Commission revealed that non-revenue water is a major problem for the country (McKenzie, Siqalaba & Wegelin, 2012:v). Non-revenue water is defined as the difference between the amount of water introduced into the distribution system and the amount of water billed to consumers (Frauendorfer & Liemberger, 2010:1). In his 2010 State of the Nation address, President Jacob Zuma remarked:

We are not a water-rich country. Yet, we still lose a lot of water through leaking pipes and inadequate infrastructure. We will be putting in place measures to reduce our water loss by half by 2014.

Despite these measures, the situation had not changed by 2014 and approximately 37 per cent of water supplied to municipalities was still lost (van Vuuren, 2014:35). The author notes that although South Africa's non-revenue water is in line with the world average, it is far from ideal for a water-scarce country.

The remaining 63 per cent of water that is delivered by municipalities should be distributed to 54.5 million South Africans (van Vuuren, 2014:35). However, many citizens do not have acceptable access to municipal supplied networks of potable water. As discussed in Chapter One Section 1.2, access to a water source, as defined by the WHO, implies that a person has access to safe drinking water located within one kilometre from the household and where a minimum of 20 litres is available per person per day. Access to a water source is also explained as water that "by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter" (WHO & UNICEF, 2016).

Access to water does not necessarily mean that it meets the standards required by the SANS 241 Drinking Water Specification. It is for this reason that what constitutes 'acceptable access' to potable water in South Africa should be defined by both the WHO and the SANS 241 requirements.

According to the WHO and UNICEF (2015), almost 50 million South African citizens had access to potable water sources in 2015. However, in the same year, over 3.5 million South Africans were still without access to potable water and those who had the least access to potable water were living in rural areas. Statistics South Africa's 2016 community survey shows that almost 2.6 million (approximately 15%) of the almost 16.8 million households surveyed in South Africa did not have acceptable access to safe drinking water (Statistics South Africa, 2016:66).

Currently, the South African government is not only struggling to decrease non-revenue water, but also seems to be having difficulty maintaining the quality of water. Results from the 2014 Blue Drop report, which outlines the performance of the Water Services Authorities regarding drinking water management, show a decrease of eight per cent in the quality of potable water (DWS, 2014). This decrease in quality was the first negative result since the implementation of the monitoring system. The overall score declined from 87.6 per cent to 79.6 per cent. This overall score indicates that there are still adequate processes in place to ensure safe water supply. However, the report reveals that in some rural areas the quality of water was given an overall score of nine per cent (Isa, 2016). This low rating indicates that there are large disparities between urban and rural areas with regard to acceptable access to potable water.

The highest population density in South Africa is often found in urban areas. Compared to rural areas, the water quality in urban areas is expected to be of a higher standard as there should be more established infrastructure in place. In Figure 2.1 the population density in South Africa is mapped, while Figure 2.2 shows the areas of water quality concerns.

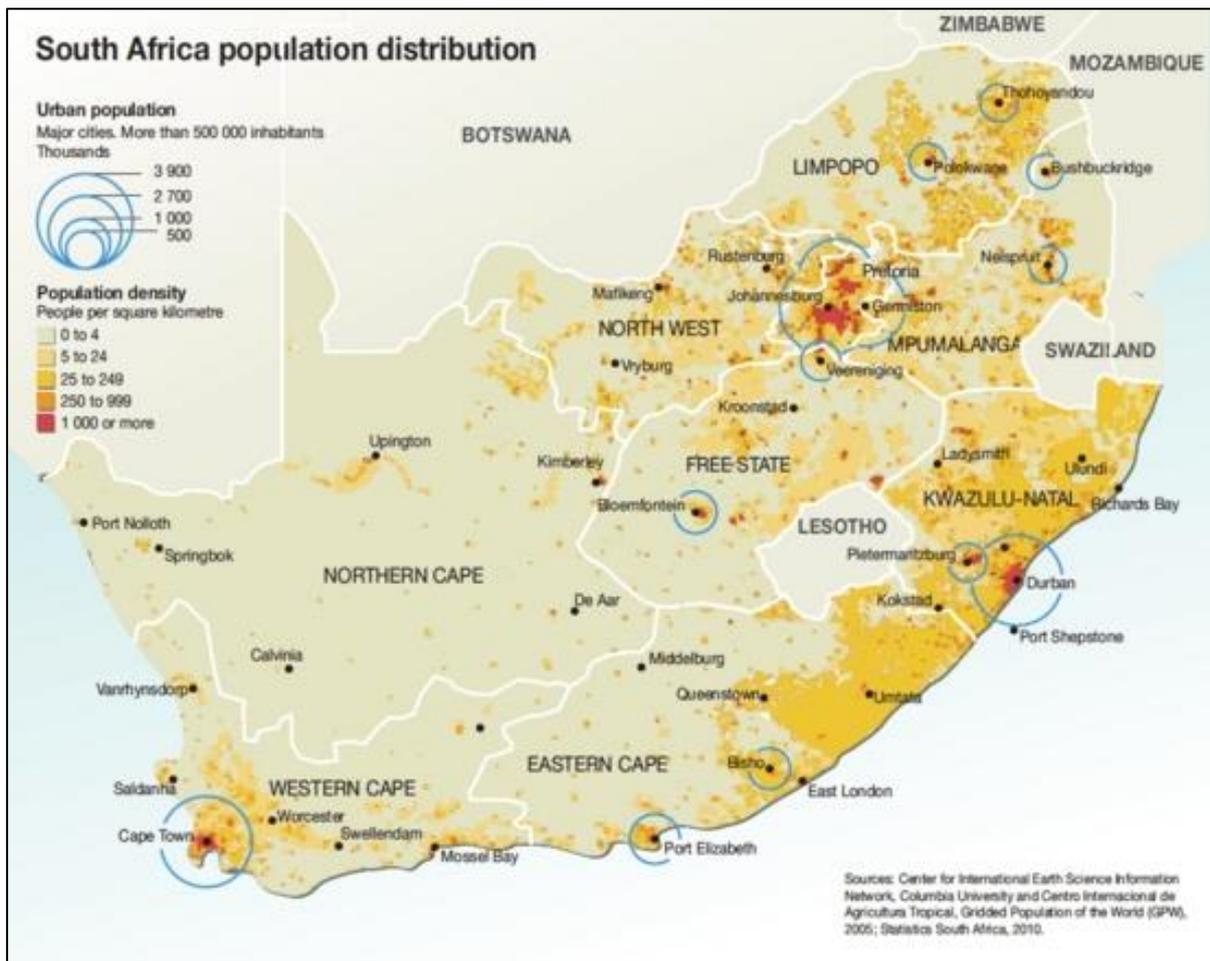


Figure 2.1: Distribution of the South African population

Source: Pravettoni (2011)

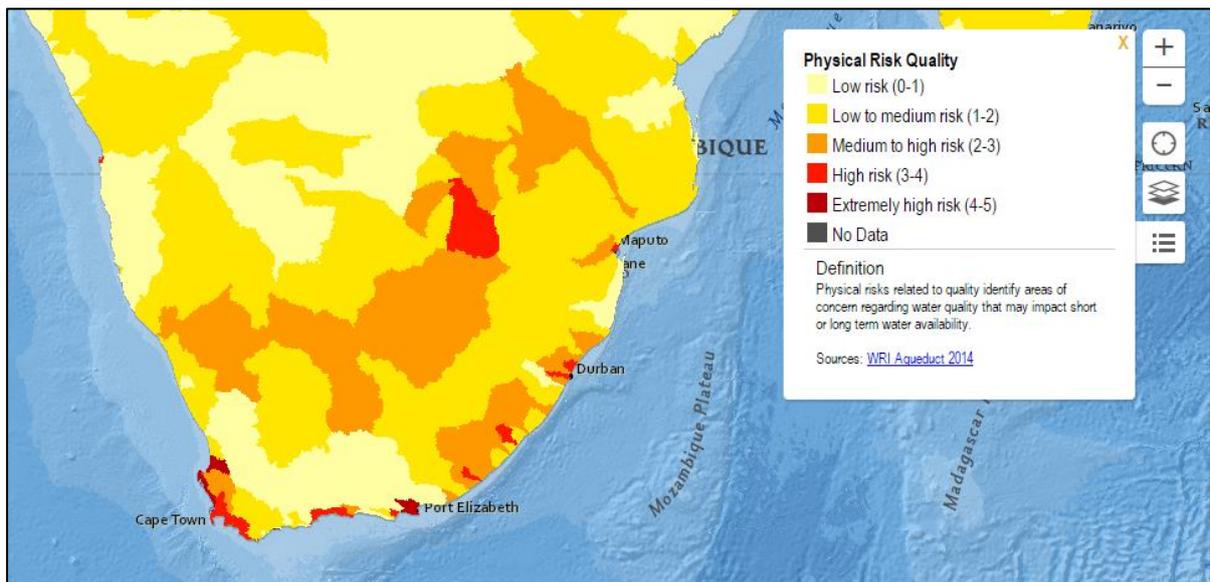


Figure 2.2: Identified areas of water quality concerns in South Africa

Source: Aqeduct water risk atlas: Physical risk quality (2016)

It can be deduced from Figures 2.1 and 2.2 that the majority of the households without acceptable access to potable water are located in and around South Africa's urban and peri-urban areas. Peri-urban areas are found on the fringe of existing city borders and the majority of these settlements are unplanned and informal (Diaz-Caravantes & Wilder, 2014:500; Parkinson, 2003:75). These areas are often referred to as 'short-term transition zones' and emerge because of rapid urbanisation (Simon, 2008:168). According to Peter-Varbanets *et al.* (2009:249), the dynamics of these transition zones present a challenge to the provision of water infrastructure and services. These authors are of the opinion that the establishment of centralised infrastructure (as defined in Section 2.4.1) in such transition zones, which consist mostly of so-called 'shanty' towns or 'slums', may not be economically or technically feasible.

The number of informal settlements in the country has also risen sharply as a result of rapid population growth (DWS, 2015:70; Jacobsen *et al.*, 2013:2). Consequently, there is increased pressure on the current availability of water purification infrastructure (Isa, 2016). These areas are, however, often excluded from both the national water-supply programmes targeting rural areas and those focused on cities (Peter-Varbanets *et al.*, 2009:249). A reason for the exclusion of informal settlements could include that government does not want these areas to expand further. Providing formal infrastructure will encourage permanent residence in the area. Peri-urban communities generally have the economic capacity to afford improvements to their potable water supply, but the lack of government support results in a variety of home-made solutions (Peter-Varbanets *et al.*, 2009:249). The researcher is of the opinion that although these areas present challenges to the authorities, they also provide opportunities for impact investment in water purification infrastructure. These opportunities will be discussed in more detail in Chapter Four Section 4.3.

The daunting task of providing acceptable access to potable water affects various users of water, suppliers of capital for water infrastructure and entities involved in the water provision process. This process and the various stakeholders are depicted in Figure 2.3.

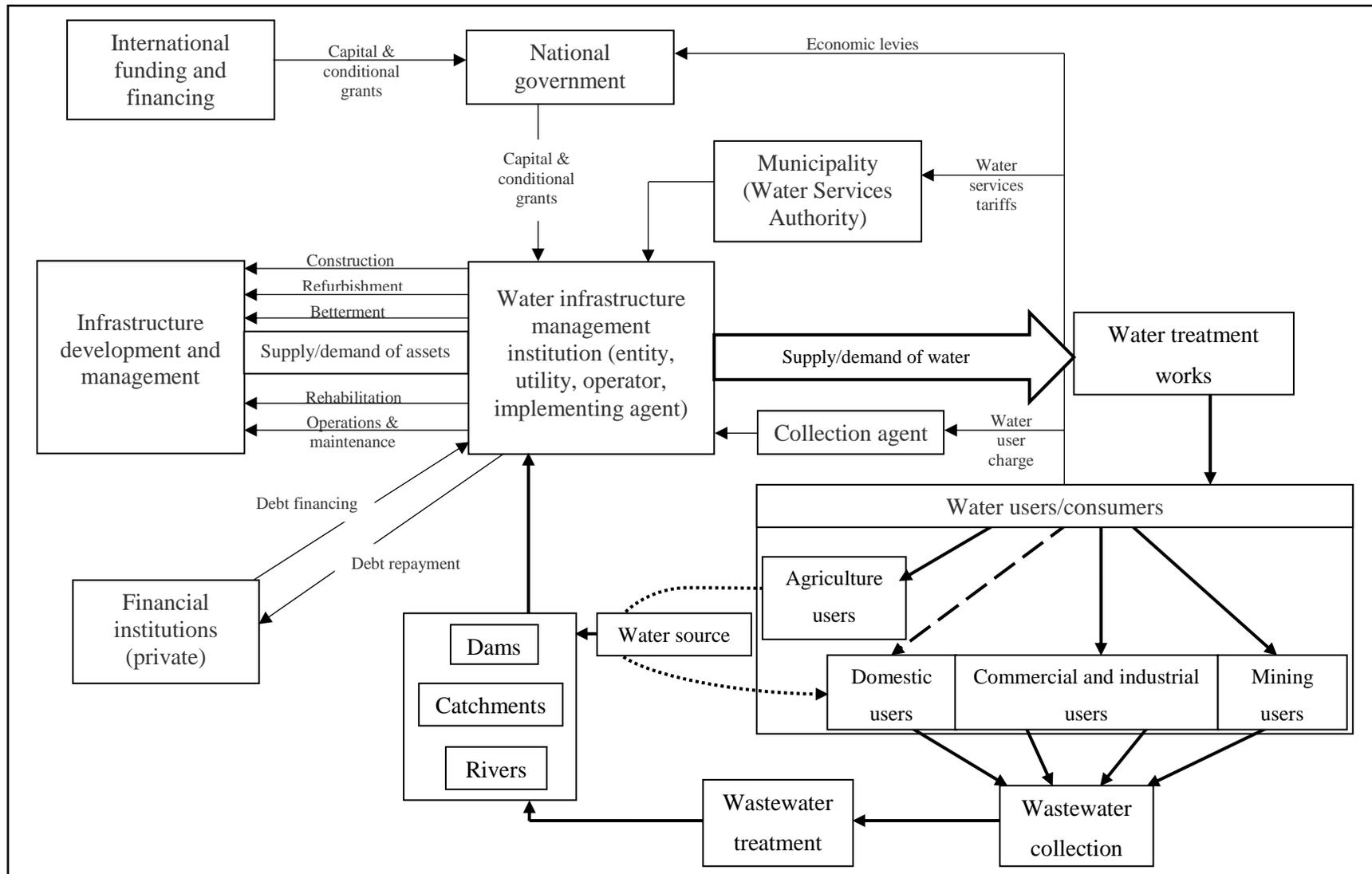


Figure 2.3: The consumer water provision process

Researcher's own compilation based on: Ruiters and Matji (2015:664); Friedrich, Pillay and Buckley (2009); DWS (n.d.)

As depicted by the thicker weighted arrows in Figure 2.3, water is treated for various users including those in the agricultural, domestic, mining, commercial and industrial sectors. According to the South African Water Quality Guidelines (1996), these users often have different water quality requirements. In this study, attention was given to water purification infrastructure for domestic users, especially those living in peri-urban areas. This infrastructure is provided along the water provision process marked by the dashed arrow shown in Figure 2.3. Another option is to provide infrastructure by purifying water to potable standards after it has been used by the agricultural sector. This option is indicated by the small, dotted arrow in Figure 2.3.

The flow of capital in the South African water provision process is also presented in Figure 2.3. Along with the financing supplied by private, public and international financial institutions, levies and tariffs charged to the users of water are used for the construction, refurbishment, operations and maintenance of water infrastructure in South Africa.

South Africa's commercial farmers are heavily dependent on the provision of clean water for the irrigation of vegetable, fruit, wine and crop production (von Bormann, 2014:6). After irrigation has taken place, the water seeps back into the river systems, but is often polluted by the chemicals used in the farming process. According to the researcher, providing water purification infrastructure at points in the provision process after the water has been used by agricultural users could be extremely cost-effective. At this point, the water has already been treated once to remove the most harmful bacteria. Therefore, it is not necessary for the water to go through the whole process again, but could instead be treated further to bring it in line with the SANS 241 drinking water standards. Given that the process is more cost-effective, this option provides many opportunities for private sector impact investors (de Clercq, 2017). Furthermore, the treatment of the water will have a considerable positive social and environmental impact.

The dire state of potable water provision in SSA has serious economic, social and environmental consequences, of which the most important will be discussed next.

2.3 CONSEQUENCES OF UNACCEPTABLE ACCESS TO WATER INFRASTRUCTURE

Water crises are listed in the World Economic Forum's 2016 global risks report as the third most serious global risk that could have significant consequences in many countries over the

next decade (Hanouz, 2016:6). The most devastating of these consequences is the millions of deaths that can be traced back to unacceptable access to water infrastructure (WHO, 2006:iii; Gleick 2004:11; Tearfund & Wateraid, 2002:22).

Water scarcity and unacceptable access to water infrastructure not only pose a health risk, but also results in limited food production, lost education hours and an increased chance of regional conflict, especially in developing areas (Adams *et al.*, 2015:674; Back, 2013:29; Sivakumar, 2011:531; Cheung, 2010:142; Singh, 2008:353; Jury & Vaux, 2007:2; Rijsberman, 2006:6).

Many developing countries have failed to manage water-borne diseases that present significant health risks (Han, Hashemi, Joo & Kim, 2016:3718). The failure is directly linked to unavailable or poorly managed water infrastructure. Therefore, close to 25 per cent of the world's population is forced to drink water contaminated with faecal matter that worsens the water-borne disease problem (Gall, Mariñas, Lu & Shisler, 2015:1). According to these authors, contaminated water contains bacteria and viruses that are directly linked to a variety of diseases, notably gastroenteritis. The diarrhoea caused by gastroenteritis is the second biggest cause of death among children under the age of five, resulting in well over half a million deaths per annum (Liu, Johnson, Cousens, Perin, Scott, Lawn, Rudan, Campbell, Cibulskis, Li, Mathers & Black, 2012:2155). Many other viral diseases are also associated with drinking unclean water. These viral infections also cause high levels of morbidity among the elderly, immunocompromised individuals and pregnant woman (Gall *et al.*, 2015:2). It is estimated that should the walking time to fetch water be decreased by 15 minutes, it could reduce child deaths under the age of five by as much as 11 per cent and diarrhoea by 41 per cent (Pickering & Davis, 2012:2394).

Women and children, mostly in rural areas, are disproportionately impacted by unacceptable access to potable water infrastructure as they are normally left with the burden of fetching potable water (Connor, 2016:22). UNICEF estimates that women and children globally spend over 200 million hours fetching water annually (Wallace, 2016). According to Graham, Hirai and Kim (2016:1), adult females are the primary individuals tasked with the responsibility of collecting potable water when the walking time to the water source is more than 30 minutes. These authors found that in the 24 SSA countries they studied, an estimated 3.36 million children and 13.54 million women were responsible for collecting water for their households. Apart from the risks of contracting diseases, other health risks include fatigue, musculoskeletal damage and early degenerative bone and soft tissue damage (Graham *et al.*, 2016:2). While

spending time to collect water, these individuals lose valuable time that could have been used for education purposes and other activities that they and their families could benefit more from (WHO, 2014b:10; Aureli & Brelet, 2004:6).

Furthermore, most people who do not have acceptable access to potable water rely on the public health authorities to help treat their illnesses. It is estimated that more than half of the world's hospital beds are occupied by people suffering from water-related diseases (Corcoran, Nellesmann, Baker, Bos, Osborn, Savelli, 2010:11). Apart from saving human lives, there could also be major cost-savings if these circumstances could be dealt with effectively.

Water scarcity and unacceptable access to water infrastructure also restrict economic development (Bigas, 2012:59; Winpenny, 2006:14). Hutton (2013:7) estimated the economic loss associated with unacceptable access to water and sanitation in 2010 at US\$260 billion or 1.5 per cent of the countries' Gross Domestic Product (GDP) included in his study. The biggest impact resulting from unacceptable access to water and sanitation is observed in SSA where the related loss is estimated at 4.3 per cent of the GDP. This loss is likely to put a major strain on fiscal income.

The water-energy-food nexus, which denotes the interaction between these three sectors, has been recognised as one of the three biggest threats to the global economy (Lawford, Bogardi, Marx, Jain, Wostl, Knüppe, Ringler, Lansigan & Meza, 2013:607). Addressing shortfalls in this nexus is considered a critical point on the global sustainable development agenda (Ozturk, 2015:999). According to Chirisa and Bandaiko (2015:392), changes in one element of the nexus affects the other two in substantive ways. An example of this is how water is used directly or indirectly in the generation of energy and food production and how energy, in turn, is needed to transport water (de Clercq, 2017; Finley & Seiber, 2014:6255). Given that 61 per cent of South Africa's water is used for agricultural irrigation, it is crucial that the water provided to farms is of good quality (Goga & Pegram, 2014:7).

As explained above, there are serious problems related to water scarcity and insufficient water infrastructure in the SSA region that need to be addressed urgently. As South Africa is already facing water shortages in several provinces, it is critically important to address further water crises in the country before they occur (Vogel & van Zyl, 2016:195; Bigas, 2012:xi). The infrastructure necessary to provide acceptable access to potable water is discussed therefore in the next section.

2.4 INFRASTRUCTURE NECESSARY TO PROVIDE ACCEPTABLE ACCESS TO POTABLE WATER

Jacobsen *et al.* (2013:8) list water purification infrastructure as an area where more development is required to increase access to water of acceptable quality. Potable water can be collected, purified and distributed via centralised or decentralised systems.

2.4.1 Defining centralised and decentralised systems of water supply

A centralised water management system favours water provision at a city-wide scale including wide area distribution networks (Makropoulos & Butler, 2010:2797). Centralised systems, which are connected to protected catchment areas containing raw water, are characterised by the purification of raw water and the safe distribution of adequate quantities of this water (Cook, Tjandraatmadja, Ho & Sharma, 2009:2). Potable water is delivered to users through pressurised pipe distribution systems (Galada, Montalto, Gurian, Sheller, Ayalew, Connor, 2014:2). Although these systems have benefits such as improved public health, environmental protection, streamlined operations, economies of scale and reliability, they are not necessarily feasible in developing regions (Galada *et al.*, 2014:2). Historically, decentralised systems have been used in peri-urban and rural areas where centralised systems are not technically, economically or environmentally feasible (Cook *et al.*, 2009:2).

Decentralised options are used to provide water to households or communities who can control and use such systems themselves (Makropoulos & Butler, 2010:2797). The infrastructure for these systems are either provided on-site or in a small cluster of joined systems. Figure 2.4 provides a graphical illustration of the difference between a centralised and decentralised system of potable water distribution.

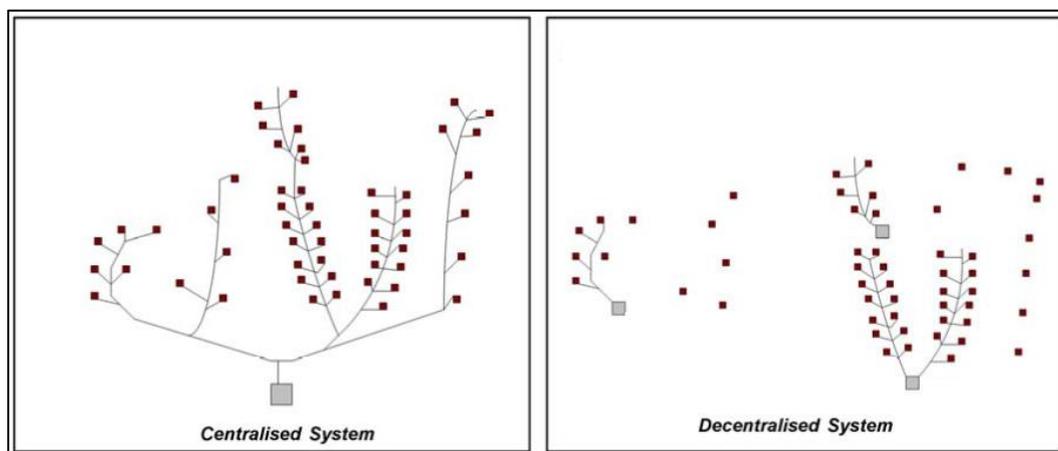


Figure 2.4: Centralised approach versus decentralised approach

Source: Cook *et al.* (2009:3)

As illustrated in Figure 2.4, decentralised water distribution systems are smaller networks (clusters) or individual facilities. As such, there is no central management of pipe systems as is the case in centralised distribution systems. When compared to centralised systems, decentralised systems have lower maintenance costs, require fewer upgrades, can be installed incrementally according to demand, and work on a ‘fit-to-purpose’ concept (Galada *et al.*, 2014:3; Sapkota, Arora, Malano, Moglia, Sharma, George, Pamminger, 2014:155). Other benefits of decentralised water infrastructure systems compared to centralised water management systems include smaller investments required, less bureaucracy, shorter delivery times and being less complex (Ringwood, 2016:5). These benefits make the implementation of decentralised systems ideal for rural and peri-urban areas.

Centralised water distribution systems fail to deliver water to those households outside the designated grid. Decentralised water distribution systems, however, have the potential to increase access to potable water in developing countries (Sima & Elimelech, 2013:7580). Private sector involvement in publicly owned assets, such as centralised water distribution systems, often faces opposition (El Gohary, Osman & El Diraby, 2006:595). According to these authors, the argument against private sector involvement is rooted in the sector’s return objectives which may cause concerns about issues such as rate hikes, quality assurance and transfer agreements.

Given the compatibility of a decentralised approach towards water purification and distribution systems in peri-urban areas and the advantages of such systems, the researcher is of the opinion that these systems might be a more viable investment option from a private sector impact investor’s perspective. The decision to provide decentralised water systems at a household or at a community level depends on the context as each level has its own characteristics. These characteristics are listed in Table 2.1.

Table 2.1: Application of decentralised water treatment systems at household and community levels

Characteristics	Household application level	Community application level
Capital requirements	Smaller	Larger
Upkeep requirements	Materials	Infrastructure and materials
Control of safe water system	Individual household	Cooperation at community level
Locus of responsibility	Individual household	Community and/or municipal government
Contamination risk	Lower as treatment of water closer to time of use	May be higher as water might still need to be transported
Suitability to land tenure status	More appropriate to low tenure security	High tenure security necessary
Treatment complexity	Low with untrained people	Medium with trained personnel
Economies of scale	None	Possible
Social impact on common issues	Individualises	Collectivises
Community organisation	May or may not be fostered, depending on approach of intervening party	Tends to foster cooperation
Public monitoring of water quality	Not feasible	Feasible

Source: Adapted from Ali (2010:727)

The researcher deduced from Table 2.1 that the investment in water purification infrastructure that serves a household or community is highly dependent on factors such as land tenure (ownership disputes), availability and proximity of a water source and the willingness of the community to be involved in the management of the system. The storage capacity in households must also be considered when developing such infrastructure. One obstacle at a household level is the impracticality of monitoring the quality of water.

As discussed in Chapter Three Section 3.2, impact investors need to achieve measurable social and environmental impact. Therefore, investments at a household level might not be considered viable for impact investors due to the difficulties in monitoring and measuring the quality of water. Careful due diligence and situation analysis should be conducted before investing to establish what would be the most appropriate form of infrastructure for a specific area. All these factors must be considered by an impact investor before making an investment decision.

Conventional water purification infrastructure provides solutions to problems pertaining to water quality and supply, but the treatment process is expensive. Therefore, the use of such infrastructure is unfeasible in most third-world countries (Shannon *et al.*, 2008:301). One of the alternatives is POU water treatment infrastructure that allows people to treat water for themselves in their own homes (Patil, Ahmad, Kausley, Balkunde & Malhotra, 2015:91). POU infrastructure is a form of decentralised water infrastructure consisting of a range of products.

2.4.2 Decentralised water purification systems

Decentralised water purification systems can provide acceptable access to potable water to individuals, households and communities. In the following sections, the different decentralised systems and products available will be investigated in more detail.

(a) Point-of-use systems providing potable water at an individual and household level

Many people living in peri-urban and rural areas use the water source closest to them whether it is contaminated or not (Arvai & Post, 2012:68; Peter-Varbanets *et al.*, 2009:249). Even if the source contains potable water, it is often contaminated between the point of collection, storage and the point of use. For this reason, development and sanitation experts promote the use of POU systems to treat collected water. These systems allow individuals without acceptable access to safe water to improve water quality by treating the water themselves and storing it safely in their homes (Sobsey, Stauber, Casanova, Brown & Elliott, 2008:4261). Examples of existing POU systems are presented in Table 2.2.

Table 2.2: Types of point-of-use water purification systems

Method used to purify POU water	Brief description	How it works	Examples of products in the market	Approximate cost per product
Chlorination	A chemical substance sold in bottles where the user dilutes water with sodium hypochlorite in a storage container and waits 30 minutes before drinking the water.	Sodium hypochlorite effectively inactivates bacteria and some viruses.	Chlorin WaterMaker CTI 8 Chlorinator	US\$0.37 per bottle (Chlorin) ZAR3 420 (1 000 WaterMaker sachets) US\$100 (CTI 8 Chlorinator)
Biosand filtration	Water is filtered through a slow sand filter and released through an outlet at the bottom of the filter.	A bioactive layer grows on top of the sand which reduces disease-causing organisms.	Samaritan's Purse BioSand filter	US\$16 – US\$100
Ceramic filtration	Water is filtered through a ceramic clay filter impregnated with colloidal silver and placed at the verge of the tap.	The majority of the bacteria is mechanically removed by the filters, but colloidal silver is needed to inactivate all the bacteria.	Potters for Peace filter Happy family water-system Silver Impregnated Clay pot (SIPP)	US\$10 (Potters for Peace) ZAR2 599; ZAR500 for additional filters (Happy family) ZAR240-300 (SIPP)
Solar disinfection	Transparent polyethylene terephthalate containers are filled with aerated water and exposed to solar ultra-violet rays.	Solar disinfection has been proven to inactivate some bacteria and viruses using the sun's ultra-violet rays.	Solarball Life sack	No prices available
Combined chlorination and filtration	A two-part system that chlorinates and filters contaminated water. Clean water is then tapped out of the bottom of the container.	Physical filtration removes particles and chlorination disinfects.	Gift of Water purifier	US\$18-22
Combined flocculation and chlorination	A two-step process consisting of a chemical coagulation step and a chlorination step.	The chemical coagulation step removes particles and the chlorination step disinfects.	PūR	US\$0.07-0.10 per sachet

Researcher's own construction based on: Watermaker purification sachet (2016); Ackerman (2014); Goodier (2012); How a biosand water filter works (2010); Mahlangu (2010:71); Barnes, Collin and Ziff (2009:24); Sobsey *et al.* (2008:4261); Linn (2007); Lantagne, Quick and Mintz (2006:19)

The types of POU water purification systems listed in Table 2.2 are some of the most widely used systems that individuals rely on to purify water for themselves. A POU system is recommended for individuals who transport water using an uncovered or unsanitary container as there is little chance of water re-contamination. These systems are also less expensive than other larger decentralised water purification systems that service communities, but often require frequent replacement. Impact investors considering to invest in water purification infrastructure could invest in the companies that produce these and other water purification products. Those who purchase and use POU systems, will save costs in the long run when considering the medical costs related to diseases caused by drinking contaminated water.

One method to decrease the costs of decentralised systems is to focus on providing infrastructure at a community level rather than at an individual or household level.

(b) Examples of decentralised potable water infrastructure at community level

According to Ali (2010:720), much of the focus in decentralised water systems has been on POU systems. There is, however, considerable potential for the development of water purification infrastructure at a community level (Ali, 2010:720). A few examples of decentralised water purification systems at a community level are discussed next.

The first example is a community water filter system. With this system, a purification device is connected to a contaminated water source and water is channelled into holding tanks. The water is then filtered into a second holding tank where all large sediment is removed. Through the use of manually operated pressure pumps, the water is then forced through filtering membranes to deliver potable water via a tap. These systems cost approximately US\$14 500 to US\$27 000 (Lifesaver C2, 2016a; Lifesaver C2, 2016b).

South African companies such as NuWater, Veolia, Container World and Nimbus have developed ‘packaged’ water purification plants, another example of decentralised water infrastructure for communities. These plants, which are often housed in shipping containers, purify almost any contaminated water into potable water. Most of these water purification systems have been developed with free moving parts and are ideal for remote rural locations. These water purification plants offer a simple, cost-effective option that has low maintenance and operation costs (Veolia, 2016). They cost approximately US\$37 000 a piece (Lombard, 2016).

Water purification centres developed by WaterHealth International is a third example of a decentralised system to provide potable water to communities. These centres are scalable solutions that also create job opportunities for the local community. The water purification centres are small, permanent structure that have the latest technology to purify water at a low cost. A consumer pays a once-off fee of, for example US\$5, and is then provided with potable water for a decade. Although these water purification centres cost between US\$25 000 and US\$30 000 and require an additional US\$300-350 per month to cover operating costs, they only have to function at 30 per cent capacity to break even (Wharton, 2012). Communities in India, Ghana, Liberia, Nigeria and Bangladesh have benefited from these centres (Communities we serve, 2016). As in South Africa, governments in these countries have also not been able to meet the growing demand for potable water.

As explained earlier, providing water purification infrastructure at a community level poses more challenges than providing it at an individual level. Nevertheless, community-level water purification infrastructure can be more sustainable in the long term as there is more opportunity for involvement from private sector impact investors, government and non-governmental organisations in developing and maintaining the infrastructure. According to Ali (2010:727), community-level water purification infrastructure also provides employment opportunities for community members and the quality of water can be monitored more easily. Furthermore, economies of scale can be created, making it a more viable investment option than would be the case with POU systems. Economies of scale decrease long-term costs by increasing the volume produced and spreading fixed costs over more units.

The researcher believes the best option to address the problems relating to acceptable access to potable water in South Africa is found in decentralised infrastructure at a community level. Many citizens could gain acceptable access to potable water that can be monitored and measured. In addition, it could create community involvement through job creation.

Given the growing need for potable water, innovative infrastructure is constantly being developed. These projects are often developed with an entire community in mind. Some of these creative projects will be discussed in the following section.

(c) Innovative water purification products

A grand challenge often stimulates innovation (Reid, Chen, Goldfarb, Hackmann, Lee, Mokhele, Ostrom, Raivio, Rockström, Schellnhuber, Whyte, 2010:917). The looming water

crisis across the globe is no exception. Apart from the cost-effective decentralised water purification systems that were discussed earlier, other recent innovative developments include new filtration technology, nano-technology and disinfection systems (Slaughter, 2010). A number of these innovations are listed in Table 2.3.

Table 2.3: Innovative water purification products that have been developed globally

Innovative development	Brief description	Examples of product	Approximate cost in 2016
Nano-technology	Two-stage filtration system that filters water through tiny pores using less energy than regular filtration systems. It can provide ten litres of potable water in an hour.	Graphene desalination	Under US\$3 per annum
Faecal waste/sludge convertor	Converts any combustible waste stream into potable water, electricity and pathogen-free ash. Creates revenue of up to US\$2.5 million per annum if all outputs are sold.	Omni-processor	US\$1.5 million
Vapour compression distillation	Machine heats, vaporises, evaporates and condenses polluted water into potable water. Uses a counter heat flow exchanger to generate electricity for a small village as well.	DEKA water purifier	US\$2 000
Inverse osmosis technology	Infrastructure that captures humid air, condenses and purifies it into potable water. Water is then stored in tanks.	Atmospheric water generator	US\$1 200
Dual-purpose water purification book	Pages of the book educate users about safe water practices and can be torn out and used as filters. The filter pages (coated with copper or silver nanoparticles to absorb bacteria) are inserted into a filter holder and the dirty water is poured through it.	The drinkable book	Still to be determined

Researcher's own construction based on: Ekocenter & slingshot clean water partnerships (2016); Begley (2015); Omni Processor S200 (2015); Foster (2014); Mollenhauer (2014); Chow (2013); Kiger (2013); Peckman (2013); Prois (2013); Yirka (2013); Chandler (2012); Cohen-Tanugi and Grossman (2012:3607)

The innovative products highlighted in Table 2.3 are indicative of what has been achieved worldwide in providing solutions to the growing lack of acceptable access to potable water. These exciting developments in the water sector are paving the way for new investment opportunities. In addition, the technology that is used in packaged treatment plants, point-of-entry systems, POU systems and desalination plants make them increasingly cost-effective and environmentally friendly (Savage & Diallo, 2005:332).

Communities who live near the coast have access to vast quantities of water in the sea, but the seawater's salt content makes it dangerous for consumption. However, by using the process of desalination, saltwater can be converted into potable water (Sood & Smakhtin, 2014:1111). The

process of desalination and the viability of investment in such desalination infrastructure will be discussed next.

(d) Provision of potable water using desalination

Desalination is the process of removing dissolved minerals in saline water thereby converting it into freshwater (Fragkou & McEvoy, 2016:1; Greenlee, Lawler, Freeman, Marrot & Moulin, 2009:2318). The process is very capital and energy intensive which limits its adoption (Shannon *et al.*, 2008:306). However, due to recent technological advances the cost of desalination is decreasing (Sood & Smakhtin, 2014:1121).

According to Swartz, Du Plessis, Burger and Offringa (2006:647), the cost of desalination in South Africa has fallen to such an extent that it is fast becoming a viable option to increase the volume of potable water in the country. These authors' 2006 investigation revealed that the production cost ranged between ZAR2.26 and ZAR8.30 per kilolitre. The cost depended on management, transport, electricity, labour and membrane replacement costs in the areas investigated. They compared this to conventional water treatment costs which ranged between ZAR1.04 and ZAR3.39 per kilolitre in the same year. Although desalination is slightly more expensive on average, it provides a viable case for future investment.

The market for desalination at a large scale is apparent (Sood & Smakhtin, 2014:1121). Population growth and urbanisation have increased the pressure on SSA's drinking water supply (Jacobsen *et al.*, 2013:xvii). According to these authors, rapid population growth means that half of the infrastructure of the cities of 2035 still needs to be built. Therefore, desalination infrastructure will be needed to fill the supply gap as the demand for water will continue to increase while fresh water sources become scarcer. The gap in the market was noticed by the DWS and in 2016, South Africa and Iran forged a partnership to develop desalination plants along all coastal communities to improve water supplies (Roelf, 2016). In 2017, the City of Cape Town started the research and development process that could lead to three new desalination plants being established in the Western Cape (Evans, 2017). The focus on developing desalination infrastructure in South Africa is thus an encouraging sign for impact investors.

2.5 THE DEVELOPMENT AND MAINTENANCE OF WATER INFRASTRUCTURE IN SOUTH AFRICA

The Bill of Rights in the South African Constitution (1996) states that every citizen has the right to sufficient water of acceptable quality. It is therefore the government's responsibility to provide potable water to all citizens (DWS, 2015:3).

2.5.1 The South African government's responsibility in developing and maintaining water infrastructure

The DWS along with water boards and municipalities are responsible for managing regional bulk (large-scale) water provision in South Africa. Water boards and some larger municipalities purify water to potable standards. The DWS regulates the quality of drinking water against standards as stipulated in the SANS 241 requirements and provides recommendations to various role players in the sector. Additionally, the DWS also oversees and regulates the formulation and implementation of water policies through its nine provincial offices (DWS, 2016). Furthermore, they function at all levels of the water provision process depicted in Figure 2.3 - from water resource management, water abstraction, water processing (including purification) and distribution of potable water, to the treatment and discharge of waste water (DWS, 2015:3).

In 2001, the South African government decided to provide a basic supply of water free of charge. Their policy specifies that six kilolitres should be provided per household per month free of charge (Palmer Development Group, 2007:5). It means that every citizen has access to at least a basic minimum of free potable water. Once this limit is exceeded, municipalities charge tariffs similar to tariffs for two of the largest municipalities in the country shown in Tables 2.4 and 2.5.

Table 2.4: Average domestic water tariffs in Cape Town, South Africa^(a)

Volume of water consumed (kl) ^(b)	Average 2016/17 tariff incl. VAT (ZAR/kl)
0 to 6	0
6 to 10.5	14.89
10.5 to 20	17.41
20 to 35	25.80
35 to 50	31.86
Over 50	42.03

Source: The City's Budget 2017-2018 (2017)

^(a) For consumptive level one

^(b) 1kl = 1m³

Table 2.5: Average domestic water tariffs in Johannesburg, South Africa^(a)

Volume of water consumed (kl) ^(b)	Average 2016/17 tariff incl. VAT (ZAR/kl)
0 to 6	0
6 to 10	7.14
10 to 15	12.07
15 to 20	17.65
20 to 30	24.03
30 to 40	25.81
Over 40	32.27

Source: City of Johannesburg Tariffs 2016 /17 (2017)

^(a) For consumptive level one

^(b) 1kl = 1m³

The tariffs charged by the DWS should be compared to sources of purified water such as bottled water and water vendors to understand the relative costs. The average price for a 1.5 litre bottle of water in South Africa in 2016 was ZAR13.61 (Cost of living in South Africa, 2016). When calculated per kilolitre, this translates into ZAR9 073.33 which is substantially more than the water per kilolitre provided at any level in Tables 2.4 and 2.5. Refilling stations or water vendors in South Africa charged approximately ZAR1.00 per litre in 2016. At this price, vendor water per kilolitre is still over 250 times more expensive than tap water per kilolitre. The selling point of these two strategies is that water treated by the DWS still contains chemicals which are harmful in the long term, whereas the water provided by these vendors is safe to consume (The problem with tap water, 2016; Cobbing, Eales, Gibson, Lenkoe & Cobbing, 2015:22; Momba, Tyafa & Makala, 2006:715). In Chapter Four Section 4.2.3, the moral dilemma of charging an affordable price for a basic human right, such as water of a drinkable quality will be deliberated.

Although the DWS is involved in the entire water provision process of providing potable water, it does not execute every function as a number of these functions are constitutionally assigned to sector partners. Rather, the DWS is described as the custodian of South Africa's water sources. In this role, the DWS is expected to promote effective and efficient water resource management to ensure sustainable economic and social development so that all South Africans can gain access to potable water and dignified sanitation (DWS, 2016). Many institutions are involved, at various stages, in the development and maintenance of water infrastructure in the country. These institutions and the role that they play in the development and maintenance of water infrastructure is briefly described in Table 2.6.

Table 2.6: Institutions involved in the development and maintenance of water infrastructure in South Africa

Institution	Brief description of role and function	Tasked with Infrastructure development	Undertakes water research, development and innovation	Involved in maintenance and/or operations
Department of Water and Sanitation	Policy maker, regulator, planning and implementation	Yes	No	Yes
Water boards	Bulk water provision.	Yes	No	Yes
District municipalities	Bulk water provision.	Yes	No	Yes
Water user associations	Co-operative associations of individual water users who undertake water-related activities for their mutual benefit.	Yes	No	Yes
Water services authorities	Planning, implementing and operating infrastructure necessary to provide effective, affordable and sustainable water infrastructure.	Yes	No	Yes
Public-private partnerships	Water services provision, operations and maintenance.	Yes	No	Yes
Department of Health	Ensuring that all hospitals in South Africa are provided with the necessary water infrastructure.	Yes	No	No
Department of Public Works	Implementing community-based public works.	Yes	No	Yes
Municipal Infrastructure Support Agency	Providing technical support to and assisting municipalities to strengthen their internal capacity for delivery and maintenance of basic service infrastructure.	No	No	Yes
Komati Basin Water Authority	Bi-national implementation agent for water resources (South Africa and Swaziland).	Yes	No	Yes
Trans-Caledon Tunnel Authority	Provides project-specific finance towards the Lesotho Highlands Water Project which has a lifespan of 25 years.	Yes	No	No
Council for Scientific and Industrial Research	Responsible for multi-disciplinary research and development in science, engineering and technology.	N/A	Yes	N/A
Agricultural Research Council	Funds and undertakes water research in the agricultural sector.	No	Yes	N/A
Council for Geoscience	Develops and publishes world-class geoscience knowledge products and render geoscience-related services to the South African public and industries.	Yes	Yes	N/A

Source: Adapted from the DWS (2015:15); Ruiters and Matji (2015:674)

As shown in Table 2.6, there are a variety of role players involved in the development and maintenance of water infrastructure in South Africa. These include government departments, engineering companies, research institutions and private sector companies. Although the DWS is working to expand the existing centralised water provision network, it still does not reach many peri-urban and rural areas (Cheung, 2010:142; Montgomery & Elimelech, 2007:20).

The Chief Executive Officer (CEO) of a multi-national water company argued that immediate pressures make long-term planning difficult as temporary and emergency solutions are draining the available water sources (Ringwood, 2016:4). He is, furthermore, of the opinion that alternative decentralised solutions are gaining traction in both the municipal and private sectors in South Africa. Positive feedback regarding decentralised solutions is an encouraging sign for impact investors considering investing in water purification infrastructure in peri-urban areas. However, the provision of potable water is still mostly the responsibility of the government. To better understand the dynamics of acceptable access to potable water in South Africa, impact investors must understand the shortcomings of the government.

2.5.2 Reasons for the South African government's failure in the provision of potable water

Two reasons for the South African government's failures in the provision of drinking water were evident in extant literature. These two reasons will be discussed in this section.

(a) Lack of skilled personnel in the water sector

The South African government endeavoured to provide potable water to the country's citizens as part of their commitment to the Millennium Development Goals. After meeting these goals for the provision of drinking water in 2005, the rate of water infrastructure service delivery by the South African government slowed down (Lehohla, 2015:36). The presidency attributed the slow-down to the shortage of bulk infrastructure and the undersupply of professionals required for the development and maintenance of new water systems. Many municipalities are also facing challenges such as the lack of technical, planning and management skills needed to ensure proper development and maintenance (Ruiters & Matji, 2016:291).

In a DWS report titled 'Strategic overview of the water sector in South Africa for 2015', the lack of skills, especially in the technical field of water management, is listed as a challenge. As most municipalities experience a high staff turnover, consistent management practices do not occur. In 2011, it was reported that 72 per cent of the posts in the water sector were filled, but that only 51 per cent were budgeted for (DWS, 2015:70). Furthermore, more than half of the

employed technical managers were under-qualified. Since 2015, there have only been three civil engineers per 100 000 people in South Africa. Accordingly, the civil engineering capacity is far too low to expect sustainable water sector management.

(b) The public financing gap of water purification infrastructure in South Africa

Government's failure to provide and maintain water purification infrastructure can also be attributed to insufficient financing. As economic and social progress occurs, there is often pressure on governments to provide and improve infrastructure beyond what their budgets can support (Drexler, Noble, Classon & Mercep, 2014a:13). Developing countries rely heavily on public sector investments to fund their water infrastructure needs. Even though 75 per cent of the financing comes from government sources in developing countries, the water infrastructure financing requirements have not been met (Rodriguez *et al.*, 2012:38).

In South Africa, water infrastructure is financed either through the national budget or the Trans-Caledon Tunnel Authority (National Treasury, 2011:126). In his 2016 national budget speech, the Minister of Finance allocated ZAR15 billion over the medium term towards the construction of bulk water and sanitation infrastructure (Gordhan, 2016:21). Furthermore, the Minister stated that during the same year the DWS had already reprioritised ZAR502 million to increase access to water in drought-stricken areas. According to Turton (2016:223), the response of government has been inadequate and too late given that the region experienced the worst drought ever. The year 2015 was declared as the driest year on record in South Africa, while dam levels have been reported to be at the lowest levels in history (Turton *et al.*, 2016:15). As alluded to in Section 2.2.2, the water scarcity is made even worse by leakages that still occur in South Africa's water provision process. In addition, only a fraction (16%) of the total volume of sewage water in South Africa is processed to an acceptable standard to be released back into rivers and dams (Isa, 2016).

According to South Africa's National Water Resource Strategy, an estimated ZAR670 billion is required over the next ten years for the construction of new infrastructure and for the refurbishment of existing infrastructure (Millson & Roux, 2015:15; DWA, 2013:84). Yet, only 45 per cent of the ZAR670 billion has been budgeted for by government (Maimane, 2015). An additional ZAR30 billion is required for sustainable water management programmes, bringing the total capital needed to ZAR700 billion. Therefore, an approximate ZAR70 billion is required per annum over the next ten years. Currently, only ZAR30 billion per annum is being accessed from all institutions, public and private, for water sector investment in the country

(DWA, 2013:84). This amount includes capital beyond the infrastructure grant funding provided by internal and external entities such as the private sector funding for additional borrowing (National Treasury, 2011:133). From the above it is clear that water infrastructure is immensely under-financed in South Africa at present.

A major concern is expressed in the National Development Plan that the South African government does not have the required institutional or financial capacity to finance and implement the infrastructure investment plans as set out in the National Resource Strategy (Lubisi, 2014:119). To put this concern into perspective, only ZAR10.2 billion was allocated to the water sector in the 2013/14 budget of the then Department of Water Affairs (DWA, 2013:84). It is evident that the private sector should contribute substantially more (approximately ZAR40 billion per year) to enable the sufficient development of water infrastructure.

2.5.3 Private sector investment as a potential solution to the public financing gap

Developing countries facing growing infrastructure needs have used PPPs to combat inefficient and expensive maintenance and development in the face of budgetary constraints (Trebilcock & Rosenstock, 2015:350). These partnerships in the water sector “involve transferring some or all of the ‘assets’ [and]/or ‘operations’ of [the] public water systems into private hands” (Ameyaw & Chan, 2015:429). As discussed in Section 2.2.2, peri-urban areas are often located outside the zones that receive water from public water systems. Therefore, private sector investment in these areas will not necessarily imply a transfer of assets, but rather new developments.

Proponents of private sector involvement in the development of water purification infrastructure argue that these investments will increase efficiency and water quality, extend public service delivery, increase water infrastructure provision and relieve stress on fiscal budgets (Brinkerhoff & Brinkerhoff, 2011:4; Koppenjan & Enserink, 2009:285; Kirkpatrick, Parker & Zhang, 2006:144).

Barriers to private sector investment involve concerns about monopolistic service provision, the over-exploitation and misallocation of resources, the production of social and environmental externalities, regulatory weaknesses and the under-provision of basic needs (Venkatachalam, 2015:135; Koppenjan & Enserink, 2009:286; Kirkpatrick *et al.*, 2006:144). Furthermore, the debate for or against private sector involvement focuses on the moral dilemma

of making a return from providing a basic human right such as acceptable access to potable water.

The primary argument against the involvement of the private sector is about the transferring control of essential services to for-profit companies (Davis, 2005:147; Lee & Floris, 2003:280). According to Koppenjan and Enserink (2009:284), the concerns are about the compatibility of the private sector's short-term focus on financial returns on the one hand, and the long-term approach needed to meet sustainability targets on the other hand. Impact investing provides a compromise between these two approaches. While impact investors do consider financial returns, they also focus on the social and environmental impact objectives that must be met. An in-depth discussion on the motives of impact investors is provided in Chapter Three Section 3.2.

To attract more financing from the private sector, investors must be appropriately incentivised. Certain financial instruments can be used to encourage private sector investment by lowering financial risk, eliminating perceived risk and reducing investment transaction costs (Rodriguez *et al.*, 2012:28). These instruments include tax-exempt municipal bonds, concessional loans, credit guarantees, commercial loans, equity and contractual schemes. Municipal bonds that are tax-exempt have been issued by the City of Johannesburg. These bonds are guaranteed by the World Bank which significantly lowers their financial risk (Rodriguez *et al.*, 2012:29). According to these authors, concessional loans can also be used for the same purpose. These loans are provided to government at a discounted interest rate, higher grace periods and longer repayment terms than what they would normally receive from banks. Similarly, government could also provide credit guarantees to local water authorities. These credit guarantees reduce risk and enable local water authorities to raise private capital more easily. Another incentive option is to provide contractual schemes to the private sector at various stages of the water provision process.

Investments in water purification infrastructure can also be funded through equity and commercial loans (Yamada *et al.*, 2011:5). The use of equity as the investment instrument will result in joint ownership of the assets according to the amount of financing an impact investor provides. A commercial loan is a debt-based funding arrangement where repayments are amortised over the period of the loan. Ultimately, impact investors need to make a market-related, risk-adjusted return on their investment on the one hand, while ensuring that society and the environment benefit from the investment on the other hand. The debt instrument

described provides market-related repayable finance. Therefore, impact investors can earn market-related returns to satisfy their financial objectives. The relevant due diligence should be conducted to establish the best investment options for the targeted community.

2.6 SUMMARY AND CONCLUSIONS

Millions of people across SSA lack acceptable access to potable water. South Africa is a water-scarce country suffering from the worst drought in recorded history, yet as much as 37 per cent of water is lost through leaking pipes and inadequate infrastructure. The quality of potable water that is available for consumption in South Africa has also decreased in recent years.

Some of the worst affected South Africans live in peri-urban areas. These short-term transition zones fall outside the national water-supply programmes targeting rural and urban areas. As residents are left without acceptable access to potable water infrastructure, these peri-urban areas were the focus of this study.

The consequences related to access to potable water are extensive. Millions of deaths are associated with unacceptable access to potable water. These deaths are caused by water-borne diseases that are contracted through consuming contaminated water. Women and children are mostly burdened with collecting water over long distances, preventing them from attending school or performing activities that could be more beneficial to their families, local communities and the economy at large. This grand challenge also puts major strain on government budgets. Economic losses related to this problem are the worst in the SSA region when compared to other parts of the world. Furthermore, the shortfalls in the water sector have a considerable economic impact on the food and energy sectors as well.

Water could be delivered to individuals and communities via centralised or decentralised systems. Centralised systems of water provision provide water at a city-wide scale while decentralised systems provide water for individuals, households and local communities. The benefits of decentralised systems include smaller investments, less bureaucracy, shorter delivery times and the fact that it is less complex than centralised water management systems. Given the complexity involved with establishing centralised systems in peri-urban areas, decentralised systems are the most viable investment option for impact investors. Furthermore, decentralised infrastructure that purifies water at an individual and household level is becoming increasingly available and affordable. The researcher believes that decentralised water

purification infrastructure that provides water at a community level will be the most effective system and the best suited for impact investors interested in these kinds of investments.

In South Africa, the DWS regulates the formulation and implementation of water policies and water boards while certain bigger municipalities are responsible for water treatment. Several other institutions and role players are involved in the development and maintenance of water infrastructure in the country. These institutions have, however, failed to provide potable water to all citizens and particularly those living in peri-urban areas. The failure can be partly attributed to the lack of experienced personnel and the lack of skills in the water sector. However, much of this failure is due to insufficient financing where approximately ZAR700 billion is required over the next ten years for the development and maintenance of water infrastructure in the country.

Many countries worldwide have been using PPPs to overcome the backlogs in public sector financing, but this approach has yielded mixed results. The main debate centres on transferring control of essential services to for-profit companies. The leading argument against private sector involvement centres on the compatibility of the private sector's short-term focus on financial returns with the long-term perspective needed to meet sustainability targets. Impact investing provides a possible solution to this problem. Although impact investors consider financial objectives, they also focus on the measurable impact that their investments could have on society and the environment. Given the important role that impact investors can play, the phenomenon of impact investing will be discussed in detail in the following chapter.

CHAPTER THREE

IMPACT INVESTING: THE MOTIVES, PROCESS, BARRIERS AND OPPORTUNITIES

3.1 INTRODUCTION

In the previous chapter, the extent of the crisis surrounding unacceptable access to potable water was discussed in detail. It was pointed out that the failure of the South African government to provide potable water to its citizens is partly due to insufficient financing for water infrastructure. It was suggested that impact investing could provide a solution to this problem. Investing to address social and/or environmental challenges is not a new idea (Revelli & Viviani, 2015:1). Recent market developments and efforts by various role players have, however, generated renewed interest in this proactive and promising RI strategy.

The focus of this chapter will be on impact investing in general and will include a discussion on the size of the impact investment market, the role players and the impact investing process. The barriers and opportunities in this market will also be reviewed. In the next chapter, the focus will shift to impact investing in water purification infrastructure in particular. To gain a better understanding of the impact investing phenomenon, the term will first be defined.

3.2 DEFINING IMPACT INVESTING

The term ‘impact investing’ was only formalised in 2007, but has a long history under different names (Höchstädter & Scheck, 2015:449; Bishop, 2014:3). Impact investing is one of several RI strategies and has been referred to in the literature as ‘cause-based investing’, ‘targeted investing’ and ‘community investing’ (Freireich & Fulton, 2009:14; Viviers, Bosch, Smit & Buijs, 2009:3). The lack of a uniform definition has been the centre of much academic discussion since the term was first coined at the 2007 Rockefeller Foundation convention (Höchstädter & Scheck, 2015:449; Sales, 2015:1; Drexler *et al.*, 2014a:9; Jackson, 2013a:97; Harji & Jackson, 2012:ix; Viviers *et al.*, 2011:224).

Arosio (2011:18) warns that if an overly broad definition is adopted, the credibility of the asset class would be undermined. However, a broad definition could allow investors to pursue a wider range of opportunities (Drexler *et al.*, 2014a:9). On the other hand, a definition that is too narrow could limit the investment of capital due to an increased perception that impact investing is a niche investment strategy (Drexler *et al.*, 2014a:9; Arosio, 2011:18). Nevertheless, a precise definition could enable the scaling of the impact investment market. Since the market currently

lacks many investments with successful track records and quantitative data (see Section 3.6.2), a narrow definition could facilitate the gathering of robust data (Barby & Pedersen, 2014:17; Drexler *et al.*, 2014a:9). This in turn could create better risk and return profiles, benchmarks and the standardisation of impact measurement.

There are elements of the definition that are generally agreed upon by both scholars and practitioners. Firstly, an impact investment should be an active and intentional deployment of capital (Bonsey, Cohen & Noble, 2016:3; Burand, 2014:58; Freireich & Fulton, 2009:11). The investment of capital must be deliberate and the investor must have social and/or environmental outcomes in mind from the outset (Grabenwarter & Liechtenstein, 2011:11). Therefore, the impact of the investment cannot be coincidental, but rather the investor must intentionally and actively seek investment opportunities that align with his/her social and/or environmental objectives. Moreover, the adverb ‘actively’ alludes to the notion that the investor is seeking opportunities and not merely screening out funds or companies that have an adverse impact on society or nature in some or other way (Brest & Born, 2013b:24).

Secondly, the impact of the investment should be measurable (Bonsey *et al.*, 2016:3; Bishop, 2014:1; Burand, 2014:58; Drexler *et al.*, 2014a:9). According to Grabenwarter and Liechtenstein (2011:11), it is essential to establish clear social and/or environmental goals before a financial commitment is made. Furthermore, the progress of the impact must be measured by asset managers and reported to investors to ensure transparency and accountability (What you need to know about impact investing, 2016).

Impact investment best practices include setting performance metrics based on the investor’s objectives and using standardised metrics where possible. In an effort to establish a standardised set of metrics, the Global Impact Investing Network (GIIN) initiated the Impact Reporting and Investment Standards (IRIS) in 2009 and later the Global Impact Investing Rating System (GIIRS). A study for JP Morgan and GIIN in 2015 found that 60 per cent of the respondents in their study used metrics aligned with IRIS, 58 per cent used investment-specific metrics, while some respondents used both (Saltuk, 2015:38). In addition, by using consistent metrics a better understanding is gained of the process and outcomes (Jackson, 2013a:97).

A third element regarding the common understanding of impact investing among scholars and practitioners is that there should be a positive correlation between the intended social and/or environmental impact and the financial return of the investment (Sales, 2015:1; Saltuk,

2015:11; Bishop, 2014:1; Burand, 2014:58; Arosio, 2011:18; Freireich & Fulton, 2009:11). Grabenwarter and Liechtenstein (2011:10) emphasise that there should be no trade-off between impact and financial return. However, a small number of impact investors have been known to accept concessionary rates of return to focus on the impact they could create. These investors are referred to as impact-first investors (See Section 3.5.1). Impact investors often have different objectives regarding the financial return they seek (Grabenwarter & Liechtenstein, 2011:7). The different types of impact investors are discussed in more detail in Section 3.5.1.

Lastly, an impact investment must have a positive effect on society and/or the natural environment (Sales, 2015:1; Saltuk, 2015:11; Barby & Pedersen, 2014:5; Drexler *et al.*, 2014a:9; Arosio, 2011:18). An impact investor must consider the net impact of his/her investment by taking into account the associated benefits and harms (Brest & Born, 2013a). Impact investors could have good intentions and objectives, but could still have a negative effect on society and the natural environment. It is therefore important to conduct pre-emptive research of the intended impact. This research, or due diligence exercise, is part of the impact investing process which is explained in Section 3.5.

Drawing on these elements underlying a mutual understanding of impact investing, the term is defined in this study as an RI strategy where investors actively and intentionally seek to generate both measurable, positive social and/or environmental impact and market-related, risk-adjusted financial return. In the context of this study, impact investors could invest directly in for-profit entities and social enterprises that develop water purification infrastructure. Alternatively, they could invest in an impact investment fund that supports the development of water and sanitation infrastructure. A number of local RI funds have such mandates (Viviers *et al.*, 2011:222).

In light of this definition, it is apparent that impact investors have dual motives of financial returns and social and/or environmental impact. These motives and their supportive references are summarised in Table 3.1.

Table 3.1: Motives of impact investors

Motive	Supporting references
Desire to earn market-related, risk-adjusted financial returns	Höchstädter & Scheck (2015:454); Ormiston <i>et al.</i> (2015:4); Brest & Born (2014:4); Harji & Jackson (2012:10); Viviers <i>et al.</i> (2011:215); Freireich & Fulton (2009:31)
Desire to make a measurable, positive social and/or environmental impact	Bonsey <i>et al.</i> (2016:3); Sales (2015:1); Saltuk (2015:11); Barby & Pedersen (2014:5); Burand (2014:58); Drexler <i>et al.</i> (2014a:9); Brest & Born (2013a); Arosio (2011:18); Grabenwarter & Liechtenstein (2011:11); Freireich & Fulton (2009:11)

Source: Researcher's own construction based on the cited sources

Instruments such as equity, debt, alternative assets, guarantees and grants are typically used to devote capital towards impact investments (Mudaliar *et al.*, 2016a:70; Sales, 2015:23). Most of the opportunities in the impact investment market are found in private markets such as real assets, private debt, private equity and venture capital (Barby & Pedersen, 2014:14).

A prime example of an impact investment that has achieved both the motives outlined in Table 3.1, is the International Finance for Immunisation Fund. This fund was established in 2006 to finance immunisations in the world's 70 poorest countries. With support from the Gates Foundation, 213 million children have been immunised, preventing more than 3.4 million premature deaths. Over US\$1.6 billion has been raised through this fund and it retained its premium AAA credit rating. The fund provided returns slightly higher than market returns when compared to similar government bonds (Sanches, 2010:34).

Another example is the Blue Orchard Senior Debt Fund that provides microfinance to low-income, unbanked and isolated beneficiaries. These micro loans range from US\$50 to US\$8 000 with an average of US\$1 584. Of the 400 000 micro-entrepreneurs that were reached in 31 countries, 41 per cent lived in rural areas (Sanches, 2010:18). The return objective of the fund is the six-month Libor plus 100/200 basis points. Between 2006 and 2008 the fund showed a net annualised return of six per cent, matching its benchmark (Sanches, 2010:18).

The two examples discussed above are known as 'social impact' bonds. They are innovative financial instruments used to finance grand social challenges and have elements of both equity and debt (Arena, Bengo, Calderini & Chiodo, 2016:928; Warner, 2013:303). According to Jackson (2013b:614), social impact bonds are increasingly being accepted by the world's advanced economies. As they are tested in advanced economies, their acceptance should also spread to the developing world where it could be an extremely effective tool in addressing social and/or environmental problems. Having defined impact investing, the discussion now turns to the size of the impact investment market.

3.3 SIZE OF THE IMPACT INVESTMENT MARKET

The global impact investment market is growing quickly. In this section, the size of the global impact investment market will be presented. The focus will then shift to the size of the SSA impact investment market with particular attention given to South Africa.

3.3.1 Size of the global impact investment market

In 2009, Freireich and Fulton (2009:5) estimated that the global impact investment market could reach a size of US\$500 billion before 2019. Similarly, other market analysts predict that the market could potentially grow to between US\$400 billion and US\$1 trillion by 2020.

Ormiston *et al.* (2015:4), however, found that obtaining an accurate measurement of the size of the global impact investment market is difficult as public information regarding transactions is often not freely available. The size of the global impact investment market also varies depending on whether a narrow or a broad definition of impact investing is used. For example, Mudaliar, Schiff, and Bass (2016b:5) estimated that by the end of 2015 capital committed towards impact investments would reach US\$116.2 billion. However, in a study among 156 respondents, the GIIN reported that impact capital under management in May 2016 only amounted to US\$77.4 billion.

Nonetheless, even if there is not consensus on the exact size of the impact investment market, most parties agree that it still has a great growth potential (Mudaliar *et al.*, 2016b:5; Clark, Emerson & Thornley, 2012:9). This growth potential is evident in the increasing number of mainstream investors (such as JP Morgan, Deutsche Bank and Goldman Sachs) entering the market (Höchstädter & Scheck, 2015:450).

Given this possibility of market growth, the impact investment market size estimates for 2020 are not over-optimistic. The predicted growth is fuelled by a low correlation with mainstream investment strategies (notably equity), increased networks and a growing recognition that impact investment funds offer diversification benefits (Höchstädter & Scheck, 2015:450; Ormiston *et al.*, 2015:14; Vaccaro, 2014:5; Viviers *et al.*, 2011:219). Growth is further stimulated by a shift in long-term thinking regarding social and/or environmental considerations and the surge in social entrepreneurship (Höchstädter & Scheck, 2015:450). It is estimated that by 2020 the impact investment market will represent approximately one percent of global assets under management (Harji & Jackson, 2012:17). If this market continues to grow at this rate,

there are bound to be many opportunities for impact investors. Many of these opportunities are found in the developing world, including SSA.

3.3.2 Exploring the size of the impact investment market in sub-Saharan Africa with specific focus on South Africa

Over two-thirds of impact investment transactions occur in developing markets and mostly take the form of debt financing (Burand, 2014:60). A survey conducted in 2014 estimated the size of the impact investment market in SSA at just over US\$11 billion (Shamash & Ashley, 2015:7). More recent estimates in the GIIN 2016 report on the ‘Impact investing landscape in Southern Africa’ show that ‘disbursed impact capital’ amounts to US\$29.1 billion. The majority of this capital (approximately US\$24.2 billion) was supplied by development finance institutions through equity, guarantees and debt such as social impact bonds. This amount, however, represents only a small portion of the global impact investment market.

There are considerable opportunities for South Africa, as a developing market, to be part of the global growth of the impact investment market. As a developing economy, many opportunities in the South African market lie with small and medium-sized social enterprises. South Africa is well-positioned to accommodate impact investments as the country is the largest impact investment market in SSA (Sales, 2015:21; Viviers *et al.*, 2011:223). The amount of impact capital invested in South Africa is 15 times more than the country second to it in the Southern Africa region namely, Zambia (Mudaliar *et al.*, 2016a:62). Impact investments, however, still only represent a small percentage of the total investment landscape in South Africa as revealed in Figure 3.1.

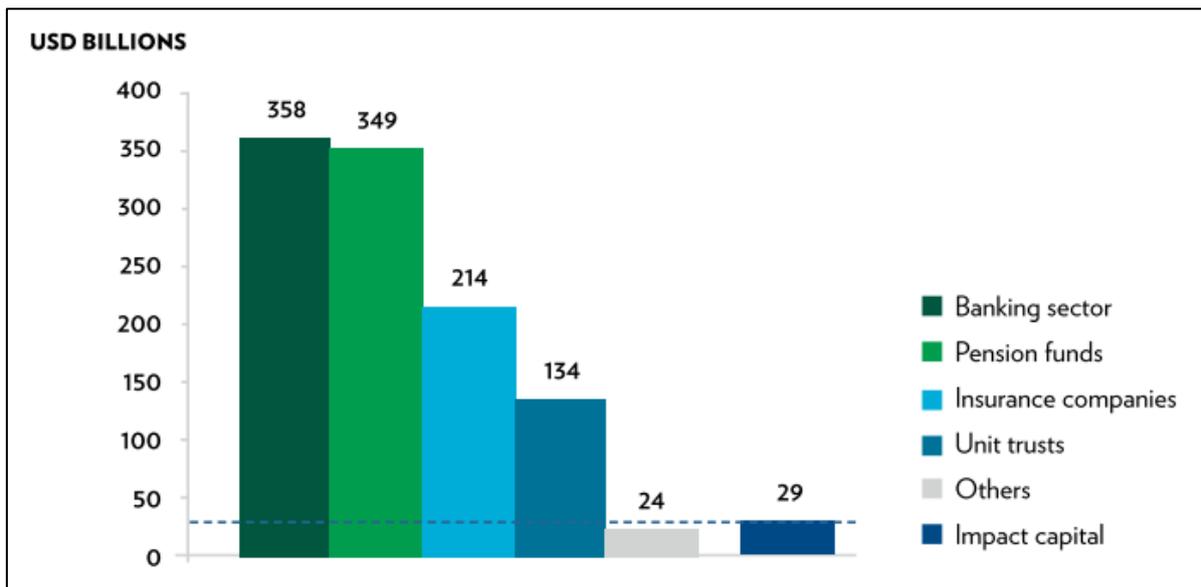


Figure 3.1: Size of the impact investment market compared to the overall investment market in South Africa

Source: Mudaliar *et al.* (2016a:58)

As seen in Figure 3.1, impact investment capital represents only a fraction of the total investment market in South Africa. Even so, the country is still seen as the gateway for impact investing in SSA. According to Mudaliar *et al.* (2016a:70), 36 impact investors had headquarters in South Africa in 2016 and an additional 26 international investment companies had regional branches in the country. The presence of these impact investment companies show an intent to conduct business in SSA through the South African impact investment market.

Viviers *et al.* (2011:223) reviewed 53 South African RI funds which were established between 1 June 1992 and 31 December 2010. Twenty-seven of these funds had impact investment mandates, most of them focussing on social infrastructure development in rural areas. Furthermore, almost half of the local impact investment funds were targeted at Broad-Based Black Economic Empowerment (B-BBEE) enterprises. It is thus evident that a large number of these local funds have a mandate to invest in impact-oriented infrastructure.

There are many role players involved in the impact investment market. As will be indicated in the next section, various categories can be used when describing the role players in the market.

3.4 ROLE PLAYERS IN THE IMPACT INVESTMENT MARKET

According to Jackson (2013a:97), role players in the impact investment market can be divided into four categories. Examples of the role players in the four categories are depicted in Table 3.2.

Table 3.2: Role players in the impact investment market

Asset owners	Asset managers	Demand-side role players	Service providers
Institutional investors - Pension funds - Insurance companies - Collective investment schemes management companies Retail investors	Investment advisors Fund managers Family offices Banks Venture capital funds Sovereign wealth funds Development finance institutions	Large, established businesses Small and medium-sized social enterprises Co-operatives Microfinance institutions Community development finance institutions	Standard-setting bodies Consulting firms Non-governmental organisations Higher education institutions Capacity development providers

Source: Adapted from South African Reserve Bank (2016); Sales (2015:22); Harji and Jackson (2012:9)

As illustrated in Table 3.2, there is a diverse range of role players across the impact investment market who fulfil various functions in the impact investment life cycle. According to Harji and Jackson (2012:9), some of these role players are involved in multiple categories. For example, some asset owners perform their own asset management. However, to simplify the case at hand, a distinction was made in Table 3.2 between those role players who own assets who are invested for impact and those who manage these assets on behalf of asset owners. These two categories include large and small entities who are involved in impact investing. Furthermore, a category was created for demand-side role players who receive and use the capital provide by the asset owners to create the impact. These role players' intention is to generate a financial return and social and/environmental impact. The final category is used to depict the service providers who engage with the other role players to create a more networked and efficient impact investment market. This research included role players from all four categories. The different types of impact investors are discussed in more detail in Section 3.5.1.

The flow of capital from asset owners to where it eventually makes a measurable impact and generate returns, follows a normal investment process with some small adaptations. This process will be discussed in the following section.

3.5 THE IMPACT INVESTING PROCESS

Impact investors ultimately desire to earn a financial return and to ensure that a social and/or environmental impact is achieved. To understand how this blended value proposition moves

from a good idea to actual returns and impact, the investing process must be slightly adapted. In Figure 3.2, the impact investing process is illustrated from the perspective of an asset owner.

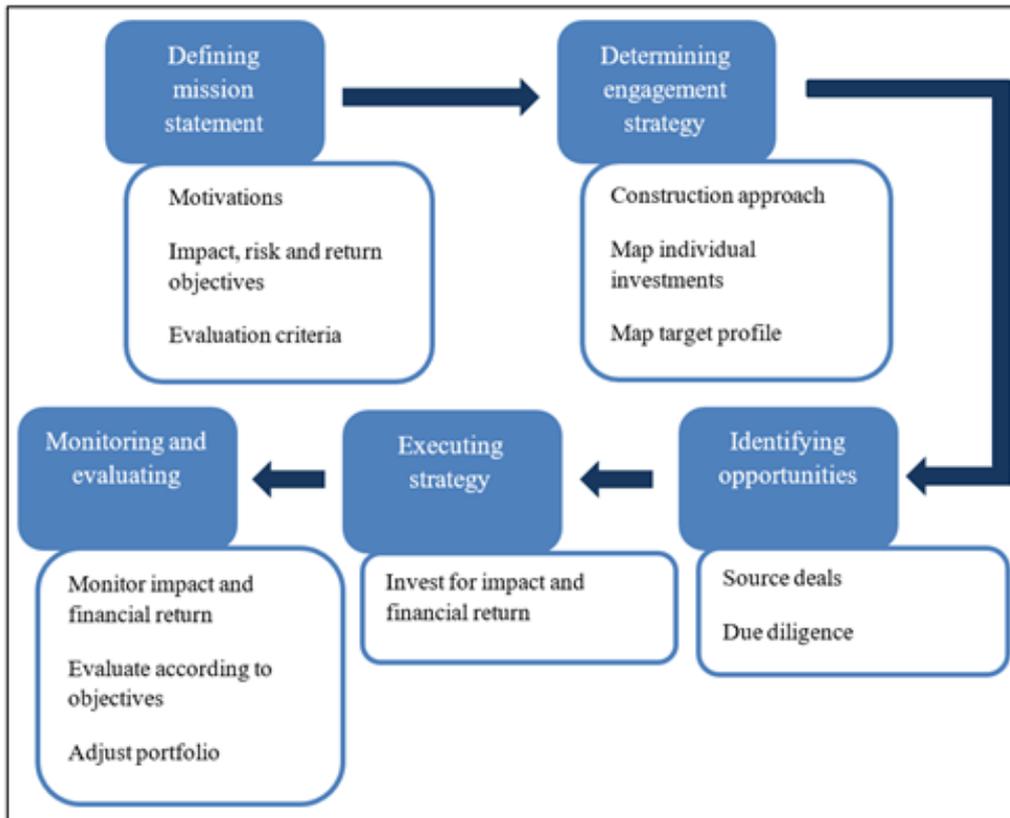


Figure 3.2: The impact investing process

Researcher's own construction based on Myers and Santo-Walter (2016:2), Drexler, Noble and Leytes (2014b:10) and Saltuk (2012:4)

Figure 3.2 will be discussed according to the five steps highlighted in the blue blocks.

3.5.1 Defining the mission statement

The first step in the impact investing process is to define the mission statement. In this phase the investor identifies clear motivations for their investment (Drexler *et al.*, 2014b:11). The majority of research conducted on impact investing classify impact investors into two groups relating to their primary objective, namely 'finance-first' and 'impact-first' investors (Höchstädter & Scheck, 2015:454). Although finance-first investors integrate social and/or environmental considerations into their investment decisions, they prioritise financial (market-related, risk-adjusted) returns above all (Harji & Jackson, 2012:10; Freireich & Fulton, 2009:31). Finance-first impact investors pursue higher returns than impact-first investors and often have a base line (floor) or market risk premium requirement. Their primary driver is to create financial value (Viviers *et al.*, 2011:215). Finance-first investors typically include banks,

pension funds, sovereign wealth funds and development finance institutions (Ormiston *et al.*, 2015:4; Harji & Jackson, 2012:10). Currently, finance-first investors dominate the impact investment market as asset managers have a fiduciary duty to make prudent investment decisions that are in the best interest of their clients.

In contrast, impact-first investors prioritise social and/or environmental considerations and are sometimes willing to accept concessionary financial returns by taking greater risks or accepting a lower return to achieve a social and/or environmental impact (Ormiston *et al.*, 2015:14; Brest & Born, 2014:4). Other impact-first investors are satisfied if their investment maintains returns that are equal to inflation. These investors include some foundations and family trusts (Harji & Jackson, 2012:10). These investors are, however, in the minority. The difference between the two types of impact investors is displayed in Figure 3.3.

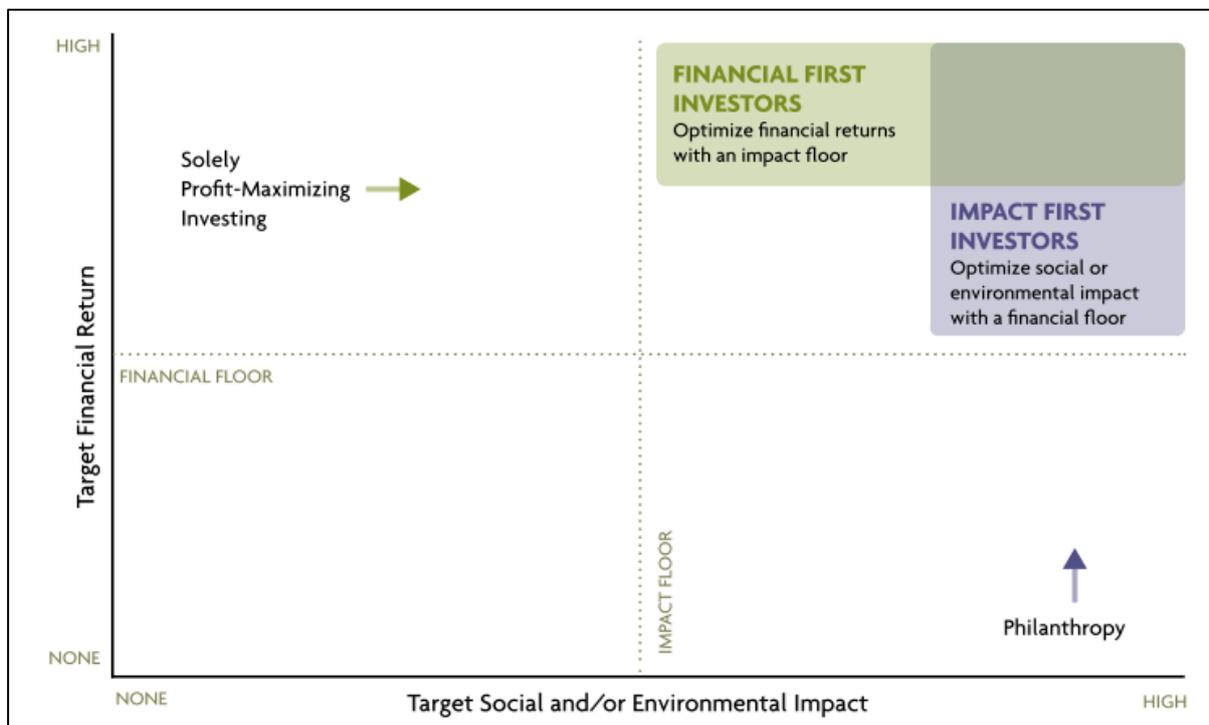


Figure 3.3: Types of impact investors

Source: Freireich and Fulton (2009:32)

As can be deduced from Figure 3.3, finance-first impact investors search for opportunities that will primarily satisfy their financial return objectives. Whereas, impact-first investors intentionally invest to meet their social and/or environmental objectives. The mission statement will differ for a finance-first investor and an impact-first investor according to their financial and impact objectives.

As seen above, impact investors' strategies are generally guided by two considerations: financial return and social and/or environmental impact (Huppé & Silva, 2013:10). The first is an investment proposition which states the targeted rate of return while generating a social and/or environmental impact. The second consideration is an impact philosophy which posits that the intended approach will make an impact by means of investment. Usually an impact philosophy is driven by the value set of an individual or the organisation and can include a theory of change (Saltuk, 2012:11). The impact philosophy often refers to the target population, the model of impact delivery and impact measurement.

With regard to the evaluation criteria, Saltuk (2012:8) suggests that performance be assessed in terms of return, risk and impact. As asset owners are likely to approach their impact investments differently, it is crucial to identify the contextual factors and state market goals so that quantifiable evaluation criteria can be established from the start (Myers & Santo-Walter, 2016:2; Drexler, Noble & Bryce, 2013:14). A finance-first investor is more likely to focus primarily on return and risk and will then consider the impact, whereas an impact-first investor will first determine the evaluation criteria on how significant an impact they could make.

As impact investors aim to make social and/or environmental impact alongside financial returns, it is essential that the desired impact is linked directly to the mission statement (Myers & Santo-Walter, 2016:2; Barby & Pederson, 2014:10). Impact themes must also be aligned with the mission statement. The themes can be broad (such as improved access to water and sanitation infrastructure) or more specific (such as access to potable water through decentralised water purification infrastructure). Once the mission statement has been defined, an engagement strategy can be determined.

3.5.2 Determining the engagement strategy

Drexler *et al.* (2014:12b) contend that it is important to establish and construct the 'stages of engagement' with impact investments. These 'stages' refer to the active involvement of asset owners in management decisions and how the investment will develop from a placement of capital to eventually creating financial return and social and/or environmental impact. Some institutional investors form teams, others create cross-portfolio partnerships, yet others develop entire institutions with an exclusive focus on impact investing (Saltuk, 2012:8).

When determining an engagement strategy one of the first steps is to identify which asset class(es) will help achieve the investor's desired impact and financial return objectives (map

individual investments). In line with conventional investors, impact investors also apply their investment decisions within the constraints of regulatory asset allocation rules (Wood, Thornley & Grace, 2013:81). These constraints drive strategy decisions in the selection of asset class(es). Impact investors also typically use the performance of similar asset class(es) as performance benchmarks. Historically, the most common way to construct an impact investment fund was to carve out a portion of a portfolio and direct it towards a measurable and thematic strategy (Myers & Santo-Walter, 2016:2). Since the impact investment market has grown in recent years, a number of new approaches have emerged.

Factors to be considered when setting risk and return parameters include geography, the sector in which the investor intends to make an impact, the instrument type, growth stage of the business, scalability, diversification of assets and the investor's risk appetite (Saltuk, 2012:16; Grabenwarter & Liechtenstein, 2011:21). Asset owners devoting capital towards impact investments often have specific social and/or environmental concerns that they target. Therefore, it is crucial for asset owners to engage with their asset managers and set parameters (by mapping the target profile) that will address these specific problems directly or indirectly. In the case of providing acceptable access to potable water, a direct method would be to provide water purification infrastructure. An example of an indirect method would be to use infrastructure that addresses sanitation issues by treating wastewater and making it potable. Having developed an engagement strategy, the impact investor's next step is to identify opportunities.

3.5.3 Identifying opportunities

In this stage impact investment deals are sourced and due diligence investigations are carried out on the sourced opportunities. According to Grabenwarter and Liechtenstein (2011:21), it is vital that thorough due diligence investigations are conducted. During this stage, an investigation of the number of deals taking place in the area of interest is essential. The continued growth of impact investing is largely dependent on investors' ability to identify and take advantage of opportunities.

It is critical to consider impact, risk and return during this stage. During the due diligence assessments, these dimensions should be evaluated by observing the financial strength of the potential investee company, its corporate governance structures and management capacities. In conjunction, the existing and potential performance of the operating environment and social and/or environmental objectives should also be reviewed (Finance in Motion, 2014:19). As the

impact investment market is still developing, one of the barriers that investors face is the shortage of so-called ‘investment-ready’ deals (the point where investors regard the deal mature enough to invest significant amounts of capital). This barrier is reviewed in detail in Section 3.6.2. This stage culminates in the selection of the opportunities that fall within the scope of the mission statement and portfolio targets.

3.5.4 Executing the strategy

At this point, asset owners will commit their capital to the selected investee company or impact investment product. This is typically done through carefully selected asset managers. Once the full amount of capital has been committed, the investment should be assessed regularly.

3.5.5 Monitoring and evaluating the impact investments

One of the key elements of the impact investing process relates to impact measurement. It is essential for asset managers to measure and report the financial, social and/or environmental impact to the asset owners who have entrusted them with their funds. As defined in Section 3.2, impact investments must show measurable social and/or environmental impact. Reporting these returns will ensure accountability and transparency. Financial returns are straightforward to measure and report, but this is not always the case when measuring social and/or environmental impact (Myers & Santo-Walter, 2016:5). A discussion on the challenge associated with impact measurement will be provided in Section 3.6.5.

Investing is a dynamic process. Once the initial investment has been made, the appointed asset manager should monitor the aggregate performance and evaluate it against the targets. If necessary, the portfolio should be rebalanced. According to Drexler *et al.* (2014a:14), effective impact investors adapt and grow their mission statement by continuously evaluating and documenting successes and setbacks. Impact investors have many opportunities to address a country’s socio-economic and environmental problems, but there are also barriers that stand between these goals being achieved. Some of the most prominent barriers will be reviewed in the next section.

3.6 BARRIERS TO IMPACT INVESTING

Some of the most important barriers that impact investors face are summarised in Table 3.3.

Table 3.3: Barriers to impact investing in general

Barrier	Relevance ^(a)	Supporting references
Relatively small size of the impact investment market	G, SA & WPI	Ormiston <i>et al.</i> (2015:5); Drexler <i>et al.</i> (2013:23); Bugg-Levine & Goldstein (2009:34); Freireich & Fulton (2009:15)
Shortage of investment-ready deals which offer satisfactory financial returns alongside social and/or environmental impact	G, SA & WPI	Mudaliar <i>et al.</i> (2016a:28); Ormiston <i>et al.</i> (2015:6); Sales (2015:31); Burand (2014:60); Freireich & Fulton (2009:22)
Shortage of high-quality impact investments with established track records across the risk-return spectrum	G, SA & WPI	Brandstetter & Lehner (2015:96); Saltuk (2015:8); Sales (2015:31); Barby & Pederson (2014:17); Burand (2014:59); Viviers <i>et al.</i> (2011:224)
Perceptions that impact investments cannot yield market-related returns	G, SA & WPI	Barby & Pederson (2014:16); Huppé & Silva (2013:14); Viviers <i>et al.</i> (2011:224)
Large amounts of competing capital such as corporate social investments	G & SA	Mudaliar <i>et al.</i> (2016a:78)
Limited number of specialised intermediaries in the impact investment market (advisors, consultants, market makers etc.) resulting in higher transaction costs, inadequate due diligence investigations and few exit opportunities	G, SA & WPI	Saltuk, Bouri, Mudaliar & Pease (2013:9); Viviers <i>et al.</i> (2011:224); Freireich & Fulton (2009:15); Bugg-Levine & Goldstein (2009:35)
Difficulties in exiting impact investments	G, SA & WPI	Saltuk (2015:8); Shamash & Ashley (2015:40); Burand (2014:59); Harji & Jackson (2012:24)
Illiquidity of impact investments	G, SA & WPI	Sales (2015:33); African Development Bank Group (2012:9)
Divergent views on what constitutes social and environmental impact	G, SA & WPI	Höchstädter & Scheck (2015:449); Sales (2015:1); Drexler <i>et al.</i> (2014a:9); Reeder (2014:82); Jackson (2013a:97); Johnson & Lee (2013:15); Harji & Jackson (2012:ix); Arosio (2011:18); Rangan, Appleby & Moon (2011:10); Viviers <i>et al.</i> (2011:224)
Lack of bespoke social and environmental metrics to measure impact	G, SA & WPI	Sales (2015:42); Harji & Jackson (2012:33); Viviers <i>et al.</i> (2011:224)

Source: Researcher's own construction based on the cited references

^(a) G (applicable to the global market); SA (applicable to the South African market); WPI (applicable to water purification investments in particular)

It should be noted that these barriers apply to impact investments in general. The barriers that specifically relate to water purification infrastructure investments will be discussed in detail in the next chapter.

3.6.1 Relatively small size of the impact investment market

One of the overarching challenges impact investors face is that the global impact investment market is still at a relatively early stage of development. Some authors even refer to the market as a “niche” market (Ormiston *et al.*, 2015:5; Drexler *et al.*, 2013:23; Bugg-Levine & Goldstein, 2009:34; Freireich & Fulton, 2009:15). Given its development stage, the market lacks supporting infrastructure and is therefore considered immature. According to Shamash and Ashley (2015:10), many of the challenges relating to impact investing in SSA are the result of a young and evolving market.

The nascent stage of the market increases risk and could leave institutional investors circumspect about investment prospects. This state of affairs make impact investing unattractive to some institutional investors as they have a fiduciary duty to make prudent investment decisions in the best interest of their clients (Sales, 2015:31).

Other barriers related to the development stage of the impact investment market include the lack of projects with established track records, small portfolio and transaction sizes and the shortage of experienced asset managers (Brandstetter & Lehner, 2015:96). These barriers will all be discussed individually in the following sections. The small size of the market can partly be ascribed to a shortage of investment-ready deals and experienced impact investment asset managers.

3.6.2 Shortage of investment-ready deals

One of the key barriers to growing the impact investment market is the limited number of investment-ready deals in which investors can place significant amounts of capital (Ormiston *et al.*, 2015:6; Burand, 2014:60; Freireich & Fulton, 2009:22). The researcher is of the opinion that there are too few mature social enterprises and impact-oriented projects/funds in South Africa to warrant investment. This view is confirmed by Mudaliar *et al.* (2016a:28) who mention that although there has been much activity in the impact investment market in South Africa, placing raised capital in this market can be challenging.

Impact investors further face the difficulty of growing their portfolios due to the shortage of high-quality investment opportunities with established track records and well-documented success stories (Brandstetter & Lehner, 2015:96; Sales, 2015:31; Saltuk, 2015:8; Barby & Pederson, 2014:17; Burand, 2014:59; Viviers *et al.*, 2011:224). There are limited viable investment options that provide market-related, risk-adjusted financial returns and satisfactory social and/or environmental impact. Similarly, Sales (2015:31) found that globally asset managers involved in impact investing have struggled to find possible impact investees with track records that demonstrate sufficient growth potential to meet the risk and return demands of their clients. Institutional investors are particularly mindful of this challenge as they prioritise financial returns above social and/or environmental impact.

The lack of well-documented success stories has also resulted in a perception among investors that impact investing cannot provide market-related, risk-adjusted financial returns (Barby & Pederson, 2014:16; Huppé & Silva, 2013:14; Viviers *et al.*, 2011:224). This perception might

be the result of the belief that there must be a trade-off between financial return and social and/or environmental impact. This perception is substantiated by the number one rated challenge to impact investing in JP Morgan's 2015 study. They ranked the lack of capital across the risk-return spectrum as the biggest challenge hindering growth in the impact investment market (Saltuk, 2015:8). In the researcher's opinion, institutional investors should invest in their client's best interests and the dearth of investment opportunities across the risk-return spectrum is clearly an inhibitor in the capital allocation process.

A review of the literature suggests that there is a large supply of competing capital in the form of mandated corporate social investments (CSI) and development capital (Mudaliar *et al.*, 2016a:78). Therefore, asset managers need to be resourceful when procuring capital for their portfolios. Urban centres are often well capitalised, so the opportunities lie in rural and peri-urban areas. However, small and medium-sized social enterprise owners in these areas are often less experienced and therefore investment ventures in these areas carry more risk. This characteristic, however, makes the need for impact investing in peri-urban areas even greater as they are often avoided by other sources of funding. People living in peri-urban areas are in need of all kinds of infrastructure (see Chapter Two Section 2.2.2). Therefore, impact investors should focus on developing these areas as a primary target. An increase in the number of intermediaries in the impact investment market could assist in overcoming the shortage of investment-ready deals.

3.6.3 Market growth stunted by the limited number of intermediaries

One of the most critical obstacles to the growth of the impact investment market is the limited number of intermediaries in this market (Saltuk *et al.*, 2013:9; Viviers *et al.*, 2011:224; Freireich & Fulton, 2009:15). Barby and Pederson (2014:17) also recognise the scarcity of specialised individuals and teams designated to incorporate impact investment strategies as a challenge in the global impact investment market.

According to Viviers *et al.* (2011:224), there is a shortage of coordinated information networks, experienced advisors and consultants, intermediary markets and market-makers. However, the launch of both GIIN and the Southern African Impact Investing Network (SAIIN) in 2009 marked the start of a new phase of development for the impact investment market. GIIN and SAIIN allow for the coordinated networking of practitioners to enhance their capacity to make and manage impact investments and contribute to the development of the impact investment market (Impact investing, 2017; Network membership, 2017). Even though GIIN and SAIIN

have provided opportunity for progress, the need for more experienced and interested advisors and market-makers in South Africa is apparent.

The lack of efficient intermediation results in high transaction costs, more complex deal structures, inadequate due diligence investigations and difficulties in exits (Bugg-Levine & Goldstein, 2009:35; Freireich & Fulton, 2009:15). A more efficient process and increase in the number of intermediaries could therefore provide solutions to these barriers.

Drexler *et al.* (2013:23) are of the opinion that although they are scarce, the few available specialised intermediaries will need to improve their skills and knowledge of impact investing, so that it can become a mainstream RI strategy. Once the spectrum of intermediaries has been strengthened, institutional investors might be more willing to engage more with the impact investment market (Harji & Jackson, 2012:26).

In addition, there are still too few exit options due to the lack of intermediary markets and market makers resulting in fairly illiquid investments (Sales, 2015:31; African Development Bank Group, 2012:9).

3.6.4 Difficulty in exiting investments and illiquidity

A shared barrier for many impact investors is the difficulty of exiting their investments (Shamash & Ashley, 2015:40; Burand, 2014:59; Harji & Jackson, 2012:24). This challenge was ranked the third biggest obstacle hindering the growth of the impact investment market in the JP Morgan 2015 study (Saltuk, 2015:8). Given that the asset classes used for many impact investments is private equity or private debt, the investments are found to be illiquid, causing major difficulties with exits (Sales, 2015:33). Fund managers have (partially) overcome this challenge by negotiating exit strategies prior to investing as part of the due diligence process (Huppé & Silva, 2013:20).

3.6.5 Challenges in the measurement of impact investments

Measuring the social and environmental impact of an investment is one of the most debated challenges among academics and practitioners. The impact investment market does not have a universally agreed upon set of metrics to measure social and environmental impact (Sales, 2015:31; Reeder, 2014:82; Johnson & Lee, 2013:15; Rangan *et al.*, 2011:10; Viviers *et al.*, 2011:224). The available metric systems, such as the IRIS and GIIRS, do not completely satisfy all the required social and/or environmental measurements. The result is not only an

inconsistent track record of the impact achieved, but also divergent views as to what actually constitutes impact.

The adequate measurement of social and/or environmental impact has always been a complex element of the impact investing process. One school of thought calls for the universal standardisation of a defined set of metrics (Harji & Jackson, 2012:33; Viviers *et al.*, 2011:224). Another school argues that impact objectives are specific to the investment and therefore a standardised metric cannot be used to measure impact. The lack of a standardised measurement system, however, makes it difficult to evaluate and compare impact across investments (Sales, 2015:42). The result is that impact investors report inconsistently and inadequately on the impact they have achieved.

The counter-argument to adopting a standardised metric is that social and/or environmental challenges often contain unique characteristics specific to a region or demographic grouping. Therefore, the metrics used need to be tailored to a specific problem or region. The researcher agrees with this point of view that there will never be a set of standardised metrics that will be universally accepted and used. Regardless of these viewpoints, asset managers must find a way to consistently and adequately report on the impact achieved to demonstrate that their investment is having a positive effect on society and/or the environment.

South African impact investors also have to consider other bespoke metrics such as those related to the B-BBEE Act (No. 53 of 2003). The B-BBEE Act aims to promote social investment and the upliftment of communities in which organisations function (Horwitz, 2011:298; Esser & Dekker, 2008:157). Legislation and regulation such as the B-BBEE Act (No. 53 of 2003) can promote impact investments, but can also be seen as a barrier to investment because of its complicated requirements. In the following section the regulatory challenges that constrain the impact investment market will be discussed.

3.6.6 Regulatory challenges adversely affecting the impact investment market

Impact investments are often made in highly regulated sectors as these investments are directed towards the delivery of public goods and services in the health, water and energy sectors (Barby, Barley, Dewan & Osibo, 2014:17). Investing in these sectors can be difficult because of the involvement of governments and parastatals.

According to Vaccaro (2014:5), regulations that govern traditional investments, most notably those governing prudential investment limits, have created a significant challenge for impact investors. Given these regulations, impact investors often cannot invest in promising impact investments because the investment is not above the required minimum size. This barrier is linked to institutional investors' fiduciary duty to act in the best interest of their clients (Ormiston *et al.*, 2015:6). Furthermore, even when meeting the minimum investment size, complicated tax regulations in some countries inhibit investments from occurring (Simon & Barmeier, 2010:26).

Viviers *et al.* (2011:224) found that the lack of conducive legislation hampered the growth of the impact investment market in South Africa. However, amendments to Regulation 28 of the Pension Fund Act (No. 24 of 1956) were made in 2011 which substantially reduced this barrier. One of the amendments highlights the responsibility of pension fund trustees to develop policy statements in a manner that promotes the importance of education, B-BBEE, and environmental, social and governance factors. Another amendment to Regulation 28 sets new investment limits on alternative investments that are higher than previous restrictions. Trustees of South African pension funds now have more opportunity to prudently invest in hedge funds and unlisted equities, especially those that are in favour of development. Therefore, the South African regulatory might better be described as an enabler of further investment opportunities (see Section 3.7.3).

3.7 OPPORTUNITIES IN IMPACT INVESTING

Despite the plethora of barriers, there are also many opportunities for impact investors. These opportunities should be identified so that impact investors can pursue solutions to the social and/or environmental challenges in South Africa. The opportunities in impact investing are summarised in Table 3.4.

Table 3.4: Opportunities in impact investing in general

Opportunities	Relevance^(a)	Supporting references
The opportunity to earn market-related, risk-adjusted returns	G, SA & WPI ^a	Clarkin & Cangioni (2016:137); Matthews, Sternlicht, Bouri, Mudaliar & Schiff (2015:19); Simanis & Duke (2014); Arosio (2011:6)
The growing interest in and acceptance of impact investing as an RI strategy	G, SA & WPI	Höchstädter & Scheck (2015:450); Sales (2015:2); Saltuk (2015:16); Dacin, Dacin & Tracey (2011:1204); Bugg-Levine & Goldstein (2009:34); Freireich & Fulton (2009:15)
Asset owners are demanding more responsible investing (process) and responsible investments (products)	G & SA	Saltuk (2015:16); Bugg-Levine & Goldstein (2009:33)
Increasing amount of capital flowing into Africa where South Africa is regarded as the hub of impact investing	G, SA & WPI	Mudaliar <i>et al.</i> (2016a:62); Sales (2015:10); Viviers <i>et al.</i> (2011:223)
Changes in the regulatory environment that could unlock additional opportunities in impact investing	G & SA	Mudaliar <i>et al.</i> (2016a:74); Drexler <i>et al.</i> (2014a:13); Viviers <i>et al.</i> (2011:219)
Opportunities to generate social and/or environmental impact	G, SA & WPI	Brandstetter & Lehner (2015:87); Burand (2014:58); Ormiston <i>et al.</i> (2015:355); Jackson (2013b:608); Verkerk (2013:209); Bugg-Levine & Goldstein (2009:33); Freireich & Fulton (2009:5)
More financial instruments available for social and environmental problems (such as tax exempt bonds and credit guarantees) which could lower risk	G, SA & WPI	Rodriguez <i>et al.</i> (2012:29); Yamada <i>et al.</i> (2011:5)

Source: Researcher's own construction based on the cited references

^(a) G (applicable to the global market); SA (applicable to the South African market); WPI (applicable to water purification investments in particular)

3.7.1 The opportunity to earn market-related, risk-adjusted returns

The opportunity to earn market-related, risk-adjusted returns is closely related to the predicted growth in the impact investment market (See Section 3.3.1). This global market growth has the potential to generate profits of between US\$183 billion and US\$667 billion (Clarkin & Cangioni, 2016:137). Impact investments generate competitive market-related, risk-adjusted returns contrary to the perception that such investments necessitate concessionary returns (Matthews *et al.*, 2015:19). The evidence of these competitive returns is displayed in Table 3.5.

Table 3.5: Returns of impact investment funds (1998-2010)

	Impact investment fund net internal rate of return (%)^(a)	Comparative funds net internal rate of return (%)
Global funds under US\$100 million	9.5	4.5
Global funds over US\$100 million	6.2	8.3
Developing market funds	9.1	N/A
Developed market funds	4.8	N/A
Funds focused on Africa	9.7	N/A

Source: Matthews *et al.* (2015)

^(a) Net of management fees and carried interest thereby representing actual returns delivered to shareholders

As revealed in Table 3.5, impact investment funds have produced competitive returns compared to funds of similar sizes. In their study for the GIIN, Matthews *et al.* (2015) examined the returns of 51 impact investment funds over a 12-year period (between 1998 and 2010). The returns of the funds were especially impressive in developing markets, and particularly those with an African focus. Likewise, impact investment funds of less than US\$100 million substantially outperformed similar sized funds. Considering these figures, it seems that institutional investors should focus their impact investments on small funds in developing markets.

According to Arosio (2011:6), there could be return opportunities for impact investors in selected ‘bottom of the pyramid’ organisations that address social and/or environmental challenges. It is estimated that there are four billion people who individually earn less than US\$1 500 per annum and form the bottom of the economic pyramid (Simanis & Duke, 2014). Therefore, an investor could target lower return margins, but to a large number of individuals to create market-based returns. A number of these return opportunities in developing countries are shown in Table 3.6.

Table 3.6: Return opportunities in selected economic sectors in developing markets

Sector	Potential investment capital required (US\$ bn)	Potential return opportunity (US\$ bn)
Housing: Affordable urban housing	214-786	177-648
Water: Clean water for rural communities	5.4-13	2.9-7
Health: Maternal health	0.4-2	0.1-1
Education: Primary education	4.8-10	2.6-11
Financial services: Microfinance	176	Not measured

Source: Arosio (2011:6)

As seen in Table 3.6, impact investment capital has the potential to address some of the grand challenges that many developing nations are facing today while creating a return on the investment at the same time. Financial contributions to existing impact investments in developing markets have produced returns that averaged between eight and 11.9 per cent for debt investments and between 20 and 24.9 per cent for equity investments (Arosio, 2011:10). These returns are impressive when compared to the expected returns of developed market impact investments of five to 7.9 per cent and 15 to 19.9 per cent for debt and equity investments respectively.

As mentioned in Section 3.2, the third element of the impact investing definition refers to a positive correlation between financial return and social and/or environmental impact. The

return potential of providing access to basic human rights such as healthcare, housing and water (Table 3.6) is evidence that there can be a positive association. Despite the opportunities to generate return from impact investments in these sectors, there are also concerns about the morality of doing so. The concerns surrounding this moral dilemma specifically pertaining to water infrastructure will be elaborated upon in Chapter Four Section 4.2.3.

The financial return potential of impact investments has led many investors to direct their investment capital towards Africa with South Africa being the hub of impact investment activity (Mudaliar *et al.*, 2016a:11). As a result, there has been growing interest and acceptance of impact investing as a viable RI strategy.

3.7.2 The growing interest in and acceptance of impact investing as a responsible investing strategy

The interest and momentum among private sector investors in impact investing has been prompted by the call for an increase in ethical and socially inclusive capitalism in contemporary market economies (Dacin *et al.*, 2011:1204). This increased awareness in impact investing stems from the broader movement and growth of what is known as ‘ethical consumerism’ (Höchstädter & Scheck, 2015:450). This movement has been strengthened by activity between the social and/or environmental sphere and the economic and/or financial sphere by means of CSI and RI. Moreover, the philanthropic community’s interest in impact investing was initiated from a desire to create long-term social and/or environmental impact (Sales, 2015:2). This community has become more receptive to impact investing due to the recognition that these investments provide sustainable models that can create social and/or environmental change.

Similarly, asset owners and asset managers are becoming more receptive of the notion that they can affect social and/or environmental change through extended financing (Bugg-Levine & Goldstein, 2009:34). According to Saltuk (2015:16), the most important motivation for impact investors to allocate capital towards impact investments is that it forms part of their commitment as responsible investors. The 2008 financial crisis and the growing recognition of RI, has intensified the public and regulatory pressure on financiers to act ethically and be socially inclusive with the capital that they manage (Sales, 2015:2; Freireich & Fulton, 2009:15). Impact investing is a vehicle that does just that. Therefore, institutional investors are also becoming more interested in the phenomenon.

Asset managers have also found that there is a rising demand to invest in impact investments from their clients (Saltuk, 2015:16). The client demand stems from an increased receptiveness and desire of capital owners to maximise the effect they can have by financing entities that create social and/or environmental change. Similarly, many traditional philanthropists have become impatient with current approaches towards social and/or environmental challenges (Bugg-Levine & Goldstein, 2009:33). The impatience of philanthropists could be due to the unpredictable success rates of the entities to which they have contributed capital. Some of them have found an alternative option in impact investing. These developments could lead to further opportunities and growth in the impact investment market.

As mentioned earlier, a growing amount of impact investment capital is flowing into Africa (Sales, 2015:10). Foreign direct investment has grown at a steady rate over the past ten years. As discussed in Section 3.3.2, there is considerable activity in the South African impact investment market. Much of the impact investment capital in the SSA region is disbursed through the South African market. According to Mudaliar *et al.* (2016a:80), one of the reasons is that South Africa has a well-developed corporate sector and a variety of business incubators and accelerators which provide a pipeline for impact investment into investment-ready opportunities, especially in small and medium-sized social enterprises. In addition, South Africa boasts an increasing number of successful mergers and acquisitions that are taking place, which are creating more and easier exit opportunities for asset owners.

Recent developments in the regulatory environment in South Africa may have made impact investing easier for institutional investors which in turn has opened many opportunities in the impact investment market.

3.7.3 Changes in the regulatory environment that could unlock additional opportunities in the impact investment market

The public sector supports initiatives that could facilitate the flow of capital towards social and/or environmental challenges while also trying to generate financial returns (Drexler *et al.*, 2014a:13). This support is shown in some countries by means of tax incentives or by alleviating regulatory barriers (Viviers *et al.*, 2011:219). Although this might not directly stimulate growth in the impact investment market it will make it easier for the more reluctant investor to engage in the process. As discussed in Section 3.6.6, various amendments have been made to Regulation 28 of the Pension Fund Act (No. 24 of 1956). These amendments should encourage

more engagement with the impact investment market, thereby unlocking opportunities and paving the way for further growth in the impact investment market.

In addition to the changes to the Pension Fund Act, South Africa's regulatory environment is overall regarded as one that encourages investment (Mudaliar *et al.*, 2016a:74). Only a few distinctions are made between foreign and local investors and government policies are typically open to foreign investment. The implications of this approach are that investors from all over the world, including impact investors, are more willing to invest in South Africa.

Support from the public sector through adaptations to regulation and capital contributions should be encouraged and considered by governments the world over. This support could prompt investment towards the improvement of social and/or environmental challenges that they are often tasked to solve.

3.7.4 Opportunities to generate social and/or environmental impact

A review of the international literature suggests that the increasing receptiveness of impact investing as an RI strategy has created many opportunities to generate social and/or environmental impact (Brandstetter & Lehner, 2015:87; Ormiston *et al.*, 2015:355; Burand, 2014:58; Jackson, 2013b:608; Verkerk, 2013:209; Bugg-Levine & Goldstein, 2009:33; Freireich & Fulton, 2009:5). According to many of these authors, the defining element of impact investing is the measurement of the impact that differentiates it from other responsible investments. As such, there must be evidence of the social and/or environmental impact achieved (see Section 3.2). This element of impact investing should drive opportunities in the market in general as capital is redirected from other RI strategies such as positive screening to impact investing. Some of the grand challenges worldwide that institutional investors can help to address through impact investing are listed in Table 3.7.

Table 3.7: Global grand challenges

Social challenges	Environmental challenges
Poverty and inequality	Climate change
Food shortages	Pollution
Lack of education	Desertification, land degradation and deforestation
Lack of access to water and sanitation	Biodiversity loss
Access to clean energy	Non-renewable energy production
Unemployment	
Lack of access to shelter	
Lack of access to health services	
Large-scale involuntary immigration	

Researcher's own construction based on: Damm and Haan (2016); Hutt (2016); World Economic Forum (2016:9); United Nations (2015); Arosio (2011:44)

Table 3.7 does not represent an all-encompassing list of global grand challenges, but provides an indication of some of the most pertinent challenges that can be addressed through impact investing. In every one of these grand challenges there are tremendous opportunities to create social and/or environmental impact.

3.8 SUMMARY AND CONCLUSIONS

The focus of this chapter was on impact investing in general. Even though impact investing has a long history under different names, the term still lacks conceptual clarity. Broad and narrow definitions can be used to describe the phenomenon, but these definitions create credibility problems and limit the investment of capital in suitable companies and projects. Having reviewed the extant literature regarding impact investing, the construct was defined in this chapter as an RI strategy where investors actively and intentionally seek to generate both measurable, positive, market-related, risk-adjusted financial return, and social and/or environmental impact.

The size of the impact investment market was then explored. Authors have varying estimates of the market size according to their definition of impact. Regardless of differing viewpoints on the actual size or extent of the market, most parties agree that the market shows good growth potential. The prospects for developing markets, including South Africa, are particularly positive. The market growth potential and positive outlook are encouraging for role players in the impact investment market. These role players include asset owners (institutional investors and retail investors), asset managers (investment advisors, fund managers etc.), demand-side actors (businesses, social enterprises etc.) and service providers (standard-setting bodies, consulting firms etc.).

This research focused on investors, i.e. asset owners and asset managers. Impact investors can be classified into two major groups based on their primary objectives. Finance-first investors prioritise financial returns, whereas impact-first investors are more concerned about the social and/or environmental impact that they can achieve through their investment.

Impact investors follow a similar investing process to that of conventional investors. The impact investing process is mainly differentiated from a traditional investing process by the establishment of social and/or environmental objectives and the measurement thereof. These objectives also differ between finance-first and impact-first investors. The steps in the investing process were briefly described as follows: defining the mission statement, determining the

engagement strategy, identifying opportunities, executing a strategy and lastly, monitoring and evaluating the impact investments.

There are many barriers limiting growth in the impact investment market, both globally and locally. One of these barriers is the relatively small size of the impact investment market. This barrier is closely related to other challenges such as the shortage of investment-ready deals and the inadequate number of experienced and interested intermediaries (advisors and market-makers) in the market. Illiquidity and difficulties in exiting impact investments furthermore make institutional investors weary of devoting capital towards these investments. A major barrier identified in the literature is the difficulty in measuring social and environmental impact. Impact investments address grand challenges and often have unique characteristics that make measurement complicated. Lastly, regulatory challenges were found to hamper growth in the global impact investment market. These regulations are either associated with investment requirements or specific to the highly regulated sectors in which investments are made such as the healthcare sector. However, recent changes to some of the South African legislation has contributed to a more conducive environment for investments in impact-mandated funds or social enterprises.

Having reviewed the barriers, the focus moved to the opportunities in impact investing. A primary concern for institutional investors is the market-related, risk-adjusted return prospects. Impact investment returns have shown positive return performance and have, in some cases, outperformed funds of similar market capitalisations that are only focused on financial return. Furthermore, there are many opportunities in the market that show growth potential. The market has been stimulated by a growing interest and acceptance of impact investing as an RI strategy among asset owners and asset managers. Given the recent pressure on financiers to act ethically and socially inclusive with the capital they manage, asset owners and managers are allocating more capital towards impact investments.

Certain tax incentives and capital allocation restrictions have been changed in recent years which also accommodate impact investing. These changes might not directly cause market growth, but could unlock opportunities and subsequent growth in the future. Impact investing provides opportunities for investors who desire to create social and/or environmental impact. Therefore, using impact investing as one of the means to address some of the world's grand challenges could be a very viable option.

The impact investment market faces many barriers which might only be overcome if impact investing is accepted as a mainstream investment strategy by investors. The opportunities discussed in this chapter reveal that there is indeed scope for mainstream acceptance, but that the range of competing capital could be a barrier.

In light of the preceding discussion, it is evident that impact investors have an opportunity to contribute towards providing acceptable access to potable water by investing in water purification infrastructure. In the next chapter, impact investing in water purification infrastructure will thus be examined in more detail. The barriers and opportunities in these investments will be explored.

CHAPTER FOUR

IMPACT INVESTING IN WATER PURIFICATION INFRASTRUCTURE

4.1 INTRODUCTION

In the previous chapter impact investing was reviewed as a means of addressing the challenges relating to acceptable access to potable water. In line with this review, the general impact investing process, motives, barriers and opportunities were explored. In this chapter the most pertinent barriers and opportunities associated with impact investing in water purification infrastructure will be examined.

4.2 BARRIERS TO IMPACT INVESTING IN WATER PURIFICATION INFRASTRUCTURE

Impact investors who are interested in investing in water purification infrastructure face several challenges. Some of the most important barriers are summarised in Table 4.1.

Table 4.1: Barriers to impact investing in water purification infrastructure

Barrier	Supporting references
Negative perceptions about private sector involvement based on more failures than success stories	Tecco (2008:135)
The possibility of political interference and concerns about corruption and bribery	van den Brink (2011:88); McGarry, Mugisha, Hoang-Gia, Unheim & Myles (2010:48); Johnson, Hokanson, Zhang, Czupinski & Tang (2008:17); Osumanu (2008:107); Winpenny (2006:12)
Financial risks inherent to water sector investments	
<ul style="list-style-type: none"> • High poverty levels. The inability of the poor to pay for water and its influence on the pricing of water 	Turton <i>et al.</i> (2016:29); Nicolson (2015); Fankhauser & Tepic (2007:1038); Gilbert (2007:1567); Winpenny (2006:13)
<ul style="list-style-type: none"> • Concerns regarding profitability and low rates of return 	Tecco (2008:135); Winpenny (2006:13)
<ul style="list-style-type: none"> • High initial costs of establishing water infrastructure 	Rodriguez <i>et al.</i> (2012:13); Tecco (2008:136); Baietti & Raymond (2005:8)
Moral dilemma associated with making a return from providing a basic human right	Gawronski & Beer (2016:1); Ramírez, Seeliger & Di Pietro (2016:8); Amnesty International & Wash United (2015:102); Murthy (2013:127); Macer (2011:22); Greene, Cushman, Stewart, Lowenberg, Nystrom & Cohen (2009:364); Appelgren (2004:18); Larsen (2000:18)
Lack of skilled government officials and engineering personnel in the water sector	Ruiters & Matji (2016:291); DWS (2015:70); Lehohla (2015:36)
Additional barriers associated with community-level water purification systems	
<ul style="list-style-type: none"> • Land tenure (ownership disputes) • Unavailability of water source(s) • Unwillingness of local communities to be involved in the management of a water provision process 	Ali (2010:727)

Source: Researcher's own construction based on the cited references

Apart from the barriers listed in Table 4.1, other challenges that impact investors face include a limited number of investment-ready deals and measuring social and environmental impact. As discussed in Chapter Three Section 3.6.2, not many investment-ready deals are available in the impact investment market, be it in general or in the water sector. The majority of impact investments in SSA have targeted microfinance, housing, technology, agriculture and clean energy (Severino & Baraton, 2013:10). According to Chitonge (2013:41), private sector investment in water infrastructure has been insignificant in the SSA region. It is disconcerting to realise that the lack of private sector investment might be evidence of wilful ignorance. On the other hand, private sector investors might feel the provision of water infrastructure is a government responsibility for which they pay taxes.

The measurement of social and/or environmental impact in water purification infrastructure investments is complicated, as is the case in most impact investments involving public goods and services. The definition of what constitutes 'impact' depends on the objectives of the impact

investor and the stage of the water provision process in which they are investing. In similar vein, definitions of ‘acceptable quality’ and ‘acceptable access’ can also vary from one investor to another. Some might see a fulfilment of the bare minimum requirements of the WHO and SANS 241 Drinking Water Specification as acceptable, whereas others might strive to exceed these standards.

One of the barriers that specifically apply to impact investments in water purification infrastructure is the possibility of political interference.

4.2.1 The possibility of political interference

Innovations in financing structures are available to improve acceptable access to water, but one of the main obstacles of making technological advancements available to the masses is what Osumanu (2008:107) calls the ‘political factor’. Water contracts and regulatory agreements are susceptible to political re-interpretation and interference (Winpenny, 2006:12). Some politicians are interested in these contracts and agreements only as tools to enhance their popularity among voters. The high probability of political interference increases the risk of investing. An increased risk factor in turn generally results in investors demanding a higher return. High risk could discourage institutional investors given their fiduciary duty to manage their clients’ capital prudently.

South Africa has been lauded as the first country in the world to develop national water legislation aimed at achieving social transformation (Siebrits, Winter & Jacobs, 2014:1). Although this legislation has contributed towards a significant reduction in the number of citizens without acceptable access to potable water, public accountability mechanisms should be strengthened if country-wide access to potable water is to be achieved (van den Brink, 2011:87). Many South African municipalities responsible for water provision are ineffective due to in-fighting, corruption and inappropriate appointments (van den Brink, 2011:88; McGarry *et al.*, 2010:48). Corruption among government officials is a major issue when dealing with investments in water purification technology (Johnson *et al.*, 2008:17). Likewise, bribery and ‘under-the-table’ deals increase the initial costs of building water infrastructure.

Unnecessary and additional costs are a serious concern for institutional investors who are under pressure to generate market-related, risk-adjusted returns. These investors typically avoid investments that are associated with illegal activities such as corruption and bribery. Any risks that compromise the possibility to earn market-related, risk-adjusted returns make finance-first

investors apprehensive and could lead to them avoiding investments. These risks will be reviewed in the following section.

4.2.2 Financial risks inherent to water sector investments

The affordability of water and electricity is central in debates on infrastructure reform in developing countries (Fankhauser & Tepic, 2007:1038; Winpenny, 2006:13). A key element to this debate is the level at which potable water becomes too expensive for the poor (Gilbert, 2007:1567). In South Africa, 21.7 per cent of the population live in extreme poverty and they are not able to pay for basic goods and services (Nicolson, 2015). A further 53.8 per cent of South Africans can afford basic living requirements, but are still regarded as poor, living on less than ZAR779 per month. These high levels of poverty among many South African citizens manifest in their inability to pay for water services and other basic needs (Turton *et al.*, 2016:29). Investors might therefore be reluctant to designate impact capital to South Africa.

When people are unable to pay, the repercussion for institutional investors is that they might not receive the financial returns that they were expecting or require. The challenge for investors who want to make an impact while achieving financial return is to gauge an acceptable compensation level for the intended infrastructure. The pricing of the drinking water will most likely need to be adapted for different socio-economic target groups and according to the type of infrastructure provided.

Research shows that a typical household in a developing market spends between 2.6 and five per cent of its collective income on water (Martins, Quintal, Cruz & Barata, 2015:118; Johnson *et al.*, 2008:17; Gilbert, 2007:1567). The reality is, however, that many of these households spend a much larger percentage of their household income to pay for water. Therefore, impact investors will need to either adapt their return objectives according to the average spending patterns of an area to ensure that the potable water provided is still affordable. If investors do not want to adapt their objectives, they should seek other investment options.

Investments in water purification infrastructure aimed at communities at the bottom of the pyramid might not generate consistent and sustainable cash flows as many households find the prices unaffordable (Martins *et al.*, 2015:118). The researcher argues that such investments could instead be used to provide acceptable access to potable water in peri-urban areas where individuals can still afford to pay for some products and services. Impact investors should then be able to make more consistent returns.

The profitability from providing acceptable access to potable water in developing countries is at the centre of the financing question. According to Winpenny (2006:13), financing water provision is considered risky in developing markets whereas investments in the water market are deemed safe in developed countries. Several prominent cases in developing countries have resulted in losses which in turn have increased the perceptions among institutional investors that these countries are high-risk investment areas (Tecco, 2008:135). The higher risk factor in developing countries compared to their developed counterparts has become a barrier to investors due to the uncertainty of financial returns associated with the higher risk.

Another aspect of the financing problem that could contribute to a low rate of return is the long-term nature of investments in water infrastructure. Traditional investments in this sector are typically structured over a time span of 20 or more years (Winpenny 2006:14). Therefore, there is also a lack of investment opportunities that satisfy most institutional investors' holding periods (Harji & Jackson, 2012:20). This holding period, however, matches the long-term time frame of many pension funds. Given the long-term nature of these investments they are regarded as illiquid making exiting such investments difficult (Jin, Roca, Li & Wong, 2016:732).

An additional contributing factor to high financial risk is the high initial costs of establishing water infrastructure (Rodriguez *et al.*, 2012:13). Water sector infrastructure often only serves a single function so investors depend solely on future revenue to create the desired returns (Tecco, 2008:136). The high initial costs and the unifunctional characteristic of water infrastructure creates the risk of severe financial loss should the plans for the infrastructure fail. Furthermore, there is a shortage of private insurers for parastatal entities in developing countries to provide bond and political risk insurance (Baietti & Raymond, 2005:8). According to these authors, the shortage of insurers is due to the lack of transparency and the poor financial state of parastatal entities.

Even when making market-related, risk-adjusted returns from investments in water purification infrastructure some investors could be concerned by making money from providing a basic human right. This moral dilemma will be explored in the next section.

4.2.3 The moral dilemma of making a return from providing a basic human right

Impact investors could face a moral dilemma when investing to address a problem involving a basic human right. A moral dilemma refers to the tension between an individual's rights and

the greater good (Greene *et al.*, 2009:364). The dilemma in this case refers to the tension of generating financial returns when those returns originate from providing acceptable access to a basic human right, namely potable water. Firstly, a clear understanding of the basic human right of acceptable access to potable water is necessary.

(a) The basic human right of acceptable access to potable water

Initial discussions on the basic human right to water began at the 1977 Mar del Plata conference in Argentina (Murthy, 2013:92). The outcome of the conference was the issuance of an action plan titled ‘Community Water Supply’ which stated that “all peoples... have the basic right to have access to drinking water in quantities and of a quality equal to their basic needs”. This principle was affirmed at the 1992 United Nations’ conference on the environment and development in Rio de Janeiro (Murthy, 2013:92).

According to a 2015 report released by Amnesty International and Wash United, the basic human right to water forms part of binding international human rights legislation. The right to potable water also forms part of the human right of having an adequate standard of living as stipulated in Article 11 of the International Covenant on Economic, Social and Cultural Rights. This right has been in force since January 1976. The treaty was signed by the 163 member states of the United Nations including South Africa (Amnesty International & Wash United, 2015:2).

South Africa further recognised all content categories of the Human Rights Council Resolution 27/7 of September 2014 that states that:

the human right to safe drinking water and sanitation entitles everyone, without discrimination, to have access to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use and to have physical and affordable access to sanitation, in all spheres of life, that is safe, hygienic, secure, socially and culturally acceptable and that provides privacy and ensures dignity.

Amnesty International and Wash United (2015:102)

One of the key points in this statement is that water for personal and domestic use should be affordable. The fact that some governments and companies providing purified water should charge consumers an ‘affordable’ price thus raises a moral dilemma.

(b) Defining the moral dilemma in the context of providing acceptable access to potable water

A widely recognised perspective in philosophy, psychology and law revolves around the notion that an individual’s moral judgements are a product of conscious decisions in which he or she

progresses directly from conscious reasoning to a moral verdict (Hauser, Cushman, Young, Jin & Mikhail, 2007:1).

A moral verdict can be viewed from two perspectives. One follows a utilitarian response, while the other represents a deontological response to a moral dilemma. According to Gawronski and Beer (2016:1), a deontological response to a moral dilemma emphasises moral norms and is thus focused on rule-based morality. Therefore, an action is deemed morally acceptable if it is consistent with the relevant moral norms of society, universal principles, laws and commandments. In contrast, a response corresponding to utilitarianism is outcomes-based and is specifically concerned with the consequences for overall well-being. Therefore, if a response results in the greatest good for the greatest number, it is deemed to be morally acceptable (Gawronski & Beer, 2016:1).

Impact investors who approach a situation from a utilitarian perspective might be slightly more conservative in how much or who they charge for providing access to a basic human right. They are driven by the consequences of an action. Should they find that individuals and households are not obtaining acceptable access to potable water, utilitarian-orientated impact investors might adjust their return margins in the interest of improving the overall well-being of the majority of individuals and communities.

If impact investors were following a deontological approach to the moral dilemma of making a return from providing a basic human right, they would base their judgement on what the moral norm is. Deontologists are rules-based and therefore, in the most extreme case, if an action such as charging for potable water would contravene a law, they will not invest. Currently, many investors are profiting from providing other basic human rights, such as food and healthcare. Making a return from providing potable water to domestic users who do not have acceptable access would thus be deemed morally acceptable.

According to Rossouw (2004:2), “ethical behaviour does not exclude self-interest, but requires that it should be balanced with considerations about what is good for others who are also affected by one’s behaviour”. Using this perspective, an impact investor could find it morally acceptable to generate return from providing water purification infrastructure to those who do not have acceptable access to potable water. However, these investors should consider the overall well-being of those who do not have acceptable access to potable water. Therefore, water purification infrastructure should be provided at an affordable price.

(c) The affordability of water purification infrastructure

‘Affordability’ implies that there should be some form of payment for the basic human right of acceptable access to potable water. International law does not prohibit the pricing of water to recover costs, but individuals and households cannot be denied acceptable access to potable water due to their inability to pay for it (Murthy, 2013:127). Water that is filtered and purified to a potable standard requires the development, effective functioning and maintenance of the infrastructure. As these processes are capital-intensive, cost recovery is essential to ensure the sustainability of the infrastructure (Larsen, 2000:62).

According to Murthy (2013:127), many municipalities around the world claim that they do not have sufficient capital to cover the costs related to water purification infrastructure. It is therefore important for municipalities to have appropriate pricing policies in place to promote the sustainable and rational use of water (Macer, 2011:22). In most countries, governments subsidise water delivery systems and prices are set to recover operational costs (Murthy, 2013:96). These prices are rarely sufficient to cover development and maintenance costs. An increase in tariffs for improved economic pricing could naturally be deliberated by government. An increase could, however, lead to criticism if promises in political campaigns were made to keep the cost of basic needs low. Involvement from the private sector has been perceived as being one way to improve the financial stability of the water market. There are, however, concerns regarding private sector involvement in the provision of a basic human right such as water. These concerns were reviewed in Chapter Two Section 2.5.3. The main concern centred on matching the private sector’s short-term return objectives with the long-term sustainability perspective that is necessary in the water sector.

The domestic users who do not have acceptable access to potable water must buy water from local shops or private vendors, who purchase water in bulk, and then charge these users a high price (Murthy, 2013:132). Therefore, those with unacceptable access to potable water typically pay a higher price than those connected to a centralised water provision system. Impact investments in decentralised water purification infrastructure could provide a viable solution to this problem and decrease costs for the end-users who currently have to buy water from local shops or private vendors (see Chapter Two Section 2.4.1 for a review of centralised and decentralised water provision systems).

As mentioned above, the price of water should be affordable, but also economically viable for private sector impact investors. Past failures in water resource management is attributable to

the perception that water is a free commodity (Larsen, 2000:18). However, water has value as an economic commodity. Just like food, water is a non-substitutable resource that is essential for survival (Appelgren, 2004:18). Therefore, just like food, water should also be priced.

Charging for water can also be used by municipalities to change consumer behaviour towards conservation and sustainable water use (Macer, 2011:24). Given the water scarcity discussed in Chapter Two Section 2.2.2, higher water prices and the enforcement of water-use regulations in South Africa may prevent excessive use (Ramírez *et al.*, 2016:8). Charging for potable water or increasing the tariffs may improve governments' ability to raise capital for development, operations and maintenance and prevent excessive use, but it could also make water unaffordable to the poor (Murthy, 2013:126; Macer, 2011:24).

South Africa's advanced financial system offers impact investors a wide range of financial instruments to use as investment mediums (International Monetary Fund, 2008:10). Some municipalities in South Africa have issued social impact bonds to finance the development of water and sanitation infrastructure and services (Murthy, 2013:133). These bonds are used to spread the cost over a long period of time. They are also used in the impact investment market and provide an effective alternative to regular means of financing. These financial instruments could effectively provide a measurable social and/or environmental impact in terms of acceptable access to potable water and a relatively stable financial return.

The affordability of water has been the centre of a court case in South Africa that set the precedent in the country and will be briefly described in the following section. In addition, one example of private sector involvement in the water sector in South Africa which has caused a public dispute will also be discussed.

(d) Practical examples of the right to potable water in South Africa

The basic human right to safe drinking water was used as the premise of an argument in constitutional litigation in South Africa in 2009 (Murthy, 2013:98). In the case CCT39/09 Mazibuko and others versus the City of Johannesburg and others, the applicants challenged the free basic water policy of six kilolitres of free water per household per month and the lawfulness of installing water meters in the township of Phiri (Constitutional Court of South Africa, 2009:1). The applicants argued that the water meters had been installed unlawfully and that the free water provided was insufficient. After two appeals, the matter was set aside with the applicants being unsuccessful in both cases. The Supreme Court of Appeal also stated that it

was inappropriate for a court to quantify what constitutes sufficient access to water as this is best determined by government.

According to Ogendi and Ong'oa (2009:192), the introduction of water meters by private companies in South Africa caused some of the poorest individuals to be denied access to this vital natural resource. Therefore, the delicate balance between privatising water provision on the one hand and management and government involvement on the other hand needs to be considered by all stakeholders. If someone is cut off from water because they cannot afford paying for it, their basic human rights are violated. Affordability is, however, difficult to gauge, but some sort of compensation is generally required for the service provided.

This review of the basic human right to water focused primarily on the affordability aspect, but there are many other aspects. These aspects include that the access to water should be sufficient, safe, acceptable and physically accessible. These aspects were discussed in Chapter Two Sections 2.1 and 2.2.

Potable water requires purification, which in turn requires the construction and maintenance of appropriate infrastructure. Each part in this process adds to the cost of delivering potable water. Therefore, individuals or households are required to make a payment whether it is subsidised or charged at full price. Furthermore, just as return is made by selling a basic human good such as food, the provision of acceptable access to potable water for financial return can be deemed morally acceptable. As discussed in Chapter Two Section 2.5.3, there is concern that the private sector's short-term return focus might override the long-term sustainability considerations of water purification infrastructure. This apprehension could be negotiated using impact investments.

Having reviewed the barriers to impact investing in water purification infrastructure in South Africa, the focus now turns to the opportunities in impact investing in water purification infrastructure.

4.3 OPPORTUNITIES IN IMPACT INVESTING IN WATER PURIFICATION INFRASTRUCTURE

Some of the opportunities in impact investing in water purification infrastructure are summarised in Table 4.2.

Table 4.2: Opportunities in impact investing in water purification infrastructure

Opportunities	Supporting references
New infrastructure needed in peri-urban areas where rapid population growth is taking place	Isa (2016); DWS (2015:70); Jacobsen <i>et al.</i> (2013:2); Peter-Varbanets <i>et al.</i> (2009:249)
Growth potential in the water market leading to increased opportunities	Robecosam (2015:20); Bigas (2012:60); Geman & Kanyinda (2007:23)
Large financing gap in the water sector caused by ineffective government intervention	Gordhan (2016:21); Turton (2016:223); Maimane (2015); Millson & Roux (2015:15); Lubisi (2014:119); DWA (2013:84); Rodriguez <i>et al.</i> (2012:24)
Opportunity for the private sector to contribute to financing water purification infrastructure thereby providing improved efficiency, quality, service delivery etc.	Brinkerhoff & Brinkerhoff (2011:4); Koppenjan & Enserink (2009:285); Kirkpatrick <i>et al.</i> (2006:144)
Substantial financial returns from investing in water	Connor (2016:11); Roca, Tularam & Reza (2015:398); Robecosam (2015:20); WHO (2014b:10); Roca & Wong (2013:37); Bigas (2012:60); Geman & Kanyinda (2007:23)
Increased interest among institutional investors in water purification infrastructure	Loftus & March (2016:47); Reynaud (2015:447); Roca <i>et al.</i> (2015:398); Valiñas, Gomez, Pandiello & Zaporozhets (2015:5); Bayliss (2013:296); DWA (2013:86); Reid <i>et al.</i> (2010:917); Slaughter (2010); Marin (2009:20); Trémolet, Cardone, Da Silva & Fonseca (2007:11)
Innovations in water purification infrastructure driving costs down	DWA (2013:86); Reid <i>et al.</i> (2010:917); Slaughter (2010)
Opportunity to create social and/or environmental impact (decreasing disease burden, improving economic growth, emptying hospital beds, reducing water pollution etc.)	WHO (2014b:20); Turner (2013:10); Pickering & Davis (2012:2394); OECD (2011:14); Corcoran <i>et al.</i> (2010:5); Sanctuary & Tropp (2005:11); Aureli & Brelet (2004:6)

Source: Researcher's own construction based on the cited references

Most opportunities in the impact investment asset class are found in private markets which include real assets, private debt, private equity and venture capital (Barby & Pedersen, 2014:14). Opportunities more specific to impact investing in water purification infrastructure include financial returns from investing in water, increased interest from institutional investment in water purification infrastructure and the opportunity to create social and/or environmental impact. These opportunities will be discussed next.

4.3.1 Financial returns from investing in water

The 2008 financial crisis caused a delay in the development of new water infrastructure and put downward pressure on tariffs. However, the water market was since supported by increased private sector participation through the provision of funding, technology and expertise. According to a report published by Robecosam (2015:20), the global water market rebounded in 2015 after the economic slowdown. Financial analysts have predicted high growth potential in the water market globally (Bigas, 2012:60). The size of the global water market in 2015 was estimated at US\$591 billion and forecasts showed that it could reach US\$1 trillion between 2020 and 2025 (Robecosam, 2015:20; Bigas, 2012:60). As the world's population increases so

will the demand for potable water (Geman & Kanyinda, 2007:23). The expected global growth of the water market is displayed in Figure 4.1.

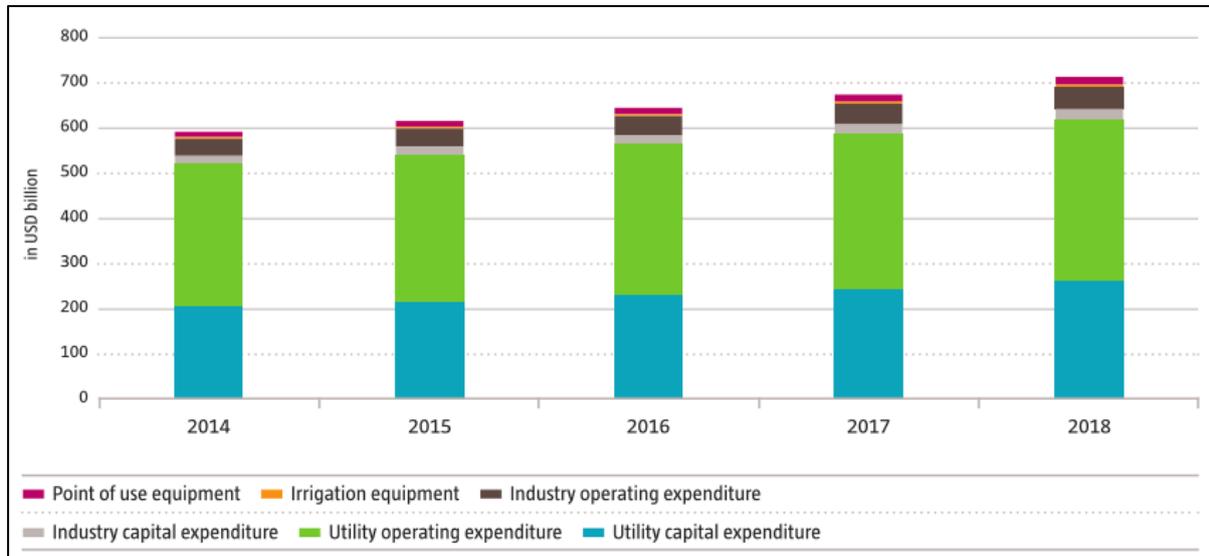


Figure 4.1: Global water market

Source: Robecosam (2015:20)

As revealed in Figure 4.1, growth in the global water market is predicted to reach more than US\$100 billion over a five-year period. The majority of the revenue made in the water market is driven by utility capital operating expenditure. Investment in POU infrastructure only represents a small portion of the total water market. Therefore, there is opportunity in this area for private sector impact investors to make a valuable contribution to improve access to potable water.

Investments in safe drinking water and sanitation have the potential to generate returns of between US\$3 and US\$34 per dollar invested depending on the region where the investment was made and the technology used (Connor, 2016:11). Recent WHO estimates forecast a US\$4.3 return on every dollar invested and a return of 1.5 per cent of the global GDP (WHO, 2014b:10). In Africa alone, investments in small-scale projects that provide access to water and sanitation infrastructure could yield returns of approximately US\$28.4 billion per annum (Connor, 2016:11). Furthermore, there is an estimated economic return of five per cent of a country's GDP for small-scale projects that provide drinking water in Africa.

Certain segments of the water market can be expected to generate annualised returns of between five and ten per cent until 2030 (Roca *et al.*, 2015:398). According to Roca and Wong (2013:37), water investments also have the potential for risk-adjusted returns, they provide a

diversification benefit and serve as a hedge when the overall market is in a bear trend. This is of vital importance for finance-first investors who prioritise market-related, risk-adjusted returns. Therefore, these investments have increased the interest from institutional investors.

4.3.2 Increased interest of institutional investment in water purification infrastructure

In Chapter Two Section 2.5.2(b), the funding gap in water infrastructure in South Africa was highlighted. It is this funding gap that has caught the interest of some institutional investors. In the areas where governments are struggling to provide, there is opportunity for impact funding to support financially viable and market-related solutions to address social and/or environmental challenges. The private sector has increasingly been recognised as crucial to filling the financing gap (Bayliss, 2013:296).

The public sector still owns a vast majority of water utilities (90%) in South Africa and accounts for 85 per cent of the financing of water (Roca *et al.*, 2015:398; Trémolet *et al.*, 2007:11). The rising number of PPPs is, however, an indication that there is a growing interest and effort from the private sector to expand their involvement in the water sector (Reynaud, 2015:447; Valiñas *et al.*, 2015:5; Marin, 2009:20). One of these indications is the competitive contract offerings in the lucrative market of desalination which has prompted interest from institutional investors. The market size for desalination contracts was estimated at US\$31 billion in 2015 and has a potential for annualised growth rates of up to 19 per cent until 2025 (Loftus & March, 2016:47). Similar to South Africa's partnership with Iran (see Chapter Two Section 2.4.2), the construction of the Thames Water desalination plant in London contracted a Spanish company to build the plant (Loftus & March, 2016:47; Roelf, 2016). These projects are evidence that the private sector is becoming progressively more involved in the construction and development of bulk water purification infrastructure.

In the South African National Water Resource Strategy Report it is stated that the private sector will be encouraged to contribute to the social component of water infrastructure investment (DWA, 2013:86). Correspondingly, the investments could be part of their CSI strategies and should benefit the communities from where they draw their labour force. As discussed previously, private sector funding in South Africa typically occurs through the Trans-Caledon Tunnel Authority or the water boards in the form of loans or bonds. The researcher is of the opinion that if capital devoted towards CSI were used, more conducive agreements could be established to benefit both the company involved and those facing unacceptable access to potable water.

In addition to the growing interest from the private sector, water-treatment technology is also becoming more affordable (DWA, 2013:86). This affordability is partly the result of advanced technology amidst the intensifying scarcity of water in many parts of SSA. These circumstances drive innovation and create significant investment opportunities to fund research and development of water-efficient technology to provide for those who do not have acceptable access to potable water (Reid *et al.*, 2010:917; Slaughter, 2010).

Water is central to many functions in everyday life. Therefore, investments in water purification infrastructure could have the potential to create social and/or environmental impact in many economic sectors.

4.3.3 Opportunity to create social and/or environmental impact

In Chapter Two Section 2.3, a review of the consequences of unacceptable access to water infrastructure was provided. These consequences included major health risks, lost education hours and a restriction of economic development. Institutional investors who devote capital towards water purification infrastructure have the opportunity to create significant social and/or environmental impact while addressing these challenges. Alongside substantial financial returns, the social and environmental benefits of clean water include improved health, education gains, increased productivity, reduced water and soil pollution and a better quality of life (WHO, 2014b:20; OECD, 2011:14; Sanctuary & Tropp, 2005:11).

It is essential for impact investors to report measurable social and/or environmental impact of their investments. The motives of both finance-first and impact-first investors are to achieve measurable social and/or environmental impact. Impact-first investors are particularly determined to create impact as they prioritise impact over financial returns.

Investments in water purification infrastructure will have a direct impact by decreasing the number of cases of diarrhoea, cholera and typhoid. According to Corcoran *et al.* (2010:5), the impact would be so extensive that half of the hospital beds currently occupied in the world would be emptied if the problems relating to water and sanitation were solved. Many of the people affected by these diseases rely on public healthcare. Therefore, governments around the world, including South Africa, are carrying an unnecessary financial burden. The root of this problem can be traced to contaminated water. Impact investors thus have a major opportunity to make a valuable contribution to society and the natural environment.

Other areas where major impact through investments in water purification infrastructure can be created relate to education and productivity levels. For instance, the provision of better access to potable water can decrease the time spent by many women and children fetching and carrying water to their households (Pickering & Davis, 2012:2394). These individuals will be able to spend more time on education and other uplifting activities that could be more beneficial to both themselves and their households (WHO, 2014b:10; Aureli & Brelet, 2004:6). Better access to water infrastructure will also create more dignified and hygienic sanitary environments and increase the quality of life (OECD, 2011:14).

Similarly, investments in water purification infrastructure can create environmental impact. By purifying water, major sources of pollution are reduced (WHO, 2014b:10; Turner, 2013:10). For example, investments in infrastructure that increases the safe disposal of wastewater improves the quality of water and thereby the functioning and biodiversity of water ecosystems (OECD, 2011:14). Reducing the water pollution levels through water purification is quantifiable and therefore impact investors will be able to demonstrate measurable environmental impact.

Safe disposal of wastewater helps to improve the quality of surface waters with benefits for the environment (e.g. functioning of eco-systems and biodiversity) and for economic sectors that depend heavily on water as a resource (e.g. fishing, agriculture and tourism).

In light of the preceding discussion, it is clear that impact investors can positively change millions of lives in South Africa, the SSA region and globally by investing in water purification infrastructure.

4.4 CONCEPTUAL FRAMEWORK

The motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa identified in Chapters Two, Three and Four are summarised in Figure 4.2.

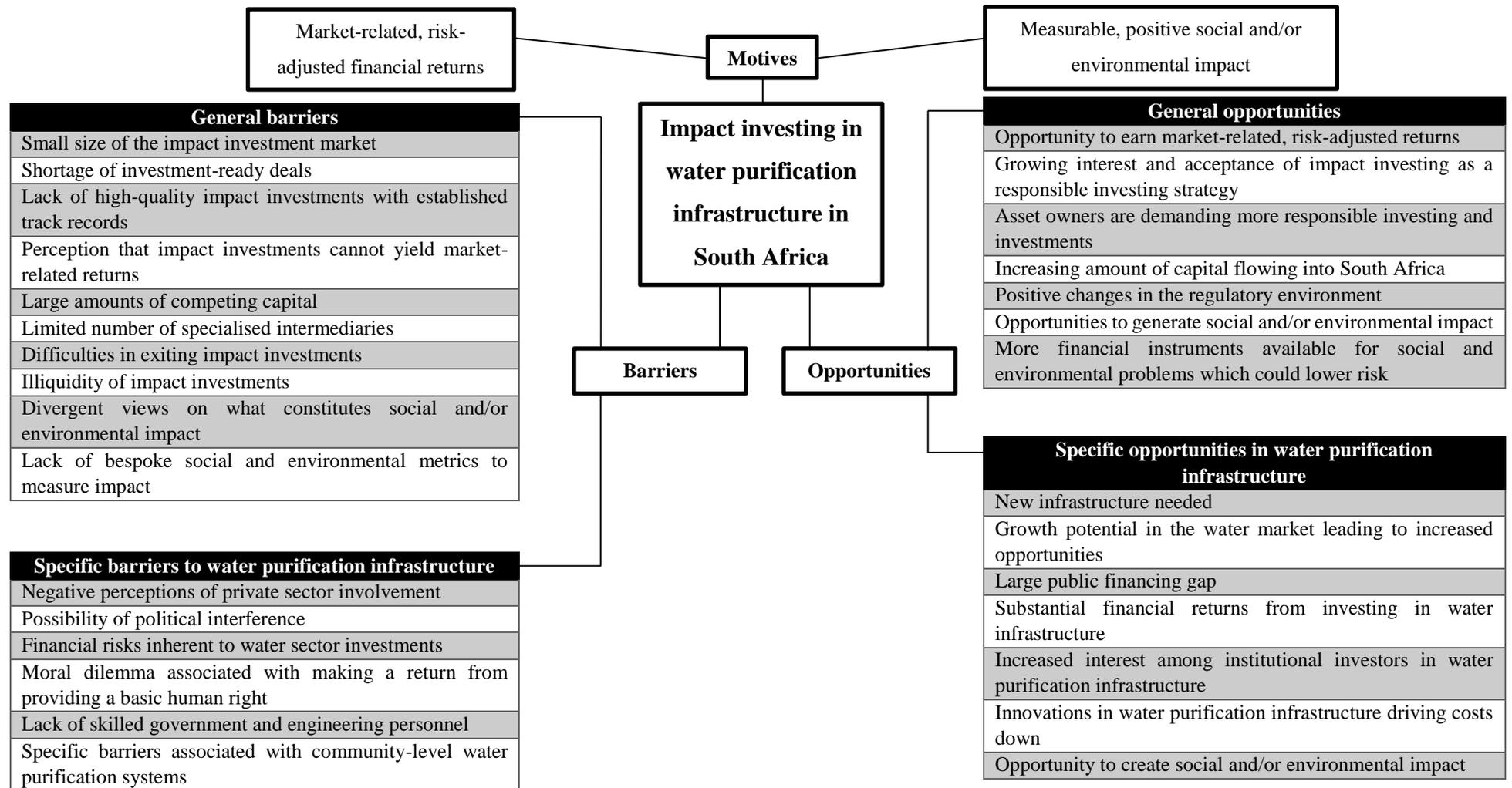


Figure 4.2: Conceptual framework of the motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa

Source: Researcher's own construction based on the previously cited secondary sources

4.5 SUMMARY AND CONCLUSIONS

Impact investors who invest in water purification infrastructure face similar barriers to impact investors in general such as a shortage of investment-ready deals and difficulties in measuring social and/or environmental impact. They also face more specific challenges such as the risk of political interference and financial risks inherent to water infrastructure investments.

The South African government has been at the forefront of legislation to create equal access to potable water to its citizens. However, corruption and inappropriate appointments have hampered the effective implementation of this legislation. Once South Africa overcomes these problems, there is likely to be an increase in capital devoted towards investments in water purification infrastructure.

A higher financial risk factor creates higher return expectations from investors. Higher risk also complicates investments for asset managers as they must take their client's best interests into account at all times. Another concern is the high levels of poverty in South Africa where many people living at the bottom of the pyramid struggle to pay for basic needs including water. This concern will have a direct effect on investors' financial return targets. However, if investors target those living in peri-urban areas who have the means to pay for water, this problem might be mitigated to a certain extent.

Investors making a return from the provision of basic human rights might face a moral dilemma. The researcher deems it morally acceptable to generate financial return from water as long as the water is provided at an affordable price. Furthermore, impact investing could bridge the gap between the private sector's short-term return objectives and the long-term perspectives necessary in the water sector.

Opportunities in investing in water purification infrastructure include the possible financial returns, increased interest from the institutional investors in water purification infrastructure and possible social and/or environmental impact. The water sector shows positive signs for growth over the next decade. Furthermore, the risk-adjusted financial returns that can be earned from investments that create acceptable access to potable water are promising. Similarly, the investments have other diversification and hedging benefits. The positive growth prospects and a large financing gap in the sector have resulted in an increased interest from institutional investors. In addition, innovative financing structures such as PPPs and the growing affordability of water purification infrastructure are likely to spur this interest on.

A crucial aspect to impact investors is the opportunity to generate measurable social and/or environmental impact. As millions of people across the world still lack acceptable access to potable water, investments in water purification infrastructure can make an immense impact. This impact could lead to fewer mortalities associated with water-related diseases, increased socio-economic activity and a decrease in water pollution. In light of the preceding discussion, the research paradigm, research types, data collection and analysis, the proposed conceptual framework of this study and criteria for good qualitative research will be discussed in detail in the following chapter.

Lastly, a summary of all the identified motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa was provided in the conceptual framework displayed in Figure 4.2.

CHAPTER FIVE

RESEARCH DESIGN AND METHODOLOGY

5.1 INTRODUCTION

In Chapters Two, Three and Four the motives, barriers and opportunities in impact investing in general and in water purification infrastructure in particular were scrutinised. The literature reviewed in these chapters has led to the development of a conceptual framework, which is presented in Figure 4.2 (Section 5.4). In this chapter, the research paradigm and research types adopted in the study will be discussed. Specific attention will be given to the methods used to collect and analyse the secondary and primary data. Details will also be presented on how the credibility, transferability, dependability and conformability of the qualitative research were ensured. In the closing sections of the chapter, the methods that were used to analyse the qualitative data will be explained. Furthermore, the ethical considerations that were taken into account in the research process will be outlined.

5.2 RESEARCH PARADIGM

A research paradigm is a way of looking at the underlying basis of a scientific investigation (Cohen, Manion & Morrison, 2013:5; Krauss, 2005:759). A variety of paradigms are available to researchers in the social sciences. Given the lack of research on private sector impact investment in water purification infrastructure in South Africa (Chapter One Section 1.2.4), a qualitative research paradigm was selected for this study. This approach was chosen to explore and provide an understanding of the meaning that South African impact investors and other role players in the water purification process ascribe to the phenomenon. This research approach is especially useful when limited research has been conducted on a phenomenon as it allows new perceptions and knowledge to be developed (Ritchie & Lewis, 2003:30). Furthermore, qualitative research is best suited to newly developed phenomena that are not well understood or have been inadequately defined.

The research paradigm enabled the researcher to follow both deductive and inductive reasoning processes whereby the motives, barriers and opportunities related to private sector impact investment in water purification infrastructure in South Africa were investigated. These motives, barriers and opportunities were identified from extant literature using a deductive reasoning process, which has led to the development of a conceptual framework (see Section 5.4). Using an inductive reasoning process, the constructs in this conceptual framework were verified with experts in the South African impact investment market and water provision

process. The views that were revealed during the inductive reasoning process were used to validate and revise the conceptual framework.

5.3 RESEARCH TYPES

According to Hair, Money, Samouel and Page (2007:153), there are three main types of research, namely exploratory, descriptive and causal research. Given the nature of the problem statement explained in Chapter One Section 1.3, both exploratory and descriptive research was undertaken in this study.

Exploratory research is often used when little is known about a topic or if existing theories do not apply to the topic at hand (Creswell, 2003:22). Exploratory research can also be used to identify and clarify ambiguous problems (Zikmund, Babin, Carr & Griffin, 2013:62). Although impact investing has become more recognised and researched in the global context, little research on impact investing in South Africa has been conducted. More specifically, the researcher identified a gap in the literature on the topic of impact investing in water purification infrastructure in South Africa (see Chapter One Section 1.2.4). As a result, the researcher set out to investigate the motives, barriers and opportunities related to impact investing in general and in water purification infrastructure in South Africa.

By using a descriptive research approach, the researcher could provide an accurate description of the phenomenon as described above. Furthermore, the approach was used to discover and define the ‘who, what, where, when and how’ of the study. Exploring and defining these concepts enabled the researcher to address the research questions as introduced in Chapter One Section 1.4. Descriptive research can be used to determine possible interactions between variables, but cannot be used to make cause-and-effect statements (Cooper & Schindler, 2006:141). Impact investing in water purification infrastructure requires expert knowledge from investors and other role players in the impact investment market, as well as role players in the water provision process. Therefore, it was crucial to investigate the possible interactions among the individuals and organisations as they often face different barriers and opportunities. Furthermore, the similarities and differences of opinion among these individuals and organisations – specifically in impact investing in water purification infrastructure in South Africa – were investigated to interrogate the conceptual framework. The investigation into possible interactions among these role players resulted in a better understanding of impact investing in water purification infrastructure in South Africa. Developing countries often face the similar barriers and opportunities in general. Consequently, role players in these countries

could also benefit from a better understanding of the phenomenon although the study was conducted in a South African context.

Primary and secondary data were collected to provide a comprehensive evaluation of the current state of impact investments in general and in water purification infrastructure in South Africa in particular.

5.4 COLLECTION AND ANALYSIS OF SECONDARY DATA

Secondary data refer to data that were gathered by a third party for purposes other than the research in question (Neelankavil, 2015:49; Blaikie, 2009:160). The secondary data collected for this study consisted of an extensive review of academic journal articles, reports, books and previous postgraduate theses. An analysis of the secondary data resulted in the compilation of the conceptual framework presented in Figure 4.2.

A conceptual framework is a researcher's conception or model explaining a particular phenomenon (Maxwell, 2005:39). A conceptual framework provides an interpretive approach to explaining a social reality (Jabareen, 2009:51). Therefore, it is a synthesis of a researcher's understanding of all the factors which shape a phenomenon and how these factors connect. Jabareen (2009:51) defines a conceptual framework as "a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon".

The conceptual framework constructed for this study provided an interpretive approach which assisted the researcher to gain a richer understanding of the phenomenon that was investigated. The revised conceptual framework was used to make research findings meaningful and more generalisable by creating a coherent structure (Green, 2014:36).

A discussion of a phenomenon's context, expected and actual long-term change, sequence of events and assumptions regarding the movement along the impact value chain must be evaluated to develop a conceptual framework (Vogel, 2013:2). Therefore, in this study, the researcher identified the motives, barriers and opportunities impact investors face when investing in water purification infrastructure in South Africa. A summary of these factors is displayed in Figure 4.2.

5.5 COLLECTION AND ANALYSIS OF PRIMARY DATA

In the following section, details will be presented on the methods used to collect and analyse primary data. Primary data refer to data generated for a specific purpose in a specific format to address research questions (Neelankavil, 2015:49; Blaikie, 2009:160; Nykiel, 2007:29). In the following sections, attention will be given to the respective sample frames, sampling techniques, samples, research instruments and methods chosen to collect and analyse primary data.

5.5.1 Sample frames

A sampling frame refers to a list of all the elements within the population from which a sample will be drawn from (Neelankavil, 2015:235). At the time of conducting the research, no usable population or sample frames existed. Therefore, a sample frame for the impact investment market was compiled from a number of sources. These included: The landscape for impact investing in Southern Africa report (2016), Impact investment in Africa: Trends, constraints and opportunities (2015) and the Principles for Responsible Investment signatory directory (Mudaliar *et al.*, 2016a:252; Rockey, 2016:5; Sales, 2015:62). Investors and other role players in the impact investment market were selected from this list.

A second sample frame was assembled from individuals and entities (described in Figure 2.3 and Table 3.2) that were identified as experts in the research and development area of water purification infrastructure and that were listed in the South African water directory (Water directory, 2017).

As it is often impossible to gather data from the entire sample frames, subsets are used called samples. The sampling techniques used to draw these samples are explained in the following section.

5.5.2 Sampling techniques

There are two main sampling techniques available to researchers, namely probability and non-probability sampling techniques. Two non-probability sampling techniques were used in this study as qualitative research is essentially purposive, meaning that the researcher decides who should be involved in the research and who should not (Takhar-Lail & Ghorbani, 2014:146). These techniques included judgemental and snowball sampling. A judgement sample is a type of purposive sampling in which a researcher who is familiar with the relevant characteristics of the sample selects elements to conform with certain criterion (Coldwell & Herbst, 2004:81).

This technique is appropriate when selecting unique cases that are especially informative (Neuman, 2011:268; Pellissier, 2007:32). Snowball sampling, on the other hand, relies on referrals from participants regarding other potential interviewees who might meet the selection criteria (Coldwell & Herbst, 2004:81).

The judgement sampling technique was used to select experts from both sample frames. However, different selection criteria were applied to identify experts in the sample frames for the impact investment market and role players in the water provision process. Thereafter, snowball sampling was used to gain referrals from the initial participants.

Expert impact investors were selected to create a credible sample of investors and other role players in the impact investment market. For the purposes of this study, an expert was defined as an executive decision-maker or a person in a managerial role who has made or has helped to facilitate impact investments over the past five years. The experts should preferably have had experience in investing in water infrastructure in South Africa or elsewhere in the SSA region. The experts, whose information was publicly available on the relevant entities' websites, were contacted via email and asked whether they would be willing to participate in a semi-structured interview. Personal networks were also used to contact experts. Thereafter, the participants were asked to refer the researcher to other knowledgeable professionals in the impact investment market.

Similar to the first sample frame, judgement sampling was applied to identify suitable role players in the water provision process. Role players in the water provision process were identified based on their expertise in different water purification processes and their involvement with the research and development of water purification infrastructure. Those selected were all regarded as experts in their profession. For the purposes of this study, an expert was defined as an executive decision-maker or a person in a managerial role who has had experience in the water provision process over the past five years. This selection criterion was based on information available on the relevant entities' websites. The participants of this sample were also asked to refer the researcher to other role players in the local water provision process. A wide range of role players were selected to provide credibility through triangulation of thoughts.

5.5.3 Samples

As it is usually impossible to gather data from the entire sample frame, subsets are typically used called samples (Pellissier, 2007:31). These samples should be gathered in way that provides the best reflection of the sample frame. Three samples were subsequently used in this study. The first sample consisted of carefully selected investors in the impact investment market, the second comprised other role players in the impact investment market, and the third sample included leading role players in the water provision process in South Africa. The names of entities and role players included in the three samples are presented in Table 5.1.

Table 5.1: Entities and role players included in the three samples^(a)

Investors in the impact investment market^(b)	Other role players in the impact investment market	Role players in the water provision process^(c)
1. Futuregrowth Asset Management	1. Genesis Analytics Economics-based Consulting	1. Stellenbosch University Water Institute
2. Old Mutual: Investments, Insurance and Asset Management	2. Bertha Centre for Social Innovation and Entrepreneurship: University of Cape Town	2. Water Research Commission
3. Ashburton Investments	3. Impact Amplifier	3. Stellenbosch University Civil Engineering Department
4. Heart Capital	4. Greater Impact	4. Western Cape Government
5. Mergence Investment Managers	5. GreenCape	5. Noble Water Solutions
6. Goodwell Investments		6. Hall Core Water
7. Investec Specialist Bank and Asset Manager		7. World Wildlife Fund
8. Ms Karlien de Bruin (independent consultant)		

^(a) One interview was conducted per company or person.

^(b) A number of other companies were approached, but they either did not respond or responded that they were not experts in impact investing in water purification infrastructure. These included: Cadiz Asset Management, Small Enterprise Foundation, Grayswan Investment, Aspen Network of Development Entrepreneurs, Knife Capital, Edge Growth and Allan Gray Investment Management.

^(c) A number of other companies were approached, but they either did not respond or responded that they did not have expert knowledge in the provision of water purification infrastructure. These included: Phelaenergy, Innovus, Veolia Water Technologies South Africa and the City of Cape Town.

According to Hair, Celsi, Money, Samouel and Page (2015:164), it may be sufficient to gather a small number of elements when using a qualitative research approach to develop a theory. In the case of the current research, small samples were deemed sufficient given that all participants had to be experts in their respective fields. The researcher, in consultation with his supervisor, then used his judgement to select the participants. The use of snowball sampling furthermore ensured that the best suitable participants were selected.

5.5.4 Research instruments

A research instrument is a mechanism used to measure a phenomenon (Colton & Covert, 2007). Private sector impact investing water purification in South Africa is phenomenon under investigation in this study. Given that the primary qualitative data were collected through semi-

structured interviews (see Section 5.5.5), interview guides had to be constructed. A main interview guide was developed to interrogate and verify the conceptual framework, displayed in Section 5.4, with experts in the impact investment market. A second interview guide was slightly adapted and used for the interviews with the role players in the water provision process.

The main interview guide was compiled using the motives, barriers and opportunities presented in the conceptual framework (Figure 4.2). The interview guide was divided into seven key sections. In the first and second sections, the biographical details and the views of and experience with impact investing were focused on. In Section Three, the motives of impact investors were covered. The emphasis of Sections Four and Five was on the barriers to impact investing in general and the barriers to impact investing in water purification infrastructure in South Africa in particular. Sections Six and Seven centred on the opportunities in impact investing in general and in water purification infrastructure in South Africa. A copy of the informed consent form and of the main interview guide is attached in Appendices A and B respectively.

Given the time constraints of the participants and the fact that over 30 motives, barriers and opportunities were identified, a five-point Likert scale was used where (1) represented strong disagreement and (5) indicated strong agreement. The use of the Likert scale also allowed the researcher to rank the respective motives, barriers and opportunities in terms of their importance more easily. Probing questions were asked to provide clarity on issues to which the participants strongly agreed or disagreed with a statement (Bryman & Bell, 2011:467).

The second interview guide was adjusted for the role players in the local water provision process. The questions related to the motives, barriers and opportunities in impact investing in general (as presented in Sections Three, Four and Six of the interview guide) were omitted due to the participants' lack of experience in this field. Furthermore, if the participant did not have a sound understanding of impact investing as presented in Sections Two, Five and Seven, the questions were reformulated from a private sector investment perspective instead of using an impact investment perspective. Questions pertaining to the participant's employer were added only to gain a better understanding of the entity's operations.

5.5.5 Data collection method

A qualitative research design attempts to answer the research questions by means of interviews, observations and document analysis of those who are involved with or who have experience in

the topic under investigation (Creswell, 2014:14; Davison, 2014:1; Astalin, 2013:118). Therefore, the method of primary data collection selected for this study was semi-structured personal interviews.

A semi-structured interview is a verbal exchange where the interviewer asks a prepared list of questions to elicit information from another person (Longhurst, 2016:143). Although the interviewer has a prepared list of questions (in the form of an interview guide), the interview is conducted in a conversational manner that allows the participants to explore issues that they feel are important. Semi-structured interviews provide flexibility, opportunity for clarification, first-hand experience of the problem and reflects the participants' views (Bryman & Bell, 2011:467; Rubin & Rubin, 2011:5). The disadvantages of this data collection method include that the quality of the interview depends on the skill of the researcher, that it is time-consuming and expensive (travel and transcription costs) and that the personal and subjective nature of the interview makes it difficult to generalise the findings (Opdenakker, 2006).

Semi-structured interviews were chosen over unstructured interviews as the results would be easier to compare due to the consistency of the questions. The questions were prepared ahead of time to ensure consistency whereas unstructured interviews might not provide uniformity throughout all the interviews. Even though the respective interview guides were prepared prior to the interviews, probing questions still allowed for flexibility. Semi-structured interviews allowed for the most relevant motives, barriers and opportunities (according to the participant being interviewed) to be discussed in-depth while the less pertinent motives, barriers and opportunities were only briefly covered. Furthermore, views and opinions of impact investing in water purification infrastructure were verified with open-ended questions. In this way more valid and reliable information regarding the participant's opinion could be obtained.

Structured interviews, on the other hand, were considered too rigid for this study and would not provide sufficient feedback to verify the conceptual framework. Structured interviews would also force the participant to choose between the alternative answers presented, thereby limiting flexibility. Furthermore, the interviewer would not be able to diverge from the interview guide if an interesting and relevant line of enquiry were discovered. As the current study is of an exploratory and descriptive nature, this particular form of data collection was deemed inappropriate.

Data collection continued until data saturation was achieved. Data saturation occurs when there is enough information to replicate the study, when no new or additional information is being obtained and when further coding is not feasible (Fusch & Ness, 2015:1408). In the current study, data saturation was also determined when participants made the same referrals as those who had already been interviewed.

The interviews lasted between 35 and 55 minutes each and were all audio-recorded. The 16 interviews conducted in the Western Cape were completed face-to-face. The remaining four participants were based in Gauteng. Two of the interviews with these participants were conducted via Skype, one via telephone and one via video conference. The first interview was conducted on 16 May 2017 and the last took place on 3 July 2017.

5.5.6 Data analysis

Data analysis in qualitative research is used to detect, define, categorise, theorise, explain and explore a phenomenon (Huberman & Miles, 2002:309). There are various methods to do qualitative data analysis. Two of the analytical approaches to qualitative data analysis include discourse analysis and content analysis (Babbie & Mouton, 2001:491). Content analysis was used as it presents a systematic and objective way to describe and enhance the researcher's understanding of a particular phenomenon (Elo & Kyngäs, 2007:109). According to Hsieh and Shannon (2005:1277), there are three approaches in the applications of content analysis, namely conventional, directed and summative content analysis. These authors contend that directed content analysis can be used to further describe an existing theory or prior research about a particular phenomenon. Also, directed content analysis can be used to provide a structured way to validate and extend a conceptual or theoretical framework. Therefore, directed content analysis was used to further describe and verify the conceptual framework depicted in Section 5.4.

Once the interviews were completed, the first step of the data analysis process was to convert the raw data into a more user-friendly format. This process involved sending the audio-recordings of the interviews to professional transcribers. Once transcribed, the data were presented in a textual format. The data were then refined by removing unnecessary repetitions and phrases.

The 20 Word documents were used to conduct directed content analysis. Firstly, key words from the questions in the interview guides were used to manually code the textual data into

categories on the motives, barriers and opportunities. Thereafter, all textual data were imported into the qualitative data analysis software ATLAS.ti. The software was used to make data coding more organised, simpler and reliable. The textual data were coded into explicit themes representing similar meanings so that patterns that were found could be easily described (Auerbach & Silverstein, 2003:31).

Some of themes included defining impact investing and the motives of impact investors, measuring impact investments, perceptions of impact investing and barriers related to the small impact investment market. Others were the growing interest, acceptance and demand of impact investing in general and in water purification infrastructure investments, opportunities and barriers to generating social and/or environmental impact and financial returns in impact investments and in water purification infrastructure in South Africa. Furthermore, themes relating to the responsibility to finance, repair and maintain water purification infrastructure in South Africa, the moral dilemma an impact investor might face when investing to make a return from a basic human right and PPPs in impact investments and in water purification infrastructure investments in South Africa were presented. The last two themes were the barriers associated with community level water purification systems and new barriers and opportunities in impact investments and impact investments in water purification infrastructure.

The researcher read the transcriptions and extracted data from the ATLAS.ti output several times to immerse himself in the perceptions and experiences of the participants (Elo & Kyngäs, 2007:113). Thereafter, the researcher conducted further directed content analysis and inductive reasoning to code and synthesise common and contrasting themes from the majority's perspective.

The findings of the data analysis of the common and contrasting themes of the motives, barriers and opportunities were used to offer supporting and contradictory evidence of the conceptual framework of the study. This evidence was used to provide various stakeholders with concrete recommendations in Chapter Seven Section 7.7.

The result of the data analysis was an accurate portrayal of the participants' views on the motives, barriers and opportunities associated with impact investments in water purification infrastructure in South Africa between May and July 2017. Refer to Chapters Six and Seven for a discussion of these results.

5.6 CRITERIA FOR GOOD QUALITATIVE RESEARCH

Quantitative research instruments, such as questionnaires, are tested to verify the validity and reliability of the research instrument used. According to Golafshani (2003:600), validity and reliability refer to the trustworthiness of the research. Since the trustworthiness of the data depends on the effort and ability of the researcher who conducts qualitative research, different terms that encompass validity and reliability are used, namely credibility, transferability and dependability (Pitney & Parker, 2009:62). In addition, Shenton (2004:63) believes that confirmability should be included in this list. In the following sections these four criteria will be considered.

5.6.1 Credibility

Credibility is defined as an accurate portrayal of the participants' perceptions by the researcher to maintain trustworthiness (Lodico, Spaulding & Voegtler, 2010). This criterion verifies the internal validity of the study (Shenton, 2004:64). Furthermore, it ensures that the findings are congruent with the reality of the phenomenon.

To establish credibility, the researcher audio-recorded the interviews and made notes. The recorded interviews were transcribed by professional transcribers soon after the interviews took place to ensure factual presentation. Expert role players across the impact investment spectrum (see Section 5.5.2) were approached to provide credibility through a triangulation of thoughts and ideas (Denzin & Lincoln, 2011:5). In addition, by interviewing experts from different entities in the investment market, bias that could result from using only one source was reduced (Davison, 2014:2). The researcher used three different samples (see Section 5.5.3) to broaden the range of informants and triangulate by means of different data sources.

The gathered data provided in-depth and rich information from the interviewees' perspective rather than from the researcher's perspective (Rubin & Rubin, 2011:31). An honest rapport was created by giving participants the opportunity to refuse to partake in the research to demonstrate that the data collection involved only those who were genuinely willing to contribute. Furthermore, the researcher and his supervisor had regular debriefing sessions to develop ideas and interpretations. Two academics from Stellenbosch University provided additional insights, one being a leading authority in the water provision process, and the other specialising in investments. The conceptual framework was also scrutinised by two external academics in preparation for a conference paper (McCallum & Viviers, 2017:247).

The researcher took care to minimise any preconceived assumptions about the research topic at hand, especially at a time when water restrictions and discussions about the water crisis in the Western Cape take place on a daily basis. However, the researcher is devoted to finding solutions to this crisis from both a financial and social justice point of view. Therefore, the study was shaped with a desire to understand and find innovative business models to finance acceptable access to potable water. To prevent bias, the researcher spent approximately 15 months reading extant literature to gain a comprehensive understanding of the topic. The questions in the interview guides were developed from the conceptual framework and structured in such a manner that they remained consistent throughout the interview process.

5.6.2 Transferability

According to Guba (1981:80), transferability denotes a measure of the external validity or generalisability of the study. Therefore, it is important to present the contextual information of the participants and their employers. The contextual information of the samples, research instruments and data collection methods of the study were provided in Sections 5.5.3 to 5.5.6. Thus, to create generalisability, the information regarding the entities taking part in the research, individuals interviewed, participant selection criteria, data collection and analysis methods, length of the interviews and the time period of the interviews were all discussed in these sections.

Shamash and Ashley (2015:10), assert that the impact investment market in SSA is still relatively nascent. Therefore, even a small sample of experts in this market would be enough to generalise the findings. Furthermore, the role players in the water provision process who were also interviewed provided a broad spectrum of opinions about impact investing in water purification infrastructure in South Africa.

5.6.3 Dependability

Dependability relates to whether the research processes are reliable, consistent, appropriate and clearly documented to allow for a replication of the study (Williams, 2011; Pitney & Parker, 2009:68; Shenton, 2004:71).

To achieve dependability, the researcher gave a thorough explanation of the research design and its implementation on a strategic level (see Sections 5.4 and 5.5). Furthermore, dependability was ensured by providing the conceptual framework in Section 5.4 and the main interview guide in Addendum B. This information will allow the study to be repeated in years

to come and provides context to the fieldwork conducted. As explained in Section 5.5.4, the main interview guide was amended slightly based on the interviewee's background and area of expertise. The amended interview guides were, however, consistently used for the relevant sample group.

An internal audit of the research process and product was also conducted by the researcher's supervisor. This reflective appraisal helped to attest that the results were consistent with the data gathered (Merriam & Tisdell, 2016:252; Shenton, 2004:72).

5.6.4 Confirmability

Confirmability refers to the objectivity of a study (Shenton, 2004:72). The impingement of the researcher's bias was inevitable given that he designed the interview guide. However, steps were taken to ensure that the results centred on the experiences and opinions of the participants, and not on those of the researcher. These steps included a review of the conceptual framework by five academics and by using triangulation of opinions from experts in the impact investment market and role players in the local water provision process. The researcher also consulted seasoned professionals to gain advice and different perspectives at the various development stages of the conceptual framework.

Emphasis was placed on interviewing participants across the impact investment market and the water provision process. These participants included asset owners, asset managers, service providers, demand-side actors, water purification infrastructure developers and government officials. Therefore, the broad range of participants dramatically reduced the researcher's bias through a triangulation of opinions and experiences.

The beliefs underpinning the decision to use semi-structured interviews including the weaknesses of such a research instrument, were documented in Section 5.5.4. These views were noted to maintain objectivity to the choice of research instrument.

5.7 ETHICAL CONSIDERATIONS

Any research that involves data collection from people should take into account the ethical considerations relating to such interactions (Orb, Eisenhauer & Wynaden, 2001:93). To create an ethical platform from which the research was conducted, the researcher firstly ensured that adequate information was conveyed about the purpose of the research to those approached to participate in the study. This was followed by an informed consent form (see Addendum A)

that was signed by the interviewees who were willing to participate. These participants were also informed that they could voluntarily withdraw from the study at any time if they wished to do so. Secondly, the anonymity and confidentiality of the interviewees was maintained and data were safely secured from improper access. The contributions of those involved in the research were also acknowledged (Saunders, Lewis & Thornhill, 2009:185; DiCicco-Bloom & Crabtree, 2006:319). The findings were analysed using appropriate data analysis methods followed by accurate reporting. Finally, ethical clearance for the research was obtained from the Ethics Screening Committee of the Department of Business Management at Stellenbosch University.

5.9 SUMMARY AND CONCLUSIONS

This chapter firstly explained why a qualitative research approach was deemed appropriate for the study. Deductive and inductive reasoning processes were used to identify and assess the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa.

The exploratory and descriptive research design that was selected for the study allowed the researcher to identify and clarify ambiguous barriers and opportunities that impact investors face when investing in water purification infrastructure in South Africa. It also enabled the researcher to determine possible interactions among the role players in impact investing in water purification infrastructure in South Africa. Furthermore, the research design has made an accurate description of the phenomenon possible.

Next, the methods of secondary and primary data collection were described. The secondary data included a detailed study of academic journal articles, industry reports, books and past postgraduate theses. The literature review mainly centred on impact investing in general and on water purification infrastructure in South Africa in particular. The result was the development of a conceptual framework (Figure 4.2) which was used to compile an interview guide for primary research. The primary research was conducted in the form of semi-structured interviews with experts in the impact investment market and the water provision process in South Africa.

Judgement and snowball sampling techniques were used to select experts (executive decision-makers or managers) in the impact investment and water provision markets. The three samples consisted of investors in the local impact investment market, other role players in the impact investment market and role players in the water provision process. The research instruments

employed in the study were the interview guides that were used to collect the data through semi-structured interviews. The main interview guide was developed using the conceptual framework for investors in the impact investment market and was then adapted for the role players in the water provision process. A total of 20 interviews were conducted over a period of a month and a half in 2017. The qualitative data that were collected were analysed using software such as ATLAS.ti which made the data coding simpler and more organised. Along with the use of ATLAS.ti, the researcher conducted his own coding, reading and synthesising to identify common themes and responses from the experts. These themes and responses were analysed to recognise recurring patterns and themes.

The credibility of the research instrument was maintained by audio-recording and by having the semi-structured interviews professionally transcribed. To reduce bias, a broad range of role players were interviewed instead of consulting one particular source. The transferability of the study was ensured by presenting the full context of the fieldwork that was undertaken. In addition, the generalisability of the study was realised by interviewing experts. To achieve dependability of the research instrument, the consistency of the research process was maintained and clearly documented. The confirmability of the study was achieved by asking experts across the impact investment and water provision spectrum to participate to obtain a triangulation of ideas.

The chapter concluded with a brief discussion of the ethical aspects that were considered during the research process. The various steps that were taken to ensure that the research was accountable and that it adhered to sound ethical principles were outlined.

In the following chapter the empirical results will be discussed in detail.

CHAPTER SIX

EMPIRICAL RESULTS

6.1 INTRODUCTION

In Chapter Five the research design and methodology adopted in this study were discussed. In this chapter, the empirical results from the semi-structured interviews will be presented. The biographical details of the interviewees will be summarised. The empirical results of this study were categorised into 12 major themes. The motives, barriers and opportunities associated with these themes will be discussed in detail. This chapter will conclude with a revised conceptual framework. The revised conceptual framework will contain the validated motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa. Specific references to extant literature will be discussed in the final chapter.

6.2 BIOGRAPHICAL DETAILS

As described in Chapter Five Section 5.5.3, interviewees consisted of eight investors in the impact investment market, five other role players in the local impact investment market and seven important role players in the water provision process in South Africa. In Table 6.1 a summary of the biographical details is provided.

Table 6.1: Summary of biographical details of the samples

	Female	Male	Average age (years)	Average work experience (years)	Average experience in impact investing (years)
Investors in the impact investment market (n=8)	5	3	30-39	11-15	6-10
Other role players in the impact investment market (n=5)	3	2	30-39	6-10	1-5
Role players in the water provision process (n=7)	2	5	40-49	16-25	N/A

As reflected in Table 6.1, there was a good gender balance among the interviewees. The average age shows that a mature and experienced group of participants were interviewed. These participants were also knowledgeable as demonstrated by the average number of years of work experience. Although the average experience specific to impact investing varied, only experts

were interviewed in this study. The definition of what constitutes an ‘expert’ for the purposes of this study was explained in Chapter Five Section 5.5.2.

The senior positions that were held by the participants at the time of the study provide further evidence of the sufficient experience and authoritative opinions gathered. Of the twenty participants, four were CEOs, five were heads of departments, six were managers and the remaining five were consultants and analysts. In addition, thirteen of the participants had masters’ or doctoral degrees. Therefore, almost two-thirds of the participants were highly educated individuals.

Although the role players in the water provision process did not necessarily have expert knowledge of impact investing, they provided extensive insights into the nature and financing requirements of infrastructure along the entire water provision process. All seven participants in this sample had managerial positions, were CEOs or head of departments in their respective occupations. Furthermore, five of them had masters’ degrees and two had doctoral degrees. Therefore, given their positions, their years of experience and general high level of education, these participants’ opinions of impact investing in water purification infrastructure were deemed extremely valuable.

6.3 DEFINING IMPACT INVESTING AND THE MOTIVES OF IMPACT INVESTORS

In Chapter Three Section 3.2, a review of the various definitions of impact investing and the motives of impact investors were presented. The lack of a universal definition of impact investing was evident in the extant literature. Therefore, the researcher set out to investigate participants’ opinions on an appropriate, context specific definition and motives of impact investing.

When defining impact investing, the majority of participants agreed that an impact investment should be an ‘intentional’ and ‘measurable’ investment to create ‘positive’ social and/or environmental impact.

Some interviewees perceived the lack of clarity on what ‘positive’ social and/or environmental impact constitutes as a barrier to investors. According to these participants, the lack of clarity causes uneasiness around the reliability of impact measurement (See Section 6.4 for other barriers regarding impact measurement). Also, the absence of a clear definition of ‘impact’ was

perceived by some participants to be the cause of investors pursuing very broad impact objectives only for the sake of having impact objectives. Therefore, as a participant indicated, the measurement and reporting of impact will be poor because some investors do not fully understand what specific goals they are trying to achieve. Participant Twelve responded by saying:

at the moment what you're defining as impact is really your own definition [so] the social and/or environmental measurement side is a little bit like the Wild West at the moment, there's just no structure.

The majority of participants, however, did not regard the lack of a standardised understanding of 'positive' social and/or environmental impact as a debilitating barrier to impact investments. Some of these participants felt that there cannot be a standardised definition of social and/or environmental impact because the developing world perspective of impact will be different to the developed world's perspective. Other participants specified that an impact investor should clearly articulate the impact objectives that they wish to achieve to overcome this perceived barrier. Therefore, the actual barrier might not be a lack of clarity on what 'positive' social and/or environmental impact constitutes, but rather the lack of clear and detailed social and/or environmental impact objectives. There is an extremely broad range of impact (see Table 3.7) that can be targeted in South Africa. Therefore, if an impact investor can distinctly articulate his/her social and/or environmental impact, the measurement of the impact should be simpler.

A universal definition of impact investing might not assist investors to clearly define impact, but might help to set financial return objectives. Participants' opinions differed on the degree of financial return that should be targeted alongside the social and/or environmental impact. These opinions often varied according to the participants' views of the motives of impact investors.

Participants regarded the majority of impact investors in South Africa to be more finance-first orientated than impact-first orientated, but qualified their views. They stated that it depends on what kind of an impact investor the individual or institution is. Most participants believed that financial institutions, such as asset managers, must be finance-first impact investors because they are bound by fiduciary duty. Participant One, a large asset manager in South Africa, claimed that "commercial risk-adjusted returns come first and foremost before social impact". These institutions cannot afford financial failure and must examine the business case first. Therefore, most investors highlighted the importance of prioritising financial return given their

fiduciary duty to manage their clients' capital with prudence. This view was in accordance with extant literature. The participants, however, also indicated that there are other impact investors in South Africa who are impact-first orientated, including development finance institutions and foundations. Some interviewees argued that a few of these institutions do not classify themselves as impact investors, but that they should actually do so.

Participant Six indicated that there should not be a dichotomy between financial return and social and/or environmental impact. According to this interviewee, impact investors should place an equal emphasis on financial return and social and/or environmental impact, "otherwise it is not impact investing".

The general motivation among the interviewees for their involvement in impact investing was the desire to find a financial sustainable way to address grand challenges without sacrificing financial returns. They also believed that these challenges will not be solved through sole reliance on government and adaptations to regulation. Emphasis was placed on the use of new technologies and new business opportunities to address grand challenges (see Section 6.9.3 for more information on interviewees' views in this regard). Furthermore, there was a noted aspiration to make a measurable difference and address a social need over the long term. The range of motivations was aptly captured by Participant Twelve who said that her motivation is to:

look for a sustainable way to actually address those very pressing challenges that we face in a very different sphere. So that's where we first came across impact investing and it just makes sense that there should be a focus across the spectrum, not just on a philanthropic side, but right through to the private sectors.

Taking the motives of impact investors discussed above into account, two major elements must be satisfied to capture a universal definition of impact investing. Firstly, a specific list of social and/or environmental objectives must be created. Secondly, there must be agreement on the range of financial returns that must be generated. As described in Chapter 3 Section 3.2, a narrow universal definition of impact investing could cause the market for such investments to disappear. On the other hand, too broad a definition creates credibility issues. In this study, it was apparent that impact investors should be expected to have specific 'measurable' and 'positive' social and/or environmental impact objectives. There was, however, no consensus on specific financial returns that should be generated in relation to *their* impact objectives. The researcher perceives the underlying problem to be linked with the possessive pronoun 'their'.

Impact investors have very specific impact motives for the entities they invest in. Furthermore, impact investors are aware that financial returns are dependent on the profitability of the underlying entity. Therefore, should an impact investor decide that ‘their’ particular impact objective is to target an entity that may return less profit, the impact investor might receive lower financial returns. As such, the definition of impact investing should not necessarily be limited to a quantified range of financial returns. However, the researcher agrees that impact investments should be able to generate some form of positive financial return over the long term.

Considering these elements, the researcher is of the opinion that the lack of a universally accepted definition is not a barrier for the growth of the impact investment market. Instead, the barrier is a lack of understanding of how to establish and balance clear and detailed impact objectives in relation to financial objectives. The underlying challenge may be related to the implications of a small impact investment market (see discussion in Section 6.6). There seems to be a shortage of successful examples of case studies in South Africa. Therefore, it is difficult for investors to know how to articulate clear and detailed objectives without having enough evidence of the financial returns that they can earn. As such, it is easier to consider the financial merits first, and then to create broad social and/or environmental impact objectives around it.

6.4 MEASURING IMPACT INVESTMENTS

As explained in the preceding section, setting clear and detailed social and/or environmental impact objectives is crucial to impact investment measurement.

The majority of investors and other role players in the impact investment market emphasised that an impact investment must create ‘measurable’ social and/or environmental impact. In Chapter Three Section 3.6.5, the challenges to impact investment measurement as outlined in the literature were examined. In the following section, the lack of a universally accepted set of metrics for impact measurement will be deliberated. Some literature (see Chapter Three Section 3.2) points out that the lack of a universally accepted set of metrics is a barrier to impact investing. Other researchers believe that the unique characteristics of social and/or environmental impact need bespoke metrics. Therefore, these researchers indicate that there is a greater need for bespoke metrics than there is for a universally accepted set of metrics.

The majority of interviewees were of the opinion that the lack of bespoke metrics was not a barrier to impact investing in South Africa. Many of the investors and role players agreed that

there are enough metrics available. They commented that most investors use their own metrics that are tailored for their specific projects. These participants indicated that the available standardised metrics are regarded as “restrictive and limiting” which has led to the development of many bespoke metrics.

Therefore, the lack of bespoke metrics might not be the real barrier to measurement. Rather, given that the majority of impact investors in South Africa use their own bespoke metrics, the real barrier could be the poor reporting of impact measurements. Investors know how to report financial returns as there is a standardised format for doing this. Participants, however, highlighted the dearth on knowledge of how to report social and/or environmental impact as there is no standardised format for doing this. Therefore, the reporting of social and/or environmental impact is inconsistent and not comparable across investment time horizons.

Contrary to the perceived barrier of standardised impact reporting, some investors specified that impact measurement is not an area of concern for them or local asset owners. Asset managers revealed that asset owners are not particularly concerned about the exact measurement of impact. Instead, many are often satisfied with anecdotal measurements that prove that some sort of impact has been made.

According to the researcher, forcing the use of a standardised set of metrics across the global impact investment market will not be of value. Social and/or environmental challenges often have unique characteristics. Therefore, the metrics that are used should be tailored to the specific social and/or environmental issue that is addressed. Having said this, it is disconcerting to observe that there are still challenges to impact reporting ten years after the launch of GIIN. As discussed in Section 6.3, these challenges may be related to a shortage of detailed and clearly articulated social and/or environmental objectives.

6.5 PERCEPTIONS OF IMPACT INVESTING

Similar to the earlier discussion regarding the use of metrics for impact investing, there were also differing views among participants regarding certain barriers and opportunities related to impact investing as a viable RI strategy.

Although the majority of the interviewees strongly agreed that there is a perception that impact investments in South Africa cannot yield market-related, risk-adjusted returns, they made it clear that this perception is not true. However, they indicated that this perception is the second

most critical barrier to raising capital. This barrier was also deemed second to the lack of investment-ready deals (see Section 6.6). Negative past experiences with the so-called “old” socially responsible investments were regarded as the cause of these differing perceptions. Most of the other interviewees in the impact investment market agreed that this perception remains a barrier to the growth of the impact investment market. Participant Nine was of the opinion that this perception is a global and not a South African perspective. The reason given was that the South African impact investment market is not mature enough to have a broad spectrum of impact investments. The participant described the few impact funds in South Africa as purely finance-first funds. Therefore, they would not devote capital unless the entity could deliver sustainable financial returns. Consequently, according to Participant Nine, the perception that impact investments cannot yield market-related, risk-adjusted financial returns should not (in theory) hamper the growth of the South African impact investment market.

In Chapter Three Section 3.6.2, the perception was described of the competition between high-impact CSI budgets on the one hand and impact investments in South Africa for the same limited number of projects on the other hand. The view across the spectrum of interviewees in the impact investment market was that there is no competition between the two forms of funding. There was only one contrasting opinion (out of the 13 opinions). Most interviewees felt that the pools of capital do not compete. Comparisons were made between the smaller CSI budgets that are primarily grant-based and the much larger impact funds that need to generate return on capital. As such, there will not be competition because impact investors will target much larger projects or businesses. Furthermore, according to Participant Five, legislation for CSI budgets restricts capital donations to non-profit entities, whereas impact investors can designate capital with a return objective. As a result, the pools of projects in need of financing will differ. The researcher thus concludes that the competition between these two forms of capital cannot be considered a barrier to impact investing.

In the existing literature it is mentioned that the limited number of specialised intermediaries make due diligence more complex to execute (see Chapter Three Section 3.6.3). However, participants who are investors indicated that they do not perceive this to be a barrier because the majority of asset manager have their own due diligence teams. These teams are well trained and specialise in due diligence investigations. These interviewees also claimed that the knowledge-base has grown in their in-house due diligence teams in recent years. Therefore, their capacity to conduct these investigations is less complex compared to the past. The other role players in the impact investment market sample, however, disagreed. The majority of these

experts felt that there are large inefficiencies in this area of the market which makes due diligence more complex. They argued that there is “a hesitation to share information and use shared knowledge for the greater good” which results in inefficiencies. Therefore, due diligence investigations take longer and are more complex than they should be. The researcher is of the opinion that the real barrier is not the lack of specialised intermediaries. Instead, the complexity of due diligence investigations is attributed to the lack of shared knowledge. Furthermore, the complexity of due diligence might be related to the lack of well-defined impact objectives as discussed in Section 6.3.

As outlined in Chapter Three Section 3.6.4, many authors regard illiquidity and the difficulty to exit impact investments as major barriers that hinder the growth of the impact investment market. However, the general opinion of participants was that impact investors have a good understanding of the nature of the assets that they are investing in. Asset owners understand that these investments are less liquid and therefore often structure exits before committing capital. Participants in the impact investors sample all disagreed that the difficulties in exits is a barrier that limits interest in impact investing. They also highlighted that this view is an international perspective where impact investments are made in early-stage ventures and also through private equity deals. As such, exits would naturally be more difficult.

Currently, investors in South Africa invest in later-stage businesses and projects and often through debt. Using these approaches, there is often more liquidity and exits are more natural because of the structured repayment terms. Some participants, however, regarded illiquidity as a major issue that limits asset owners’ interest in investments in general. Although many participants recognised illiquidity as a barrier to impact investments, they did not find it more difficult than other deals they were involved in. These participants added that investors are finding innovative ways to structure their deals to provide liquidity. Therefore, the researcher concluded that perceptions regarding illiquidity and difficulties in exits that limit interest in impact investments in the South African context are unjustifiable.

6.6 BARRIERS RELATED TO THE NASCENT IMPACT INVESTMENT MARKET

The small size of the impact investment market, lack of investment-ready deals, shortage of impact investments with established track records and the limited number of intermediaries are all barriers related to the nascent impact investment market. Therefore, they will be jointly discussed in this section.

The majority of interviewees agreed that the relatively small impact investment market in South Africa could limit opportunities in this market. However, they qualified this opinion by saying that it was a question of what type of transaction was available. The participants emphasised that the lack of investment-ready deals represented a much greater barrier. The shortage of investment-ready deals in the impact investment market in South Africa was considered to be the largest barrier to impact investing in general in South Africa and to water purification infrastructure by extension.

Participants claimed that impact investors in South Africa are focused on later-stage investments. The majority indicated that there are not enough later-stage opportunities that are financially viable for investors (especially institutional investors) to invest significant amounts of capital. The interviewed investors have seen an increase in deal flow, but not in “qualified” or investment-ready deal flow. Most of the deals they have inspected could be categorised as venture capital and have been regarded as too risky for their mandates. Therefore, many impact investors are vying for the same later-stage or mature deals. According to the participants, the South African market does not suffer from a lack of business activity, but rather “activity that is investable”. According to one participant, this challenge was strongly emphasised at the SAIIN conference in 2016, highlighting its importance.

Participants considered that the small impact investment market size could be a result of the lack of lifecycle support (supporting the entire growth of an entity from inception to maturity) of small and medium-sized social enterprises. As such, there is a bottleneck in the number of viable deals from a fund perspective. The bottleneck is caused because the available deals are either too small or at a too early stage to invest in. Similarly, according to Participant Eleven, the small size of impact investment funds in South Africa makes it difficult to raise capital from international investors.

The general outlook was that there is also a shortage of impact investments with established track records across the risk-return spectrum in South Africa. The shortage of investment-ready deals was again perceived as the main contributor to this. It was deemed difficult to demonstrate good track records across the spectrum of the investment lifecycle in South Africa because there is a shortage of investment-ready deals. Investors commented that there are funds with three-year track records in the market, but asset owners do not have confidence in this form of investment yet. Participant Thirteen perceived the barrier to be predominantly finance-related because too many asset owners are concerned about making “bigger” financial returns.

Therefore, the shortage of impact investments with large return track records was considered the barrier. However, another participant saw the lack of confidence in measuring social and/or environmental impact and trusting those measurements as the perceived challenge with establishing successful track records. Challenges with defining and measuring of impact were discussed in Section 6.4.

As presented in Chapter Three Section 3.6.3, another barrier related to the nascent impact investment market is the limited number of specialised intermediaries which increases transaction costs. The majority of the participants agreed that there is a limited number of specialised intermediaries in the local impact investment market. However, there was no consensus regarding whether the limited number of specialised intermediaries would result in an increase in transaction costs (thereby representing a barrier to impact investing). An argument against the increase in transaction costs posited that these costs would not be material in larger projects or funds.

A greater barrier due to a shortage of specialised intermediaries was found to be the dearth of awareness of impact investing. Therefore, impact investments would not be made due to a lack of information. Furthermore, an uncoordinated impact investment market creates hesitation among role players to share information. The shortage of a coordinated investment ‘ecosystem’ across the impact investment market was highlighted by a few participants as a major barrier. This barrier results in incoherent actions amongst the role players. An uncoordinated impact investment market has a shortage of multi-tiered financial and lifecycle support. As such, there is a funding gap between the prototype or early-stage development and the mature institutional investment stage. As a result, there is likely to be a shortage of investment-ready deals.

Impact investors have not observed an increase in investment opportunities in the water market in South Africa over the past five years. Many mentioned that they expected it to be a growing area of investment in the future, but that they had not seen any specific investment opportunities yet. These participants furthermore commented that there are still too many barriers to overcome and that the water market in general is still very isolated and fragmented. Therefore, the lack of investment-ready deals in water infrastructure was highlighted as a major barrier to the growth potential in the water market in South Africa.

As alluded to earlier, most of the barriers related to the nascent impact investment market are influenced by the shortage of investment-ready deals. Considering that most impact investors

in South Africa only invest in more mature entities, the researcher believes that these barriers are actually related to a more critical barrier. This barrier is the lack of lifecycle support. For example, small and medium-sized social enterprises in South Africa are often adversely affected by the lack of lifecycle support to assist in their development. Therefore, these enterprises are often at a too early stage of development for impact investors to consider investing in them. The investment mandates of some impact investors may restrict their involvement in early-stage entities. Therefore, the researcher is of the opinion that impact investors claim that there are not enough investment-ready deals, but they are only considering one stage of the investment spectrum. Consequently, the impact investment market is likely to remain stunted until there is more support across the business lifecycle of small and medium-sized social enterprises or until impact investors become less risk averse.

6.7 THE GROWING INTEREST, ACCEPTANCE AND DEMAND FOR IMPACT INVESTING

Many of the perceived impact investment opportunities in general and in water purification infrastructure in particular are related to the increasing interest in, acceptance of and demand for impact investing. In the following section, these themes will be discussed in more detail.

The majority of participants agreed that there is a growing acceptance of impact investing as an RI strategy in South Africa. They indicated that the growing acceptance of impact investing is one of the key factors that could lead to an increase in investment opportunities. Interviewees also generally agreed that some asset owners are demanding more RI which could open up new impact investing capital streams. However, they did point out that there is more interest in these investments than there is a demand for them. There is especially a growing interest and acceptance of impact investing as an RI strategy among pension fund trustees, institutional investors and among the younger generation asset owners. Investors have seen that pension fund mandates are providing more scope for impact investments. Two interviewees posited that pension fund trustees are engaging much more with impact investing than a few years ago. It is promising to see that pension funds are showing more interest in impact investing because they manage large sums of money. However, unless they are taking the lead by investing large sums of money in impact investments, the impact investment market will always stay nascent and underdeveloped.

The increase in interest from asset owners in impact investing was evident in responses from the interviewees. All eight impact investors indicated that the number of impact investments

that they had made or managed over the past five years had increased. This increase was related to the size and scale of the projects and an expansion of their product suites. The most common focus of impact investments that the participants highlighted was affordable housing and renewable energy solutions. Participant Ten emphasised that the foremost opportunities to earn market-related, risk-adjusted returns in the impact investment market is currently through investments in renewable energy. According to the participant, the existing energy tariff structures enable investors to earn “commercial or close to commercial returns”. Many participants also mentioned that impact investments contribute to job creation, health solutions and social infrastructure development. Other examples of areas of impact investments that were mentioned included micro-financing, financial technology solutions, the green economy and climate resilience. It is disconcerting that only one participant reported that his/her company was investing directly in water infrastructure. However, there were other participants who mentioned that their focus was on climate change and the green economy. This example is particularly reassuring as acceptable access to potable water is a major consideration in these investments.

Some participants observed growth in interest, but had not observed a direct demand for more impact investments in terms of the process or products of impact investing yet. Instead, there was only an increased awareness of impact investing and capital available for such investments. Furthermore, a few participants claimed that the number of impact investment transactions had not increased substantially. Therefore, there is not enough material evidence of an increasing interest and demand from asset owners to regard it as an area from which opportunities can be created. They justified their view by saying that there were a number of barriers that deter investors from showing interest in local impact investments. The most important of these barriers were presented in Section 6.6 of this chapter. Two other participants also mentioned that there has been a growing acceptance of impact investing, but qualified their responses by saying that it depends on which definition of impact investing the investors used. Therefore, the growing acceptance of impacting investing as an RI strategy might only lie in the broader definition of impact investing (see Chapter Three Section 3.2).

The majority of the sampled experts agreed that there was a growing interest among institutional investors in water purification infrastructure investments in South Africa. However, they did not perceive that the interest has resulted in more investment opportunities. In this regard, Participant Nine commented that there is considerable activity in the areas of water conservation, waste treatment and repairing leaking pipes, but that very little has been done in

water purification infrastructure to facilitate acceptable access to potable water. After examining more than 350 social enterprises, this participant could not find anyone directly involved in the water purification infrastructure. The participant felt strongly that there has not been increased interest among institutional investors in water purification infrastructure because there are no investment-ready opportunities in South Africa.

A good reflection of the growing interest in impact investing is the increase in capital flow into the market. The majority of the participants in the impact investment market indicated that there is an increasing amount of capital flow to these investments, albeit slow. Two of the participants also mentioned that although the capital is increasing, there are not necessarily enough investment-ready deals to handle more capital inflow (see Section 6.6). Two participants agreed that impact investments have grown in South Africa, but that it has primarily been driven by international investors. Participant Nine emphasised that there are many international investors who have shown interest in investing in South Africa or who do have the capital waiting to be deployed in such investments. Unfortunately, these international investors indicated that there are not enough viable deals. Therefore, there is a mismatch between capital inflow and capital that has been deployed in impact investments. As such, an increase in capital flow could open up more opportunities to achieve impact, but the barriers mentioned in Section 6.6 first need to be overcome.

The majority of the participants also perceived that the amendments to Regulation 28 of the Pension Fund Act (No. 24 of 1956) and Section 12J of the Income Tax Act (No. 58 of 1962) have prompted interest in and thinking about impact investments. Nonetheless, there has not been an increase in demand and capital deployment due to these changes in the South African regulatory environment. Similarly, the implementation of the B-BBEE Act (No. 53 of 2003) has prompted new thought processes, but has not necessarily provided new opportunities. Therefore, the changes in the South African regulatory environment were not considered as an area that has contributed to impact investing opportunities. These amendments should rather be considered as enablers and motivators. Furthermore, participants deemed the current legal and regulatory framework in investments in water infrastructure as a major barrier. This was highlighted as a barrier because it takes too much time to obtain approved licenses and policies which in turn hamper investments. In addition, these legal barriers complicate the structuring of deals (see Section 6.9).

The increasing interest in impact investing and rising capital inflow should be classified as enablers of investment opportunities. They have not, however, created more demand for the process or products of impact investing yet. Furthermore, it seems that the amendments to South African legislation have not motivated asset owners to contribute more capital towards impact investments. Although the interest to create social and/or environmental impact is apparent, it seems that many of the barriers related to the nascent impact investment market must first be overcome to see an increase in demand for such investments.

6.8 OPPORTUNITIES AND BARRIERS TO GENERATE SOCIAL AND/OR ENVIRONMENTAL IMPACT

As revealed in Section 6.3, part of the primary motivation of participants' involvement in the impact investment market is to generate social and/or environmental impact. Therefore, their opinions about the opportunities and barriers to create social and/or environmental impact will be discussed in this section.

6.8.1 Social and/or environmental impact in impact investments in general

As expected, the majority of participants felt strongly that there are many opportunities for impact investors to generate social and/or environmental impact in South Africa. One participant indicated that South Africa has massive social and/or environmental problems (i.e. the grand challenges referred to throughout this study), but also has a mature enough financial market to incorporate these investments: "Therefore, South Africa is regarded as the perfect place for impact investments". The best areas of opportunity that were identified by the participants included renewable energy, agriculture, education, waste removal and affordable housing. Participant Six specified that the best opportunities for impact investors will be found where there is a convergence of sectors. Investments that are made in a convergence of sectors could create a variety of opportunities and the chance to serve a broad spectrum of the South African population.

The need for impact investments in general was stressed, but the lack of investment-ready deals (see Section 6.6) was once again highlighted. Furthermore, there were concerns that there is not enough investment lifecycle support in South Africa to facilitate these investments from a prototype stage to a mature business or project.

6.8.2 Social and/or environmental impact in impact investments in water purification infrastructure

Similar to the views expressed on impact investments in general, most of the interviewees (16 of the 20) strongly agreed that impact investments in water purification infrastructure could definitely create social and/or environmental impact. Participant Ten commented as follows on the social impact that investments in water purification infrastructure could make:

[The] non-financial benefits of providing access to potable water firstly [includes] health benefits so obviously you have reduced incidence of diseases that people get from consuming untreated water and then secondly timesaving particularly [for] women and children going to collect water every day.

The consensus among interviewees was that impact investing could provide acceptable access to potable water, but this positive view was always caveated. Participants were particularly concerned about the complexity of the structure of the deal and the financial returns that could be generated. These concerns are reviewed in Section 6.9.

A variety of ideas were expressed on which stage of the water provision process would be the best to invest in to create social and/or environmental impact. Participants revealed opportunities throughout the water provision process (described in Chapter Two Section 2.2.2). The majority of interviewees, however, did not share the same outlook on which stage would be the most suitable to generate maximum social and/or environmental impact. As expected, the areas which interviewees saw the most promising impact investment opportunities included investments in the agricultural sector (the largest user of water in South Africa), wastewater management and acid mine drainage.

Some of the participants expressed the definite need for impact investments in water purification infrastructure, but considered the focus on water purification infrastructure as being too narrow. They recognised the social and/or environmental impact that could be made, but indicated that they could not foresee financial return opportunities. Interviewees believed that investments in decentralised systems of water supply provide the best opportunities when investing in water purification infrastructure. According to these participants, bulk infrastructure is well funded in the local water provision system through grants. Therefore, the best investment opportunity would be where the centralised water systems end. Furthermore, other participants regarded the best focus for impact investments would be on the research and development of technology and innovation. Most of these participants indicated that there

should be a focus on decentralised water purification infrastructure as they felt it would provide the largest impact.

In line with the literature discussed in Chapter Two Section 2.4.1, the participants favoured decentralised systems of water supply over centralised systems in South Africa. However, impact investors might need to approach investments to provide acceptable access to potable water in more creative ways such as investing in a convergence of sectors. As far the researcher could ascertain, interviewees did not regard direct investments in water purification infrastructure to be plausible yet. Investing in other areas of the water provision process might, however, provide indirect investment opportunities in later stages of the process to treat water to potable standards. These indirect investments in the water provision process will probably only provide more potable water for urban areas though. As revealed in Chapter Two Section 2.2.2, the majority of people who do not have access to potable water in South Africa live in rural and peri-urban areas. Therefore, the researcher remains sceptical if those who currently do not have access to potable would actually gain access if these indirect investments were made.

All the participants highlighted the need in rural areas and the potential to make major social and/or environmental impact through private sector impact investments. They were, however, conscious of the low financial return potential and collection risks in rural areas. Interviewees noted that rural communities are accustomed to getting their water for free from natural resources and urban areas in South Africa are quite well developed. Therefore, peri-urban or informal settlements were highlighted as the best case for impact investments in water purification infrastructure. The majority of the interviewees also agreed that one of the main opportunities in impact investments is to provide water purification infrastructure in areas of rapid population growth. Investors were, however, slightly sceptical of the financial returns that could be earned from such investments. Nevertheless, the “forecasted doubling of urban populations and the tripling of slum areas” was stated as a possible long-term investment case for water infrastructure. There was a strong view that the South African government will not have the capacity to cope with the rising needs in areas of rapid population growth. Therefore, the investment opportunities will depend on the financing gap that government leaves (further discussed in Section 6.12.1).

As seen in Chapter Two Section 2.2.2, the areas in South Africa that have the highest population that is underserved live in peri-urban areas. Rapid population growth will put current water

infrastructure under even more stress. Therefore, the need to develop, maintain and refurbish water purification infrastructure will create long-term impact investment opportunities. The researcher, however, contends that this long-term outlook could be a barrier too because there are too many uncertainties, one of them being the financial return prospects of such investments.

6.9 FINANCIAL RETURNS

In Section 6.3 the participants' definition of impact investing was analysed. They all agreed that impact investors should generate financial returns. Details about the size of those financial returns, however, differed among the interviewees. In this section, the objective to generate financial returns from impact investments will be discussed. Furthermore, the opportunities and barriers to earning financial returns from impact investments in water purification infrastructure will be scrutinised.

6.9.1 Financial returns from impact investments

According to most of the participants, there are opportunities to earn market-related, risk-adjusted returns. However, they were not convinced that there are many such opportunities in the South African impact investment market. Therefore, the majority had the outlook that the opportunity to earn market-related, risk-adjusted returns is not a key factor to attract more investors to the local impact investment market.

As discussed in Section 6.6, the shortage of investment-ready deals is a critical barrier to the growth of the impact investment market in South Africa. The challenge is to find social enterprises that have the potential to generate market-related, risk-adjusted returns for investors. Similarly, in Section 6.7, the lack of viable deals with suitable financial returns was regarded as the main contributing factor to the mismatch between capital inflow and deployed 'impact' capital. Therefore, although there are many grand challenges that need to be addressed in South Africa, there are not enough social enterprises that are mature enough to earn market-related, risk-adjusted returns to attract impact investors. As such, the prospects of earning market-related, risk-adjusted returns in the impact investment market in South Africa cannot be viewed as an opportunity. Rather, the combination of earning some financial return and the ability to create impact by addressing one or more grand challenges should be seen as the better option.

Although the interviewees perceived that the possibility to earn market-related, risk-adjusted returns is relatively low, there were positive opinions of other investment market factors that could change this perception. The majority of participants referred to the growing number of

financial instruments available to address social and/or environmental challenges. These instruments could decrease the risk, and thus increase the possibility of investment. Financial instruments such as convertibles, guarantees and blending different sources of financing were named as examples that could be used to decrease risk and address social and/or environmental challenges. However, the growth in the number of these financial instruments was not considered as a major factor that could lead to more opportunities. On the contrary, a few participants indicated that there are not enough financial instruments available that could sufficiently mitigate the risk of an impact investment to attract other private investors. One participant emphasised that there might not necessarily be an increase in financial instruments, but rather an increase in the need to understand how to use them.

6.9.2 Financial returns from impact investments in water purification infrastructure

The general opinion was that substantial financial returns could not be earned from investments in water purification infrastructure. One of the challenges that was highlighted is the unclear commercial opportunity. There is an apparent mismatch between the impact an investor could make and the return requirements. As the current water tariff structure in South Africa is low, the revenue raising ability of water is constrained. Therefore, the participants in the impact investors sample recognise the impact that can be made, but cannot reconcile the low financial returns with their mandates. Many, however, mentioned that the revenue raising ability depends on the business model and how the deals are structured. However, half of the participants did indicate that there are opportunities to earn returns, but not substantial returns. These participants posited that the rate of return and the profit margins might be too low.

Participants alluded to the difficulty of structuring water purification infrastructure deals in a typical project finance way. The difficulty was mainly due to the complexity in ring-fencing the revenues and expenses of water purification projects. Interviewees attributed this to the complicated relationship between the private sector and the entities that control water in South Africa. The negotiation of deal structuring in the water market in South Africa is complex because private sector involvement would decrease municipal revenues. Municipalities cannot give up ownership, but are often unwilling to sacrifice returns even when private sector funding is a necessity. The complex relationship between the private and public sector in the water market is further reviewed in Section 6.11.

Some participants, however, claimed that structuring these deals was not that complicated. Respondent Sixteen argued that private sector involvement in centralised and bulk water

provision would not be that difficult when one considers the current Water Services Act (No. 108 of 1997) and the Water Act (No. 36 of 1998). Therefore, impact investors could service municipalities with debt to create an impact fund. Some investors indicated that the current method to raise funds for water projects through listed bonds (in partnership with water boards) proves that it is possible to finance these projects. Furthermore, the water infrastructure suppliers will always be assured of many clients due to the necessity of access to potable water. Therefore, a business model that targets small profit margins to serve a large number of clients could be implemented which could lead to substantial financial returns.

Participants considered the high level of poverty in South Africa as a barrier to impact investments in water purification infrastructure, albeit not a main barrier. As expected, this barrier was linked to the inability of the poor to pay for the product and/or service provided. Some of the participants strongly agreed that because the poor cannot afford to pay for the products and/or services that are provided to them to purify water, they should be subsidised. However, financial return expectations would be quite low. The tariff structures and free basic water allocation in South Africa were also considered as factors that could create expectations among consumers, more specifically that they are entitled to affordable or free water. Hence, if the poor were the main target group, the concern among many of the interviewees was that the financial returns would not be satisfactory.

Six interviewees across the three samples disagreed that the high level of poverty in South Africa should be seen as a barrier to impact investments in the water market. These participants said that there is a misconception that the poor are “unable and unwilling” to pay for basic goods and services. These participants considered the base of the pyramid as an area of opportunity to deliver products and/or services, as the population at the base of the pyramid is often willing to pay and make sacrifices in other areas to have acceptable access to potable water. Furthermore, the emerging middle class in South Africa’s ability and willingness to pay for basic products and services that they once did not have was emphasised. Participant Four also raised the point that there are “enormously creative solutions on how things and services can be paid for”. She commented that creative funding models can be structured so that the poor do not necessarily have to pay. The researcher agrees with these six participants. There is an untapped market at the bottom of the pyramid where people are willing to pay for basic goods and services. However, there should be strict control and regulation to prevent exploitation. The moral dilemma of generating return from the provision of a basic human right is discussed in Section 6.10.

The majority of participants considered poor profitability predictions of investments in water purification infrastructure to be a critical barrier to impact investments. However, they highlighted that it depends on the financial model that is implemented. Participants considered the current tariff structure and free basic water allocation as barriers to profitability which could also deter investors. According to Participant Nineteen, “[the tariff structure and] legal framework relies on government providing water and if they don’t then there is very little room to make money for outsiders”. Furthermore, a number of the participants revealed that the free basic water allocation has created an expectation of free products and services among certain bottom-of-the-pyramid citizens. Therefore, revenue collection would be difficult which in turn could put strain on profitability targets.

In line with literature, the general view among participants was that the perceived high initial costs of water infrastructure is a fundamental barrier to these type of impact investments. The main concern was, once again, that the water tariff structure is not aligned with the initial capital investment. Therefore, the deals should be structured over long periods with doubts about financial returns. Participant Ten mentioned that their research showed that small-scale rural water infrastructure did not match impact investors’ investment criteria of a combination of financial return and impact. Some participants, however, caveated their statements by discussing different financial models or ways to structure these investments to mitigate some of the initial costs. Furthermore, the asset class (fixed income, equities and money market instruments) that is used to fund a deal was also mentioned as a factor that could influence investments.

One of the underlying problems relating to concerns about the financial returns from investments in water purification infrastructure is the complexity of deal structuring. It currently seems as though most role players in the impact investment market would like to be involved in such investments, but do not have a feasible deal structure. The deal structure is complicated by the low tariff structures in South Africa and concerns about real and perceived political interference. Innovation in financial mechanisms was mentioned, but the researcher believes the current tariff structure does not allow investors to generate high enough financial return to interest them.

6.9.3 Financial returns from investments in innovative water infrastructure technologies

As mentioned earlier, the participants recognised opportunities to earn financial returns throughout the different stages of the water provision process. The first and most regularly

mentioned opportunity was to invest in wastewater treatment systems. The general opinion was that there are many technological advancements in this area of the water provision process. Likewise, the consensus was that the market for treating grey water and discharging it back into the water system is growing. Investments in innovative wastewater treatment infrastructure such as the Omniprocessor described in Chapter Two Section 2.4.2(c), provide means to solve multiple grand challenges. These types of infrastructure often deal with sanitation and clean water problems while creating financial returns at the same time. Therefore, these types of infrastructure should be strongly considered by impact investors as viable investment opportunities.

The majority of participants believed that there are investment opportunities in different forms of innovation in water purification infrastructure. Most of the participants, however, did not think that innovation in desalination would drive down costs. In fact, many believed that desalination would increase water purification costs if implemented today. The main concern was that the energy consumption required to desalinate seawater is extremely expensive. Therefore, they saw opportunities in developing energy saving solutions for the desalination process such as solar energy. Other forms of innovative technologies were considered to be better options to drive down costs, including “financial models” that could be designed and implemented to fund water purification infrastructure. One such solution that was suggested was to give a 100 per cent assurance of water supply to industries that are heavily dependent on water such as mining and healthcare.

Another identified opportunity was the treatment of acid mine drainage (the outflow of acidic water from a mine). According to Participant Eighteen, mines are high-use consumers of water and the polluted water is regarded as a liability. Furthermore, the communities surrounding the mines often do not have acceptable access to potable water. Therefore, treating water that is polluted by mining activities and reselling the purified water to surrounding communities could be another investment opportunity.

The examples highlighted above are evidence that the best investment opportunities are found in a convergence of sectors. The researcher agrees that an investment in innovative technologies that combines the water, agricultural, mining and energy sectors could generate the best financial returns.

Lastly, investment opportunities related to water conservation and refurbishment were highlighted. As presented in Figure 2.3, private sector investments can be made in the construction, refurbishment and rehabilitation of water infrastructure. South African water networks are prone to leakages. The historic infrastructure used by South African municipalities is asbestos cement piping. The private sector could target these leakages by using, for instance, modern polyvinyl chloride pipelines. Although financial returns can be earned from repairing and maintaining water infrastructure, some interviewees argued that this should not be the responsibility of the private sector. The responsibility to finance, repair and maintain water purification infrastructure in South Africa will thus be discussed next.

6.10 RESPONSIBILITY TO FINANCE, REPAIR AND MAINTAIN WATER PURIFICATION INFRASTRUCTURE IN SOUTH AFRICA

As revealed in Chapter One Section 1.2.2, the South African government is ultimately responsible to finance, repair and maintain water infrastructure in the country. The current status of water infrastructure in South Africa, however, has left many role players questioning who really should be responsible.

6.10.1 Responsibility to finance water purification infrastructure in South Africa

Most of the participants indicated that the South African government should be primarily responsible for financing water purification infrastructure as part of the broader water provision process. However, all the experts felt strongly that there should be some sort of involvement from the private sector (see Section 6.12 on PPPs). Respondent Three captured the general sentiment of the respondents by saying that:

there is an express[ed] requirement for government to be the steward of the natural resources around water, but I think from a hard infrastructure perspective there's definitely scope for private sector participation.

Participants cited the lack of financial capacity, the country's small tax base and the limited municipal capability as reasons for the government's inability to accept full responsibility of the financing of such infrastructure.

A number of interviewees suggested that, given the lack of capacity and financial resources, the government should outsource at least some of its responsibilities. Some participants, however, believed that it still remains the government's duty to finance traditional water provision through centralised systems. Therefore, the smaller scale water provision projects

could be outsourced or structured through PPPs. In addition, the role of the private sector to treat the water sources that they are polluting, was highlighted. The researcher concurs with these participants who believe that private sector entities that pollute water should have a responsibility to treat or purify the polluted water to acceptable standards.

Although participants acknowledged the need for (more) private sector involvement in water purification, they were also aware of the risks of privatisation. Some of these risks include the extremely detrimental effects on the country's indigents due to the commercialisation of potable water. In the respondents' opinion, indigents do not have the ability to pay for basic services. Therefore, their access could be substantially limited if the provision of water was privatised. This concern highlights the moral dilemma that an impact investor might face when investing to make a return from a basic human right. This concern will be discussed in Section 6.11.

It is reassuring that private sector participants realise that they have a role to play in the funding of water infrastructure. The current financing gap of water infrastructure provides evidence that the South African government cannot be solely responsible to finance such infrastructure. The disconcerting state of water infrastructure also indicates that there might be a lack of skills to repair and maintain such infrastructure.

6.10.2 The lack of skills to repair and maintain water infrastructure in South Africa

Participants strongly agreed that there is indeed a shortage of skilled government officials to repair and maintain water infrastructure in South Africa. They considered the lack of skills as a major barrier to impact investments. Participants made reference to the existing state of water infrastructure in South Africa saying that it is in disrepair. The key areas of concerns that were highlighted included the scarcity of strategically focused senior managers in municipalities and the shortage of government officials who are technically trained to specifically deal with water infrastructure.

Some participants, however, disagreed that there is a shortage of skilled government officials. They argued that South Africa has enough skilled people, but that they have not been appointed in the appropriate positions. Participant One did not regard the lack of skilled government officials as a huge barrier. This participant has experienced that government involves the private sector to repair and maintain the water infrastructure when they themselves do not have the capacity.

There were mixed opinions across the three samples of whether or not the lack of skilled engineers was a barrier to impact investments. Six participants disagreed and stated that there are enough skilled engineers in South Africa. Other participants believed the shortage of skilled engineers is not the actual barrier. Instead, the real barrier is that there are not enough engineers in the DWS. According to Participant Sixteen, municipalities do not nearly have the same number of engineers as they used to have in the past.

According to the researcher, there seems to be a shortage of government officials who are strategically focused on repairing and maintaining water infrastructure in South Africa. Having said this, the deficiency of skills to repair and maintain water infrastructure does not appear to be the main barrier to impact investments. Instead, the barrier to impact investments in the local water infrastructure is the lack of skilled government officials and engineers in the appropriate and needed positions.

6.11 THE MORAL DILEMMA OF MAKING A RETURN FROM PROVIDING A BASIC HUMAN RIGHT

As expected, there were divergent views on the moral dilemma that an impact investor might face when making a return from a basic human right such as providing acceptable access to potable water. More than half of the participants, however, felt that there was no moral dilemma at all.

These participants qualified their views by stating that financial return cannot be at the expense of people accessing potable water. In other words, people should not be denied access to potable water if they cannot afford it. The general view was that the levels of return that are pursued cannot be to the detriment of those paying for the basic need of water. Two participants highlighted that impact investors are trying to create measurable social and/or environmental impact. However, they would not invest if the social and/or environmental impact was heavily compromised by their attempts to generate financial return.

Most of the interviewees were also of the opinion that if investments were made to provide acceptable access to potable water, the water should be affordable even for the poorest of the poor. Furthermore, they felt that access should be available to the poorest of the poor from the outset. Participant Twenty highlighted that it would be very difficult to cross-subsidise or structure deals that the poorest of the poor in a community pay reduced rates unless good metrics were implemented. Therefore, acceptable access to potable water should be affordable

for as many people as possible. Many participants, however, mentioned that the poorest of the poor are actually provided for by the free basic allotment of water. Participant Sixteen also emphasised that the ‘poorest of the poor’ is a relative term. The government has established a definition of poverty below a certain income level. However, this participant was of the opinion that if an individual lives in an informal community and has some sort of roof over their head, they should not be considered as the ‘poorest of the poor’. He stated:

someone who has no place to stay and who owns absolutely nothing should qualify as the ‘poorest of the poor’. It would be unethical to charge the second individual for potable water, but most of the population can afford to pay for potable water and the investment should thus be made.

Seventeen of the 20 participants agreed that there is nothing wrong with making a return from a basic human right such as providing acceptable access to potable water in a capitalist economy. The remaining three participants did not answer the question. However, the participants did specify that the potable water should be charged at a “reasonable” price.

Participant Sixteen indicated that the basic human right to a certain proportion of potable water is an expectation that has been created by government. The basic policy of six free kilolitres per household per month (See Chapter Two Section 2.5.1) has resulted in an expectation of supply. The participant indicated that a household could live with far less than that. Therefore, government has established a norm for the supply of a basic right to satisfy a need (access to potable water) that might be considered as high. This expectation among South African citizens creates a perception that it is unethical to be charged for a certain amount of water. In reality, nothing is provided for free so a cross-subsidisation deal could be established that will reduce the moral dilemma.

Other participants, however, felt that investors do face a moral dilemma because of the two opposing goals of making as much return as possible while trying to provide as much access to potable water as possible. In addition, the provision of potable water is more sensitive than the provision of other basic human rights. For example, electricity supply can be cut off if the consumer fails to pay for it because there are alternative options. Acceptable access to potable water, however, cannot be refused by a provider as it is essential to everyday life. Therefore, acceptable access to water will always be regulated and complicated.

The researcher believes that an impact investor will only face a moral dilemma if their prices exploit the consumers' needs and if they overcharge them. As discussed earlier in this section, government should be held responsible to make sure that their citizens have the basic allotment of potable water. Therefore, if the private sector charges for potable water it will be charging consumers for a product that they want, and not necessarily for a product that they need to survive. Given this context, charging for a product such as potable water can be compared to charging for food. As such, impact investors do not face a moral dilemma; they should merely establish a price that is affordable using thorough due diligence. The difficulty, however, arises in trying to establish an affordable price range. Affordability, in turn, is a relative term and can be influenced by various factors such as a norm created by government.

6.12 THE ROLE OF PUBLIC-PRIVATE PARTNERSHIPS

PPPs have often been mentioned in the extant literature as a suitable way to address grand challenges in impact investments in general and in water purification infrastructure in South Africa. However, there are major difficulties that limit their implementation in South Africa. Both the opportunities and barriers relating to PPPs will be discussed in the following section.

6.12.1 The large public financing gap

According to the vast majority of participants, the large public financing gap in South Africa was considered a major opportunity for the private sector to invest in infrastructure throughout the water provision process. Many participants regarded the large public financing gap as a motivating factor to establish PPPs. An example provided was the recent request for information made by the City of Cape Town to find willing businesses to partner with them to establish reclamation and desalination plants. The participant who mentioned this example emphasised that if government was not in need of private sector support, they would not have created the opportunity. However, a few participants were concerned with how the deals would be structured (see Section 6.9 for more details on deal structuring). There was also a noticeable distrust of government by private sector impact investors included in this sample. Therefore, the lack of trust and coordination between government and the private sector might hamper the growth of the impact investment market in South Africa. This distrust could be attributed to the complex division of revenues between municipalities and private sector entities (see Section 6.9.2).

Most participants indicated that the South African government should be primarily responsible for financing water purification infrastructure. The participants mentioned that there should be

some sort of involvement from the private sector. Given the lack of financial capacity and financial resources, participants argued that government should outsource some of the smaller-scale projects to the private sector. The participants were generally positive that PPPs could be used to leverage benefits for all parties involved. The success of such partnerships in the energy sector was often cited as an example. Some concerns about private sector involvement were, however, raised in the extant literature. These angsts were presented in Chapter Two Section 2.5.3. One of the concerns is that past failures of private sector involvement could cause adverse effects on impact investments in water purification infrastructure.

6.12.2 Past failures of private sector involvement

The majority of participants disagreed that past failures of private sector involvement in water market investments have caused a negative perception among impact investors. Many of these participants were of the opinion that there have not been enough failures to justify this negative perception. In fact, many of the interviewees did not know of any failures of private sector involvement. Participant Three commented that there is scope for PPPs in the water market considering the success of PPPs in the renewable energy programme. Therefore, private sector involvement in the water market should rather be regarded as an opportunity. Eight of the 20 participants decided not to respond to this question as they did not have enough information regarding failures. Many also pointed out that they had no knowledge of failures of PPPs in water purification infrastructure as these types of PPPs are very rare and uncommon in South Africa.

There were, however, fears that even one failure could cause major reputation damage to PPPs in water purification infrastructure. One participant mentioned that international private sector investors should be careful to address “an African problem with an African solution”. This participant has seen international investors implement their own infrastructure and how it remained unused. Such failures could reflect poorly on PPPs and deter other investors.

Although none of the interviewees were involved in PPPs in water purification infrastructure, it is encouraging to note that private sector investors do regard the use of PPPs as an opportunity. They might be hesitant to be involved in PPPs because of the lack of knowledge about how these partnerships should be structured and whether they would be successful. Furthermore, as stated in Section 6.12.1, there is distrust in government which could make investors even more cautious to be involved in PPPs. However, the barriers related to PPPs do

not seem to be limited to the water market, but are also prevalent in other sectors of the South African economy.

6.12.3 The possibility of political interference, corruption and bribery

Most of the participants strongly agreed that political interference is a barrier to private sector impact investment in South Africa. Moreover, it was regarded as one of the most pertinent obstacles to investments in water purification infrastructure in South Africa. However, the participants did not consider corruption and bribery as particularly important barriers. Although most of the interviewees agreed that political interference could leave investors hesitant, they did not think the risk is higher than it is with investments in other economic sectors. They highlighted that the levels of trust between government and the private sector is generally low. Therefore, the private sector is not prioritising investments that would involve government because of the risks involved such as major payment delays, additional processing costs and slow decision-making. These risks are related to the complicated revenue division between the private sector and the entities that control water in South Africa (see Section 6.9.2).

Respondent Ten regarded the provision of potable water to underserved communities as a politically sensitive issue. Therefore, the participants' concerns were not the political interference *per se*, but rather the political aspects associated with providing potable water given that it is ratified in the South African Constitution. These political aspects could result in expectations of unrealistically low pricing or the provision of a free public good (see Section 6.11 for a more in-depth discussion on this topic).

The opportunity to invest in water purification infrastructure in South Africa is apparent given the large public financing gap. PPPs seem to be the obvious way to structure such opportunities in ideal market conditions. However, the current distrust between private and public sector role players needs to be negotiated by means of stringent legal stipulations in the deal structures. Many private sector investors are concerned about political interference given the politically sensitive nature of acceptable access to potable water. Therefore, government could either outsource some of the water provision services to the private sector and pay them directly or allow the private sector to conduct their own revenue collection. The researcher is of the view that the better option would be to allow the private sector to conduct their own revenue collection.

6.13 BARRIERS ASSOCIATED WITH COMMUNITY-LEVEL WATER PURIFICATION SYSTEMS

Many of the participants believed that land ownership disputes in South Africa often leave water purification infrastructure unused, which in turn, could deter impact investors. This barrier is especially applicable to rural areas. Furthermore, the inequality and land redistribution problems in South Africa were highlighted as contributing factors to this barrier. From what the researcher could ascertain, this barrier was considered more a possibility than a reality. Many participants regarded the possibility of land ownership disputes as a possible deterrent to investment. Therefore, with the appropriate stakeholder engagement and due diligence endeavours, an impact investor could avoid this barrier.

There were mixed views about the additional costs related to specialised research that needs to be conducted given the concerns about water availability in many communities in South Africa. The majority of interviewed investors did not think that these costs would deter investors. One participant also commented that there is enough industry research available regarding water availability so additional costs related to this research should not be regarded as a barrier. Most of the other role players in the impact investment market, however, thought that the additional costs related to specialised research would hinder investments. Participant Eleven regarded these costs as a barrier because an investor requires many data points for their feasibility studies to ascertain what the true extent of the possible impact would be. Therefore, cooperation is necessary from many stakeholders which could be very costly. The researcher believes that impact investors are familiar with such costs. As specialised research costs can be factored into the pricing model, these costs should not be considered a barrier to impact investments in this market.

The responses regarding the unwillingness of local communities to be involved in the water provision process as a barrier to investment also varied among the samples. Many of the participants felt that this unwillingness was a barrier to investments because of internal politics of land ownership. However, the majority of interviewees disagreed as they had experienced the opposite. The researcher believes that the unwillingness of communities to be involved in water provision and purification projects should not be considered a barrier. If these communities are not being overcharged for access to potable water they will most probably be willing to partake and assist in such projects or the establishment of businesses with a social and/or environmental focus.

6.14 NEW BARRIERS AND OPPORTUNITIES IN IMPACT INVESTMENTS AND IMPACT INVESTMENTS IN WATER PURIFICATION INFRASTRUCTURE

One participant acknowledged that South Africa's status as a developing country could be a barrier for impact investors. These investors often have mandates to invest in low-income countries to create more recognisable social and/or environmental impact. Therefore, international impact investors might be more inclined to invest in less developed countries than South Africa many of which are found in SSA.

Two of the impact investors indicated that the complexities involved in multiple stakeholder engagement is a barrier to impact investments. They noted that there are too many interest groups that must be engaged before an investment in water purification infrastructure can be made and that some investors are consequently hesitant to get involved in such investments.

One participant also highlighted the opportunity to decrease transaction costs by developing algorithm-based solutions to evaluate the creditworthiness of businesses and deploy capital. According to the participant, these solutions will help unlock capital from international investors. Moreover, the participant regarded the development of specialised metrics as an opportunity to influence the impact investment market.

6.15 REVISED CONCEPTUAL FRAMEWORK

Guided by the empirical results, the conceptual framework as presented in Chapter Five Section 5.4, was revised. The revised framework is presented in Figure 6.1. A number of barriers and opportunities were added, whereas others were omitted or amended in the revised framework.

The general barriers to impact investing that were omitted from the revised conceptual framework were as follows: the limited number of specialised intermediaries, the difficulties in exiting, and the illiquidity of impact investments. General barriers to impact investing that were added to the revised framework included the uncoordinated impact investment market, distrust between government and the private sector hampering the establishment of PPPs, and South Africa's developing status deterring impact capital flow. A number of general barriers to impact investing were amended. These barriers were reformulated as 'the lack of clear and detailed social and/or environmental impact objectives' and 'the lack of a standardised format to report social and/or environmental impact'.

The barriers to impact investments associated with water purification systems at a community-level were removed from the revised framework. The barriers specific to water purification infrastructure that were added were the lack of investment-ready deals in water purification infrastructure and the complexity of deal structuring. The many uncertainties associated with the long-term outlook of investments in water purification infrastructure and complicated multiple stakeholder engagement in the local context were also added as new barriers to water purification infrastructure. A few barriers to impact investing in water purification infrastructure were amended. These amended barriers included: the moral dilemma associated with making a return from providing a basic human right and the lack of skilled government and engineering personnel. These two barriers were rephrased as ‘difficulties in establishing an affordable price range that does not exploit consumers, but allows for financial returns to be generated’, and secondly, ‘the shortage of skilled government and engineering personnel in the appropriate positions’.

The opportunities in impact investing in general that were removed from the revised framework included the demand by asset owners for more responsible and positive changes in the regulatory environment. Interviewees indicated additional opportunities in developing algorithm-based solutions to evaluate the creditworthiness of businesses and to deploy capital in the impact investment market. Therefore, this opportunity was added. The large amounts of competing capital were no longer regarded as a barrier. Instead, it was added as an opportunity to combine high-impact CSI budgets to support the lifecycle growth of small and medium-sized social enterprises. Participants did not see many opportunities in South Africa to earn market-related, risk-adjusted returns. Instead, it was rephrased to ‘opportunities to earn financial returns and to address grand challenges’.

The opportunities due to increased interest of institutional investors in water purification infrastructure were omitted from the revised conceptual framework. The provision of basic goods and services to the untapped bottom-of-the-pyramid market was also added as an opportunity in impact investing in water purification infrastructure in the revised conceptual framework. Perceptions of private sector involvement were not as negative as was originally believed. In fact, the participants were relatively positive that PPPs could be used to address grand challenges and to create financial returns in the process. Lastly, technological innovations in water purification infrastructure that could decrease costs were adapted and rephrased in the revised framework as ‘the opportunity to invest in a convergence of sectors through innovations in water purification infrastructure to earn financial return and generate impact’.

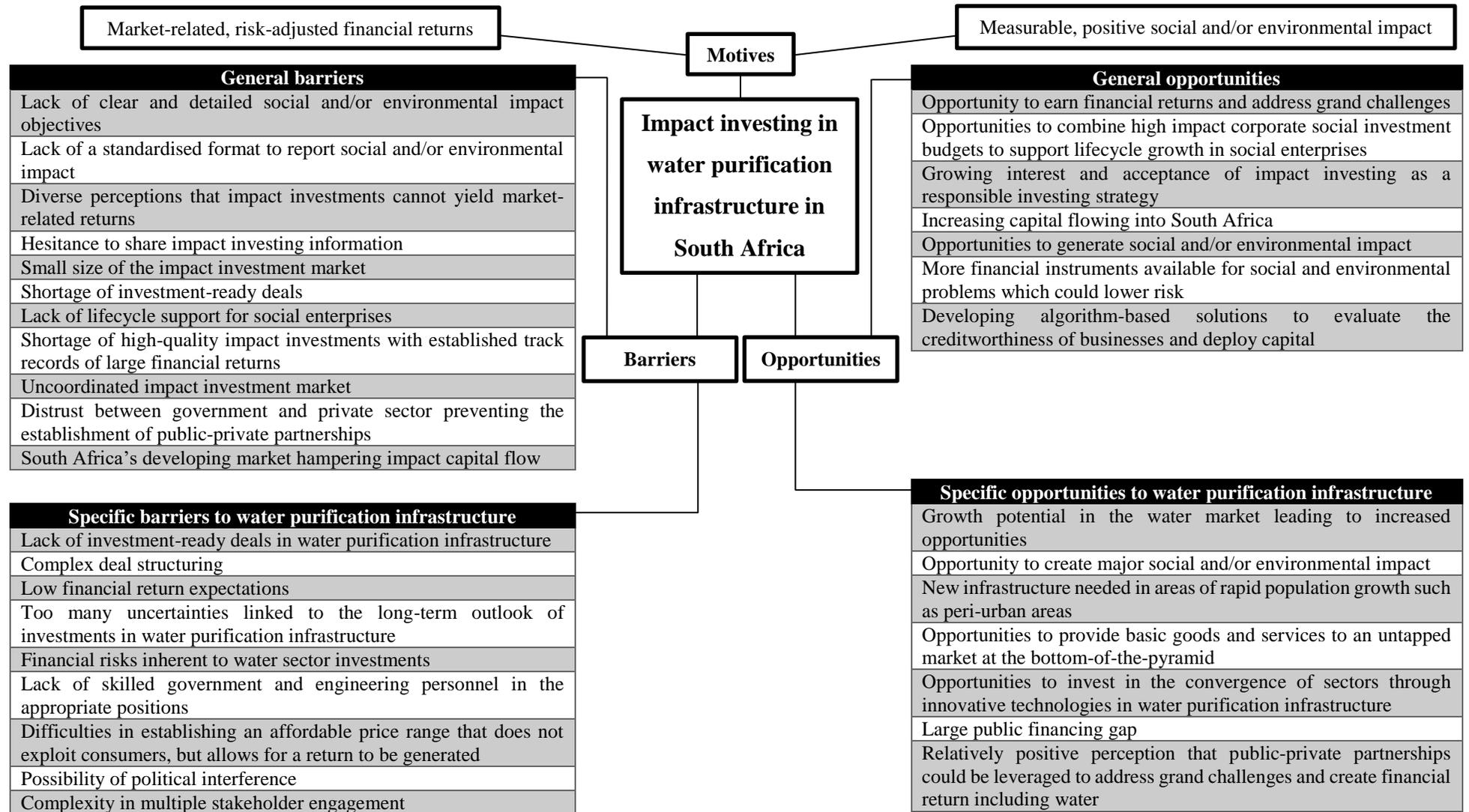


Figure 6.1: Revised conceptual framework of the motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa

6.16 SUMMARY AND CONCLUSIONS

In this chapter, the researcher identified themes and patterns in the experts' responses on the motives, barriers and opportunities associated with impact investing in water purification infrastructure in South Africa. An experienced and knowledgeable group of 20 participants were interviewed. There was a balanced gender split among the interviewees, with the majority being highly qualified with some form of postgraduate qualification.

When defining impact investing, participants highlighted that impact investments should be 'intentional', 'measurable' and create 'positive' impact alongside financial return. Some participants prioritised market-related, risk-adjusted financial returns over social and/or environmental impact while others were of the opposite opinion. The debate of implementing a universal definition of impact investing was deliberated. The lack of a universal definition was not considered a barrier among a large number of interviewees. Instead, the researcher found that the real barrier was an insufficient understanding of how to establish and balance clear and detailed impact objectives in relation to financial objectives.

There has also been a call for a standardised set of metrics to measure impact. The shortage of a standardised set of metrics was often mentioned as a barrier in the extant literature. The researcher, however, found that the real barrier to measurement is related to an absence of a standardised format to impact reporting.

Most participants regarded the perception that impact investments in South Africa are unable to yield market-related, risk-adjusted returns to be a major barrier to further investment. Participants also indicated that there is not competition between high-impact CSI budgets and impact investments in South Africa for the same number of limited projects. Similarly, the interviewees did not consider the barrier of the limited number of specialised intermediaries that make due diligence investigations more complex to be true. Furthermore, illiquidity and difficulties in exiting impact investments were no longer viewed as barriers to impact investing. As such, these barriers were removed from the revised conceptual framework.

The most pertinent barriers in the impact investment market in general included the small size of the market, the lack of investment-ready deals and a shortage of impact investments with established track records across the risk-return spectrum in South Africa. The researcher perceived that the underlying challenge was the lack of lifecycle support to assist the development of small and medium-sized social enterprises in South Africa. This challenge was

considered to be the most significant barrier hindering the growth of the impact investment market in South Africa.

The majority of participants agreed that there has been a growth in the interest and acceptance of impact investing in general and in water purification infrastructure over the past five years. However, they have not experienced an increase in the demand for impact investments. This lack of demand was associated with the shortage of viable deals. Additionally, interviewees did not perceive recent changes in the South African regulatory environment as having created more demand for impact investments. Instead, these changes may have only opened the option for institutional investors to invest in impact investments.

Most of the interviewees agreed that there are promising impact investment opportunities to generate social and/or environmental impact in South Africa. Participants, however, were not convinced that there are many of these opportunities that offer market-related, risk-adjusted returns. The lack of investment-ready deals was once again emphasised as the barrier that caused a mismatch between capital inflow and deployed 'impact' capital. Therefore, based on the evidence of this study it seems as if there are not many impact investment opportunities to earn market-related, risk-adjusted returns.

Most of the participants acknowledged that major social and/or environmental impact can be generated from impact investments in water purification infrastructure. Participants highlighted opportunities to achieve impact in peri-urban areas, regions of rapid population growth and by supplementing the large public financing gap in water purification infrastructure. Furthermore, investments in alternative infrastructure and in new innovation in a convergence of sectors were considered opportunities in investments in water purification infrastructure. Participants, however, did not see many opportunities to earn market-related, risk-adjusted returns in such investments, particularly in South Africa. In fact, the majority of participants considered the return expectations to be low owing to profitability concerns and high initial costs. The high level of poverty in South Africa was not considered a barrier to impact investments in water purification infrastructure. Instead, participants saw opportunities to provide products and services to an untapped market at the bottom of the pyramid. The complexity of deal structuring in water purification infrastructure was perceived as an additional barrier which did not feature in the original conceptual framework.

The empirical results suggest that the South African government should be primarily responsible to finance water infrastructure in the country. However, given the shortage of capacity and financial resources, private sector involvement was considered a necessity. Participants considered the shortage of skilled government officials and engineers in the appropriate positions a barrier to impact investments in water purification infrastructure in South Africa.

Most of the interviewees were of the opinion that impact investors do not face a moral dilemma when making a return from providing a basic human right. However, they did caveat their statements by indicating that the price of the goods or services provided should be affordable. The researcher shares the view that impact investors do not face a moral dilemma as long as they do not exploit the end-users' needs by charging unaffordable prices. Establishing a reasonable price that does not compromise financial return, but provides acceptable access was, however, emphasised as a major challenge for impact investors. As a result, this challenge was regarded as a barrier to impact investments in water purification infrastructure.

The large public financing gap and relatively positive perceptions of PPPs in South Africa were regarded as drivers for private sector involvement in the financing of water purification infrastructure. Participants, however, mentioned the possibility of political interference and distrust between government and private sector preventing the establishment of PPPs as a major barrier to private sector investment. The other major concern was that investments in water purification infrastructure would not be profitable given the low tariff structures and complexity of revenue collection.

The general perception among the participants was that the barriers of additional costs due to specialised research and the unwillingness of communities to be involved in the water provision process were not necessarily true. The possibility of land ownership disputes was also considered more a risk than a barrier.

This chapter concluded with a revised conceptual framework. Barriers added to this framework included South Africa's status as a developing country inhibiting impact investments and secondly, the complexity of multiple stakeholder engagement. An additional opportunity highlighted in the revised framework was the opportunity to create innovative solutions to evaluate and deploy impact capital.

An extensive discussion of the overall findings will be provided in the final chapter. Conclusions will also be drawn from the empirical results and recommendations will be offered to important stakeholders and for future research based on the limitations of the study.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The primary objective of this study was to develop, validate and revise a conceptual framework outlining the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa. The researcher addressed the primary research objective by formulating six secondary research objectives. In this chapter, a summary and conclusions of each of these research objectives will be presented separately. First, the secondary research objective to select the most suitable research design and methodology will be addressed. It will be followed by secondary research objectives number two to four, which were to conduct an extensive review of acceptable access to potable water, impact investing in general and in water purification infrastructure. In accordance with the fifth secondary research objective, the original conceptual framework will be validated and revised by comparing the empirical results to the extant literature. Appropriate recommendations to various stakeholders and role players in the impact investment market and the water provision process in South Africa will then be presented. Limitations and suggestions for future research will also be offered. The chapter concludes with the researcher's personal reflection on the study.

7.2 SUMMARY AND CONCLUSIONS PERTAINING TO SECONDARY RESEARCH OBJECTIVE ONE

This secondary research objective was to select the most suitable research design and methodology. Given the nature of the problem statement, a qualitative research approach was adopted. This approach was purposively selected to explore and to provide a richer understanding of impact investing in general and in water purification infrastructure in South Africa.

The adopted research design was both exploratory and descriptive in nature and used to identify and clarify ambiguous motives, barriers and opportunities in impact investing in general and in water purification infrastructure in South Africa. Using this research design, the researcher described the phenomenon to provide an accurate portrayal of the interactions between role players in both the impact investment and the water provision markets in South Africa.

Secondary data were collected from a detailed investigation of journal articles, industry reports, books and previous postgraduate theses. A conceptual framework was consequently developed based on this literature review. The framework served as the basis for the interview guide which facilitated the collection of the primary qualitative data. Semi-structured interviews were conducted with 20 experts across three samples.

The interviewees were selected using judgement and snowball sampling techniques. The participants consisted of expert impact investors, other expert role players in the local impact investment market and experts in the water provision process. The interview guides were the research instrument of choice to collect data through semi-structured interviews. These interview guides were adapted according to the interviewees' skills, knowledge and experience of impact investing. Semi-structured interviews were used as they provided the researcher with enough flexibility to ask probing questions. The interviews were audio-recorded and professionally transcribed. The transcribed qualitative data were analysed using ATLAS.ti and the researcher's own coding system. The coding, reading and synthesising of the textual data allowed the researcher to identify common themes from the interviewees' responses.

Attention was given to ethical considerations as well as the credibility, transferability, dependability and confirmability of the research process itself (see Chapter Five Section 5.6).

7.3 SUMMARY AND CONCLUSIONS PERTAINING TO SECONDARY RESEARCH OBJECTIVE TWO

The second research objective was to conduct a thorough review of the relevant literature on acceptable access to potable water (see Chapter Two).

7.3.1 Acceptable access to potable water in South Africa

In Chapter Two Section 2.2.2, it was pointed out that there are millions of South Africans who do not have acceptable access to potable water (Statistics South Africa, 2016:66). According to van Vuuren (2014:35), this problem is accentuated by the volumes of water that is lost due to pipe leakages. In line with this author, the participants in the present study also regarded the amount of revenue lost due to the leakages as a major problem (see Chapter Six Section 6.9.3 for a detailed discussion in this regard). Therefore, it was concluded that repairing these leaks in pipes could be a private sector investment opportunity.

From Figures 2.1 and 2.2 the researcher deduced that the majority of South African households with unacceptable access to potable water are located in and around urban and peri-urban areas. Rapid population growth is predicted to increase the pressure on the already insufficient water infrastructure in these areas (Isa, 2016; DWS, 2015:70; Jacobsen *et al.*, 2013:2). In similar vein, the participants strongly agreed that the most promising investment opportunities would be in peri-urban areas due to rapid population growth and the poor levels of service delivery in these areas. Furthermore, the researcher concluded that investments in a convergence of sectors (such as the water-energy-food nexus described in Chapter Two Section 2.3) provide promising investment opportunities.

The discussion on systems of water provision focused on providing decentralised water treatment systems to a community. Ali (2010:727) proposed that much of the investment proposition is highly dependent on involving the community. According to this author, land ownership disputes, the availability of a water source and the willingness of the community to be involved in the management of the system all influence the viability and success of such investments. These factors were thus regarded as barriers to some impact investors. Similar to the views expressed by Ali (2010:727), participants considered land ownership disputes a barrier, albeit minor, especially in rural areas. However, it should be noted that none of the interviewees had experienced land ownership disputes before. The participants did not regard additional costs related to specialised research on water availability to be a barrier. Likewise, the interviewees did not believe that communities would be unwilling to participate in the management of water treatment system if they could benefit from it. Consequently, the challenges of land ownership disputes, the cost of specialised research and perceptions that the community is unwilling to be involved in the management of water treatment systems were all removed from the revised conceptual framework.

In line with the literature presented in Chapter Two Section 2.3, most of the participants acknowledged the serious consequences of inadequate water infrastructure. As a result, it was deduced that impact investments in water purification infrastructure that would increase acceptable access to potable water will result in significant measurable and positive social and/or environmental impact.

7.3.2 Infrastructure necessary to provide acceptable access to potable water in South Africa

As explained in Chapter Two Section 2.4, water is either collected, treated and distributed by means of centralised or decentralised systems to domestic end-users. In their study, Cook *et al.* (2009:2) concluded that decentralised systems have been used in peri-urban and rural areas where centralised systems are not technically, economically or environmentally feasible. In similar vein, participants in the present study favoured decentralised systems in these areas as they believed it would offer better investment opportunities. However, many interviewees indicated that direct investments in decentralised water purification infrastructure might not be a plausible investment yet. Instead, impact investments in innovative water technologies that could address challenges beyond the need for potable water, should also be considered. The main barriers that hamper the investment prospects in water purification infrastructure will be discussed in more detail in Section 7.5.1.

Considering the barriers that influence impact investors, the most plausible option to address acceptable access to potable water in South Africa might be through investments in innovations at specific stages of the water provision process. Examples that were raised by the participants included wastewater treatment and acid mine drainage. Constant technological innovation provides a wealth of opportunities to invest in these alternatives to provide acceptable access to drinking water as a by-product. It is encouraging to note that the participants were optimistic about the financial returns that could be earned from these alternative investment options. Therefore, given the challenges with direct impact investments in water purification infrastructure, the preferred option might be to invest in a convergence of sectors (such as the water-energy-food nexus) with the objective to deliver potable water, amongst others.

The use of desalination, as described in Chapter Two Section 2.4.2(d), elicited mixed responses. Contrary to the views of Sood and Smakhtin (2014:1121) and Swartz *et al.* (2006:647), most of the participants indicated that desalination would not reduce water tariff costs if implemented in the existing water provision process (see Chapter Six Section 6.9.3). However, participants did take note of the opportunities in combining desalination with solar plants to reduce energy costs. Furthermore, the researcher found that due to the water scarcity, there comes a point where government will not have any other choice but to invest in desalination plants. For instance, the City of Cape Town has already requested the private sector's assistance in establishing desalination plants (Cloete, 2017). It is thus encouraging to observe that government is considering to co-operate with the private sector to address these challenges.

Government should, however, adopt a long-term approach and use innovative technology to maximise capacity while minimising costs.

7.3.3 Responsibility to finance, develop and maintain water infrastructure in South Africa

As described in Chapter Two Section 2.5.1, the participants agreed that the DWS should be responsible for the broad oversight of the water provision process in the country. In light of these findings, local government should be primarily responsible for the financing, development and maintenance of water infrastructure. However, government simply does not have the capacity and financial resources to fulfil this responsibility (Ringwood, 2016:4). Therefore, the private sector should also be involved. Ruiters and Matji (2016:291) attribute the lack of capacity in local government to the shortage of skilled personnel. The empirical results, however, revealed that it was not necessarily a shortage of skilled personnel, but rather a matter of too few skilled government officials and engineers in the appropriate positions.

The public financing gap of water purification infrastructure was described in Chapter Two Section 2.5.3. According to Rodriguez *et al.* (2012:24) and Millson and Roux (2015:15), the inability of government to provide sufficient financing for the development and maintenance of water infrastructure in South Africa is evident. The researcher deduced from the findings that participants were generally optimistic about the investment opportunities arising from the public financing gap that private sector could leverage to create impact. Similarly, given the lack of financial resources, participants revealed that the financing gap is a major motivator for the establishment of PPPs.

As suggested by Trebilcock and Rosenstock (2015:350), the formation of PPPs is a way to improve efficiency and water quality and to reduce pressure on fiscal budgets in the water provision process in South Africa. The majority of the participants supported the notion that PPPs could be used to leverage benefits for both the private and public sectors. The researcher, however, observed a significant distrust between these two sectors, which may inhibit the establishment of PPPs. Furthermore, some participants showed the same concerns described in the extant literature by Venkatachalam (2015:135) and Koppenjan and Enserink (2009:286) regarding the private sector's financial return objectives. These concerns mostly centred on many citizens' inability to afford acceptable access to potable water and the private sector's pursuance of large financial returns. These concerns form part of the moral dilemma of making a return from the provision of a basic human right that will be discussed in Section 7.5.1.

Rodriguez *et al.* (2012:28) recommend that certain financial instruments (i.e. tax-exempt bonds, concessional loans and equity) should be used to encourage private sector investments. In line with these authors, the results of the present study showed that a growing number of international and local financial instruments could be used in PPPs to address social and/or environmental challenges. Interviewees agreed that these instruments could decrease risk, and thus increase the possibility of investments. It is therefore concluded that the continued growth and understanding of these financial instruments could lead to a wider adoption of impact investing as an RI strategy.

7.4 SUMMARY AND CONCLUSIONS PERTAINING TO SECONDARY RESEARCH OBJECTIVE THREE

As indicated earlier, the third research objective called for an extensive review of the extant literature on impact investing in general. The motives, process, barriers and opportunities of impact investing were thoroughly examined in Chapter Three.

7.4.1 Defining impact investing and the motives of impact investors

The definition of ‘impact investing’ has been debated since the term was first formalised in 2007 (Höchstädter & Scheck, 2015:449). Much of the discussion has centred on the lack of a uniform definition. The complexity in defining impact investing is the result of the dual objectives of achieving financial return and social and/or environmental impact (Drexler *et al.*, 2014a:9; Arosio, 2011:18). In Chapter Three Section 3.2, the researcher originally defined impact investing as “an RI strategy where investors actively and intentionally seek to generate both measurable, positive social and/or environmental impact and market-related, risk-adjusted financial return”.

The empirical results revealed that an impact investment should be an intentional and measurable investment to create positive social and/or environmental impact. Contrary to the debate on the lack of conceptual clarity on what constitutes ‘positive’ social and/or environmental impact, participants did not perceive it as a challenge to the definition of impact investing. The findings of the study showed that this perceived challenge could be overcome by establishing clear and detailed objectives in the very early stages of the impact investing process, namely when a mission statement is formulated. However, there are difficulties in understanding how to determine these specific social and/or environmental objectives in a manner that they will match financial return objectives.

As discussed in Chapter Three Sections 3.2 and 3.5, the majority of research classifies impact investors into two groups, namely ‘finance-first’ and ‘impact-first’ investors, depending on their motives or objectives. Therefore, certain investors may prioritise financial returns over social and/or environmental impact objectives or vice versa (Höchstädter & Scheck, 2015:454). Consequently, the researcher deduced that setting a minimum financial return objective for investors to qualify as impact investors will not be helpful in defining the term. Rather, the emphasis should be on establishing clear and well-defined social and/or environmental impact objectives that can generate positive financial return. These returns might not always be market-related and risk-adjusted (see Section 7.4.3). Based on what the researcher concluded empirically, impact investing was redefined as “an RI strategy where investors actively and intentionally establish and attain specific measurable and positive social and/or environmental impact objectives whilst seeking to generate financial return”.

7.4.2 Barriers to impact investing in general

The small size of the impact investment market is associated with many of the barriers to impact investing (see Chapter Six Section 6.6). The extant literature shows that the South African impact investment market is nascent, but that large amounts of capital deployment are restricted due to the market’s small size. Furthermore, South Africa is regarded as the hub of impact investing in SSA which implies that there are considerable opportunities for impact investors (Mudaliar *et al.*, 2016a:62). However, the empirical evidence indicated that there are not enough investment-ready deals in South Africa to deploy the capital inflow that could create impact.

The shortage of investment-ready deals was perceived to be a critical barrier to the impact investment market. In fact, most of the barriers hindering the growth of the South African impact investment market related to this barrier. The shortage of impact investments with established track records was considered a reason for the lack of investment-ready deals. The results of this study revealed that these barriers were a result of a lack of lifecycle support for small and medium-sized social enterprises. The lack of lifecycle support creates a dearth of investment-ready deals across the risk-return spectrum because only mature deals are deemed investable. Therefore, the researcher concluded that the real barrier to growing the impact investment market is the lack of lifecycle support for small and medium-sized social enterprises. It could thus be argued that the South African impact investment market needs more angel investors and venture capitalists. These financiers could help facilitate the social enterprises’ growth to an investment-ready stage.

According to the literature presented in Chapter Three Section 3.6.3, the limited number of specialised intermediaries which increases transaction costs is a barrier to the small impact investment market (Bugg-Levine & Goldstein, 2009:35; Freireich & Fulton, 2009:15). However, interviewees of the present study did not agree with these authors' views. Instead, the findings of this study revealed that the limited number of specialised intermediaries have led to an uncoordinated market. An uncoordinated market in turn, causes a hesitation to share information. Therefore, the hesitance among impact investors to share information was added as a barrier to impact investing in general in the revised conceptual framework (see Figure 6.1).

The researcher found that some of the barriers to impact investing were as a result of divergent perceptions. In Chapter Three Section 3.6.2, the perception that there is a trade-off between financial return and social and/or environmental impact was described as a barrier (Barby & Pederson, 2014:16; Huppé & Silva, 2013:14; Viviers *et al.*, 2011:224). Although the empirical evidence confirmed that this perception was a major barrier to raise capital, it also showed that it is a perception that cannot be corroborated with evidence. The researcher also discovered that some of the perceptions related to barriers to the international impact investment market were not applicable to the South African market. These barriers included inadequate due diligence investigations caused by the limited number of intermediaries, difficulties in exiting impact investments and their illiquidity.

The findings indicated that intermediaries who conduct specialised due diligence investigations were not necessary. It was found that asset managers' in-house due diligence teams were very capable of conducting in-depth and reliable due diligence investigations. Similarly, challenges related to illiquidity and the difficulty to exit impact investments were not regarded as major barriers hindering the growth of the South African impact investment market. As explained in Chapter Six Section 6.5, interviewees specified that investors understood the nature of their investments and structured their deals according to their stated liquidity and exit requirements. The empirical results differed from the views suggested by Mudaliar *et al.* (2016a:78) that there is competition between high-impact CSI budgets and impact investments in South Africa for the same limited number of projects. Instead, it is recommended that these pools of capital could be used in conjunction to stimulate growth of the impact investment market at its different lifecycle stages.

The measurement of social and/or environmental impact has always been a complex component of the impact investing process. According to multiple authors, the major challenge in the

measurement of impact investments has been the lack of a universally agreed upon set of metrics (Sales, 2015:31; Reeder, 2014:82; Johnson & Lee, 2013:15; Rangan *et al.*, 2011:10; Viviers *et al.*, 2011:224). The other school of thought argues for the use of bespoke metrics. Using the experts' opinions, the researcher concluded that the issue of which metrics to use, standardised or bespoke, was not the real barrier to the measurement of impact. Instead, the lack of a standardised and detailed way of reporting the measured social and/or environmental impact seemed to be a greater barrier. Investors confidently report financial return because they have a standardised format. A standardised format to report impact may thus help to create consistency and comparability, but such a format has its own challenges given the wide range of social and/or environmental impact objectives that could be targeted at any specific point in time.

7.4.3 Opportunities in impact investing in general

In Chapter Three Section 3.7.1, the opportunity to earn market-related, risk-adjusted returns through impact investments was discussed. According to Matthews *et al.* (2015:19), such returns can be earned. The findings of the present study, however, showed that there are not many opportunities available in the South African impact investment market to earn market-related, risk-adjusted returns (see Chapter Six Section 6.9.1). As pointed out earlier, the lack of investment-ready deals was regarded as the primary barrier. As a result, there are not enough viable local deals that can earn market-related, risk-adjusted returns to classify it as an opportunity.

According to the existing literature, there is a growing interest in and acceptance of impact investing as an RI strategy in developed markets (Saltuk 2015:16; Dacin *et al.*, 2011:1204; Bugg-Levine & Goldstein, 2009:34). As a result, asset managers have noticed a rising demand for impact investing from their clients (Saltuk, 2015:16). In line with the extant literature, the results revealed that there is a growing acceptance of impact investing as an RI strategy locally. A gradual increase of capital inflow was attributed to the growing awareness of impact investing. However, as pointed out earlier, there are not enough viable deals to deploy interested investors' capital. The empirical evidence also confirmed that the gradual increase in awareness is not enough proof to claim that there is a rise in the *demand* for more impact investments from asset owners in the South African impact investment market. Therefore, despite the increasing interest in and acceptance of impact investing as an RI strategy, there has not been an increase in the *demand* for impact investments locally.

The findings of the study showed that there might not be new impact investment opportunities resulting from the amendments in the South African regulatory environment (see Chapter Three 3.7.3). However, the changes have prompted interest and opinions that more impact capital can be deployed. Therefore, the researcher considered the amendments to be enablers of impact investing. As described in Chapter Three Section 3.6.6 and confirmed in Chapter Six Section 6.12.3, investing in highly regulated sectors such as the water market is often complicated by government involvement.

Some of the most pertinent global grand challenges include poverty and inequality, climate change and the lack of access to water and sanitation. Authors such as Brandstetter and Lehner (2015:87) and Ormiston *et al.* (2015:355) have found that the increasing receptiveness of impact investing has created many opportunities to generate social and/or environmental impact. Participants strongly agreed that impact investments could be used to address many of the grand challenges that South Africa faces. Based on the empirical results discussed in Chapter Six Section 6.8.1, the researcher concluded that there was strong evidence of the need for impact investments. However, the researcher is concerned about the lack of lifecycle support that could help facilitate the growth of small and medium-sized social enterprises to the point of being deemed investment-ready by South African impact investors.

7.5 SUMMARY AND CONCLUSIONS PERTAINING TO SECONDARY RESEARCH OBJECTIVE FOUR

This secondary research objective centred on a detailed review of the relevant literature on impact investing in water purification infrastructure.

In Chapter Two Section 2.2.2 an outline was given of the water provision process and the different role players in this process. As displayed in Figure 2.3, there are many role players involved in the process. These role players range from government officials, private sector financiers, institutions involved in the development and maintenance of the infrastructure to the end-users of water. The wide range of role players makes the provision of acceptable access to water complex.

7.5.1 Barriers to impact investing in water purification infrastructure

A few of the barriers related to investing in water purification infrastructure such as the shortage of investment-ready deals and difficulties in measuring impact, closely corresponded with those to impact investing in general. Many expert investors did not notice an increase in investment

opportunities in the water market in recent years. Although a lack of viable deals was given as one of the reasons, it was concluded that there could be more opportunities in the future.

As described in Chapter Four Section 4.2, the measurement of the social and/or environmental impact of impact investments in water purification infrastructure is complex. Although the researcher did not empirically verify the participants' perceptions of these complexities, the summary and conclusions of social and/or environmental impact measurement in general can also be applied to impact investments in water purification infrastructure.

Tecco (2008:135) attributed negative perceptions of private sector involvement in the water provision process to the many cases of failure compared to the success stories of impact investments in water purification infrastructure. The empirical results of the present study, however, revealed divergent views from those described by Tecco (2008:135). In fact, many interviewees regarded the involvement of the private sector as an investment opportunity. They saw scope for public and private sector to work harmoniously to address grand challenges.

The view of Osumanu (2008:107) was corroborated by the findings of the present study that the risk of political interference is one of the major barriers to impact investment in water purification infrastructure in South Africa. Having said this, it was concluded that this risk was no greater than in any other sector of the local economy. Furthermore, the empirical evidence showed that bribery and corruption should not be considered as barriers specifically related to impact investments in water purification infrastructure. This finding contradicts the views on bribery and corruption as outlined in Chapter Four Section 4.2.1. A number of the private sector participants, however, revealed a noticeable distrust in the government. This distrust could be an inhibitor of the formation of PPPs. Based on this evidence, the researcher concluded that the perceived and real risk of political interference leaves many impact investors apprehensive to invest because of the chance of their returns being jeopardised.

Many of the concerns of impact investors in water purification infrastructure centred on the financial risk and return prospects. The findings confirmed that such investments do not have attractive financial return prospects. The high levels of poverty in South Africa is directly associated with the poor's inability to pay for certain basic goods or services. Some interviewees, however, considered this 'barrier' to be a misconception of the poor's so-called unwillingness to pay for a basic commodity. Therefore, there might be investment opportunities

to provide goods and services to the poor if such goods and services are priced appropriately or are affordable.

As Winpenny (2006:13) predicted, a bigger concern for the majority of participants was the low return expectations of such investments. The empirical results verified the South African water tariff model as a barrier because of the low return potential. Therefore, positive cash flows will be difficult to maintain. Furthermore, the responses from the interviewees confirmed the view expressed by Rodriguez *et al.* (2012:13) about the high initial costs of establishing water purification infrastructure. The findings of this study showed that the tariff structure is not aligned to the high initial capital investment of water infrastructure. Therefore, the return potential is very low or negative in the short term which may deter investors. Based on the empirical results, the barriers related to the financial risks inherent to water infrastructure investments could be overcome with a suitable deal structure. Such a deal would require a partnership with government. Therefore, the challenges affecting these PPPs should first be resolved.

In Chapter Four Section 4.2.3, the researcher described the debate pertaining to the moral dilemma of making a return from providing a basic human right such as acceptable access to potable water. There are many different opinions on this topic, but most can be viewed from a utilitarian or deontological perspective (Gawronski & Beer, 2016:1). The complexity of this topic does not centre on which perspective an individual adopts, but rather on achieving a balance between financial return and affordability. Consequently, the pricing of water needs to be high enough so that financial return prospects are attractive for investors and low enough to be affordable so that the consumers are not exploited. As described by Murthy (2013:127), entities can charge for water to recover their costs, but individuals and households cannot be denied acceptable access due to their inability to pay. It is therefore concluded that the balance between financial return and affordability needs to be carefully contemplated.

The vast majority (17 out of 20) of the experts who participated in this study did not believe that earning a financial return from providing a basic human right such as water, poses a moral dilemma (see Chapter Six Section 6.11). Similar to the case discussed in Chapter Four Section 4.2.3(c), the participants revealed that the access to water should be affordable to the large majority of consumers. Furthermore, the levels of financial return pursued should not exploit the consumers' need for the product or service. As such, the researcher concluded that there is nothing wrong with receiving a reasonable financial return from providing a basic human right

in a capitalist economy, as long as the end-users' needs are not exploited. However, the researcher remains unconvinced that an affordable price and an investor's expected financial returns will converge without substantial government subsidisation.

7.5.2 Opportunities in impact investing in water purification infrastructure

In the existing literature, there was a positive sentiment towards the growth potential of the international water market (Robecosam, 2015:20; Bigas, 2012:60). Similarly, there was optimism about the financial returns an investor could earn from investing in water. However, as delineated in Chapter Six Section 6.9.2, this sentiment was not applicable to the South African water market. The results of the study showed that the commercial opportunity in impact investment in water purification infrastructure was unclear. The profit potential was low and therefore deemed unattractive. In other words, there were indications that financial returns could be earned, but that they would not be substantial.

There was consensus on the need for investments in water purification infrastructure, but many interviewees commented that deal structuring is complicated in some cases. Therefore, the difficulty of deal structuring in this market was highlighted as a critical barrier. The researcher perceived that this difficulty could be a result of the complexity of multiple stakeholders being involved in the water provision process. Investments in water purification infrastructure require engagement from the public and private sectors, asset owners and the end-users. The deal structuring is complicated even further by the existing water tariffs which are deemed too low to interest investors.

Water scarcity and the public funding gap discussed in Chapter Two Sections 2.2.2 and 2.5.3 have attracted the interest of institutional investors in water purification infrastructure investments (Reynaud, 2015:447; Valiñas *et al.*, 2015:5; Marin, 2009:20). However, the empirical evidence showed that the rise in interest has not materialised in an increase in investments as there has not been a growth in viable deals in water purification infrastructure (see Chapter Six Section 6.7). Even though innovative technology is more readily affordable (DWA, 2013:86), the researcher concluded that this too has not led to more investment deals. As such, the increasing interest among institutional investors in water purification infrastructure investments could only be classified as a minor opportunity.

In Chapter Four Section 4.3.3, the significant social and/or environmental impact that can be made through investments in water purification infrastructure was discussed. The different

areas of impact include improved health, educational gains, increased productivity, reduced water and soil pollution and a better quality of life (WHO, 2014b:20; OECD, 2011:14; Sanctuary & Tropp, 2005:11). Similar to the views expressed in the extant literature, the findings of the present study attested to the major opportunities to create significant social and/or environmental impact through local impact investments. However, the researcher concluded that there might not be realisable financial return opportunities to attract the private sector to invest directly in water purification infrastructure as the focus was too narrow.

Throughout this study, the definite need for such investments was apparent as was the need to create social and/or environmental impact. It was therefore disappointing to note that direct investments in water purification infrastructure might not be a viable option for impact investors. However, as concluded earlier, impact investments in a convergence or nexus of sectors might be a solution to generate market-related, risk-adjusted financial returns and at the same time obtain measurable, social and/or environmental impact.

7.6 SUMMARY AND CONCLUSIONS PERTAINING TO SECONDARY RESEARCH OBJECTIVE FIVE

The penultimate secondary research objective was to develop, validate and revise a conceptual framework on the motives, barriers and opportunities associated with impact investing in water purification infrastructure in South Africa. The original conceptual framework presented in Chapter Five Section 5.4 was developed from a thorough literature review of impact investing in water purification infrastructure in South Africa.

Based on the empirical evidence, a number of barriers and opportunities were omitted, whereas others were added or amended in the revised conceptual framework. The revised framework was discussed and presented in Chapter Six Section 6.15.

7.7 RECOMMENDATIONS

The final secondary research objective was to provide pertinent conclusions and recommendations to a range of stakeholders and role players in the impact investment market and the water provision process in South Africa. The conclusions were addressed in Sections 7.3 to 7.5. In this section, a number of recommendations will be offered to role players in the South African impact investment market, government and other policy makers, educators and the media.

7.7.1 Recommendations for investors in the South African impact investment market

As revealed in Chapter Six Section 6.3, the lack of a standardised definition of impact investing was not perceived as a barrier to clarify the understanding of ‘impact’. Instead, the lack of clear and detailed social and/or environmental impact objectives was pointed out as a barrier. Many investors have broad impact objectives which makes the measurement of impact difficult and unreliable. As pointed out earlier, impact investors should articulate clear and detailed social and/or environmental impact objectives at an early stage of the investment process, i.e. where the mission statement is defined (see Figure 3.2). These impact objectives should be as specific as possible to enable better measurement.

The lack of a standardised format to social and/or environmental impact reporting is related to the preceding recommendation. It is difficult to envision standardised reporting without universally accepted metrics. Therefore, a standardised format of reporting should be developed, not in terms of social and/or environmental impact categories, but in terms of consistent measurement reports across multiple years. It is recommended that SAIIN and GIIN provide more workshops on consistent impact reporting by means of clearly articulated impact objectives. Furthermore, these organisations could attempt to establish a standardised format for impact reporting that requires a consistent and detailed level of reporting.

It was evident that at the time this study was conducted many participants did not see viable opportunities in investing directly in water purification infrastructure. Therefore, investing in a nexus of sectors is recommended to provide acceptable access to potable water. Some of the greatest threats to the South African economy are the risks related to the water-energy-food nexus. The interactions between any of the three elements in this nexus substantially affect the others. Therefore, impact investments in the agricultural and/or the energy sector, of which both have a specific goal of creating clean water as a by-product, are recommended. According to Ali (2010:727), community-level systems of water treatment can provide employment opportunities to the community. Similarly, an investor devoting capital towards the development of water infrastructure should also consider developing small and medium-sized social enterprises in water treatment infrastructure to provide more employment opportunities. In doing so, the investor can rely on a stable customer base and a more consistent revenue stream.

7.7.2 Recommendations for other role players in the South African impact investment market

Two of the apparent barriers that emerged from the interviews were the uncoordinated impact investment market and investors' hesitance to share information. The demand-side actors and service providers in the impact investment market have an important contribution to make in these two areas. The annual SAIIN conferences have already been helpful in creating a more coordinated market, but it is recommended that more opportunities are created for role players to network and share information.

As discussed in Chapter Six Section 6.6, many impact investors in South Africa are competing for the same later-stage investment opportunities. The lack of investment-ready deals has also caused a reluctance to share information. Other role players in the impact investment market, such as higher education institutions and consulting firms, should coordinate their efforts to provide further information. More academic and industry studies on impact investing in South Africa are needed. Some of this research should be specifically focused on case studies of successful impact investments as it is necessary to share success stories.

Lobby groups such as the Banking Association South Africa and the Association for Savings and Investment South Africa could exert more pressure on asset owners and pension fund trustees to implement responsible investment strategies. These two lobby groups have mandates to support initiatives that can enable an inclusive economy and to participate in social development projects (About ASISA, 2017; Inclusive economy, 2017). South Africa faces many grand challenges but has a small tax base. Government does not have the financial resources to address all the challenges effectively on its own. Lobby groups could encourage private sector role players to devote more capital to address the grand challenges through impact investing.

7.7.3 Recommendations for multiple stakeholders to increase lifecycle support in the South African impact investment market

The South African impact investment market needs more angel investors and venture capitalists to ensure more lifecycle support for small and medium-sized social enterprises. In other words, it is crucial for these investors to facilitate the growth of small and medium-sized social enterprises to reach an investment-ready stage. Without an increase in angel investors and venture capitalists, the impact investment market will remain small and the competition to invest in the same later-stage entities will continue.

There are also multiple other role players that could make a contribution to increase the lifecycle support of social enterprises and impact businesses in South Africa. In agreement with Olawale and Garwe (2010:736), the researcher strongly recommends that government encourage agencies to provide financial training and concessional loans with lower interest rates to small and medium-sized social enterprises. Also, service providers could conduct and provide thorough market research to ensure an adequate demand for the products or services offered by social enterprises. As the proficiency in using technology is important, the offering of school and adult education programmes in the use of technology is vital (Olawale & Garwe, 2010:736). Furthermore, policy makers should implement regulatory reforms to reduce lengthy business registration processes. Moreover, tax incentives could motivate capital contributions to new ventures. Lastly, small and medium-sized social enterprises should ensure that they have proper business plans in place that forecast cash flows and that demonstrate their operational viability to secure debt finance.

7.7.4 Recommendations for government and other policy makers

The large public financing gap and the lack of capacity are evidence that government needs assistance to address the difficulties related to the provision, development and maintenance of water infrastructure in South Africa. The researcher recommends that PPPs should be used in developing countries more often to, amongst others, combat inefficient and expensive infrastructure development and maintenance. As discussed in Chapter Six Section 6.12, there was a positive perception among interviewees that PPPs can benefit all stakeholders. Many of the participants also indicated that the large public financing gap was a further motivator to establish PPPs. As such, government and other policy makers should implement regulatory reforms to encourage the formation of PPPs.

It was emphasised that the South African government is primarily responsible for the development and maintenance of water infrastructure. They could, however, outsource more stages of the water provision process to the private sector than they currently do. By outsourcing new developments and maintenance, government could reduce the levels of non-revenue water. Furthermore, government could save costs by using PPPs that could, for instance, repair leaking pipes.

The complexity of deal structuring in impact investing in water purification infrastructure and the low financial return expectations were two critical concerns that emerged from the content analysis. The possibility of government subsidisation in rural areas should thus be considered.

Such subsidisation could counter the low water tariff recovery rates, paving the way for more investment opportunities. Consequently, the private sector will be incentivised by government to make investments in water purification infrastructure. Government could also encourage the private sector to develop new and innovative technologies to address the grand challenges that the country faces.

Government could also ensure agreements with the underlying small and medium-sized social enterprises for the future selling or purchasing of resources which could mitigate some of the financial risks that the private sector investors face. In doing so, government might motivate the private sector to develop new water infrastructure with the guarantee of subsidising potable water for those who cannot afford it. Considering the high risk of non-payment, there are multiple ways in which water infrastructure deals can be compiled in South Africa. However, these deals are fragmented and should be reconfigured. In line with the recommendations by Ruiters and Matji (2015:672), the financing of water infrastructure should come from a combination of institutions that focus on water. The authors suggest that the success of such deals will be largely dependent on the governance structure, financial markets, financing pool and the political climate. It is thus recommended that government and other policy makers focus on recompiling fragmented deal structures to attract interest from the private sector.

In light of the preceding discussion, new and different policies are required to allow the growth of small and medium-sized social enterprises specifically focused on providing acceptable access to water. The researcher found that recent amendments to regulations have not necessarily led to an increase in a demand for impact investments. Therefore, more and other policy reforms are necessary. The current public financing gap is further evidence of the ineffectiveness of the existing policies, their implementation and governance structure to attract private sector funding. In line with Ruiters and Matji (2015:672), the researcher calls for reforms regarding water resource infrastructure management and development, water resources management and water services and sanitation. Participants also suggested that appropriate water tariff structures need to be implemented to ensure attractive financial returns. If these tariff structures are not revised by the relevant authorities, government should outsource water purification infrastructure to the private sector to create promising opportunities.

7.7.5 Recommendations for educators

Although many educators in commerce faculties at tertiary institutions have incorporated social and environmental considerations into their curricula in recent years, there is room for

improvement. More attention should be given to RI strategies including impact investing. In doing so, commerce students will gain a deeper understanding of these strategies enabling them to structure transactions in innovative ways once they enter the market place. Educators in the commerce departments of tertiary institutions can influence the next generation of asset owners, fund managers, pension fund trustees, investors and entrepreneurs in South Africa in more than one way. First, they can create an awareness of impact investing as a viable investment strategy to address grand challenges and to generate financial returns in the process. Second, they can shape the virtues of their students by integrating appropriate content throughout their syllabi. The presentation of impact investment content should be as practical as possible to challenge the students' underlying virtues. Using practical examples that reveal students' true convictions could stimulate debates regarding rational and ethical decision-making. Lastly, by using an experiential-based learning method, students can be encouraged to wrestle with the complexities of ethical decision-making in a controlled environment before they face real and even more complex moral dilemmas in the business world.

Educators also have a responsibility to educate the next generation of public sector officials. As indicated earlier, there is a shortage of government officials who are technically trained to deal with water infrastructure. The Stellenbosch Water Institute is already in the process of establishing a water management programme that will address some of the challenges related to water infrastructure (Jackson, 2017). In the same way that educators can shape the next generation of asset owners, fund managers, pension fund trustees, investors and entrepreneurs, educators can also positively influence the upcoming group of public sector officials to make ethically justifiable decisions. It is thus recommended that the topic of ethical decision-making is incorporated into law and political science courses.

7.7.6 Recommendations for the media

The media coverage on the challenges related to acceptable access to water in SSA and specifically South Africa plays an important informative role. Government officials have stated that 94.7 per cent of South Africans have acceptable access to drinking water while President Jacob Zuma has claimed that South Africa is one of only twelve African countries where drinking water is available throughout the country. However, according to Statistics South Africa's 2016 community survey and the 2014 Blue Drop report, these claims are not true (Statistics South Africa, 2016:66; DWS, 2014). It is thus vital that the media report on these discrepancies as the citizens of South Africa should be informed of the facts and made aware of how dire the water situation really is.

It is also recommended that the media further promote the call for an increase in ethical and socially inclusive capitalism in South Africa. The media should use their influence to motivate local asset owners to create long-term social and/or environmental impact by providing more relevant and accurate information regarding responsible investing.

7.8 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

Some limitations became evident as the study unfolded. These limitations in conjunction with recommendations to future researchers will be discussed next.

Given the large number of stakeholders in the water provision process and a deliberate focus on private sector investments, not many public sector role players were interviewed. Therefore, future researchers could conduct interviews with more government officials. These interviews can be supplemented with the opinions of individuals who do not have acceptable access to potable water. Research being undertaken by the Stellenbosch Water Institute is addressing this information shortage. This research will yield better contextual data to the challenge of unacceptable access to potable water from the domestic end-users' perspective. In addition, international impact investors who invest in South Africa could also be interviewed to enlarge the sample size.

The second limitation that was evident in this study was the limited research on impact investing in water purification infrastructure in South Africa. As far as the researcher could ascertain, this study is the first post-graduate research on this topic. Academic literature on impact investing (mostly from an international perspective) and on private sector investment in water purification infrastructure was limited. The empirical results confirmed that many of the opportunities and barriers to impact investing were relevant from an international perspective, but not necessarily relevant to the South African market. As such, the revised conceptual framework was notably different from the original one. Future research could be conducted in the form of a longitudinal study over a period of five to ten years. Such a longitudinal study could provide a better understanding of the pertinent barriers and opportunities relevant to a mature impact investment market as opposed to this study that primarily focused on a nascent market.

Many impact investors included the provision of acceptable access to potable water in their mandates. However, during the data gathering phase the researcher found that there were only a few impact investors who have been investing in water infrastructure and even fewer in water

purification infrastructure. Therefore, researchers could follow a broader approach by considering a convergence of sectors such as the water-energy-food nexus. Furthermore, future research could be conducted on the involvement or interest of angel investors and venture capitalists in the provision of water purification infrastructure in South Africa.

Finally, of the wide range of motives, barriers and opportunities that were identified in this study, the researcher found that the most critical barrier was the shortage of investment-ready deals. This shortage was attributed to the lack of lifecycle support of small and medium-sized social enterprises. More research is therefore recommended on lifecycle support to ensure that small and medium-sized social enterprises in South Africa progress to an investment-ready stage.

7.9 REFLECTION

The root of my passion for this research topic was the desire to use innovative business models to address grand challenges. My aspiration to address the challenges of providing acceptable access to potable water to those living without it goes back to the 2013 June holidays. I went on a mission trip to Malawi where we stayed in a rural area. Members of the community had to walk a few hundred metres to a water pump and then had to carry their water in large containers all the way back home. Seeing this really affected me. Therefore, the desire to create change in some or other way was birthed. After learning more about impact investing, I could immediately see the relevance.

My journey in understanding impact investing through an academic lens began in my BCom (Hons) year. I wrote a research paper entitled '*Exploring impact investment and its success factors in a South African context*'. At the end of that study I knew that I had to continue. I was excited to see how closely connected the challenges of water and sanitation were because I thought I could 'kill two birds with one stone'. However, I quickly realised, through the guidance of a mentor and my supervisor, I quickly realised that the scope of water and sanitation was too broad. Having refocused my study to what I really wanted to investigate, namely providing acceptable access to potable water, an intense two-year relationship with this study started.

I have learnt to respect the process of research. Even though research can be extremely frustrating, I have been taught an invaluable skill. I have learnt to problem-solve. The research process has also taught me patience and perseverance. I have learnt to be teachable and how to

use critique of one's work to grow. Lastly, I have realised that understanding the 'nitty gritty' details are often as important as understanding the big picture.

At present there are more barriers than opportunities in impact investments in water purification infrastructure in South Africa. However, I remain optimistic about the future prospects in this area. Water, often named 'the blue gold', is a resource related to many sectors. I believe that an effective and innovative deal structure offers endless possibilities to create impact.

In a modern society that is becoming increasingly aware of the grand challenges we face I now know that I can make a valuable contribution. I look forward to being part of some of the solutions presented in this study to provide and improve acceptable access to potable water in the future.

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ADDENDUM A: CONSENT TO PARTICIPATE IN RESEARCH



UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

IMPACT INVESTING IN WATER PURIFICATION INFRASTRUCTURE IN SOUTH AFRICA

You are asked to participate in a research study conducted by Stephen McCallum [BCom(Hons) Financial Analysis] and Prof Suzette Viviers from the Department of Business Management at Stellenbosch University. The results of the study will contribute to Stephen McCallum's MCom dissertation. You were selected as a possible participant as you are regarded as an experienced local asset manager.

1. PURPOSE OF THE STUDY

The aim of the study is to investigate the motives, barriers and opportunities associated with private sector impact investment in water purification infrastructure in South Africa. Specific attention will be given to the moral dilemma associated with making money from providing a basic human right (i.e. acceptable access to potable water).

2. PROCEDURES

If you volunteer to participate in this study, we would ask that you take part in a personal semi-structured interview of approximately an hour.

The interviews will be arranged at your convenience and at a venue of your choosing. With your permission, the interview will be voice recorded. You have the right to read the transcription to ensure that it is an accurate reflection of the interview.

3. POTENTIAL RISKS

There are no foreseeable risks associated with the research.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Diverse stakeholders in the water provision process (especially financiers) could benefit from a better understanding of the motives, barriers and opportunities which might help unlock more private sector financing for water purification infrastructure in South Africa. The individuals who lack acceptable access to potable water could also benefit if more financing becomes available for the development and maintenance of water purification infrastructure in the country. The findings could also allow impact investors to make more informed investment decisions. Ultimately, an impact investment should not only produce financial returns, but also create social and/or environmental impact.

5. PAYMENT FOR PARTICIPATION

There will be no compensation for participation in the study.

ADDENDUM B: MAIN INTERVIEW GUIDE



UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Department of Business Management
Stellenbosch University
Private Bag X1
Matieland
7602
31 March 2017

Dear Sir/Madam,

IMPACT INVESTING IN WATER PURIFICATION INFRASTRUCTURE IN SOUTH AFRICA

My name is Stephen McCallum and I am studying towards my MCom degree in Business Management at Stellenbosch University. I am driven by the desire to find innovative methods to create change through impact investments. Impact investments are responsible investment (RI) strategies whereby investors invest in social enterprises or funds with the aim of generating market-related, risk-adjusted financial returns and obtaining measurable, social and/or environmental impact.

With millions of people worldwide living without acceptable access to drinking (potable) water and an increasing financing gap to provide the necessary water purification infrastructure, this field offers many opportunities for research. 'Acceptable access' to potable water can be measured in terms of distance, availability and quality. According to the World Health Organization (WHO), the water source should be located within one kilometre of the user's place of residence and should provide a minimum of 20 litres per person per day. The WHO also provides detailed guidelines on what could be considered safe drinking water (Guidelines for drinking-water quality, 2011). I am thus investigating various aspects of investing in water purification infrastructure to address the lack of access to potable water.

This study focuses on the motives, barriers and opportunities associated with private sector impact investing in water purification infrastructure in South Africa. Particular attention is given to the moral dilemma associated with making profit from providing a basic human right. Having conducted a thorough literature review, I have identified some motives, barriers and opportunities in impact investing in general and in water purification infrastructure in particular.

Your views on impact investing in general and on water purification infrastructure in particular will be greatly appreciated.

If you have any queries, please feel free to contact my supervisor Prof Suzette Viviers (021 808 2223; sviviers@sun.ac.za).

Yours sincerely,

Stephen McCallum
(smccallum@sun.ac.za; 078 122 7566)

Section 1: Biographical data

Asset management company:

Please provide the following biographical details about yourself:

1.1	Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>
1.2	Age group: 20 – 29 <input type="checkbox"/> 30 – 39 <input type="checkbox"/> 40 – 49 <input type="checkbox"/> 50 – 59 <input type="checkbox"/> 60 or older <input type="checkbox"/>
1.3	Highest education: _____
1.4	Current position in the company: _____
1.5	Number of years of experience as an asset manager: 1 – 5 <input type="checkbox"/> 6 – 10 <input type="checkbox"/> 11 – 15 <input type="checkbox"/> 16 – 25 <input type="checkbox"/> 25 or more <input type="checkbox"/>

Section 2: Views of and experience with impact investing

2.1	How would you describe impact investing? _____ _____
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In the context of this study, impact investors could invest directly in for-profit and social enterprises that produce water purification infrastructure. Alternatively, they could invest in an impact investment fund which supports the development of water and sanitation infrastructure. A number of local RI funds have such mandates. Examples of impact investments include microfinance, and investments in sustainable agriculture, renewable energy and urban restoration.

2.2	Please indicate the number of years of your experience in the impact investment market: 1 – 5 <input type="checkbox"/> 6 – 10 <input type="checkbox"/> 11 – 15 <input type="checkbox"/> 16 – 25 <input type="checkbox"/> 25 or more <input type="checkbox"/>
2.3	Please provide examples of impact investments which you have made or managed over the past five years _____
2.4	Has the number of impact investments which you have made or managed increased over the past five years? If yes, please provide some details. _____
2.5	Do you think that impact investments in water purification infrastructure can provide acceptable access to potable water? _____
2.6	Do you think that the financing of water purification infrastructure should be the sole responsibility of the government? _____

The water provision process begins at a dam, catchment area or river from where the water is extracted and treated according to the specified standards for the various users. Once the water has been treated, it is distributed to the users. After usage, the wastewater is treated and transferred back into the water provision network. Although the availability and quality of water

also affect agricultural, commercial, mining and industrial users, the focus of this study is on domestic users (especially those living in peri-urban areas). Given this background:

2.7 At what stage of the water provision process should impact investments be focused on to provide acceptable access to potable water?

2.8 Which areas (i.e. urban, rural or peri-urban) should private sector investments be focused on to provide acceptable access to potable water in South Africa? Please motivate your answer.

Section 3: Motives of impact investors

In light of the definition of impact investing adopted in this study and the comprehensive literature review, it is clear that impact investors have different motives. The majority of research on impact investing divide impact investors into two broad groups, namely finance-first investors and impact-first investors. Although finance-first investors will consider social and/or environmental aspects when making investment decisions, their primary objective is to obtain financial returns. In contrast, impact-first investors are sometimes willing to accept concessionary financial returns, but they prioritise the social and/or environmental impact of their investments.

Please indicate to what extent you agree with the following statements on the motives for investing in an impact investment in general. On the five-point scale below, 1 indicates that you strongly disagree with a statement, while 5 indicates that you strongly agree with a statement. If you mark 1 or 5, please motivate your strong disagreement or strong agreement. If you do not strongly disagree or agree with a statement, but would still like to comment, please feel free to do so. Please note that there are no correct or incorrect answers.

		strongly disagree ⇔ strongly agree					
3.1	The majority of impact investors in South Africa are finance-first investors.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
3.2	The majority of impact investors in South Africa are impact-first investors.	1	2	3	4	5	N/A
Please motivate your response:							

3.3 What is your primary motivation as an impact investor and why?

Section 4: Barriers to impact investing in general

Please indicate to what extent you agree with the following statements on the motives for investing in an impact investment in general. On the five-point scale below, 1 indicates that you strongly disagree with a statement, while 5 indicates that you strongly agree with a statement. If you mark 1 or 5, please motivate your strong disagreement or strong agreement.

If you do not strongly disagree or agree with a statement, but would still like to comment, please feel free to do so. Please note that there are no correct or incorrect answers.

		strongly disagree ⇔ strongly agree					
4.1	The relatively small impact investment market in South Africa limits opportunities that can be seen as a barrier for impact investors	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
4.2	There is a shortage of ‘investment-ready’* deals where local impact investors can invest significant amounts of capital. *(Please note that an ‘investment-ready’ deal is one that offers satisfactory financial returns along with positive social and/or environmental impact.)	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
4.3	The shortage of impact investments with established track records across the risk-return spectrum in South Africa can be regarded as a barrier to investing.	1	2	3	4	5	N/A
Please explain your response:							
		strongly disagree ⇔ strongly agree					
4.4	The perception that impact investments do not yield market-related, risk-adjusted returns in South Africa may limit the amount of capital devoted to such investments.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
4.5	There are many forms of investments for high-impact social and environmental projects (e.g. from corporate social investment budgets) which makes the competition for the same limited number of projects even more intense.	1	2	3	4	5	N/A
Please elaborate on your response:							
		strongly disagree ⇔ strongly agree					
4.6	The limited number of specialised intermediaries (advisors, consultants, market makers etc.) may be a barrier to grow the local impact investment market as it may result in higher transaction costs.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
4.7	The limited number of specialised intermediaries in the impact investment market may result in due diligence investigations becoming more complex to execute in South Africa.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
4.8	It is difficult to exit impact investments in South Africa (which may limit interest in these kinds of investments).	1	2	3	4	5	N/A
Please explain your response:							

		strongly disagree ⇔ strongly agree					
4.9	Impact investments in South Africa are illiquid (which may limit interest in these kinds of investments).	1	2	3	4	5	N/A
Please substantiate your response:							
		strongly disagree ⇔ strongly agree					
4.10	The lack of bespoke social and environmental metrics to measure the different impact may be a barrier to impact investing.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
4.11	Impact investors should be able to show measurable impact therefore the lack of clarity to what actually constitutes 'social and environmental impact' may be a barrier to impact investing	1	2	3	4	5	N/A
Please explain your response:							

4.12	Are there any other barriers to impact investing in general that you would like to highlight?

Section 5: Barriers to impact investing in water purification infrastructure in South Africa

5.1	Have you invested in water purification infrastructure in the past five years? If so, please provide a few specific examples (point-of-use, community-level infrastructure, desalination, etc.).

Please indicate to what extent you agree with the following statements on the motives for investing in an impact investment in general. On the five-point scale below, 1 indicates that you strongly disagree with a statement, while 5 indicates that you strongly agree with a statement. If you mark 1 or 5, please motivate your strong disagreement or strong agreement. If you do not strongly disagree or agree with a statement, but would still like to comment, please feel free to do so. Please note that there are no correct or incorrect answers.

		strongly disagree ⇔ strongly agree					
5.2	There are more failures than success stories of private sector involvement in the water provision process. These failures, which have caused negative perceptions among investors, adversely affect impact investing in the local water provision sector.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
5.3	The possibility of political interference, corruption and bribery may leave investors hesitant to invest in water purification infrastructure in South Africa.	1	2	3	4	5	N/A
Please motivate your response:							

5.4	FINANCIAL RISKS						
		strongly disagree ⇔ strongly agree					
5.4.1	The high level of poverty in South Africa creates a barrier to investing in water infrastructure (because of the inability of the poor to pay for the product/service provided).	1	2	3	4	5	N/A
Please explain your response:							
		strongly disagree ⇔ strongly agree					
5.4.2	The concerns among local institutional investors about the profitability of investments in water infrastructure hamper impact investments in the country.	1	2	3	4	5	N/A
Please substantiate on your response:							
		strongly disagree ⇔ strongly agree					
5.4.3	The perceived high initial costs of water infrastructure could be a barrier to investments.	1	2	3	4	5	N/A
Please justify your response:							
5.5	MORAL DILEMMA						
		strongly disagree ⇔ strongly agree					
5.5.1	An impact investor faces a moral dilemma when investing and making profit from a basic human right such as providing acceptable access to potable water.	1	2	3	4	5	N/A
Please explain your response:							
		strongly disagree ⇔ strongly agree					
5.5.2	If investments were made in social enterprises and funds to address basic human rights such as providing acceptable access to potable water, the access should be affordable even for the poorest of the poor.	1	2	3	4	5	N/A
Please substantiate your response:							
		strongly disagree ⇔ strongly agree					
5.5.3	In a capitalist economy, there is nothing wrong with making profit from a basic human right, such as providing acceptable access to potable water.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
5.6	A lack of skilled government officials in South Africa to repair and maintain water infrastructure leads to the notion that investments in water purification infrastructure might not be sustainable.	1	2	3	4	5	N/A
Please substantiate your response:							
		strongly disagree ⇔ strongly agree					
5.7	A lack of skilled engineers in South Africa to repair and maintain water infrastructure leads to the notion that investments in water purification infrastructure might not be sustainable.	1	2	3	4	5	N/A
Please explain your response:							

5.8		ADDITIONAL BARRIERS ASSOCIATED WITH COMMUNITY-LEVEL WATER PURIFICATION INFRASTRUCTURE					
		strongly disagree ⇔ strongly agree					
5.8.1	Land ownership disputes in South Africa often leave water purification infrastructure unused, which in turn can deter investing.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
5.8.2	The availability of water resource(s) is a major concern in South Africa and therefore investing in water-related infrastructure requires specialised research beforehand. The additional costs related to specialised research could be a barrier to investing.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
5.8.3	The unwillingness of local communities to be involved in the water provision process could be a barrier to investing.	1	2	3	4	5	N/A
Please substantiate on your response:							

5.9	Are there any other barriers to impact investing in water purification infrastructure in South Africa that you would like to highlight?

Section 6: Opportunities in impact investing in general

Please indicate to what extent you agree with the following statements on the motives for investing in an impact investment in general. On the five-point scale below, 1 indicates that you strongly disagree with a statement, while 5 indicates that you strongly agree with a statement. If you mark 1 or 5, please motivate your strong disagreement or strong agreement. If you do not strongly disagree or agree with a statement, but would still like to comment, please feel free to do so. Please note that there are no correct or incorrect answers.

		strongly disagree ⇔ strongly agree					
6.1	There are many opportunities to earn market-related, risk-adjusted returns in the South African impact investment market.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
6.2	There is a growing acceptance among local institutional investors of impact investing as a responsible investment strategy.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
6.3	Asset owners in South Africa are demanding more responsible investments (both in terms of process and products) which could open up new capital streams.	1	2	3	4	5	N/A
Please explain your response:							
		strongly disagree ⇔ strongly agree					

6.4	There is an increasing amount of capital flow into the impact investment market in South Africa.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
6.5	There have been recent changes in the South African regulatory environment that have created additional opportunities in impact investing.	1	2	3	4	5	N/A
Kindly provide examples of what you regard as important changes in this regard.							
		strongly disagree ⇔ strongly agree					
6.6	There are major impact investment opportunities to generate social and/or environmental impact in South Africa (e.g. employment, housing, clean energy).	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
6.7	A growing number of financial instruments are available to address social and environmental challenges which could decrease the risk, and thus increase the possibility of investment.	1	2	3	4	5	N/A
Please explain your response:							

6.8	Are there any other opportunities in impact investing in general that you would like to highlight?

Section 7: Opportunities in impact investing in water purification infrastructure in South Africa

Please indicate to what extent you agree with the following statements on the motives for investing in an impact investment in general. On the five-point scale below, 1 indicates that you strongly disagree with a statement, while 5 indicates that you strongly agree with a statement. If you mark 1 or 5, please motivate your strong disagreement or strong agreement. If you do not strongly disagree or agree with a statement, but would still like to comment, please feel free to do so. Please note that there are no correct or incorrect answers.

7.1	There is good growth potential in the global water market that has led to increased investment opportunities. Do you think that this is also true for the South African water market? Please motivate your response.

		strongly disagree ⇔ strongly agree					
7.2	New water purification infrastructure is deemed necessary in areas of rapid population growth which leads to promising investment opportunities.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					

7.3	The large public financing gap has created opportunities for the private sector in South Africa to invest in the provision of water infrastructure.	1	2	3	4	5	N/A
Please explain your response:							
		strongly disagree ⇔ strongly agree					
7.4	Substantial financial returns can be earned from investing in water purification infrastructure in South Africa.	1	2	3	4	5	N/A
Please justify your response:							
		strongly disagree ⇔ strongly agree					
7.5	There is an increased interest among institutional investors in water purification infrastructure in South Africa.	1	2	3	4	5	N/A
Please motivate your response:							
		strongly disagree ⇔ strongly agree					
7.6	New innovations in water purification infrastructure such as desalination and nanotechnology can save costs, which in turn may increase investment opportunities in such infrastructure.	1	2	3	4	5	N/A
Please elaborate on your response:							
		strongly disagree ⇔ strongly agree					
7.7	Investment opportunities in water purification infrastructure in South Africa can lead to social and/or environmental impact e.g. alleviating the disease burden, boosting economic growth, freeing up hospital beds, and decreasing water pollution.	1	2	3	4	5	N/A
Please justify your response:							

7.8	Are there any other opportunities associated with impact investing in water purification infrastructure in South Africa that you would like to highlight?

Thank you very much for your time and participation.

Would you like to receive the results of this study?

Yes

No