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A systems framework for analysing the impact of corporate social investment projects that focus on Information Technology

by

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ABSTRACT

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South Africa as a country faces stark socio-economic development challenges, such as extreme levels of inequality and unemployment, and specifically youth unemployment. To assist with addressing some of these challenges associated with the history of apartheid, the South African government instituted Broad-Based Black Economic Empowerment (B-BBEE). One of the instruments to implement B-BBEE is Corporate Social Investment (CSI). CSI refers to projects that companies undertake that goes beyond their primary profit motive, to assist and empower disadvantaged individuals and communities. A number of CSI projects in South Africa has an Information and Communications Technology (ICT) focus, where companies spend their CSI budget to contribute to, among other things, ICT skills development. Research has revealed that these types of projects are often short-lived, and at times unsustainable. As a result, communities are not necessarily benefiting from such projects. The objective of this research is to analyse the impact of South African CSI projects with an ICT focus on poor urban communities. The study is further limited in scope to CSI ICT initiatives aimed at supporting disadvantaged youth.

The study followed a qualitative research approach. Four case studies were performed in poor urban communities in Soweto, all four of them CSI initiatives that were aimed at providing ICT support to disadvantaged youth. A systems framework was developed using literature as a foundation from which to analyse the cases. The systems framework is primarily based on Checkland's soft systems methodology, which facilitates an inquiry into the problem situation and context. The Ubuntu philosophy, which emphasises the belief systems in which people and communities reflect their experiences in a day-to-day life, further supports the framework. Lastly, autopoiesis was employed as part of the framework, as it describes the self-production and sustainability of the system of interest.

The study sought to gather qualitative data to understand the problem situation and use as a basis for analysis. Through an iterative process, data was collected from interviews, focus groups, documentation, and observations at four learning centres in Soweto. The collected

data pertained to the implementation of CSI ICT projects by learning centres between 2002 – 2016. The case studies were analysed by applying the social systems framework, which was based on SSM, Ubuntu philosophy, and autopoiesis concepts.

The findings of the study indicate that companies derived some form of benefit for contributing to CSI in poor communities. These benefits included having a local presence, achieving a better B-BBEE rating that enables them to do business with the government, and to retain or attract new business. In addition, the communities and their members benefited from the CSI ICT projects; this demonstrated an essential element of Ubuntu, namely, that collectively everyone could benefit. The CSI ICT projects had a positive impact on the socio-economic situation of the communities. It contributed to the employability of the unemployed youth, as they were trained in ICT skills. The school children used ICT to do their schoolwork and for ICT training. In addition, the learning centres proved to be self-reproducing and self-maintaining, and therefore sustainable.

The contributions of the study include a systems framework and guiding principles that companies, systems thinkers, and ICT4D practitioners could use to assess the sustainability and the impact of similar projects that are geared towards achieving socio-economic development in poor urban communities. Further, the research findings were used to refine the theoretical framework to analyse the impact of CSI ICT projects in poor urban communities in South Africa.

DECLARATION

I, **Mmatseleng Lefike** declare that this thesis is my own work, based on my personal research and that I have acknowledged all material and sources used in its preparation. I also declare that this thesis has never been previously submitted for assessment at any tertiary institute and that I have not copied in part or whole or otherwise plagiarised the work of other students and persons.

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Mmatseleng Lefike

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“I am who I am because of all of you”

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LIST OF ACRONYMS

BEE	Black Economic Empowerment
B-BBEE	Broad-Based Black Economic Empowerment
CATWOE	Customers, Actors, Transformation, Worldview, Owners, Environment
CEO	Chief Executive Office
CHS	Critical Systems Heuristics
CIO	Chief Information Officer
CSI	Corporate Social Investment
CSR	Corporate Social Responsibility
CST	Critical Systems Thinking
DST	Dialectic Systems Theory
DTI	Department of Trade and Industry
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IS	Information Systems
ITU	International Telecommunication Union
MDG	Millennium Development Goals
M & E	Monitoring and Evaluation
MPA	Multiple Perspective Approach
NDP	National Development Plan
NGO	Non-Government Organisation
NPAT	Net Profit After Tax
OPLC	Orlando Pirates Learning Centre
OECD	Organisation for Economic Cooperation and Development
PIAC	Public Internet Access Centre
SSM	Soft Systems Methodology
SAAYC	Southern African Association of Youth Clubs
SD	Systems Dynamic
SED	Socio-economic Development
TSI	Total Systems Intervention
UNCTAD	United Nations Conference on Trade Development

1 CHAPTER 1 INTRODUCTION

1.1 Introduction

Society is living in a fast-evolving world where technologies are developed and incorporated into people's everyday lives on a daily basis (Lepikson & Moraes, 2017). This development fundamentally reshapes people's lives by growing the information base and bringing innovative ways to connect people, companies, and governments (World Bank Group, 2016). This has a significant impact in many different spheres of our lives, for instance, the ongoing convergence of the real world and virtual reality, whereby information and communication technologies are combined with traditional industrial processes, thereby changing production. This form of communication and innovation represents a new revolution, and there is no doubt that it brings about substantial change for almost every corner of society (Deloitte Insights, 2018). A recent survey found that Global Executives believe that the new revolution will lead to social and economic equality and stability; they further view technology as a bridge that will provide access to education, jobs, and financing across different social clusters (Deloitte Insights, 2018). Moreover, the World Economic Forum predicted that information and communication technologies (ICTs) would be the backbone to support a new revolution (Baller, Dutta, & Lanvin, 2016).

It is worth noting that, despite the new revolution and technology advancements that are continuously reshaping people's lives, there is a vast majority of people who are still not connected to the Internet, who do not have access to computers and skills, and who have no ability to gain experience in using computers (Schwab, 2017). Information and Communication Technology for Development (ICT4D) is a domain that is advancing in many developing countries with the aim of using ICT to benefit disadvantaged or marginalised groups (Unwin & Unwin, 2009). ICT4D also has the ability to change economies and communities to increase efficiency, promote innovation, and improve education (Arellano & Cámara, 2017). The Networked Readiness Index of 2016, which investigates the capacity of countries to leverage ICTs for increased competitiveness, ranked South Africa (65th, up by 10 spaces) as having improved in ICT infrastructure and affordability (Baller et al., 2016). ITWeb (2019) reported that South Africa has a well-invested ICT infrastructure and a significant uptake of mobile phone users. ICT continues to be an integral part of communication and interaction (Eady & Lockyer, 2013). Irrespective of where people are located, ICT allows for knowledge and information to be exchanged efficiently and effectively for decision-making purposes (BMZ, 2013). As a result, government, companies, NGOs, and foreign investors are enthusiastic about initiating ICT-related projects in disadvantaged communities with the aim of alleviating

poverty, reducing unemployed, and improving other socio-economic conditions (Harris, 2004; International Telecommunication Union, 2017).

Southern African communities are confronted with many socio-economic development challenges such as poverty, underdevelopment, poor economic and political conditions, poor governance, challenging environmental conditions, and poor health, peace, and security systems (Brown, Hammill, & McLeman, 2007). The South African government embarked on a drive to socially and economically transform the country. One of the transformation strategies is the inception of Broad-Based Black Economic Empowerment (B-BBEE) with the view to redressing the legacy of apartheid (The Department of Trade and Industry, 2003b). The government encourages companies from the private sector to participate in the transformation and development of the country. Participation by companies is governed by various policy instruments that have been determined by Government to achieve its goals in relation to B-BBEE. Such policy instruments include legislation, charters, regulations, restructuring of state-owned enterprises, preferential procurement by government, institutional support, and BEE Advisory Council and other incentive schemes.

With the policy instruments in place, government is also searching for partnerships from the private sector to accelerate the transformation process. In a quest to abide by the law, companies are now contributing to disadvantaged communities through their Corporate Social Investment (CSI) budgets (Anwana, 2018; Department of Trade and Industry, 2003) to numerous initiatives. These include education, health, information and communication technology (ICT), capacity building, charities, and flagship projects in disadvantaged communities (Tait, Wlokas, & Garside, 2013; Xulu & Steyn, 2001), with the aim of empowering and improving the standard of living in poor communities.

1.2 Background

In 1997, the Government of South Africa developed a White Paper for Social Welfare to guide the streamlining of social services and social welfare (Department of Welfare, 1997). Social and economic development are two processes that are reliant on each other. Social development paves the way for economic growth, and economic growth, in turn, enables social development. Social welfare refers to an interlinked and holistic system that includes social services, facilities, platforms and social security to enable social development, social justice, and functioning of people. Social services, social security, and associated social development initiatives are instruments that could lead to economic improvements and translate to economic growth (Department of Welfare, 1997). If these social investments are not realised, economic growth could be compromised. To enable social development and

promote economic growth, the government promulgated a transformation framework that would see black people be empowered and, in return, this would benefit economic growth (Gnade, Blaauw, & Greyling, 2016).

The South African Government, through the Department of Trade and Industry, developed a framework for the implementation of B-BBEE (Department of Trade and Industry, 2003). In 2007, the ultimate B-BBEE Codes of Good Practice were promulgated to companies. These Codes of Good Practice are a set of regulatory guidelines and 'balanced scorecards' used by government and the private sector to measure and gauge the success of broad-based black economic empowerment (Mohamed, 2015). Table 1-1 illustrates the elements of the B-BBEE scorecard, including ownership, management control, skills development, enterprise and supplier development, and socio-economic development (referred to as corporate social investment) as defined by the Department of Trade and Industry.

Table 1-1: B-BBEE Elements and Weight

B-BBEE ELEMENT	WEIGHT
Ownership	20.00%
Management	10.00%
Employment Equity	15.00%
Skills Development	15.00%
Preferential Procurement	20.00%
Enterprise Development	15.00%
Socio-economic Development	5.00%

B-BBEE compliance is not a mandatory exercise for all companies; however, in order to do business with the government, NGOs, state-owned enterprises, and private organisations, it is required from companies to demonstrate their B-BBEE compliance. A balanced scorecard of a business is dependent on the scorecard of their own suppliers. For many companies, B-BBEE has become a supplementary part of the way that business is being conducted in South Africa (Mohamed, 2015).

1.2.1 Corporate Social Investment legislation and regulation

In South Africa, Corporate Social Investment (CSI) is governed by various government policy instruments such as legislation and regulation, as well as JSE rules, the 2008 Companies Act, and the King IV report on corporate governance (de Villiers & Alexander, 2014; Department of Trade and Industry, 2003; Institute of Directors, 2016).

Companies that follow the King Report on Corporate Governance (Institute of Directors, 2002) have been mandated to adhere to the recommendations of CSI and elements of B-BBEE. A study by Trialogue (2018) revealed that participating companies that report on King IV have impacted the governance of their CSI programmes by increasing the CSI part of the Social and Ethics Committees. In addition, de Villiers and Alexander (2014) state that companies that are listed on the Johannesburg Stock Exchange (JSE) are also mandated to report on their corporate social investment initiatives, in order to adhere to the King Report on Corporate Governance, which stresses investments in social and environmental matters.

The other legislation that companies are required to adhere to is the 2008 Companies Act (Anwana, 2018). The Act states that companies should contribute towards socio-economic development within the country, as well as within communities where their products are consumed (Republic of South Africa, 2008).

The government of South Africa have, through its B-BBEE empowerment programmes, urged companies to be compliant in order to do business with the government. The B-BBEE Act prescribes that companies are lawfully obligated to support and report on CSI projects (Department of Trade and Industry, 2003).

Da Piedade and Thomas (2006) mention that government alone will not be able to address the social challenges that communities are faced with; therefore, partnership with business is imperative for the alleviation of some of the social challenges that the communities are facing on a daily basis. As a result, CSI should be seen as a responsibility of the tripartite coalition of institutional players in development – specifically government, the private sector, and civil society.

1.2.2 Corporate Social Investment Spend

In 2018, the government of South Africa committed to spending R1.94 trillion over the medium term (2018/19 – 2020/21) on improving primary education and health, community development, and social services (Republic of South Africa, 2018). Additionally, companies in South Africa spend a significant amount on CSI programmes with the aim of improving socioeconomic situations in poor communities. The Trialogue's CSI Handbook states that

companies spend R6.9 billion in 2012, with the 2014 CSI spent at R8.2 billion, and the 2016 spend at R8.6 billion (Trialogue, 2012, 2014, 2016). A study conducted by Trialogue (2017) indicated that companies are continuing to mature their strategies and contributions for socio-economic development through CSI programmes. These programmes are now positioned with policies, accountability, and employee involvement. This is demonstrated by their spend, whereby companies spent an estimated R9.7 billion on CSI programmes in 2018. The education sector was a popularly supported sector at 44%, followed by social and community development at 17%, health at 9%, and security and agriculture at 9% (Trialogue, 2018). This demonstrates that CSI plays a pivotal role in aligning government priorities and linking with a spectrum of initiatives that will sustain the society during and after the inception of CSI initiatives, moreover once the funders cease funding.

Even though companies are maturing their CSI spend and strategies, some companies are still looking out for their own and shareholder interests. Literature highlights that CSI's true meaning is disappearing, because companies are looking after their interests more than considering the interests of the communities that they serve. They are using this as a mechanism to promote their business, manage image, and enhance reputation (Anwana, 2018; Fu, Tang, & Yan, 2019; Mohamed, 2019).

In addition, due to strict and obligatory B-BBEE requirements, a tick-box mentality is promoted whereby companies are spending on CSI initiatives in order to score B-BBEE points and to be complying with the letter of the legislation (Gerber, 2018). However, in order to eradicate social challenges, it is vital that companies reassess the purpose for their CSI spend. The way in which CSI is conceptualised, it aims to ensure that community's benefit from these projects.

Companies embark on various types of CSI projects that are aimed at benefiting communities, including education, ICT, entrepreneurship, health, job creation, and environment (Myres, Mamabolo, Mugadza, & Jankelowitz, 2018). Companies contribute part of their CSI budget to various education programs, for example, the improvement of mathematics, accounting and science; learnership programs that focus on technical skills; the introduction of information and communication technology in communities; and improving access to further education and post-matric training for learners from disadvantaged backgrounds (Trialogue, 2017). Entrepreneurship is another stream that is encouraged by companies through their CSI contributions for post-matric learners and other community members as an alternative employment opportunity and to foster job creation (Investec, 2012). Other examples of CSI activities are sponsorship programmes, providing career development and training to employees, and waste recycling. The well-being of community members has prompted companies to initiate community health projects that consider disease prevention, treatment,

and care, and other health projects including mobile clinics that serve communities (Trialogue, 2017).

The introduction of ICT projects in communities has an extraordinary potential to facilitate community development (Unwin & Unwin, 2009) in the form of Corporate Social Investment. Information and communication technology — for example, cell phones, telephones, home personal computers, tablets, and the Internet — have become a fundamental part of modern society. ICT connects people, creates more business in goods and services around the world, and increases access to information and knowledge (Kilenthong & Odton, 2014). According to Pohjola (2003) and The United Nations Conference on Trade and Development (2011), ICT is a fundamental player for economic development. Therefore, CSI projects that introduce ICT skills and facilities have the potential to make a meaningful contribution to development.

As an example of a CSI ICT project, Huawei South Africa, in partnership with Khulisani is contributing to communities with the view of reducing unemployment and alleviating poverty. The two organisations have invested in the construction of a mobile ICT training centre that supports communities with computer skills training as well as employment for people living with disabilities (IT News Africa, 2013). Similarly, other telecommunications companies such as Vodacom and the Telkom foundation have CSI initiatives that facilitate the improvement of access to health and social welfare, and initiatives that focus on the ICT literacy of teachers (Telkom Foundation, 2018; Vodacom Digital Classroom, 2014). In 1997, Melinda and Bill Gates, the founders of Microsoft, along with some of the South African organisations came up with an initiative to provide access to information for a community in Chiawelo, Soweto, through a concept called the ‘digital village’. This initiative had a cash injection of $100,000 in the form of computer packages (The Spokesman Review, 1997). However, today there is little sign of the existence of the digital villages in South Africa. These villages were functional for a while, but soon collapsed once the sponsors ceased the funding.

1.3 Problem Statement

The introduction of information and communication technology (ICT) projects in poor urban communities hold great promise for these communities to improve human efficiencies, access to information and knowledge, and improve quality of life. However, there are challenges when introducing technology to poor urban communities under the banner of Corporate Social Investment. The Mighty Pen (2015) reported that R4 billion is lost annually on CSI projects. Stakeholder engagement is a requirement for CSI projects to be successful; however, companies are profit and time-driven, hence there is often little or no time for community–business dialogue to identify the needs and expectations of the communities. Engaging with

those affected, designing holistic solutions, and understanding the boundaries of involvement are essential elements of a proposed intervention. Lack of engagement with those affected results in failed or terminated projects or initiatives. In addition, ill-managed projects, donated funds disappearing, and inadequate utilisation of ICT attribute to the failure of CSI projects (Maluleke, 2015). Some of the challenges associated with failed ICT projects relate to the unreliability of ICT equipment, lack of technical support, lack of maintenance funds, and lack of knowledge and skills. Some companies would donate their old, unused computers to poor communities, which renders a challenge to the community in the long run as they are unable to maintain these computers (Schneiderman, 2000).

Most importantly, ongoing monitoring of outcomes is the only way in which the implementers of CSI programmes will know whether they are uplifting communities or not. As illustrated by the case of the Microsoft digital village, the intentions were good; however, there was no sustainability model and long-term follow-through, thus resulting in project termination once the funds were exhausted. Chanda (n.d) reflected that companies are no longer opting for long-term CSI project investment strategies but for short-term ones, as it is deemed that short-term strategies are more measurable. Watson (2015) mention that CSI projects have become ‘glamorous’ in nature, as companies are contributing to communities' digital learning because of all the promise it has. As a result, this action leads to communities not benefiting while companies’ image is enhanced; at worst, these kinds of projects do nothing for the communities because they are short-term focused. Malm (2012) mentions that some of the projects are seen to be of a remedial nature because the focus is on short-term needs as opposed to long-term empowerment of the communities. This research seeks to investigate the value of CSI projects in South Africa, and in particular ICT projects in a poor urban community.

1.3.1 The objective of this study

Against the above background, the objective of the study is:

- A qualitative analysis of the impact of South African CSI projects with an ICT focus. CSI projects are assumed to have benefits for the partnering company as well as the community, but what, if any, are the longer-term benefits to the community?

1.3.2 Motivation for this research

The motivation for the study is that companies continue to implement CSI ICT projects in poor communities to improve the communities' socio-economic situations. However, there is insufficient evidence reported on the sustainability and impact of these projects from a systemic perspective.

Applying systems thinking in this study is done in order to better understand the system by exploring relationships and interactions among the elements that form the entire CSI ICT community system. This refers to understanding the community needs, as well as companies' objectives as a whole, before implementing CSI ICT projects. Systems thinking further allows for a comprehensive assessment of the broader community impact of CSI ICT projects. Unlike viewing relationships independently, systems thinking advocates for inclusive viewing of multiple relationships. In addition, systems thinking is suited to address socio-economic situations that are complex, and it further promotes meaningful insights into dealing with CSI issues (Patel & Mehta, 2017).

The research questions below are posed to assist in addressing the objective of the study.

Main research question:

What is a suitable systems framework for analysing the impact of CSI ICT projects in a poor urban community in South Africa?

Sub-questions

Sub-question 1: How does Ubuntu contribute to an understanding of the success (or not) of CSI ICT projects?

- What concepts of Ubuntu are relevant to include in a systems framework for analysing the impact of CSI ICT projects?

Sub-question 2: In which manner do principles of autopoiesis or self-production contribute to an understanding of the success (or not) of CSI ICT projects?

- What concepts of autopoiesis or self-production are relevant to include in a systems framework for analysing the impact of CSI ICT projects?

1.4 Assumptions

According to Leedy and Ormrod (2010, p. 62), “Assumptions are so basic that, without them, the research problem itself could not exist”. This study is conducted under the following assumptions: The first assumption is that large private companies are contributing part of their budgets towards CSI initiatives. The second assumption is that companies invest with the intention to make a difference. Companies have the liberty to choose what/ where/ how they want to invest in CSI, and it is assumed that their choice is partially based on where their project will make a difference. The third assumption is that the introduction of ICT4D projects is for the betterment of the disadvantaged communities. The fourth assumption is that participants in this study will answer interview questions truthfully. Otherwise, any relationship developed between concepts might be spurious. The last assumption is that the chosen sample size will be large enough to ensure that the study has sufficient power to detect a significant relationship among the study concepts.

1.5 Research Strategy

The empirical study adopted the interpretive stance, which recognises a human-centred approach and assumes multiple subjective realities meaning that there is “no single version of the truth” (Oates, 2006, p. 319). The approach followed is qualitative, with the view of using various forms of inquiry. The theoretical framework for this study comprises Soft Systems Methodology, Ubuntu philosophy, and Autopoiesis concepts. The framework is used to analyse the impact of CSI ICT projects in a specified community. Multiple case studies are used as a research strategy. The case studies are cross-sectional, based on four learning centres in impoverished communities around Soweto that implemented CSI ICT projects. Each learning centre and the related CSI ICT project is described as a serving system, and associated communities are described as served systems. Data is collected through individual and focus group interviews, documents, and observations. Chapter 3 discusses the research methodology in detail.

1.6 Limitations

The following limitations are relevant:

- The case studies are limited to learning centres in various communities around Soweto, Gauteng;
- Various projects are implemented through CSI; however, this study is limited to CSI ICT projects implemented between 2002 and 2016; and

- The study progressed only with ICT companies that were willing to take part in the study.
- Some employees that initially managed the CSI ICT projects for the technology partners have left the organisation.

1.7 Expected Contributions of the study

This study is expected to contribute to the ICT4D domain in the following manner:

- The theoretical contribution of SSM, Autopoiesis, and Ubuntu towards a better systemic understanding of the impact of CSI ICT projects;
- The application of a systems framework to empirically analyse the impact of CSI ICT projects in poor urban communities; and
- The practical contribution of learning from what worked in successful cases.

1.8 Summary

The South African government has several initiatives to reform poor urban communities. One of those initiatives is the implementation of the Broad-Based Black Economic Empowerment programme. A business needs to adhere to various elements to be compliant with this programme, such as ownership, management control, skills development, enterprise and supplier development, and socio-economic development.

Socio-economic development, in particular, is a field where companies are allocating funds with a view of supporting disadvantaged communities. However, this field is riddled with controversies. This study adopts a systems approach to investigate the relationships between the elements that make up an impactful CSI ICT project in a poor urban community. Section 1.9 provides a brief overview of the thesis layout.

1.9 Brief Overview of Chapters

The study is structured as follows:

Chapter 1 - Introduction: provides a broad outline of the study. The chapter provides an overview of the current situation and background on Corporate Social Investment-related ICT4D projects in disadvantaged communities. It describes the problem statement and the associated research questions. Assumptions and limitations of the study are discussed.

Chapter 2 - Literature Background: defines the constructs used in this study. This chapter further discusses corporate social investment in South Africa, including the social investment that focuses on the ICT context.

Chapter 3 - Research Methodology: presents the research methodology and planning. It presents the theories that underpin the study. The chapter includes sections on the research design, as well as a description of the study population and the sampling procedures used. It covers the methods of data collection and the data collection instruments used.

Chapter 4 - Systems Thinking: provides an overview of systems thinking, along with its associated concepts. The chapter begins by discussing the philosophy that is aligned to systems thinking. It further provides an understanding of dealing with complex and persisting problems that can be addressed by employing systems approaches.

Chapter 5 - Ubuntu Philosophy: explores the origin and characteristics of Ubuntu as an African philosophy that emphasizes 'being human through other people'. It further explores the concept of Ubuntu and its relation to systems thinking.

Chapter 6 - Autopoiesis and Its Application in Social Systems: provides a brief account of autopoiesis theory, its origin in the field of biology, and its application in social systems.

Chapter 7 - Systems Framework for CSI ICT Projects: presents the proposed framework that is developed using the literature and part of the collected data. The bases for the framework are the constructs from soft systems methodology, Ubuntu philosophy which emphasises the belief systems in which communities reflect their experiences in day-to-day life, and autopoiesis theory.

Chapter 8 - Case Study Demographics: this chapter sets the scene by providing background on the four case study sites. It provides the context of the larger Johannesburg area, and its history and demographics. Moreover, it provides the background and contextualisation of each community. It also provides the background of learning centres in poor urban communities in Soweto, South Africa, that were selected for this study.

Chapter 9 - Description and Analysis of Cases: this chapter presents the empirical context of the study, including case study site visits and participants' profiles from the four case studies, which included four learning centres that implemented CSI ICT projects in Soweto. It further applies the system's framework to the identified systems of interest. Guiding principles to assess sustainability and impact are presented.

Chapter 10 - Conclusion and Recommendations: this chapter concludes this study and answers the main research question. It also assesses the contribution of the research to the body of knowledge. A set of principles developed by Klein and Myers are used to evaluate the

manner in which the interpretive study was conducted. In addition, the developed theory is further assessed. The recommendations for future research are outlined, based on the insights obtained from this study.

1.10 Thesis Roadmap

Figure 1-1 outlines the roadmap for this study, which is illustrated in phases. The roadmap guides the reader on his or her current position in the thesis: highlighted block show the reader where they are relative to the rest of the text.

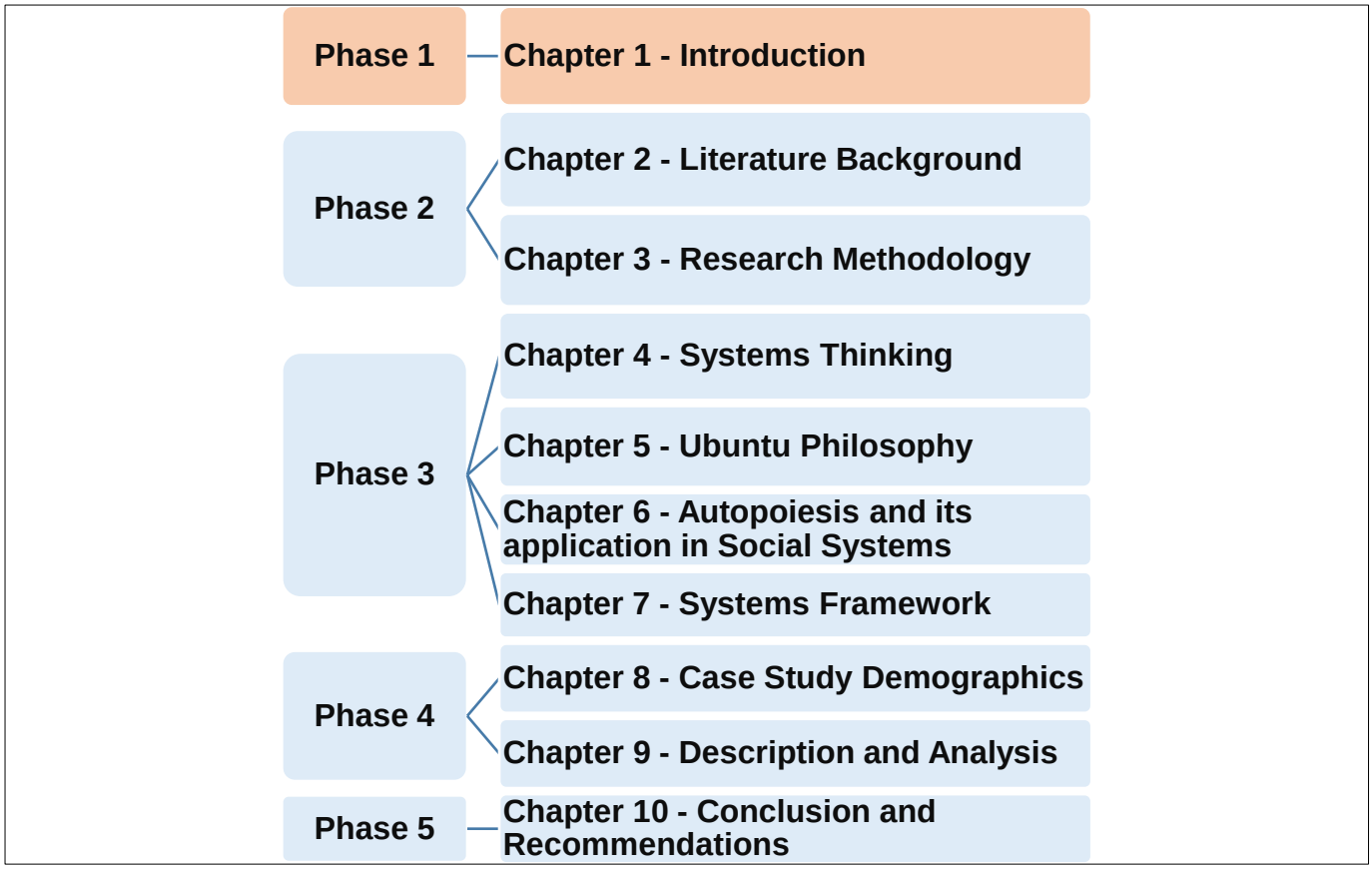
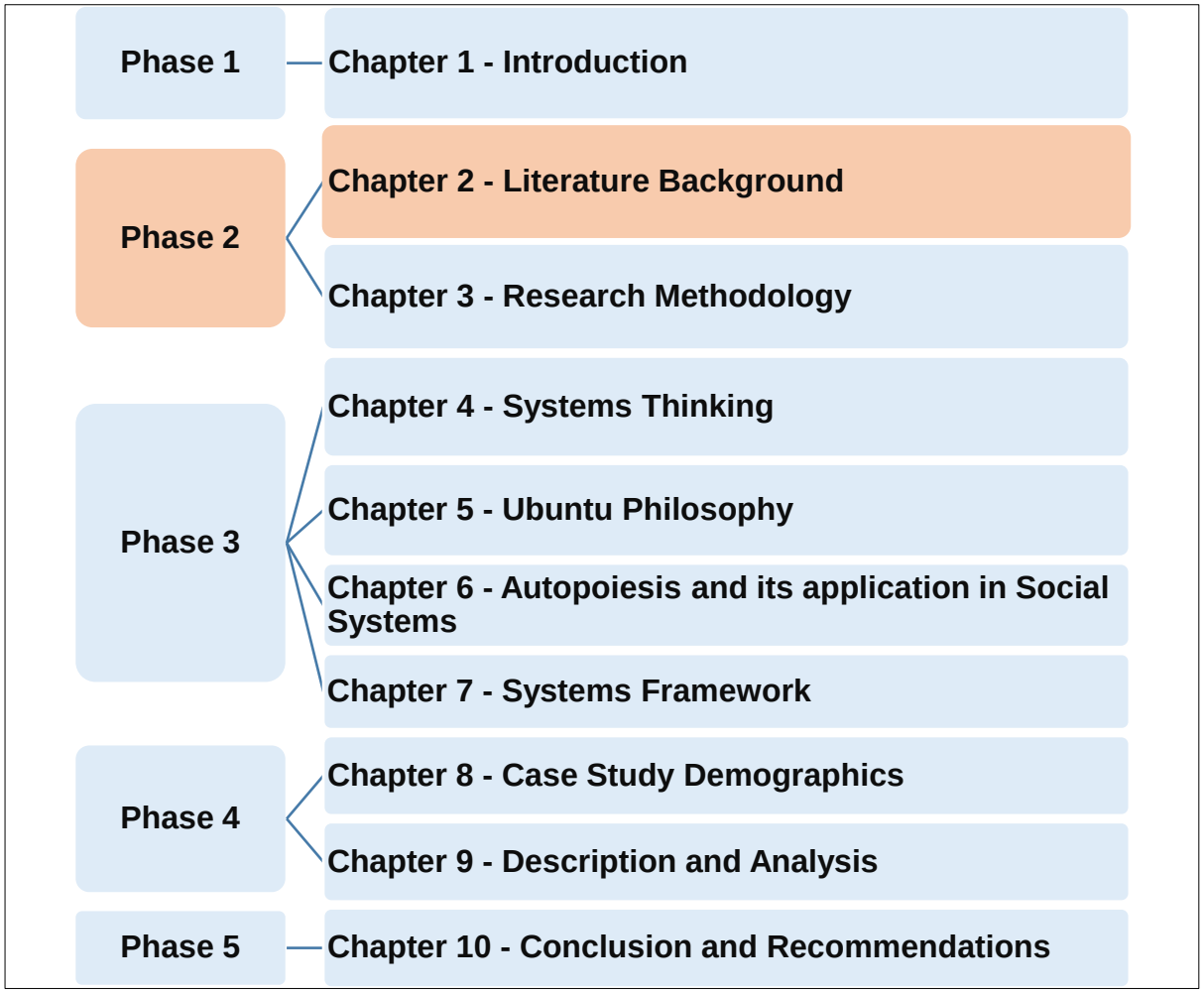


Figure 1-1: Thesis roadmap

This chapter lays the groundwork for the research study. It introduced the background, the research problem, the research questions, and the aim of the study. The arrangement of the thesis is detailed in Figure 1-1. Chapter 2 presents the literature background to the study.

2 CHAPTER 2 LITERATURE BACKGROUND



2.1 Introduction

This chapter commences by introducing and defining the terms that are used in this study. It provides background from the literature on corporate social investment in South Africa, including the social investment that focuses on the ICT context.

2.2 Definition of Concepts

Benefits	Value created for the intended beneficiaries or the sponsoring companies as a direct result of a successful implementation of a project.
Corporate Social Investment	Company's contribution towards social projects or initiatives that are not part of regular company activities.
Impact	Process of assessing the influence of developmental projects.
Information and Communication Technology (ICT)	An umbrella term that includes computers, telephones (fixed and mobile) network hardware, software, communication devices, and the Internet.
Information and Communication Technology for Development (ICT4D)	Research and practice for the use of ICT in driving socio-economic development agendas.
Project success	Measure of value, quality, stakeholder satisfaction and project benefits.
Socio-economic development	Interventions aimed at improving the socio-economic conditions of an impoverished community.
Sustainability	Process of interlinking and harmonising social, financial, technological, institutional efforts while sustainable development, is defined as milestones towards achieving sustainability.

2.2.1 CSI

Corporate Social Investment (CSI) refers to a company's contribution towards social projects or initiatives that are not part of regular company activities (The Department of Trade and Industry, 2003a). These projects are not undertaken for profit-making, but with the aim of uplifting a community, thus improving their quality of life.

2.2.2 Socio-Economic Development

According to Fritz (2004), socio-economic development refers to interventions that are aimed at improving the socio-economic conditions of an impoverished community. Socio-economic development can include individual or community empowerment, conflict resolution, institution-building, community building, nation-building, region-building, and world-building (McGann, Viden, & Rafferty, 2014). Socio-economic development is further aimed at creating sustainable access into the economy for previously disadvantaged individuals.

2.2.3 ICT

This study employs ICT as an umbrella term that includes computers, telephones (fixed and mobile), network hardware, software, communication devices, and the Internet as essential tools for socio-economic development in developing countries. Michiels and van Crowder (2001) define ICT as an assortment of technologies which, when integrated together, are flexible, adaptable, enabling, and capable of transformation and redefining social relations. ICT involves innovations in electronics, computing (hardware and software), emails, the Internet, and laptops.

According to the White Paper of the Department of Telecommunications and Postal Services (2016), information and communication technologies are a platform to enable inclusive socio-economic development in South Africa. ICT in the context of this White Paper refers to a variety of technologies, such as computing and information technology, telecommunications technology, audio and audio-visual content, and the Internet. A digitally inclusive community is one that increases its socio and economic opportunities and affords its members digital technologies (Clark & Perry, 2015). Digital inclusion is classified into three categories: access, adoption, and application. Combining these categories leads to building digitally inclusive communities. Access refers to availability, affordability, and public access; Adoption includes relevance and digital literacy, whilst application comprises economic and employment opportunities, education, health care, and social networks (Clark & Perry, 2015).

2.2.4 ICT4D

Information and Communication Technology for Development (ICT4D) is a term for research and practice in using ICT in driving the socio-economic development agenda. It is based on the premise that ICT can contribute to the improvement of socio-economic situations (Mann, 2003).

ICT for development (ICT4D), as Heeks (2008) presents it, was introduced around the 1990s. The focus then was on the Internet and the Millennium Development Goals (MDG). The

introduction of the Internet created an interest in ICT, including the introduction of the Internet in developing countries. These developmental goals were supported by a political agenda on the targets of the Millennium Declaration, adopted by 147 heads of state and 189 Member States of the United Nations Assembly in September 2000**.** Target 18 of Goal 8 of the MDG declares: "*In cooperation with the private sector make available the benefits of new technologies, specifically information and communications*" (United Nations Development Group, 2003). In the South African context, the National Development Plan (NDP) 2030 states that technology should be considered in addressing challenges related to education and health (National Planning Commission, 2012). What this refers to is that government and companies are to use ICT to help alleviate poverty, and improve service delivery, health care use, and education; moreover, ICT should be used to achieve the overall MDG goals and the NDP. In the 1990s, a mechanism was required to assist in driving the development goals; this mechanism came in the form of digital technology (Heeks, 2008). Therefore, with the amalgamation and expansion of the fields, ICT4D was established.

There is a growing view that ICT can assist in meeting socio-economic goals and spearheading progress in developing countries, and many researchers have consented that ICT plays a crucial role in socio-economic development (Nawi et al., 2013) - for instance, communities can access up-to-date information and be equipped with relevant skills through ICT. ICT4D projects are people-oriented, and therefore focus on meeting the needs of the people or addressing socio-economic problems. This study uses the term CSI ICT project to refer to ICT4D projects.

2.2.5 Project Success

Traditionally, project success was defined as projects that met budget, quality, and time objectives. However, there are other variables such as value that need to be considered (Winter, Andersen, Elvin, & Levene, 2006), meaning that it is important for project teams to consider a wider range of value creation aspects which incorporates project outputs, outcomes and benefits (PMI, 2016). In addition, Musawir, Serra, Zwikael, and Ali (2017) states that the foundation of a successful project relies on continuous monitoring and evaluation, to ensure that the actual outcomes are aligned to the target outcomes, this further leads to benefit realisation. Most projects comprise of multiple stakeholders with different expectations of what the project must deliver (Bannerman, 2008). However, for CSI ICT projects, success goes beyond meeting budget, quality, and time objectives, it includes value, benefits and meeting expectations of beneficiaries and donor companies. CSI ICT projects alike, they also have multiple stakeholders such as sponsoring companies, the intended communities and

beneficiaries who stand to benefit from these projects with different expectations and perceptions.

2.2.6 Benefits

There is an expectation that investment in projects should have clear and sustainable benefits. Benefits is value created for the intended beneficiaries or the sponsoring companies as a direct result of a successful implementation of a project (Project Management Institute, 2006). CSI ICT projects are implemented to improve socio-economic situations of communities and therefore, it is crucial that these projects deliver long-term benefits and positive impact to the communities that stand to benefit. Benefits can be classified as wither short-term or long-term. Short-term benefits are aimed at addressing immediate challenges whereas long-term benefits are aimed at addressing challenges over a long period of time (Project Management Institute, 2006). In the context of CSI ICT projects, it is the long-term benefits that add value in the quest of addressing socio-economic situations (Uimonen, 2003).

2.3 Non-Governmental Organisations

Non-Governmental Organisations (NGOs) are organisations that registered as non-governmental, non-profit making, self-governing, and are sometimes controlled by volunteers. They concern themselves with the cultural, socio-economic, and political development of society (Omofonmwan & Odia, 2009). NGOs work with government institutes, profit-making companies, and foreign funders in delivering socio-economic development services towards the upliftment and well-being of the society. Some of their services include health care, health, monitoring, needs assessment, training, education, and coordination (World Bank, 2015).

NGOs are being used as a delivery vehicle for ICT4D projects in poor communities. These centres bring communities together to establish a culture and improve their ability to deal with poverty (Cogburn, 2001). This study is based on NGOs that are operating as learning centres (Chapter 9 provides the background and context of the learning centres).

2.3.1 Community learning centres

In many countries around the world, there are facilities that provide communities with access to ICT services and training (Colle & Roman, 1999; International Telecommunication Union, 2009). These facilities are referred to as public Internet access centres (PIAC), village knowledge centres, telecentres, Internet cafés, infocentres, community technology centres (CTC), community multimedia centres (CMC), multipurpose community telecentres (MCT),

education centres, community libraries, Common/Citizen Service Centres (CSC), and school-based telecentres (International Telecommunication Union, 2009; Rose, 1999). According to Gomez, Martinez, and Reilly (2001), these centres afford the community access to information and communication technologies, notably Internet access, scanning, photocopying, and printing. These centres enable poor communities to contribute more effectively to their own development and sustainability. This study adopted the term learning centre because the centres referred to in the case studies are non-governmental organisations that also offer services beyond ICT services and training, such as healthcare, nutrition, life-skills, homework assistance, and others. Chapter 9 presents a detailed outline of the services offered by each learning centre.

2.4 Corporate Social Investment

Within the South African democracy, government has responded to a strong expression by citizens for companies to showcase their socio-economic development responsibilities (Freeman & Hasnaoui, 2010). This section defines Corporate Social Responsibility (CSR) — a term that has appeared in academic literature since the 1920s (Clark, 1926), as well as in the international context. In certain instances, the terms corporate social responsibility and corporate social investment are used interchangeably; however, they have now been defined separately.

In the South African context, the term that is mostly used is ‘corporate social investment’ rather than ‘corporate social responsibility’. The ‘investment’ part refers to financial contributions made by a company, while ‘responsibility’ links to all the actions related to the capacity-building activities that are necessary for social development and upliftment of disadvantaged communities (Fasseta, 2012). In addition, CSR refers to a company's responsibility towards the business environment in which it operates. CSR encompasses resolutions to a triple bottom line sphere — profit, people, and planet — as stipulated in South Africa’s King Report on Governance for South Africa, endorsed by the United Nations (Thwaits, 2012).

Corporate Social Investment (CSI) is one part of CSR, and is aimed at uplifting poor communities in a manner by which the quality of life is improved and protected (CSI Solutions, 2019). However, for the purpose of this study, the term ‘corporate social investment or CSI’ will be used in discussing the subject even, when referring to international literature.

The government introduced a B-BBEE scorecard legislative framework which includes how companies should contribute towards CSI. This encourages companies to spend their profit in initiatives aimed at uplifting socio-economic situations of disadvantaged communities. The framework stipulates that companies should spend at least 1% of their Net Profit after Tax

(NPAT) for each financial year (The Department of Trade and Industry, 2003a); this will make them eligible for B-BBEE points for their contribution towards socio-economic development.

It is worth noting that one of the points of departure of CSI is that there should be an engagement between government and companies in meeting the socio-economic development goals of the country (Ndhlovu, 2009). CSI has become a vehicle used by companies as a means to obtain B-BBEE points (Mohamed, 2015) in order to do business with the government. This indicates that companies are contributing to CSI initiatives for personal gain because these companies want to know "What is in it for them?" In other instances, these projects act as mere public relations or marketing stances. This behaviour results in a 'check-box' or 'tick-box' exercise for companies.

2.4.1 Corporate Social Investment in the South African Context

Several South African companies are committed to improving the living conditions of people in impoverished communities. Companies have adopted steps to ensure that they have suitable CSI programmes in place that are aligned to their business strategies. Furthermore, these companies produce a report on an annual basis detailing their CSI spend for the year (Crowther & Aras, 2008).

According to the Tshikululu Social Investment report, companies mostly invest their CSI budgets in education, at all levels, for the reasons that they are creating a channel of capable, qualified, and highly skilled individuals entering corporate (Tshikululu Social Investment, 2013). Below are a few examples of how South African companies are managing their CSI initiatives.

Pick 'n Pay, under the chairmanship of Raymond Ackerman, started its foundation on the principals and values of corporate social responsibility. Pick n Pay was one of the first companies to commit fully to corporate social responsibility in South Africa. As part of the contribution towards socio-economic development in poor communities, Pick 'n Pay has developed short to long-term CSI programmes (Pick 'n Pay, 2019). The company's CSI programme includes education, food gardens, and sport initiatives. The education program is called the Pick 'n Pay School Club, and it reaches 3025 schools and contributes to educational resources. The other programme is the community food gardens, where they assist communities in establishing food gardens. As a result, this programme feeds communities, and it allows for the sale of surplus products. For their sports programme, Pick 'n Pay partnered with Velokhaya Life Cycling Academy, and have assisted about 1500 youth to progress by means of bicycles (Pick 'n Pay, 2019). Pick 'n Pay's commitment to CSI is evident;

however, it has been designed to increase their marketing impact (Friedman, Hudson, & Mackay, 2004).

AngloGold Ashanti, in mid-2003, convened a social summit to encourage dialogue between people responsible for various aspects of the businesses that interact with the outside world (Friedman et al., 2004). The summit was held to reflect on the CSI spend for AngloGold Ashanti; however, it failed to provide a definitive account of the company's contribution because it did not account for the time spent on CSI activities. In 2003, AngloGold Ashanti spent R15.5m on 104 CSI project within its domain. These projects ranged from education and health to arts and culture.

In line with their vision of 'Connecting to Society', SANParks, devised a CSI strategy that saw the company engage in the promotion of benefit sharing, socio-economic development, and better standards of living for villagers in local communities near the national parks (SANParks, 2014). Funding for CSI projects is raised by charging a community levy on all guest accommodation in national parks (SanParks, 2012). SANParks have programmes such as Imbewu (seed), an educational programme for children from disadvantaged communities to learn traditional and cultural knowledge with a view to understand their connection with the earth. The children are then expected to, upon their return to their communities, start conservation clubs or community-based environmental projects such as vegetable gardens. In addition, in partnership with the National Lottery Grant, SANParks initiated a programme called Kids in the Kruger where children from local communities within the municipalities bordering the Kruger National Park are brought to the park for an educational experience (SanParks, 2012).

Truworths, a clothing retail store, has a programme aimed at contributing meaningfully to the improvement and empowerment of young adults and youth from disadvantaged communities. The CSI programmes' focal point is on healthcare, education, social development, arts and culture, and sports (Truworths, 2015). In Truworths' 2014 financial year, nearly half of the CSI budget of R170 million was allocated to healthcare initiatives for the benefit of disadvantaged communities. The clothing store split their CSI budget into Healthcare 77%, Education 11%, Social development 7%, sport 4%, and arts and culture 1%. In addition, Truworths donated over 1.6 million clothing items and store samples to local community organisations, to the value of over R1 million (Truworths, 2015).

Data World, a GIS and ICT consulting company, devised their CSI programme with the belief that it has a social responsibility role in assisting and enhancing the standard of living in the disadvantaged communities where it operates. The company also aims to empower impoverished communities through skills transfer and training in order to grow the economy.

The focus areas for their contributions is mainly education, technical skills training, and donations to orphanages and homes of vulnerable children. Their CSI expenditure is based on the specified formula of a minimum of 1% net profit after tax. Some of their flagship donors include CANSA (the Cancer Association of South Africa), Cotlands, the KwaZulu-Natal Blind & Deaf Society, and the South African Medical & Education Foundation (Data World, 2013)

Discovery reports annually on their CSI programme in their Sustainable Development report. Their approach to achieving the CSI programme is through partnership and collaboration. Discovery classified their CSI programmes into Discovery Forgood, The Discovery Fund, and The Discovery Foundation (Discovery, 2018). Discovery Forgood is an employee volunteer programme, where employees engage with communities to work on social projects. The Discovery Fund is primarily for improving health systems by building capacity, including delivering primary healthcare. Focal points of this fund are maternal and childcare, HIV/ AIDS, and Tuberculosis treatment. In 2018, Discovery identified 46 health-related projects to the value of R31.8m for funding under the Discovery Fund. The Discovery Foundation is another arm of the CSI programme, which trains medical specialists and develops medical research centres in order to meet the country's healthcare needs (Discovery, 2018).

Samancor Chrome's CSI initiative is administered under the banner of the Samancor Chrome Foundation. This foundation encapsulates the CSI initiatives of various business units of Samancor Chrome: Western Chrome Mines, Ferrometals, Middleburg Ferrochrome, Eastern Chrome Mines, and Tubatse Chrome. The Samancor Chrome Foundation operates with the mission "to improve the quality of life of people in communities around Samancor Chrome operations" (Samancor Chrome, 2008). The company invested in education for local communities by renovating a crèche in Steelpoort, Limpopo, and by donating child development educational toys. In 2003, they introduced a feeding scheme to cater for four local schools in the Marikana, Mooinooi, Kroondal, and Matebeleng areas. In partnership with the local municipality, Samancor Chrome Foundation installed taps with running water for the Hlalanikahle informal settlement to improve their living standards. Furthermore, a Platinum Harvest project was initiated for local community farmers to clear more land for cash crops and to build an agri-tunnel for the production of vegetables. The farmers can sell the produce on local markets and at greengrocers (Samancor Chrome, 2012)

Companies are an integral part of the local communities in which they do business. Commonly, CSI is understood to be the way by which companies address social, environmental, and economic needs in their companies by practising their values, culture, decision-making, strategy, and operations in an open and responsible way, thus creating better practices within the business, create wealth, and improve local communities. Reflecting

on the CSI projects of the companies mentioned above, these companies are upfront about their quest to improve the standard of living of people in disadvantaged communities. Corporate social investment programmes come in various forms and sizes, but many of them focus on developing communities in training and education, health programmes, and arts and culture. These programmes also focus on the environment by encouraging local communities to grow their own vegetable gardens for further sustainability.

2.4.2 Corporate Social Investment with an ICT Focus

In the field of ICT4D, a number of studies have been conducted to investigate the benefits of corporate social investment and ICT in disadvantaged communities. This section reviews some of these studies.

A study conducted by Hargittai (1999) indicates that ICT projects can contribute to socio-economic development. Gómez and Hunt (1999) validate Hargittai's observation that ICT implementation is known to have a social and economic impact in communities. Other studies have revealed an inverse correlation between the use of ICTs and the human poverty index; that is, the more universal ICT use within a specific demographic, the lower the poverty level (Sangonet, 2011). However, some studies demonstrate where the implementation of ICT projects, either by companies or government agencies, did not result in upliftment, and that the focus is also not long-term (Madon, 2004). The studies below demonstrate instances where socio-economic development ICT projects did not yield the desired outcomes.

In India, the Worldwide Fund established the Indira Gandhi Conservation Monitoring Centre, which was envisioned to be a national information supplier based on geographic information systems principles. However, notwithstanding over a year of planning, analysis, and design work, this geographic information systems centre was never functioning; therefore, the whole initiative collapsed a short while after. Initiatives like these leave the people that were involved more disgruntled than before (Puri, Chauhan, & Admedullah, 2000).

The number of studies that had been conducted on telecentres in disadvantaged communities have not presented many success stories. The key challenges are attributed to a lack of continued sustainability plans and donors, as well as poor administration and management (Breitenbach, 2013). Benjamin and Dahms (2001) show in their study that, for any ICT project to develop local ability and function successfully, the capacity of the community to negotiate with the donor business is an important aspect. A study conducted in Malaysia on community ICT hubs, another term for telecentres, by Nawi et al. (2013) indicates that, after 10 years in operation, 19% of the community ICT hubs were sustained whilst 81% of them failed to be

sustained and were either not used, abandoned, or completely closed. These statistics show that many community ICT projects are not sustainable.

The above concern served as a motivation for this study. The objective of the study is to conduct an analysis of the impact of CSI ICT projects in poor urban communities in South Africa. CSI projects are assumed to have benefits for the partnering company as well as the community, but what, if any, are the longer-term benefits to the community?

2.4.3 Monitoring and Evaluation of Corporate Social Investment

Currently, it is assumed that a lack of monitoring and evaluation and other factors are the reasons behind failed and unsustainable community-based projects (Linkages Development Agency, 2003; Ndou, 2012). Siyobi (2015) supported the assumption above by stating that there is inadequate monitoring and evaluation of CSI projects, following their implementation in communities.

Companies have developed CSI programmes that are geared to contribute to social development. However, as mentioned by FASSET, “a CSI project is as good as its results” (Fasseta, 2012). Social investors and communities have to reach an understanding of the process of achieving development goals (Ndhlovu, 2009). The quality of life of people living in disadvantaged communities is ‘impacted’ through CSI programmes that are linked to profits. For this issue to be addressed, it is suggested by various authors that, prior to the commencement of projects, the investors have to conduct an in-depth analysis of community requirements (Soriano, 2013; Watkins, West Meiers, & Visser, 2012, p. 31). Further, for any project to make a significant contribution, companies need to precisely monitor and evaluate every aspect of the project to know what impact it will have on its employees, suppliers, the disadvantaged community, and the society as a whole. For significant transformation, the key M&E concepts of objectives, inputs, activities, outputs, outcomes, and impact ought to be identified and measured — see Figure 2-1.

Figure 2-1: Impact Process

Source: United Nations Development Programme (2009, p. 55)

According to the OECD's (2007) glossary of statistical terms, monitoring and evaluation are defined as:

Monitoring

"A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds".

Evaluation

"The systematic and objective assessment of an on-going or completed project, programme or policy, its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of both recipients and donors".

The Department of Trade Industry established the B-BBEE Commission following the 2013 amendments of the B-BBEE Act with a regulatory mandate to monitor and evaluate the quality of B-BBEE transactions that are entered into including the impact of these B-BBEE transactions in line with B-BBEE elements, one of the elements is socio-economic developing which refers to corporate social investment. Moreover, the commission is tasked to implement measures that ensure sustainability of the B-BBEE transactions to eliminate the tick box mentality and the 'get rich quick scheme' approach.

By implementing monitoring & evaluation, companies have an opportunity to learn from past projects, improve their service offering to the local community, and demonstrate results as part of accountability to the key stakeholders (Prasad & Kumar, 2011). This process is a shared responsibility between companies and their stakeholders that ensures that funds destined for B-BBEE transactions which incudes CSI projects are used appropriately. It allows gauging the impact that the investment is making for the intended beneficiaries (Warhurst, 2000).

2.5 Impact

Wallman-Stokes, Hovde, McLaughlin, and Rosqueta (2013) define impact as products of decisions by people and organisation with the goal to change situations of those that stand to benefit from the intervention. In addition, in the context of ICT4D projects, Heeks and Molla (2009) defines impact as a process of assessing the influence of developmental projects. Impact is further divided into three sub-categories: output refers to micro-level situational changes, outcomes are costs and benefits associated with the projects and development impacts is the contributions or influence emanating from the ICT4D projects to addressing development goals.

2.5.1 Assessing the Impact of ICT projects

According to the United Nations Conference on Trade and Development (UNCTAD) report, various studies have aligned impact to the three sustainability categories: economic, social, and environmental (The United Nations Conference on Trade and Development, 2011). ICT impacts may be direct or indirect, where the direct impact of ICT may be observed more economically, while indirect impact is social and environmental. However, the direct impact of ICT may also be both economic and social in relation to human capital. Using ICT can improve human capital in various ways, such as through education, and knowledge, skills, and literacy development. Through ICT, individuals may gain skills and knowledge, which leads them to benefit economically and socially environmental (The United Nations Conference on Trade and Development, 2011).

The introduction of technologies in poor communities has resulted in some impact in the lives of those that live in those communities, such as by impacting on economic activities, improved education and healthcare practices, and access to employment opportunities (Davison, Vogel, Harris, & Jones, 2000; Ntawanga & Felix, 2013). Moreover, the impact for the youth, learners, and young adults include learning how to use computers, signing up for ICT training, downloading assignments, and conducting research (Ntawanga & Felix, 2013).

Impact assessment is essential in ICT4D projects, because it provides the donors, partners, and beneficiaries with a clear expectation of the use of ICT in communities (Amariles, Paz, Russell, & Johnson, 2006). However, assessing impact of ICT4D projects still remains a problem (Turpin, 2017). Several authors have previously attempted to determine what measures to be considered when assessing the impact of ICT4D projects. According to Amariles et al. (2006) these attempts have produced compilations of best practice in ICT4D projects. For example, Daly (1999) suggests that assessments should start with the individual, after which the group and companies can follow. Gómez and Hunt (1999) have identified that ICT usage may have intended or unintended consequences on people or companies, and that the needs and assessment methods would need to be tailor-made. Whyte (1999) acknowledges that community centres play a significant role in development projects, and that it is therefore essential to assess the changes that these organisations undergo.

Gomez et al. (2001) present a social view on assessing the impact that focuses on access, meaningful use, and social appropriation of ICT resources. The Partnership on Measuring ICT for Development is an international, multi-stakeholder initiative established to develop Core ICT Indicators to assist developing countries in producing internationally comparable data and in assessing the impact of ICT4D projects (The United Nations Conference on Trade and Development, 2011). The indicators have been grouped into four categories, namely: 1) ICT infrastructure and access; 2) access to, and use of, ICT by families and individuals; 3) use of ICT by companies; and 4) ICT sector and trade in ICT goods.

2.6 Sustainability

Sustainability is a process of interlinking and harmonising social, environmental, and economic efforts, while sustainable development, on the other hand, is defined as milestones towards achieving sustainability (Global Reporting Initiative, 2016 - 2020). Roode, Speight, Pollock, and Webber (2004) eloquently define sustainable development as self-reliant human centred development at the community level, regional and national level which is horizontally and interdependent and vertically complementary. Breitenbach (2013) mentions that sustainability is the ability of an intervention to continue for an extended period of time without any interruptions. According to Nawi et al. (2013), in the domain of information systems, the term sustainability has been defined to include design and implementation of IT projects; moreover, research views sustainability as a crucial element for long-term development (Mudziwepasi, 2015).

In ICT4D literature, sustainability is classified into five categories: social, financial, technological, institutional, and environmental (Proenza, 2001). Social sustainability involves

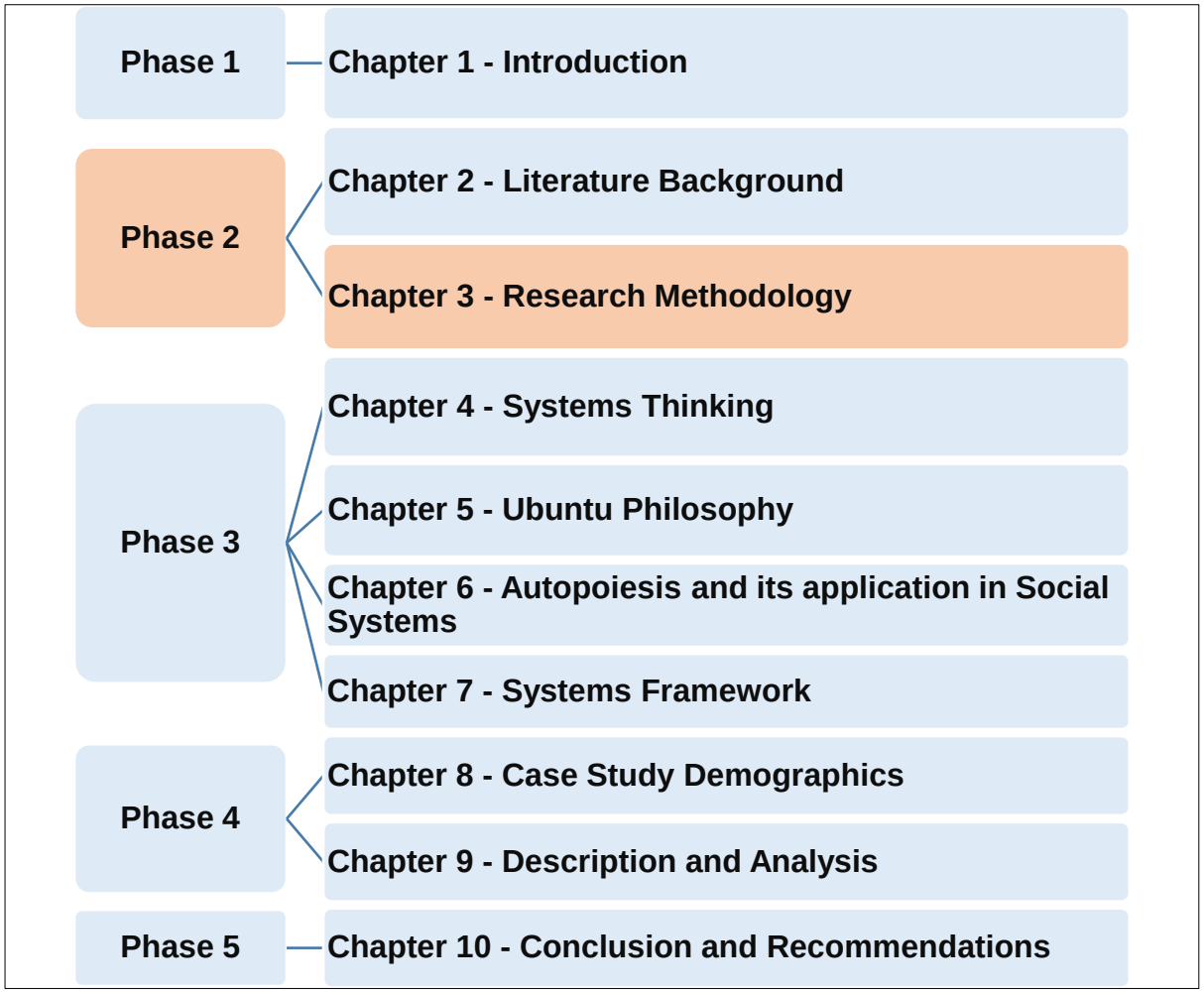
the acceptance of a specific development project into the community (Ali & Bailur, 2007). Institutional sustainability refers to the ability of a business to use inputs to continuously produce outputs that are sufficient for future production (Brinkerhoff & Goldsmith, 1990). Financial sustainability refers to the ongoing ability of ICT projects to generate funds to meet their operational and maintenance costs, and also to have reserve funds to be able to renew or repair broken equipment (Proenza, 2001). Technological sustainability relates to the ability for technology, either software or hardware, to be available or durable (Ali & Bailur, 2007; Misund & Hoiberg, 2003). Lastly, environmental sustainability, according to Kumar and Best (2006), refers to plans on how to dispose and reuse broken or old computer hardware within communities. When planning and operationalising ICT projects, there is a need to integrate all the facets of sustainability (Mudziwepasi, 2015). Moreover, with respect to socio-economic situations, these development solutions should be people-oriented for them to succeed; however, it is also highlighted that ICT for Development projects continue to fail. Heeks (2002) classified ICT4D failures into total failures, which refers to projects that were never implemented or that were immediately neglected; partial failure, which refers to projects where their objectives were not met or the project had undesirable outcomes; sustainability failure refers to projects that were initially successful, but that were abandoned after a year or so. This was corroborated by Ceptureanu, Ceptureanu, Luchian, and Luchian (2018) in reflecting that projects fail within the first few years of operation; in other instances, they fail when the seed funding is discontinued and, as a result, they do not meet the needs of the community. However, it is not only an entirely hopeless situation, as there are projects that are successful and that are impacting the communities positively, thus meeting the objectives of the communities (Heeks, 2002).

2.7 Conclusion

This chapter introduced several concepts relevant to the study, namely: CSI, socio-economic development, ICT and ICT4D, and learning centres. Following this, the notion of CSI and its application was discussed in more detail.

The chapter reflected on how South African companies are spending their CSI budgets towards improving the socio-economic situation of people living in poor communities. Companies have developed CSI programmes that are aligned to their business strategies, and they are using NGOs as a delivery vehicle for their CSI projects. Assessing the impact of CSI projects is essential, because it provides the donors, partners, and beneficiaries with a clear expectation of the use of ICT in the communities, as well as the impact that these projects are making in the communities. The next chapter discusses the research methodology that will be used for the study.

3 CHAPTER 3 RESEARCH METHODOLOGY



3.1 Introduction

This chapter provides an outline of the research method that was employed in the study. It describes the research paradigms and theoretical framework that underpins the study. The researcher describes the research design appropriate for this study and the rationale for its selection. It further presents the process undertaken for selecting participating companies and learning centres that are part of the study. Moreover, it provides information on the participants, using the criteria for inclusion, and discusses the ethical considerations that were adhered to in this study. The chapter also outlines the process of data collection and data analysis and concludes with a discussion on the assessment and evaluation of the study.

3.2 Research Philosophy

In this section, the researcher interrogates her philosophical position before undertaking the study. Burrell and Morgan (1979) postulate that, in developing a philosophical view, a researcher needs to make assumptions concerning two aspects: the nature of society and the nature of social science.

The nature of society is seen as either arising from the status quo or from what can be. In accordance with the status quo view, the *sociology of regulation* is a view of society, where the researcher assumes that society evolves rationally. Society is observed as unified and cohesive. It attempts to explain the factors that make the society to stay together and not disperse. It is characterised by the balanced effects of social order vs. those tactics that focus exclusively on change. Traditionally, sociologists such as Durkheim, Weber, and Pareto were concerned with social order, whilst Karl Marx was concerned with how and why societies changed (Barkan, 2011). On the other hand, the *sociology of radical change* views society as in constant conflict, as humans struggle to free themselves from the control of societal structures (Burrell & Morgan, 1979). For instance, its emphasis is on denying a human being certain affordances and potential changes.

The involvement of objectivity and subjectivity in research presents dimensions pertaining to the nature of social science, and these philosophical approaches are defined by several core assumptions related to ontology (reality), epistemology (knowledge), human nature (pre-determined or not), and methodology (Burrell & Morgan, 1979). These assumptions are viewed as critical to each other, for instance, their outlook of ontology has the ability to influence their epistemology which, subsequently, has the ability to influence their view of human nature; the choice of methodology follows the researcher's assumptions.

3.2.1 Ontology

Ontology is concerned with the nature of the social world that is being explored. There is a distinction by Archer (1988) between 'external realism', which views reality as existing separately of individuals' construction of it, and 'internal realism', which views reality as an inter-subjective construction of the shared human reasoning's 'subjective idealism', by which individuals are considered as constructing their own reality (Myers & Avison, 2002).

3.2.2 Epistemology

Connected to the ontological views are the assumptions concerned with the nature of knowledge — about how individuals understand the world they live in and how they articulate this knowledge to other human beings in a way that it makes sense.

These assumptions take into account our thinking about ideas that can be regarded as 'facts'. Positivism as a position is grounded in the premise that only facts, and not values, are applicable in pursuit of the truth. According to Archer (1988), scientific knowledge consists only of facts. Aristotle defined truth and falsehood as: "To say of what is that it is not, or of what is not that it is, is false; while to say of what is that it is, and of what is not that it is not, is true" (Ross, 1924, p. 38). On the other hand, 'normativism' takes a stance that scientific knowledge is ideological, which is more attractive to the interpretive researcher to employ.

3.2.3 Human Nature

Human nature concerns itself with the relationship between human beings and their environment (Burrell & Morgan, 1979). The deterministic view concerns human beings and their experiences as products of their environment, projecting humans as conditioned by their external world. However, the voluntarist views human beings as free-willed, with the ability to create their own environment.

3.2.4 Methodological implications

The assumptions discussed above have implications for the choice of methodology that is employed to obtain 'knowledge' about the social world. According to Burrell and Morgan (1979), an objective outlook on social science assumes a realist ontology, a positivist epistemology, and determinism. The *nomothetic view* requires the social world to be treated as a hard, external, objective reality that is backed up by scientific methods. However, on the contrary, a subjective outlook assumes a nominalist ontology, an anti-positivistic epistemology, and voluntarism. This position leans towards an *ideographic* research method, as the researchers attempt to align with the inside world of the subjects that they are

investigating. For instance, if the researcher assumes that the social world can be objectively viewed from the outside, then they are likely to adopt a methodology that emphasises examination of relationships, and the researcher could employ appropriate approaches to expose these relationships. However, if the researcher assumes that the social world can be investigated by obtaining knowledge from the subjects under study, they could use an approach where the individuals interpret the world as they understand it (Kuada, 2009).

As discussed above, research undertakings are based on how researchers 'make sense' of the phenomenon under study. However, the sense-making process differs from researcher to researcher and depends on their paradigmatic alignment. The difference is drawn between objective and subjective approaches to research. The differences have also been recorded in contrasts between internal and external worlds. Burrell and Morgan (1979) compares the two outlooks using ontology, epistemology, human nature, and methodology in Table 3-1.

Table 3-1: The Objectivist-Subjectivist Dispositions in Social Science

Dimensions	**The Objectivist Approach**	**The Subjectivist Approach**
Ontology	Realism	Nominalism
Epistemology	Positivism	Anti-positivism
Human Nature	Determinism	Voluntarism
Methodology	Nomothetic	Idiographic

Burrell and Morgan (1979) state that social theory can be conceived based on various meta-theoretical assumptions about the nature of science and the nature of society. The four paradigms are the results of the two contrasting views on the nature of society, namely: sociology of regulation and sociology of radical change, combined with two contrasting views on the nature of science: objectivist vs. subjectivist. The identified sociological research paradigms are functionalist, interpretive, radical humanist, and radical structuralist — the paradigms are illustrated in Figure 3-1 (Burrell & Morgan, 1979). The four paradigms are defined as "fundamental meta-theoretical assumptions, which underwrite the frame of reference, mode of theorising, and modus operandi of the social theorists who operate within them" (Burrell & Morgan, 1979, p. 23).

The *functionalist paradigm* concerns itself with offering explanations of the status quo, social order, social integration, consensus, need satisfaction of the individuals or system, and fact (Burrell & Morgan, 1979). It is further concerned with regulation and social order. This paradigm seeks to explain how all elements of a social system interact to form an integrated whole. The *interpretive paradigm* seeks explanations within the realm of individual

consciousness and subjectivity within the confines of reference of the participants instead of the observers. The *radical humanist* is concerned with overthrowing or transcending limitations exerted on existing social arrangements. Its primary focus is on the structure and analysis of power relationships. The *radical structuralist* is concerned with radical change, emancipation and potentiality. Burrell and Morgan (1979) emphasises the role that social actors play in trying to understand change. Moreover, the radical structuralist focuses on limitations and how to overcome them.

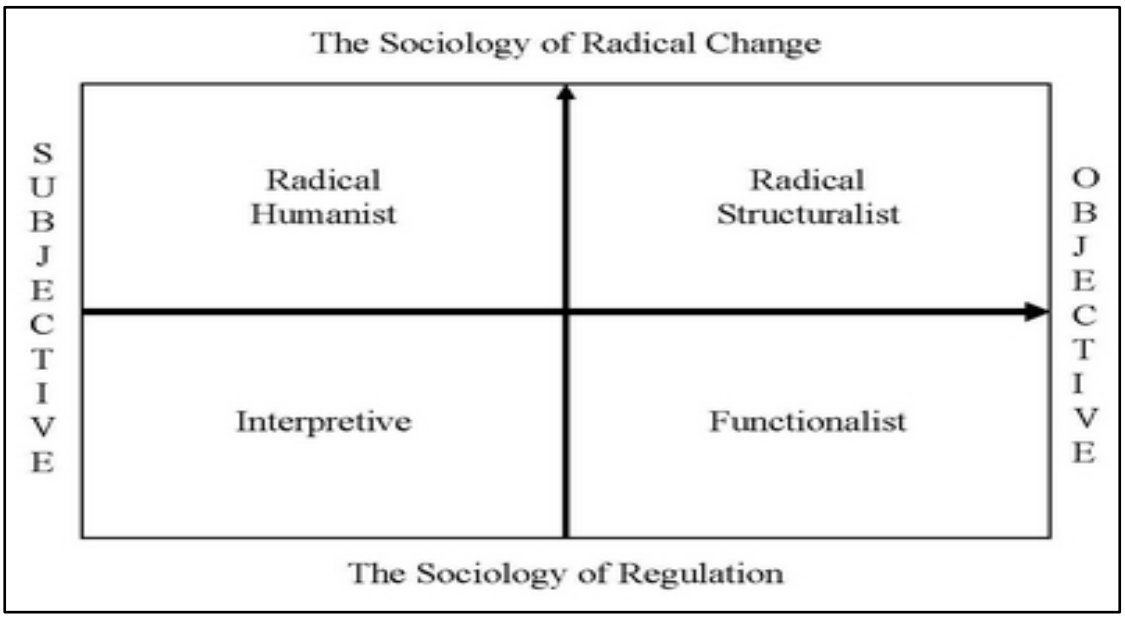


Figure 3-1: Four paradigms for the analysis of social theory
Source: Burrell and Morgan (1979, p. 16)

Figure 3-1 illustrates the four paradigms for the analysis of social theory. Both Burrell and Morgan (1979) mention that social theorists' viewpoints can be located in the four paradigms, in line with the related meta-theoretical assumptions. Following their assertion, Section 3-3 discusses the use of paradigms in the context of information systems.

3.3 Research Paradigms in Information Systems

Research philosophy in IS has been informed by three paradigms from Burrell and Morgan (1979). They are the positivist, interpretive, and critical paradigms (Chua, 1986; Oates, 2006; Orlikowski & Baroudi, 1991) and are discussed below along with pragmatism, which is a more recent addition in the field of IS.

3.3.1 Positivist

The main objective of the positivist paradigm is its scientific approach to problem-solving (Oates, 2006). The positivist epistemology inspired the functionalist approach (Kuada, 2009)

(Gond & Matten, 2010). *Positivist* researchers assume that the nature of ontology is through discovery and that it exists objectively (Chen & Hirschheim, 2004). They argue that the nature of social reality is real and exists 'out there' and independent of the 'knower'. For example, the positivists view the behaviour of human beings as determined by outside factors such as politics, processes, and relationships (Oates, 2006) that produce specific results under various situations. They further use regulations and laws to explain social events and relationships (Van Rensburg et al., 2009). Methodologically, positivists argue that their research is value-free, and they use objective scientific and quantitative data. The positivist paradigm in IS aligns with Burrell and Morgan's (1979) functionalist paradigm.

3.3.2 Interpretivist

Interpretivist views social reality as subjective (Walsham, 1995). The interpretivists affirm that they have the ability to interpret situations and choose how to act in line with the situation. Meaning is created through situations, by being part thereof. This paradigm is concerned with understanding the subjective meanings of people involved in the study (Goldkuhl, 2012). Meaning is derived from human beings interacting with each other and holding a vital role in describing a situation to make sense thereof (Van Rensburg et al., 2009). The meanings that interpretivists uncover are done within the social process and are shared between subjects by subjects, that is, intersubjectivity. These subjects are referred to as individuals who are aware of what is happening around them, and who have the ability to act with a conviction in mind. Van Rensburg et al. (2009) further argue that the determination of their research work is to make the nature of social reality intelligible and to uncover its natural meaningfulness further. The nature of this social reality occurs through actions and perspectives of human beings.

Interpretivist research in the IS context

Interpretive research in the IS field is aimed at producing an understanding of the situation of the information system, as well as the situational developments whereby the information system influences and is also influenced (Walsham, 1993). Interpretive IS research, assumes that the social world is not given, but is produced and reinforced by social actors through action and interaction (Orlikowski & Baroudi, 1991).

Interpretive studies often strive towards an in-depth understanding of the IS phenomena, and to analyse the processes and relationships that continue to change (Oates, 2006). The techniques that are mostly used for IS research include interviews, which are associated with qualitative data. Moreover, interpretive studies are case study-based, with the aim of understanding the phenomena (Falkenberg, Hesse, & Olivé, 2016).

In the field of Information Systems (IS), conducting an interpretive study begins with a stance that knowledge of reality is a social construction by human actors. An assertion by Walsham (1993) affirmed that the interpretive research approach in IS aims to produce an understanding of the situation of IS, whereby IS influences and is influenced by the situation. Using the interpretive approach will assist the researcher in increasing their understanding of the context of social and organisational issues related to CSI ICT projects in communities.

3.3.3 Critical Research

Critical research aims to critically evaluate and transform the social reality that is being investigated. Its primary focus is on critiquing existing social systems and highlighting conflicts, contradictions, and empowering people within the structures (Oates, 2006). Critical researchers are more interested in challenging inequalities and power. This paradigm encourages human beings to work towards meaningful social change and transformation (Orlikowski & Baroudi, 1991). It recognises that social reality is multidimensional, and is created and recreated by human beings (Oates, 2006).

3.3.4 Pragmatism

Pragmatism is concerned with solving practical challenges in the real world rather than with assumptions about knowledge (Feilzer, 2010, p. 8). It is the philosophical element of the mixed methods approach (Goldkuhl, 2012), and it is deduced from the work of Peirce, Dewey, and James in the early 20th century. Peirce (1991) identified pragmatism as a method to highlight the practical consequences of a concept. The philosophy was further expanded and applied to the education and democracy domain by Dewey (1916).

The concept of creative design of method, as reflected by (Midgley, 1990), encompasses understanding the problem situation through systematically related research questions. Each of the research questions might need to be addressed using a different method. When using this approach, the research questions are not established up front, and they may evolve with time.

Blumer (1986, p. 71) states that "the essence of society lies in an ongoing process of action — not in a posited structure of relations. Without any actions, relationships between people are worthless. To be understood, a society must be seen in light of the actions that encompass it". Pragmatism is affiliated with action and change and the relationship between knowledge and action. To effect change in a favourable manner, actions must be led by purpose and knowledge (Goldkuhl, 2012).

Following the discussion above on research paradigms, Table 3-2 provides a summary of the characteristics of each paradigm and the methods to be used for each.

Table 3-2: Research paradigms

Paradigm	Ontology	Epistemology	Method
Positivism	Hidden rules govern teaching and learning processes	Focus on reliable and valid tools to uncover rules	Quantitative
Interpretivism	Reality is created by individuals within societies	Discover the underlying meaning of events and activities	Qualitative
Critical	Society is rife with inequalities and injustice	Help to uncover injustices and empowering citizens	Ideological review
Pragmatism	Truth is what is useful. Symbolic realism	The best method is the one that solves the problem	Mixed Methods Design-based

3.3.5 The rationale to the choice of paradigms

The position that the researcher takes is determined by the research paradigm within which the world is viewed (Dash, 2005). For the purpose of this study, the interpretivist paradigm is adopted on the basis that this paradigm considers human nature as essential and recognises the existence of the social world. It also permits the researcher to study human beings (communities and companies) in their 'real life', and to further understand the nature of meaning in their daily lives. The purpose of this inquiry is not to comment on whether the status quo of the involvement of companies should or should not be questioned, but rather to inquire and discover the relationship between communities and companies. In addition, this inquiry affords the research the flexibility to learn about experiences within embedded, hidden networks and situations of communities. The emphasis is on individual and community views, beliefs, feelings, and ideologies. Therefore, interpretive inquiry is viewed as best suited to this study.

3.4 Theoretical Underpinning for the Study

To better analyse the impact of CSI ICT projects in poor urban communities, systems theory will be used as a conceptual framework for analysis. For instance, it will be used to illustrate how societies work, how organisations operate, and why people interact and behave in the manner that they do. A theory provides the researchers with different 'viewpoints' through

which to consider complex problems and social issues, focusing on different aspects of data collection and analysis (Orlikowski, 2000).

Theory encompasses methodical concepts and beliefs with the intention to clarify a specific phenomenon. In the field of IS, there are five distinct, interrelated types of theories: theory for analysing, theory for explaining, theory for predicting, theory for explaining and predicting, and theory for design and action (Gregor, 2006).

One of the critical factors of underpinning theories in the IS field includes both the technical and social context within which the phenomena are being studied (Mkhomazi & Iyamu, 2013). Theory can be employed in three ways: "guiding the design and collection of data, as part of an iterative process of data collection and analysis, or as a final product of the research" (Walsham, 2006). For this study, a theory is employed as an iterative process for collecting and analysing data; this provides the researcher with an opportunity to refine the theory during the process. Yin (1993) added that the theoretical intent should be established prior to the commencement of the case study, because the intent will contribute towards the design of the case.

3.4.1 Theories previously used in Corporate Social Responsibility research

In the CSR domain, literature revealed that there had been a few different theories that dominated in CSR research over the years. Some of the popular theories are discussed below and tabled in Table 3.3. The paragraphs that follow introduce the theories applied in the CSR domain.

Stakeholder Theory introduced by Freeman (1984) mentions that a business should comply with their management processes and the integrity that addresses morals and values. This theory's emphasis is on investors' needs, power, legitimacy, and urgency. In addition, it revolves around the issues concerning the stakeholders in an institution (Yusoff & Alhaji, 2012). According to Coleman, Hacking, Stover, Fisher-Yoshida, and Nowak (2008), this theory is narrow because it recognises the institutional stakeholders as the only interest group of a company, and it does not prioritise communities. Coleman's argument has limitations for the current study because companies and communities are to be viewed as relevant in projects that are established to address socio-economic development.

The second theory, Social Contract Theory, was initially noted in Socrates' decision to enter into an agreement with the state after his prosecution by the law, and likewise by Freeman and Hasnaoui (2010). As illustrated by these theorists, throughout the centuries, CSR stipulated that human beings are required to follow the norms and standards of the societies in which they live. In relation to social contract theories, companies are bound by the law to

have some form of social contract with the society in order to give back (Mathews, 1987). Furthermore, this theory views community involvement as a sequence of social contracts between members of the community and the community itself (Gray, Owen, & Adams, 1996) that directs the nature of support that companies provide to communities.

The third theory, Legitimacy Theory, is described by Suchman (1995, p. 574) as "a generalised perception that the actions of a business are desirable, proper, or appropriate with some socially constructed system of norms, values, beliefs and definitions". Similar to Social Contract theory, legitimacy theory forges to have a 'social contract' between business and the community within which it operates. However, this theory goes further than Social Contract theory in that it involves behaviour where companies heed to the demands of communities and act to legitimise their actions. This theory promotes that companies should take into account the rights of the communities where they are involved, and not just the rights of their investors. For example, a business should obtain consent to be involved in the community, and is therefore accountable to the community for how it operates and what it does (Deegan, 2004). Table 3-3 further illustrates selected papers from previous studies where theory related to CSR was applied however these studies are not related to systems thinking.

Lastly, in recent years, social systems theory had been used in the fields of CSI and ICT4D. Social systems theory starts with the recognition of systems and sub-systems, relationships, boundaries, and the environment. As Luhmann (1995) mentioned, each system is designed to be able to reproduce itself repeatedly on the basis of its own, system-specific operations. These systems must further be accountable to the nature of their own observations in communities, companies, churches, and schools. This particular theory is not concerned with defining essences, laws, and values. In addition, social systems theory explains how social structure and agency appear together in a common instance, which Giddens (1984) termed the duality of structure. What this relates to is that there are no communicative structures without actors, and no actors without structures of communication. Society creates the 'individuals' who produce it. The relationship between the individual and society is also intertwined by social systems theory.

Table 3-3: Theoretical lenses used in CSR

Theoretical lenses used in CSR		
Author(s)	**Nature of theoretical perspective(s)**	**Key argument/result**
(Friedman, 1970)	Agency theory	CSR is indicative of self-serving behaviour on the part of managers and, thus, reduces shareholder wealth.
(Freeman, 1984)	Stakeholder theory	Managers should tailor their policies to satisfy numerous constituents, not just shareholders. These stakeholders include workers, customers, suppliers, and community organisations.
(Donaldson & Davis, 1991)	Stewardship theory	There is a moral imperative for managers to 'do the right thing', without regard to how such decisions affect firm performance.
(Jones, 1995)	Stakeholder theory	Firms involved in repeated transactions with stakeholders on the basis of trust and cooperation have an incentive to be honest and ethical, since such behaviour is beneficial to the firm.
(Hart, 1995)	Resource-based theory	For certain companies, environmental social responsibility can constitute a resource or capability that leads to a sustained competitive advantage.
(Jennings & Zandbergen, 1995)	Institutional theory	Institutions play an important role in shaping the consensus within a firm regarding the establishment of an 'ecologically sustainable' organisation.
(Baron, 2001)	Theory of the firm	The use of CSR to attract socially responsible consumers is referred to as strategic CSR, in the sense that firms provide a public good in conjunction with their marketing/business strategy.
(Feddersen & Gilligan, 2001)	Theory of the firm	Activists and NGOs can play an important role in reducing information asymmetry with respect to CSR on the part of consumers.
(McWilliams & Siegel, 2001)	Theory of the firm	Presents a supply/demand perspective on CSR, which implies that the firm's ideal level of CSR can be determined by cost-benefit analysis.
(McWilliams, Van Fleet, & Cory, 2002)	Resource-based theory	CSR strategies, when supported by political strategies, can be used to create sustainable competitive advantages for firms.
(Waldman, Siegel, & Javidan, 2004)	Theory of the firm/strategic leadership	Certain aspects of CEO leadership can affect the propensity of firms to engage in CSR. Companies run by intellectually stimulating CEOs do more strategic CSR than comparable firms.

(Ngwakwe, 2014)	Shareholder support social investment	The analysis revealed that, within the six years of Woolworths Holdings' Good Business Journey, a significant positive relationship exists between Woolworths Holdings' social investment and its revenue, earnings per share (EPS), and return on equity (ROE).
(de Villiers & Alexander, 2014)	New institutional theory	Evidence suggests that CSRR is institutionalised through professionalization and other means, suggesting a need to interpret CSRR characteristics and patterns as a reflection of global CSRR templates.
(Księżak & Fischbach, 2017)	Triple Bottom Line theory	Triple Bottom Line presents a clear understanding of what is counted as corporate social responsibility, thus rendering the concept easy to understand.
(Du Toit & Lekoloane, 2018)	Stakeholder theory	Corporate social responsibility and financial performance: Evidence from the Johannesburg Stock Exchange, South Africa.
(Wisdom, Lawrence, Akindele, & Muideen, 2018)	Stakeholder theory	Results suggest that improved CSR investment benefits shareholders; this would promote positive performance in investment level in the firm and also improved firm performance.
(Anser, Zhang, & Kanwal, 2018)	Resource-based theory Institutional theory	The results are that direct relationship exists among CSR, Innovation and company performance while moderating effect of innovation is absent between CSR and firm performance.

3.4.2 Proposed theory for this study

The main objective of the study is to analyse the impact of CSI ICT projects on poor communities in South Africa. A theory is required that can assist in understanding the effects, and the dynamics leading to those effects, of the CSI ICT projects of companies in poor urban communities in Soweto within the social contexts where these projects are undertaken.

The motivation for the study is that companies continue to implement CSI ICT projects in poor communities to improve communities' socio-economic situations however some of these projects do not produce the benefits and impacts as planned. It is required for companies, when implementing these projects in communities to consider relevant holistic approaches to create impact and sustainable developments.

Section 3.4.1 reflected on some theories that have been applied in corporate social responsibility however, these theories are concerned with company interests more that community socio-economic upliftment. Section 4.7.2 further discusses some of the systems thinking theories that have been applied in the CSI domain with the view of understanding social systems with its relationships. This study proposes a combination of systems thinking theories that complement each other in a holistic manner, while considering the interconnectedness of the community and its members and CSI ICT projects sustainability for current and future generations to benefit from.

Applying systems thinking entails understanding the system by exploring relationships and interactions among the elements that form the entire system. This refers to understanding the community needs, learning centres, and companies' objectives as a whole prior to implementing any CSI ICT project. Unlike viewing independent relationships, systems thinking advocates for inclusive viewing of multiple relationships. In addition, systems thinking is successful in addressing socio-economic situations that are complex, and further promotes meaningful insights into dealing with CSI issues (Patel & Mehta, 2017).

The theoretical framework that influenced this research comprises of three theories, namely: SSM, Ubuntu, and social autopoiesis, which are discussed later (see Chapters 4 - 6). In addition, this study takes into account the interactions between the theoretical lens and the empirical evidence. The learning from the empirical study could assist in refining the theoretical framework, while the evolving theoretical framework could lead to new insights when interpreting the data.

SSM seeks to understand the social construction of reality by engaging people, within the context of their own problem situation, with the view of improving the situation (Checkland & Scholes, 1990). Its strength lies in clarifying the perspectives from different role-players and their underlying assumptions. SSM in practice provides insights into social processes. Therefore, this study proposes to use SSM as a theoretical lens to analyse the impact of CSI ICT projects in poor urban communities.

Daellenbach and McNickle (2005) assert that systems thinking provides a platform for investigation of the effectiveness of a system as a whole. Moreover, it offers a way to identify and handle unintended consequences. Ubuntu epitomises some of the general concepts of systems thinking (Chapter 4) such as interconnectedness, collectivism, communalism, wholeness, caring, respect, sharing, openness, and kindness (Mbigi, 1997; Mugumbate & Nyanguru, 2013). Ubuntu demonstrates itself through various human acts in different social circumstances. Therefore, it was relevant to choose Ubuntu for this study because it provides

a better understanding of how people are connected to each other, their situation, the environment, and how they collectively work together to achieve a common objective.

The other theory that is considered relevant for this study is autopoiesis (Chapter 6), developed by Maturana and Varela (1980). The central notion of autopoiesis is self-maintenance and self-reproduction, which relates to the relationship between a living system and its environment. In the process of self-reproduction, the systems' behaviour is not influenced by its environment but by its own structure, which limits how the systems can behave in various situations. Relevant to this is the notion of structural coupling, where two or more operationally closed systems interact with each while retaining their individuality. The combination of the three theories provides a lens through which CSI ICT projects may be assessed for sustainability and impact, as well as to inform the empirical work.

In conclusion, the literature highlighted various forms of theory that have been employed in studies of community development. Stakeholder theory is concerned with the returns of investors, whilst social contract theory is concerned with the contractual obligation between companies and the communities that they serve. Legitimacy theory entails the rights of the communities as well as investor needs. For this study, a systems approach is advocated, with SSM, Ubuntu, and Autopoiesis providing the theoretical building blocks. A systems approach would afford the researcher an opportunity to understand the systemic problems at the heart of the investigation. Second, it affords an opportunity to assimilate the structures and functions of the system and sub-systems, whereby the system can be observed from various viewpoints.

3.5 Research Approach

3.5.1 Introduction

This section outlines the research approach, which is a plan detailing the data collection, analysis, and interpretation. It outlines the approach to respond to the research problem presented in Chapter 1. The previous section discussed the interpretivist paradigm adopted for this research. This position strives to understand real-world phenomena by investigating them within the social context in which they happen.

Qualitative research is the approach proposed for this study, and it aligns with an interpretive philosophy. One of its advantages is that it employs open-ended questions, and probing affords participants the opportunity to respond in their own thoughts and words, rather than forcing them to choose from fixed responses, as quantitative methods do (Maluleke & Marnewick, 2012). Another advantage of qualitative methods is that they allow the researcher the flexibility to probe initial participant responses — that is, to ask the 'what', 'how', or 'why'

of a phenomenon, rather than the ‘how many’ or ‘how much’ that are answered by quantitative methods (Mack, Woodsong, Macqueen, Guest, & Namey, 2005). Qualitative research is context-based; therefore, it is important for the researcher to be context-sensitive about participants' lives. The context also includes economic, political, social, and cultural aspects. However, it should be noted that, with a qualitative inquiry, human beings cannot be predicted; therefore, at times, the data might not be as anticipated.

The rationale for employing a qualitative approach in this research is to analyse the impact of CSI ICT projects in poor urban communities in South Africa. A qualitative approach is appropriate to capture rich data on the views and experiences of the community members that are impacted by these projects.

3.5.2 Case Study Strategy

In the field of Information Systems, the use of case studies is a widely accepted research strategy. In IS research, case study methods were the most employed research strategy from 1970 to1979, according to a survey of 532 journal papers (Scott & Ives, 1992). A case study allows the researcher to investigate holistic and meaningful attributes of real-life events, such as business processes and social systems.

In addition, Hancock (2002) mentions that using a case study forces an in-depth analysis of the selected cases, and therefore produces information that is more in-depth and richer with content. A combination of a descriptive and explanatory case study will be used for this study, with the aim of analysing the impact of CSI ICT projects in poor urban communities in South Africa. This will further ensure that the dynamics are not explored from a single perspective, but rather from multiple viewpoints.

Case studies assess a single phenomenon with the view of determining its distinct structure, as well as to generalise the findings (Bryman, 2012). This form of research can provide an understanding of the case, and it reflects the significance of culture and context in different cases.

Considering Yin’s (2003) view, case study research can comprise either single or multiple cases. A single case study investigates a single case while, with a multiple case study, data is collected from multiple cases that form part of the study to enable the researcher to compare within and between cases.

Multiple case studies are necessary when the intention of the researcher is to build a theory or to describe the phenomena. Additionally, they allow for the extension of theory and the production of general research findings. These cases offer a source of explanatory data that

allows the researcher to make generalisations about the 'why' and 'how' of the current study (Miles & Huberman, 1994, p. 172). In this study, the particular cases were selected because they provide a *structural representation* that is aligned to the objective of the study (Stake, 1994).

Multiple case studies are regarded as the appropriate method for this study on the basis that each community, individual, and business is independent and different. The researcher will be addressing the real-life situations of the learning centres, companies and communities, stressing that the phenomena cannot be disconnected from their context. Moreover, case studies are used as a vehicle to apply a systems approach (discussed in detail in Chapter 4). The aim is to understand the context within which the whole system operates and to develop a detailed, rich picture with the aim of learning about the structures, processes, relationships, perceptions, and associated behaviours of the situation (Finegan, 1995). For the purpose of this study, it is important to understand companies' CSI programmes and to understand communities' social, economic, and political situations.

Each case was investigated and documented separately; however, the researcher looked for situations that were similar or different between the cases (Oates, 2006). Section 3-6-3 discusses the case study site selection.

3.5.3 Units of Analysis

Establishing the cases for the study allows for the researcher to determine the unit of analysis for the study (Yin, 2009). Moreover, the research questions should clearly state which characteristics of the cases are of importance, as it would not be practical to explore all the aspects of the selected cases.

This research study employed a multiple case approach consisting of various units of analysis. The units of analysis are the CSI ICT projects in Orlando East, Orlando West, Protea, and Dhlamini, all of which are located within the Greater Soweto area in the Gauteng Province of South Africa.

3.6 Selection of the Case Study Sites

When implementing a multiple case study approach, Yin (1984) suggests two principles for choosing case sites. First, sites where comparable findings are anticipated may be considered. Second, sites may be selected for their possible 'theoretical' reproduction. For this study, the site selection was carefully considered, as discussed in the following section.

Selection of companies to include in the study

The target population of this study is ICT companies that have corporate social investment programmes. The sample frame that was initially used to identify ICT companies in South Africa was the Brainstorm 2015 CIO directory as well as the Information Technology Association (ITA) of South Africa's website. However, this does not represent a comprehensive list of ICT companies in South Africa. A tally was taken among all the companies on the sampling frame.

The criteria for selecting ICT companies for inclusion in the study included:

- ICT companies with a corporate social investment programme as starting point;
- The companies needed to have supported CSI ICT projects between 2002 – 2016 in poor urban communities;
- The CSI ICT-based programmes needed to target school learners and unemployed youth; and
- Geographically, the CSI projects were to be in the Soweto area of the Gauteng Province of South Africa.

Case selection for this study started with a multistage sampling procedure to select ICT companies to partake in the study. This form of sampling involves dividing the population into smaller groups, whereby sampling was carried out in levels. In certain instances, several levels of group selection may be applied prior to reaching the final sample units (Shimizu, 2005).

The sampling units are arranged in multi-levels: primary, secondary, tertiary units; this is in accordance with the number of levels in the multistage sampling. The listing units on which studies are conducted are the units selected at the last sampling level.

- Using this sampling technique**,** twenty-four (24) ICT companies that contributed to corporate social investment were selected, forming the *primary sampling unit*.
- Of the twenty-four (24) companies, only eleven (11) companies focused on community ICT projects and not ICT in schools. There is already a plethora of research on ICT corporate social investment in schools. Therefore, a decision was made to focus on community-based ICT projects and not schools in this study. This then formed the *second sampling unit*.
- Lastly, four (4) companies with CSI ICT projects in Soweto were selected as the final sampling unit.

The primary sample unit of twenty-four (24) ICT companies is illustrated in Table 3-4. These ICT companies partnered with learning centres in poor urban communities around Gauteng.

Table 3-4: Primary Sampling Unit

	Technology Partner	Learning Centre	Location of the projects	ICT Projects Name	Community Access
1	Dell	Change the World Trust	Diepsloot Midrand	IT Training Centre (2015)	Yes
2	Microsoft	Siyabonga Multi-purpose Centre	Orange Farm, Gauteng	Microsoft Digital Villages (2003)	Yes
		Tokologo Centre for Quadriplegics,	Protea Glen, Gauteng	Microsoft Digital Villages (2009)	Yes
3	Intel	SAAYC Orlando West Community	Orlando West Gauteng	Intel Computer Clubhouse (2003)	Yes 8 – 24yrs
		Abel T Motsoane High School	Mabopane	Inter powered classroom (2007)	No
4	IBM	Sehlaba Sabana Pre-School (African Self-Help Association)	Pimville	IBM's global multi-million-dollar early learning programme (KidSmart) (2002)	No
5	Datatec (Datatec Educational and Technology Trust?	Siyakhula Computer School	Ivory and Ebony Park	Establishment of Siyakhula Computer School (since 2001)	Yes, a person with Grade 10 and up
			Diepsloot	Establishment of Siyakhula Computer School (2012)	Yes
6	Blue Label Telecoms	Boys and Girls Club	Protea Glen, Gauteng	Boys and Girls Club Protea Glen (2015)	Grade 0 – Grade 12
7	Xperien	Siyabonga Children's Home Trust	Germiston	Donation of old, refurbished IT equipment	
		Love Trust (Nokuphila School)	Tembisa	Donation of old, refurbished IT equipment (2015)	No
8	Samsung Electronics	Phomolong Secondary School	Tembisa	Solar Powered Internet Classroom (2014)	No
9	Jasco	Kaalfontein Primary School	Midrand	Numberwise Training (Teachers training)	No
10	Integr8 IT	Refilwe life for all	Phelindaba	Computer Centre (2010)	Yes
11	Pinnacle Holdings (Axiz, Datacentrix)	Boitumelong Senior Secondary	Tembisa	E-Learning Classrooms in (2015)	No
12	Dimension data	Tiisetsong Secondary School	Thokoza	E-learning Progamme (2012)	No
13	Bytes Technologies	Isikhumbuzo Secondary School	Orange Farm	Project Qhakaza (computer lab) (since 2004)	No
14	Mustek (Rectron)	Siyakhula Foundation	Diepsloot and Olivenhoutbosch	Mobile Computer Lab	Yes

	Technology Partner	Learning Centre	Location of the projects	ICT Projects Name	Community Access
				(2013)	
15	Huawei SA	Khulisani Sebokeng Technical High school	Sebokeng	(ICT) Training Centre Project (2013)	no
16	Business Connexion	Irene Primary and Middle School	Irene	LetmeLearn (2011)	no
17	Siemens South Africa	Ingayizivele High School	Tembisa	Siemens Generation 21 Projects (2006)	No
		Entshonalanga primary		Siemens Generation 21 Projects (2008)	No
		Endulwini primary school			no
		Sedibeng primary school			no
18	Acer South Africa (Acer for Education)	Children living in and around the Orlando East	Orlando East, Soweto	Orlando Pirates Learning Centre (2012)	Yes
19	AdaptIT	Steve Tshwete Secondary School	Olievenhoutbosch, Centurion	Knowledge Centre (2014)	No
20	Internet Solutions	The community of orange farm	Orange Farm	Orange Farm ICT Hub(2005)	Yes
21	Datacentrix	Zifuneleni Junior Secondary School	Klipspruit	Donation of Refurbished PC's (2005)	No
22	SAP	Tembisa High School	Tembisa	Donation of computers and related infrastructure (2005)	No
23	Neotel	Thusong Youth Centre	Alexandra	Internet cafés (Since 2010)	Yes
		Nanga Vhutshilo	Dhlamini		Yes
24	Vumatel	Forest Town School	Forest Town, Johannesburg	Installation of Fiber-Free Internet Access (2015)	No

Once the primary sampling unit was concluded, only eleven (11) companies that focused on community-based ICT projects, and not schools, formed a second sampling unit (see Table 3-5).

Table 3-5: Secondary Sampling Unit

	Technology Partner	Learning Centre	Location of the projects	ICT Projects Name	Community Access
1	Dell	Change the World Trust	Diepsloot Midrand	IT Training Centre (2015)	Yes
2	Microsoft	Siyabonga Multi-purpose	Orange Farm, Gauteng	Microsoft Digital Villages (2003)	Yes

	Technology Partner	Learning Centre	Location of the projects	ICT Projects Name	Community Access
3	Intel	SAAYC Orlando West Community	Orlando West, Gauteng	Intel Computer Clubhouse (2003)	Yes 8 – 24yrs
4	Datatec (Datatec Educational and Technology Trust)	Siyakhula Computer School	Ivory and Ebony Park	Establishment of Siyakhula Computer School (since 2001)	Yes, a person with Grade 10 and up
5	Blue Label Telecoms	Boys and Girls Club	Protea Glen, Gauteng	Boys and Girls Club Protea Glen (2015)	Grade 0 – Grade 12
6	Xperien	Siyabonga Children's Home Trust	Germiston	Donation of old refurbished IT equipment	Yes
7	Integr8 IT	Refilwe life for all	Phelindaba	Computer Centre (2010)	Yes
8	Mustek (Rectron)	Siyakhula Foundation	Diepsloot and Olievenhoutbosch	Mobile Computer Lab (2013)	Yes
9	Acer South Africa (Acer for Education)	Children living in and around the Orlando	Orlando, Soweto	Orlando Pirates Learning Centre (2012)	Yes
10	Internet Solutions	A community of orange farm	Orange Farm	Orange Farm ICT Hub (2005)	Yes
11	Neotel	Nanga Vhutshilo	Dhlamini	Internet cafés (Since 2010)	Yes

From the 11 (eleven) companies with community-based ICT projects, a final of 4 (four) companies were selected for inclusion in this study based on geographical location. In association with the sampled companies, there are learning centres in communities around the Soweto township, in the city of Johannesburg, Gauteng Province, South Africa. The learning centres are in the following communities: Protea Glen, Orlando West, Orlando East, and Dhlamini.

The researcher initially contacted the companies telephonically, and afterwards by email, with the view to provide details about the study, the aim of the study, and the effort that would be needed from them. The researcher visited these companies for an introductory meeting at their premises to discuss the research in more detail. After engagements with companies and learning centres, the final list was compiled, as illustrated in Table 3-6.

Table 3-6: Final Sampling Unit

	Technology Partner	Learning Centre	Community	CSI ICT Project name	Community Access
1.	Intel	SAAYC Orlando West Community	Orlando West	Intel Computer Clubhouse (2003)	8– 24yrs
2.	Blue Label Telecoms	Boys and Girls Club	Protea Glen	Boys and Girls Club Protea Glen (2015)	Grade 0 – Grade 12
3.	Acer for Education	Orlando Pirates Learning Centre	Orlando East	Orlando Pirates Learning Centre (2012)	School-going children Unemployed youth

	Technology Partner	Learning Centre	Community	CSI ICT Project name	Community Access
4.	Liquid Telecom (Neotel)	Nanga Vhutshilo	Dhlamini	Internet Café's (Since 2010)	Yes

The final sample includes ICT companies (technology partners), learning centres, and the associated communities. The four projects that formed the case sites are introduced next.

CSI ICT Project 1: Orlando Pirates Learning Centre Project

The chairman of Orlando Pirates, Dr Irvin Khoza, and the Department of Basic Education unveiled the learning centre in October 2012. The Orlando Pirates Learning Centre, supported by Acer Africa, is an ICT project designed to benefit children living in and around the Orlando East area, as well as unemployed youth, whilst improving their numeracy and literacy skills (Orlando Pirates learning Center, 2017). In addition, the aim of the centre is to bridge the digital divide while contributing to the education of young people living in the area. The facility is fitted with state-of-the-art equipment and high-tech computers that were donated by Acer.

CSI ICT Project 2: Southern African Association of Youth Clubs Learning Project

In 2003, Intel donated a Computer Clubhouse to the Southern African Association of Youth Clubs (SAAYC) in Orlando West, in Soweto to provide IT education and training for disadvantaged people, predominantly the youth. The Computer Clubhouse has 14 multimedia workstations with Intel's Pentium 4 processors, connected to the networked and with access to the Internet. The machines are preloaded with software, including animation and multimedia; electronic publishing and graphic design; three-dimensional design; robotics and science exploration; Web design; computer programming; and electronic music and video editing. Moreover, the clubhouse has a music and video-editing studio boasting two high-end server systems, keyboards and sound-mixing system, digital video camera, and video editing suite (Van Rooyen & Chetty, 2003).

CSI ICT Project 3: Nanga Vhutshilo Learning Centre Project

Liquid Capital, previously Neotel, opened one of their 14 Internet cafés in 2011 in the Nanga Vhutshilo community Centre, a charity organisation that services over 100 families and more than 230 children, in Dhlamini, Soweto (Media Update, 2011). The aim is to provide community members with the opportunity to invest in their education. They donated computers, printers and scanners, unlimited access to the Internet, and in-depth computer training courses to selected participants. The company installed electrical work, lighting, cabling, full interior as well as air-conditioners, computers, printers, software, and networks. Moreover, they provided

free connectivity for six months, including entrepreneurship training, mentorship, and IT support.

CSI ICT Project 4: Boys and Girls Learning Centre Project

Blue Label Telecommunications, through their CSI programme, launched the Boys & Girls Club in Protea, Soweto, in 2016 (Blue Label Telecom, 2015). The facility accommodates young people after school, aged between 6 and 19, managed by trained educators who provide structured programmes and activities. The company has also made an undertaking to support the facility financially.

Selection of community participants

Purposive sampling was used at the four sites for individual community participants. The main aim of purposive sampling is to focus on certain attributes of a population that are of interest to the study, which will best enable the researcher to answer the research questions (Patton, 1990). This form of sampling provides for detailed, rich information, and can be employed to address the concern of transferability, as specific data is best used in alignment to the context rather than generalised. The shortcomings of this method include that of researcher bias, because the researcher would have created the sample based on their judgment. Furthermore, in this method it could prove to be difficult to justify to the reader that the selected participants are, in fact, appropriate for the study. In the current study, the groups that were sampled under purposive sampling included CSI project community leaders and community members. The community members are referred to as participants in this study. Where required, the researcher selected additional participants through her own judgement on the grounds that they could provide the necessary data required for the research.

The selection criteria for participants in communities include:

- The intended beneficiaries are between the ages of 5 and 35;
- Participants needed to have used the facilities in the period 2002 to date; and
- Other participants included parents of the minors, CSI managers, and learning centre managers that oversee the daily operations.

Selecting participants for the study goes hand in hand with gaining access to participants in the communities (Kondowe & Booyens, 2014) and corporate companies (Johl & Renganathan, 2010). According to Bogdan and Biklen (1992), community-based studies require buy-in from 'gatekeepers' within the communities. The gatekeepers require more

information about the study being conducted and how it will impact the participants or uphold the reputation of the organisation.

For this study, the researcher first approached the ICT companies to request access to their CSI ICT projects; she experienced challenges when attempting to establish contact with the ICT companies. Flowers (1996) says that, when conducting research, it is difficult to obtain access to private companies when investigating business and internal matters. This was the case in this study as the researcher had to exclude companies that did not respond to her communication due to time constraints. The study only includes the four companies that have positively agreed to be part of the study. The researcher then approached the learning centre managers within the communities to assist with selecting the participants. Consent letters were written and submitted to the respective learning centre in the selected communities and ICT companies, stipulating the following: why was the community selected for the study, and what can the community expect during the study, including the amount of time to be spent by the researcher? Will the researcher's presence be disruptive? How will the reports be presented?

3.7 Ethical Considerations

Part of the research process includes research integrity, which considers several good research practices and conducts such as honesty, accuracy, fairness, and protection of human participants involved in the study (Israel, 2014). The researcher was sensitive to moral principles when conducting and reporting the findings in order to avert the harmful effects that the study could have on the lives of the participants.

The researcher exercised caution when engaging with the participants; the following process details the ethical considerations:

- The researcher set up introductory meetings with the CSI managers and the learning centre managers before commencing with the study. During this initial meeting, the researcher explained to the managers what she was seeking to address with the research study, and the context for participation was explained. These meetings were not recorded, because the researcher wanted to provide comfort to the managers and to create a level of trust, since this meeting was also to request the manager for further access to the organisations.
- The researcher further expressed that participation in this study is voluntary.
- The managers provided consent for their organisations to be part of the study. Their consent was used as part of the ethics application.

- The researcher stressed that the information provided by the participants would remain private and confidential. As a result, the names of the participants are unidentifiable.
- The researcher was granted Ethics Clearance by the University of Pretoria's ethics committee (see Annexure A for the ethics approval letter). As part of the ethical process, the researcher awaited ethics clearance before commencing with the data collection.
- Data was collected using appropriate methods such as interviews, focus groups, documentation and observations.
- During all interviews and focus group sessions, the researcher gave all the participants a consent form to inform them of the overall goal of the study (see Annexure B). The sessions started with the researcher explaining the aim of the study, then she proceeded with the interviews.
- Informed consent touches on other values, such as trust, privacy, and security (Friedman, Kahn, Borning, & Huldtgren, 2013). The researcher experienced a challenge in one of the focus group sessions pertaining to trust. One participant was told at home not to sign any document that they are told to sign due to issues of trust. The researcher then asked the Learning Centre Manager to explain in the language of the participant that the individual consent form simply seeks consent from the participant to take part in the study. Following the intervention from the learning centre Manager, the participant was willing to give consent.
- Participants were made aware that they could withdraw from the study at any time.
- Avoidance of harm was explained to all the participants.
- During the data collection phase, to secure and protect data against risk, names of all the participants were not documented on the fieldnotes; after every interview, the fieldnotes were typed up and uploaded to a password-protected laptop.

3.8 Data Collection

Data collection methods included collecting documents and archives, participant observation, and interviews. The researcher collected and integrated quantitative data, which enabled understanding of the whole phenomenon under study, where possible. Moreover, the collection of data from various data sources added rigour to the research study (Oates, 2006).

The use of multiple case studies, along with various data collection methods, was done to enhance the accuracy, validity and reliability of the outcomes and to gain a more

encompassing perspective on the phenomena of interest. Qualitative data was collected through open-ended questionnaires, interviews, classroom observations, and documentation. Figure 3-2 outlines a data collection guide developed by the researcher for the purpose of this study.

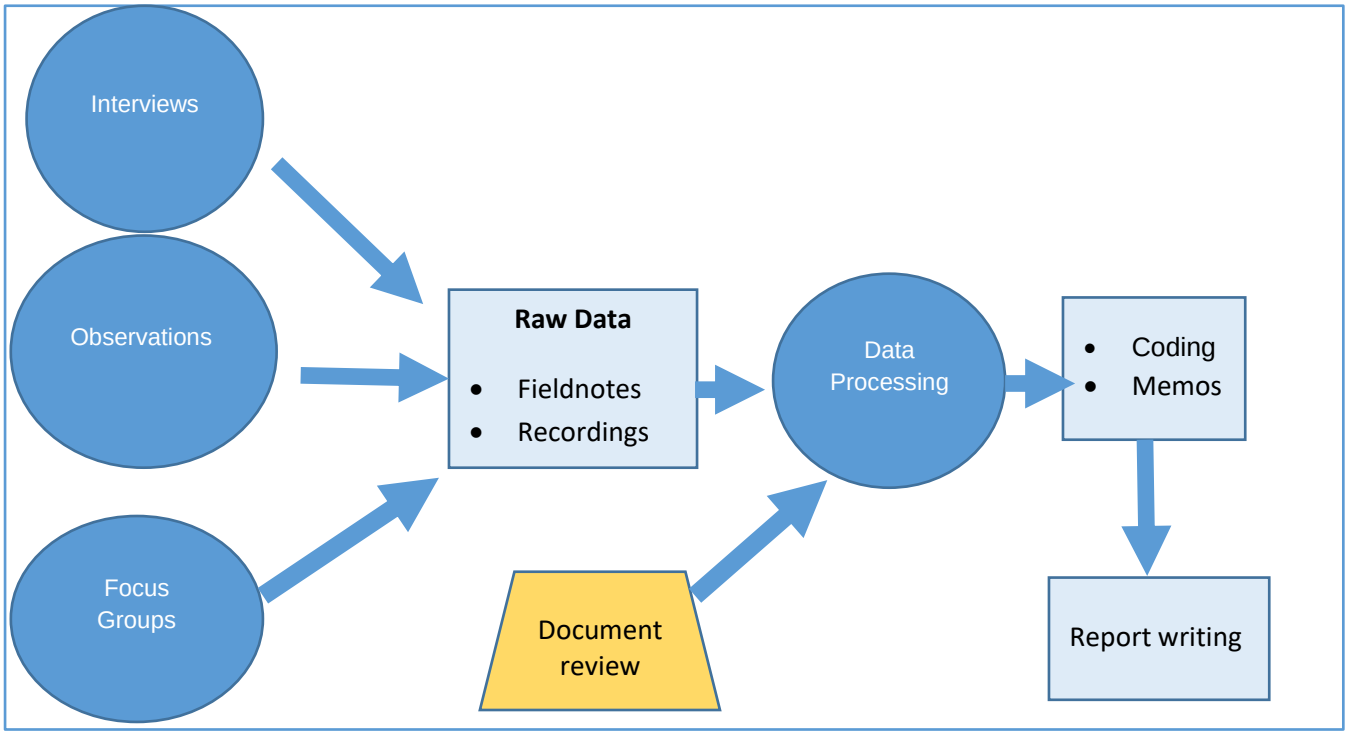


Figure 3-2: Data collection guide developed by the researcher for this study

Poor urban communities are the centre of this study because of their socio-economic status. Due to the empirical nature of the study, it strives to gather primary data that is qualitative to understand the problem situation and to use the empirical data for analysis. The data collected is based on CSI ICT projects that were implemented between 2002 – 2016.

As part of the process, data was collected in a variety of formats and from various sources to generate an opportunity for triangulation and verification. The data collection methods employed in the study are depicted in Table 3-7.

Table 3-7: Data Collection Methods

Data collection method	Number of objects/ participants	Data Instruments	Category of data	Data analysis technique
Posters and Leaflets	1	Pictures of the original posters Hardcopies of leaflets	Secondary data	Hermeneutic analysis. Set principles of interpretive research by Klein and Myers (1999)
Focus Groups	+- 22	Digital recordings with transcripts	Primary data	
Individual Interviews	8	Digital recordings with transcripts	Primary data	
Annual Reports	3	Scanned for analysis	Secondary data	
Company websites	8	Scanned for analysis	Secondary data	
Pictures	16	Scanned for analysis	Primary data	
Observations	6	Fieldnotes	Primary data	

3.8.1 Interviews

Interviews are a frequently and widely used approach for collecting qualitative data. This approach enables the researcher to obtain first-hand data directly from participants. The researcher seeks distinct information in order to investigate the phenomenon further. An additional benefit of interviews is that participants can reveal knowledge in a way that is expressed in the form of answers (Flick, 2006). They provide the researcher with the chance to probe further during the interviews to get better clarity of the subjects at hand (Lewis, 2000). Interviews can be conducted at individual or group level.

Individual interviews were scheduled with CSI managers and learning centre managers in their respective companies or communities. These participants were selected for individual interviews to capture their in-depth project perspectives and the challenges that they encountered (Westas, 2002). These interviews were scheduled to be a minimum 30 minutes each, and a digital recorder was used from which transcripts were taken. The interview guides employed for CSI managers and learning centre managers can be found in Annexure C-1 and C-2 respectively.

This study further utilised focus group interviews to uncover the views of the individuals that have used and are still using these facilities. Denzin (2001) and Stewart, Shamdasani, and Rook (2006) indicate that groups form their own structure and meaning, and a focus group interview provides access to participants' level of meaning, views, and opinion. Focus groups were initially used around the 1920s as a market research tool (Kamberelis & Dimitriadis, 2013). This data gathering approach has become popular in the social sciences because it

can be adapted to suit a variety of purposes and methods (Kamberelis & Dimitriadis, 2013). Focus group sessions require the researcher to understand the socio-cultural context of the community that forms part of the study. A focus group was conducted in each identified community; sessions comprised 6–10 community members and lasted between 30 minutes and 2 hours. The focus group interview guide can be found in Annexure C3.

The sequence for data collection was vital because it enabled the researcher to validate that the identified CSI ICT projects are associated with the ICT companies and learning centres. Therefore, the empirical work was initiated by introductory meetings with CSI managers and Centre managers. Subsequently, after ethics approval, formal interviews took place between May 2018 – August 2018; these consisted of four individual interviews with CSI managers, four individual interviews with Centre managers, and three focus group interviews. Table 3-8 summarises site visits and provides the interview schedule for this study. The researcher was also invited to an open day that was hosted by one of the centres, whereby time was spent with some of the people that have used the centre and with other members of the community; general observations were also made. With consent of the participants, all interviews were recorded and later transcribed.

Table 3-8: Interview schedule and site visits

	Organisation	Date	Participant Role	Duration
Introductory meetings				
	Orlando Pirates Learning Centre	05 Jun 2017	Centre Manager	Initial meeting
	Nanga	09 Oct 2017	Centre Manager	Initial Meeting
	SAAYC	09 Oct 2017	Centre Manager	Initial Meeting
	Acer	20 Oct 2017	CSI Manager	Initial Meeting – Telephonic
	Boys and Girls Club	22 Oct 2017	Centre Manager	Initial meeting
	Blue Label Telecom	22 Oct 2017	CSI Manager	Initial meeting
	Liquid Telecom	25 Oct 2017	CSI Manager	Initial Meeting
	Intel	30 Oct 2017	CSI Manager	Initial meeting – Telephonic
Corporate Social Investment Managers				
	Blue Label Telecom	05 June 2018	CSI Manager	54:51 min
	Acer	23 May 2018	CSI Manager	36:35 min
	Intel	29 May 2018	CSI Manager	63:00 min
	Liquid Telecom	31 May 2018	CSI Manager	50:11 min
Learning centre managers				

	Orlando Pirates Learning Centre	31 May 2018	Centre Manager	34:12 min
	Nanga Vhutshilo	05 June 2018	Centre Manager	31:00 min
	Boys and Girls Club	07 June 2018	Centre Manager	37:12 min
	SAAYC	19 July 2018	Centre Manager	74:23 min
	SAAYC	21 July 2018	Centre Manager + Open day	120 min
Focus groups				
	Parents Boys and Girls	20 July 2018	Parents of the users (users are minors)	45:00 min
	SAAYC FG	01 August 2018	Users	35:58 min
	OPLC FG	22 August 2018	Users	56.52 min
	Nanga	none	No users because the Internet café does not exist	-

3.8.1.1 Participants' Profile

The participants of the study included corporate social investment managers, learning centre managers, users of the centres, and parents of the minor users, as shown in Table 3-9. The following participants were involved in this study:

Table 3-9: Profile of the Participants

Participation Group	Number
Corporate Social Investment Managers	1 Males and 3 Females
Learning Centre Managers	2 Males and 2 Females
Boys and Girls Club Focus Group (Parents)	7 Mothers of minor centre users
OPLC Focus Group (Users)	2 Females and 6 Males
SAAYC Focus Group (Users)	6 Females and 3 Males

3.8.2 Observation

A day was spent at each of the identified learning centres. The observations were used to gain first-hand experience of the kinds of services that these centres offer. During the observations, a guide was used to direct and document the activities that the researcher observed at the learning centres (see Annexure D). Fieldnotes of the observations consisted of a description of the setting, brief identity profiles of the individuals that used the centre, the number of individuals that use the centres, the types of services that people use, and the interactions between users and learning centre staff (Westas, 2002).

3.8.3 Documentation

According to Lincoln and Guba (1985) and Westas (2002), a document is defined as “any written or recorded material”. This form of data collection method was used as a secondary source of data to assist the researcher in corroborating and supplementing information from the interviews. Documentation related to CSI ICT projects and learning centres was collected. The collected documents were used to corroborate what the interview participants revealed. The types of documents collected included annual reports (which reflected learning centres, financial status, management structures), B-BBEE scorecards, posters, and leaflets – see Table 3-7.

The following section details the process followed to analyse the data.

3.9 Data Analysis

Qualitative data analysis provides a means of honing, contrasting, and making sense of important patterns or themes from data collected for research (Westas, 2002). It comprises thoroughly looking at the text, describing information, and developing themes and patterns.

Yin (2011) asserts that the analysis of qualitative data normally progresses through five phases – compiling, disassembling, reassembling, interpreting, and concluding – regardless the orientation that the researcher assumes (see Figure 3-3). Phase 1 (compiling) is about c*ompiling* and sorting the data collected. Sorting can be done using software such as Atlas ti. Phase 2 (disassembling) refers to going through the data and breaking down the compiled data into smaller pieces to examine meticulously, and compare for relations, similarities, and dissimilarities. As part of the trial and error process, the researcher may repeatedly do the disassembling procedure. Phase 3 (reassembling) follows the disassembling procedure by using themes, categories, and patterns to reorganize the disassembled data into different groupings. Phase 4 (interpreting) entails utilising the reassembled data to formulate a new

story; this may be accompanied by tables and graphics where applicable. Phase 5 (concluding) is the final phase; it may be viewed as the conclusion phase, as it draws the conclusions of the study. The conclusions should be connected to the interpretation.

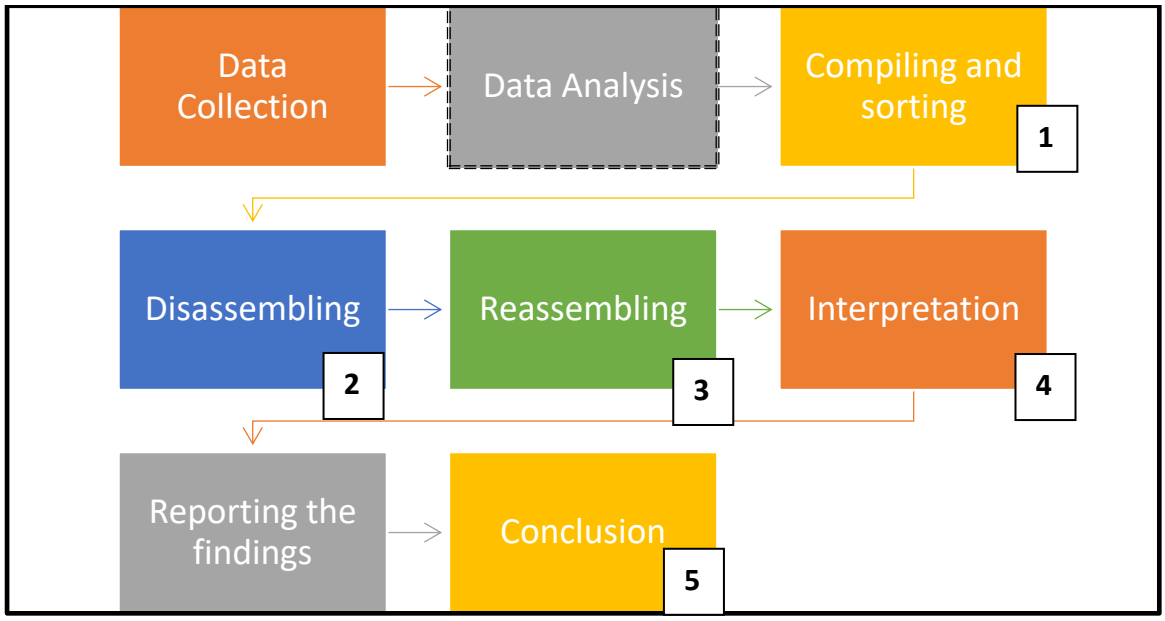


Figure 3-3: Data Analysis Process
Source: Yin (2011)

This study needed a flexible data analysis approach, hence the reason for opting to analyse data using hermeneutics. Hermeneutics is seen as a philosophical slant on how to understand humans, and it is used mostly in interpretive research; moreover, it is an approach that can be considered for analysis, in developing an understanding of data that is not clear (Bleicher, 1980). For this type of approach, the interpretation is not only left to the researcher, but to the reader as well.

Both Yin (2003) and Stake (1995) reiterate the importance of analysing data as soon as the researcher has collected it. Furthermore, Miles and Huberman (1994) assert that analysing qualitative research is an iterative process, and can thus not be carried out at the end of the data collection phase, but during and after data collection. It is advised to start the process of making sense of the data whilst still collecting data, and as soon as the first sets of data are available (Westas, 2002). During the transcribing process, interviews were transcribed verbatim (Merriam, 2002), meaning the ‘uhms’ and ‘ahs’ and the number of seconds of a pause are captured. Capturing transcriptions verbatim reflects cues about the participant’s way of processing what they are thinking (Gilgun, 2004).

Thematic analysis is a technique that is used widely in qualitative research to identify, analyse, and report patterns in datasets. This technique is also referred to as discourse analysis or content analysis (Braun, Clarke, Hayfield, & Terry, 2019). Analysing data using this technique involves constantly revisiting the entire dataset, including coded and analysed data.

Braun et al. (2019) have developed a six-phase guide on how to analyse data: 1) familiarisation of yourself with your data – refers to the researchers immersing themselves in the data with the aim of getting a better understanding; 2) generating initial codes – once the researcher is familiar with their data, they can start identifying initial codes; 3) searching for themes – this is the beginning of the interpretive analysis of the codes. Data extracts are organised according to the main themes. At this point, the researcher begins to see a relationship between codes, subthemes, and themes; 4) reviewing themes to gauge if they should be combined, refined, or discarded; 5) defining and naming themes is an ongoing process with the view of enhancing the themes that have been identified. This step is where the unified story about data emerges; and 6) producing the report – writing starts at this point, whereby the researcher transfers interpretable data and uses data extracts that relate to themes. The report should state the results of the analysis in a manner that convinces the reader.

The analytical process is concerned with seeking a clear understanding of the problem that is investigated by engaging with the data. Prior to analysing the data in this study, the researcher transcribed four (4) corporate social investment managers' interviews, three (3) focus group sessions, and four (4) centre manager interviews; these were then loaded and compiled into to *Atlas.ti*, which is a Computer Assisted Qualitative Data Analysis (CAQDAS) tool intended to track and manage data sources comprising fieldnotes, documentation, narratives, photographs, and audio records. When using a manual system, it is easy for the researcher to ‘forget’ the raw data that was used to formulate concepts, as it is painstaking to return to the data. However, with an analysis that uses software, the researcher can access the raw data in a few mouse clicks (Friese, 2006). However, Yin (2011) cautioned that there is a risk associated with using software, because the researcher becomes fixated with learning the software’s procedures and terminology. This may distract the researcher from the required analytical thinking and decisions that are required to conduct a good analysis.

In analysing the data, the researcher first read through the data for a first impression, and applied the six phases of thematic analysis as developed by Braun et al. (2019).

As part of the data analysis process, the researcher needs to make decisions regarding the inclusion or exclusion of data that is not suitable for the study, in line with the relevance to the research question. Therefore, data that is not aligned to the emerging themes were

disregarded. Coding could be developed either inductively or deductively (Lewins & Silver, 2007). An inductive approach is utilised when the researcher intentionally narrows the codes and eliminates any existing theories with an undertaking of discovering new theories. On the contrary, deductive coding is more interested in drawing up explicit classes with the purpose of testing existing theories (Ryan & Bernard, 2000). A deductive approach uses theory to lead the design of the research and interpret the research findings (Yin, 2011). During the empirical research process, the researcher is able to test the theory, and may change some propositions of theory or discard the theory completely. For the purpose of this study, a deductive approach was employed, as the researcher used concepts from the theory to guide the data analysis process.

3.9.1 Coding of data

Coding is a vital process in the analysis phase (Green et al., 2007). It assists the researcher to arrange and assemble data in a clear manner. There are various forms of coding, namely, open codes, selective/axial codes, and theoretical codes (Myers, 2013); coding is done in three successive phases, as described in Table 3-10.

Open coding involves coding of data in various forms and breaking it into smaller pieces, whereby the researcher generates as many categories as they can identify (Corbin & Strauss, 2008). This type of coding emphasises textual data (wording, context), which should be labelled in a descriptive fashion. Open coding further requires the researcher to be theoretically sensitive, which refers to the researcher's character and theoretical insight into what they are exploring (Glaser, 1978). Open coding guided the analysis of this study in developing an informed interpretation of data (Merriam, 2002), where assessments are based on paragraphs of transcriptions, observations, and collected documentation; each incident, idea, or event is given a code that represents the concept of primary data collection. Selective coding follows from open coding, which entails delimiting coding to categories that are closely aligned to the emerging theory (Glaser, 1978) and (Strauss & Corbin, 1998). This form of coding was then shadowed by axial coding, where categories are developed from patterns or themes and organised according to causality, context, and rationality revealed by data, with the aim of completely understanding the questions that the research seeks to answer. With axial coding, patterns are categorised by similarity (things taking place in a common manner), differences (things happening in a different manner), frequency (things taking place often or occasionally), sequence (things taking place in a certain order), correspondence (taking place in relation to other events) or causation-actions that trigger other actions (Saldaña, 2015, p. 7). Theoretical coding was employed as a next level of coding in order to refine the proposed

theoretical framework that describes the phenomena that is being studied. Theoretical coding was guided by SSM, Ubuntu philosophy and Autopoiesis concepts.

During this phase of the analysis, there could be instances where a different phenomenon emerges than the one that was originally assumed as taking central prominence; when this happens, the researcher would be making new and surprising discoveries (Böhm, 2004).

Table 3-10: Qualitative Coding Phases

Coding Phases	Description
Open coding	Breaking data apart and assigning text with a descriptive code
Axial coding	Presenting concepts/categories that relate to each other.
Theoretical coding	Inferencing predictive statements that are emerging, formatting theory.

Yin (2003) reiterates the importance for the researcher to revisit their proposition during the data analysis phase. In revisiting the proposition, the researcher continues to ask what narrative the data is revealing. At this point, the researcher should ask themselves: What is the problem that is being addressed? What have I learned from the study? What is or are the central idea(s)? What are the existing relationships? Bohm's rationale is that: first, it would assist the researcher to be attentive when analysing data and prevent any analysis that is outside the scope. Second, investigating opposing propositions would be an avenue to offer substitute explanation of the phenomenon. Lastly, the process increases the assurance in the research findings that the propositions and opposing propositions are dealt with and accepted or rejected (Böhm, 2004).

The researcher started the coding process by jotting initial codes on the actual interview transcripts, documents, and pictures. Subsequently, the researcher jotted the codes and notes on the margins of an exercise book and colour-coded them to identify patterns and themes. During this process, the researcher continued to revisit the codes. Theoretical coding was led by Ubuntu philosophy and autopoiesis concepts. These concepts were then used to develop the theoretical framework that describes the phenomena being investigated.

The projects of each of the case studies are unique to their communities. Data was analysed using the social systems framework concepts identified in Chapter 7, the results of which are presented in Chapter 9. Since this is an interpretive study, the analysis was guided by comparing the narrative within its context with the independent views of the participants.

Section 3.10 discusses the assessment and evaluation of the study.

3.10 Assessment and Evaluation

Assessing the accuracy of research findings is imperative in ensuring the 'integrity' of the research process. Due to different philosophical views and assumptions, researchers use different evaluation criteria to ensure the rigour of their inquiry. *Trustworthiness* is a term that is often used in qualitative research as a way of measuring the quality of research. These authors (Lincoln & Guba, 1985; Schwandt, Lincoln, & Guba, 2007) identified *dependability, credibility, transferability, and confirmability* as measurement criteria for trustworthiness with the aim to ensuring rigorous research findings. A study is viewed to be trustworthy if the audience judges it to be truthful.

Through the evaluation process, credibility is judged through the confidence that can be located in the truth of the research finding. Credibility further institutes whether the research findings epitomise plausible information that was provided by the participants, and that it is a true reflection of the participant's views (Graneheim & Lundman, 2004; Lincoln & Guba, 1985). The process of using multiple data collection techniques, termed 'triangulation', validates data in terms of consistency and congruence. Phillimore and Goodson (2004) mentioned that triangulation eradicates the researcher's views that could be biased, while improving the study's trustworthiness. The researcher compared interviews transcripts and fieldnotes to ensure trustworthiness.

Confirmability refers to the level to which the research findings could be confirmed or corroborated by other researchers (Baxter & Eyles, 1997). The researcher constantly reflected on the research process to ensure that the interpretations of the findings are a true reflection of what the participants provided and confirmed.

To ensure dependability, extreme care was exercised to ensure that the research process adopted was rational and traceable; it was illustrated in a reflexive manner by providing a detailed description of the research process.

The researcher described the research process of *what* was completed, *how* it was completed, and *why* it was completed, as well as its implementation in line with the prescribed criteria for qualitative research. This aimed to ensure increased authenticity and trustworthiness of the research. For this study, the following strategies were employed: prolonged field experience, sampling, reflexivity (field journal), triangulation, and peer examination to establish rigour in the inquiry.

Principles of Conducting and Evaluating an Interpretive Case Study

Klein and Myers (1999) have proposed a set of seven principles to evaluate interpretive case studies in information systems. It should be noted that Klein and Myers (1999) opted to use the term 'principles' to safeguard against the mandatory application of these principles. The researcher will be required to apply her mind and discretion when deciding to use these principles. Klein and Myers argue that the principles are interdependent and should be viewed as a whole.

The set of principles includes: a) principle of hermeneutic circle; b) principle of contextualisation; c) principle of interaction between the researcher and the subject; d) principle of abstraction and generalisation; e) principle of dialogical reasoning; f) principle of multiple interpretations; and g) principle of suspicion. These principles are discussed below.

Principle 1 - Hermeneutic circle

The *principle of the hermeneutic circle or process of sense-making* recommends that the researcher understands a whole from presumptions about the meanings of its parts and their interrelationships, and vice versa (Weick, 1995). Towards the application of the **principle of the hermeneutic circle**, the researcher will immerse herself with the participants (organisations and communities) in their social context in order to understand the impact of CSI ICT projects. The researcher will collect and study through companies' publications, such as reports related to the corporate social investment sustainability programmes. This will enable the researcher to gain insight towards understanding the various CSI initiatives that are undertaken by the companies under study.

Principle 2 - Contextualisation

The *principle of contextualisation* recommends that the researcher studies the social and historical background of a case setting when interpreting the situation. By providing context, it benefits readers of the research work. Conversely, an interpretive perspective acknowledges that context cannot be used to predict, but it is dynamic and can be influenced by the researcher. This principle required that the researcher searches for meaning in context.

In applying the **principle of contextualisation**, the researcher will investigate the data obtained from observations, reports, and interviews. This will be used in a social context (from external and internal) and historical understanding of the communities and organisations that are part of the study.

Principle 3 - Interaction between researcher and subject

The *principle of interaction between the researcher and the subjects* stipulates that there should be an acute reflection on how data was socially established through interaction between the researcher and participants (Klein & Myers, 1999). In applying this principle, it required that the researcher recognise the influences that the participants have on the researcher, and equally the influence that the researcher has on the participants.

Principle 4 - Abstract and Generalisation

The *principle of abstraction and generalisation* required the ability to conceptualise the collected data in the ways described in the application of principles one and two. The theory is often used as part of the abstraction to generalise concepts that illustrate the nature of participants' understanding and social action (Klein & Myers, 1999).

Principle 5 - Dialogical Reasoning

The principle of *dialogical reasoning* is a cycle that extends to include Principle 3, which establishes the need for a dialectic interaction until a common understanding is reached where the researcher can opt to review the previous assumption made at the beginning of the research in order to seek clarity (Klein & Myers, 1999). In applying the principle of dialogical reasoning, the researcher and the research supervisor will engage in dialogues toward reasoning about certain ambiguities or confusion in the research data. Ambiguity clarifications will be sought from the research participants, or secondary data such as documents will be reviewed.

Principle 6 - Multiple Interpretations

The *principle of multiple interpretations* requires that the researcher should be open-minded about possible different viewpoints emerging from the situation, to make sense of possible explanations for the differing views. The researcher will be required to find a way to accommodate differing views that may advance to a new interpretation of the situation (Klein & Myers, 1999).

Principle 7 - Suspicion

The principle of *suspicion* requires the researcher to be aware of inconsistencies in the data and to probe the meaning of participants' responses. It might occur that participants provide falsified or distorted information because of their own underlying issues. This principle is

viewed as optional by Klein and Myers (1999). In the event of suspicion, the researcher will verify the information with the community participants or organisational documents.

The above-described principles are applied in Chapter 10 of this study as a self-assessment guide to assess the validity and reliability of the study.

3.11 Conclusion

The goal of this chapter was to position the study in terms of the various aspects of research methodology, including philosophy, strategy, theory, data collection, and analysis.

This chapter discussed the different research paradigms, their strengths, and weaknesses. For the purpose of this study, the interpretive paradigm and case study strategy were applied, as it focuses on a profound understanding of a human being's everyday experience and aids to understand the nature of meaning further. A systems framework that combines SSM, Ubuntu, and Autopoiesis is employed as theoretical framework.

Multiple case studies were selected, and the appropriate data collection methods were based on the study's structure of participation by companies and communities. Sampling is used to study a smaller group of participants, who precisely represent the population and who meet the criteria. For this study, purposive sampling is used for selecting the participants.

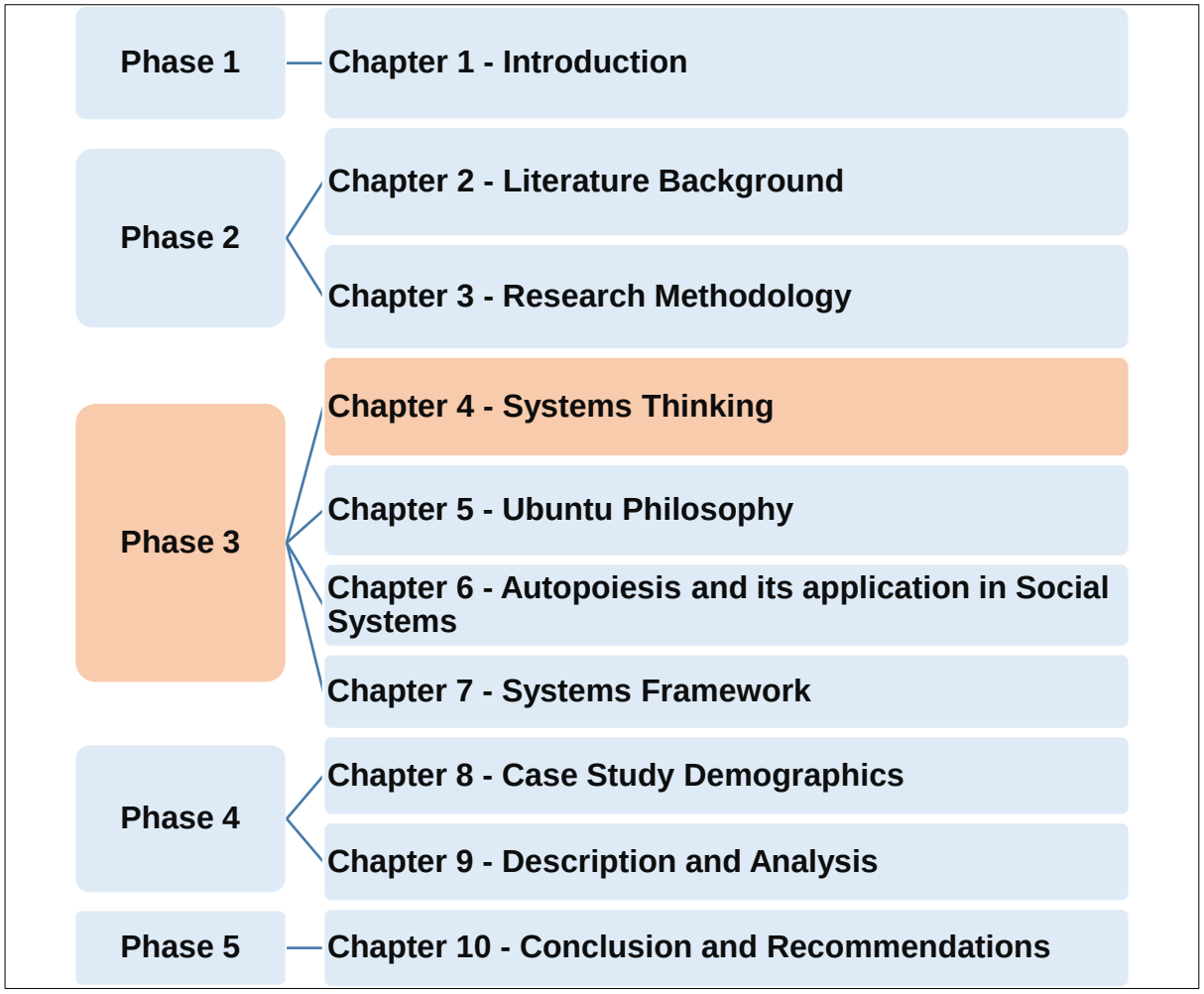
Prior to data collection, the researcher obtained ethical clearance to ensure that, when collecting data, there would be no harmful effects of the study could on the lives of the participants. Data collection methods for this study include interviews, documentation, and observations. Yin's five-phased qualitative data analysis approach will be applied to the collected data. The analysis of data will progress through open coding to axial, after which theoretical codes will be developed. *Atlas.ti as* CAQDAS will be used to manage and store data. Table 3-11 presents a summary of the research design and methodology that the research will follow.

Table 3-11: Research design and methodology

Method	Choice
Research Philosophy	Interpretivism
Research Approach	Deductive approach
Research Strategy	Multiple Case Study
Time Horizon	Cross-sectional
Data Collection	Interview, focus group, document review
Data Analysis	Yin's five-phased data analysis process with open and theoretical coding
Theoretical Framework	Ubuntu philosophy and Autopoiesis

The next chapter discusses concepts related to systems thinking, which forms the foundation on which the systems approach (as an analytic framework for this study) is based.

4 CHAPTER 4 SYSTEMS THINKING



4.1 Introduction

The purpose of this chapter is to provide an overview of systems thinking and its position in this research. Systems thinking entails the development of an understanding of the system by exploring relationships and interactions among its constituting elements. In this particular study, the focus is on the interplay between community needs, learning centre dynamics and companies' objectives in implementing CSI ICT projects. In contrast to considering independent relationships, systems thinking advocates for inclusive viewing of multiple relationships.

The chapter begins by discussing systems in terms of philosophy, methodology and application from a systems' thinking perspective. This is followed by an introduction of the basic systems terminology that is used in this research, as well as the systems approaches that resonate with the understanding of social systems.

The chapter concludes with a discussion on the application of systems thinking, in preparation for the application of systems thinking in analysing the impact of CSI ICT projects.

4.2 Systems Thinking Background and Overview

Philosophers such as Plato and Kant laid the philosophical foundation of systems thinking (Stacey, Griffin, & Shaw, 2002). The domain of systems thinking was developed further by biologists, who accentuated the outlook of living things as an integrated whole (Capra, 1996). As more attempts are brought forward in an attempt to solve significant problems in current times, the realisation increases that problems cannot be understood in isolation, and can therefore not be addressed in isolation. Capra (1996) notes that leaders have failed to see how all problems are interlinked, and that their proposed solutions have a spill-over effect in future generations. From a systematic perspective, feasible solutions are those that are sustainable. Brown (1982) conceptualises the notion of sustainability as a critical concept in ecology that aims to satisfy current needs without failing the prospects of generations to come.

4.2.1 Systems Terminology

This section introduces the terms that are associated with systems thinking. Before proceeding with a discussion on systems thinking, some basic terminology needs to be introduced:

A boundary is an interface that separates the system from the environment (Gharajedaghi, 2006, pp. 30-31).

Environment – A system's environment includes all factors that can affect its state. External factors that affect non-essential elements of a system are not considered as part of its

environment. There are two types of systems, namely, closed and open systems. A closed system does not interact with its environment. Emery (1969) added that closed systems relate to formism, mechanism, contextualism and organicism, and that none of these could articulate the relationship between the environment and an organisation. An open system, on the other hand, is considered as dynamic and interchanging with its environment, which further implies the presence of boundaries and their maintenance (Parsons, 1961).

A system, as defined by Von Bertalanffy, is "a set of elements standing in interaction". This refers to a system as a cluster of elements with a common aspect and encompasses any clustering with some form of relationship – for example, a group of people, a forest, the planets. If it is possible to recognise a cluster of elements, this collection is referred to as a "system" (Bertalanffy, 1969).

Structure: the way in which the elements of a system are interrelated (Lannon, 2018).

Function: The lifecycle of a structure exhibits itself in its function. For example, any failure in the structure may lead to a body not functioning as it should be. Ackoff (1971) describes the function as an outcome that defines the system's objective.

Feedback is regarded as the return of information about the status of a process. For example, in annual performance appraisals, feedback is a way the employer returns information to an employee about their work performance. Various researchers have reflected that feedback is a vital element of systems thinking and that there are two kinds of feedback; the first one is referred to as negative feedback with balancing loops, and the second one as positive feedback with intensifying loops (Forrester, 1968; Kim, 1993; Richardson, 1991; Wolstenholme, 1990).

Emergence is a behaviour that can appear when two or more agents interact in an environment, to form a new behaviour as a collective. For example, when studying hydrogen and oxygen in isolation, particular characteristics are observed. However, through the interaction of the two elements, water becomes an emergent characteristic of the mutual interaction of hydrogen and oxygen (Lewes, 1877). According to Blitz (1992), "Emergent properties are anchored in structures, and do not exist independently of them, though they are not reducible to them".

An ***information system*** is defined as a combination of hardware, software, and communication that is intended for the processing and handling of business information (Yeo, 2002). In recent years, people have depended on modernised information systems to process and communicate with others. These types of systems may or may not include the utilisation of computer systems (Yeo, 2002).

In systems thinking, information systems exist to assist and serve the people that require information to make decisions (Checkland & Scholes, 1990). In a book authored by Checkland and Holwell (1998), an information system is considered to comprise two systems: the system being served, comprising of people with information needs to make decisions, and the serving system that provides support to the people in the system, thus enabling them to make decisions. These systems are referred to as “meaningful systems”.

4.2.2 Systems in context

Systems thinking is a way of viewing reality that assists us in understanding and working with communities and organisations. Systems may comprise of people, processes and structures that are designed to work together to ensure that the system survives. The characteristics of a system include a purpose that defines it. In Ackoff’s view, the environment of every system should consist of three stages of purpose: “the purpose of the systems; sub-systems and suprasystems” (Ackoff, 1981, p. 23). All parts of the system must be present for a system to carry out its purpose. The manner in which sub-systems are arranged will have an impact on the overall performance of the system. Systems further require feedback mechanisms to enable their stability.

As mentioned by Ackoff (1971), a system is governed by the environment, which in turn can affect its state. In systems thinking, an environment is viewed as the set of all entities for which a change in elements influences the system, as well as those entities that are influenced by the performance of the system (Hall & Fagen, 1956).

Reductionism vs holism

In the sixteenth and seventeenth centuries, Descartes developed the technique of analytical thinking, which meant that a complex phenomenon was to be broken up into smaller pieces to understand the behaviour of the whole from the properties of its part. This technique is also known as reductionism. Systems thinking emerged around the twentieth century as a response to the notion of reductionism. Reductionism or traditional analysis is the approach of reducing system parts into smaller pieces for in-depth analysis. In contrast, systems thinking emphasises that our understanding of systems cannot depend on analysis alone. Scientists such as Ludwig von Bertalanffy questioned Descartes' view on reductionism and philosophical analysis, and argued that a system could not be understood by analysis alone (Capra, 1996). Von Bertalanffy illustrated that the constructs of reductionism did not have much power in appreciating the dynamics of living systems. He promoted the idea that the properties of the parts of the system are to be understood as a whole. Many scholars have claimed that knowledge and meaningful understanding emerges from considering the whole phenomenon

and not dismantling it into smaller pieces. In line with the systems view, systems thinking employs an understanding of a system by exploring the relationships, influence and interactions between the parts that make up the whole system (Flood, 2010).

4.3 General Systems Theory

Around the 1940s, Von Bertalanffy introduced the foundation of general systems theory by joining together the concepts of systems thinking and biology to formulate a theory of living systems (Flood, 2010). This research developed into a theory of open systems (Capra, 1996; Flood, 2010). Open systems theory uses functional and relational measures to examine the whole, rather than a process of reductionism to examine system elements. Systems thinking requires living things to co-exist with their immediate environment. Its structures are maintained by managing the ongoing flow of information and vitality between living things and the environment. Flows happen in a living system through various elements that are interrelated through feedback loops (Flood, 2010). In 1968, von Bertalanffy published a book on general systems theory that was based on open systems principles. These open systems organise themselves in a stable manner away from equilibrium, projected by constant flow and change. Von Bertalanffy came up with the German phrase *Fliessgleichgewicht* ("flowing balance") to define the state with which dynamic change happens (Capra, 1996).

4.4 Cybernetics

Drawn from the Greek *kybernates* or “steerman”, the term “cybernetics”, as defined by Norbert Wiener in 1948, emphasises communication and control in living things, as well as artificial systems with assumed or defined goals. Cybernetics was developed into an integral concept that led to organismic biology and general systems theory (Wiener, 1948).

The notion of cybernetics was refined between 1946 to 1953 at the Macy conferences on cybernetics that were held in the USA. The cyberneticists were drawn from a widespread population of scholars, including mathematicians, neuroscientists, social scientists and engineers. The cybernetics discourse focused on patterns and communication, more particularly in closed loops and networks (Capra, 1996; Flood, 2010; Heylighen & Joslyn, 2001). Their research directed them to the notions of self-organisation and feedback cycles. Wiener was mindful about the importance of feedback for modelling – not only of living things, but also of social systems (Capra, 1996; Ramage & Shipp, 2009).

The notion of feedback is closely related to that of network patterns. There are cycles and closed loops in a network pattern, which can be viewed as feedback loops. A feedback loop is based around cause and effect: the primary cause promulgates around the connection of

the loop; in order for each element to have an effect on the element, this will happen until the final element "feeds back" the effect into the primary component of the loop. In living networks, feedback loops can be self-controlled and self-organised (Capra, 1996).

Through the 1950s, cybernetics, in conjunction with General Systems Theory (GST), challenged existing thinking by attempting to develop an amalgamated science through uncovering the common tenets that manage open systems. GST focuses on systems at all levels; however, cybernetics focuses more explicitly on goal-directed, functional systems (Heylighen & Joslyn, 2001).

Third-order cybernetics saw the unveiling of the term “sociocybernetics”. This term elevated cybernetics and systems thinking to a higher level to reflect on issues of society at large (Geyer, 2003). This introduced complexity to social sciences by focusing on relations and impacts. This opened human insight into previously overlooked attributes of reality. Knez-Riedl, Mulej, and Dyck (2006) developed 6 attributes that they warranted as necessary for a synergetic whole:

- A system that is very complex, is a system with various internal and external relationships;
- A system that is open, has relations with its environment;
- A system that is dynamic should be able to adopt to any change with which it could be confronted;
- A system that takes inputs, produces outputs, and is impacted by information and energy flows;
- A system that can support, stabilise and simplify component flows; and
- A system that is mentally, explicitly or implicitly modelled from selected viewpoints.

4.5 Systems Dynamics

Forrester (2009) states that organisations should develop models in order to improve organisational processes. Systems Dynamics (SD) is a process that starts with mental models with the quest of obtaining information, and then organises the information into simulation models (Forrester, 2009; Richardson, 1991).

Ryan (1996) indicates that synergies exist between the characteristics of systems dynamics and the characteristics of pragmatism:

- SD adopts an ongoing outlook of events, where feedback mechanisms play an essential part in the process;
- SD uses reference models to create a system that is interested in complex problems, and uses symbols to depict the system; and
- SD promotes group model creations in order to represent “a community analysis”.

The strength of SD is found in the power of its claim that structure is the main cause of systems behaviour, and that structure can be viewed as the interrelationship between positive and negative feedback cycles. According to Jackson (2003), this therefore demonstrates that SD is a unifying interdisciplinary framework, capable of viewing situations beyond the surface detail. Systems dynamics is said to be able to assist organisations in dealing with complex problems, so as to facilitate change and improve social systems.

4.6 ‘Hard’ vs ‘soft’ systems thinking

According to Checkland (1981), a systems approach can be applied to understand social phenomena. A systems approach assures the creation of meaning that resonate with societal experiences within a systemic world.

Burrell and Morgan (1979) argue that the social theories that are used in business analysis could be partitioned into four paradigms, which represent the fundamental assumptions about the world, namely: functionalist, interpretive, radical humanist and radical structures. Checkland argue that the approaches that he termed hard systems thinking are aligned with the functionalist view. Jackson (1982), following the argument made by Checkland, suggest that soft systems thinking could be located in Burrell and Morgan’s interpretive paradigm.

A functionalist systems approach assumes that systems are objective components of reality, and that they are independent of the observer. For example, various observers would see the same system and regard it to have the same goal. Functionalist approaches have been applied in problem situations that are considered to be technically complex, but they can also deal with low human complexity and low to medium multiple views (Daellenbach, 2001).

An interpretive approach to systems thinking allows for subjectivity. It deals with a problem situation from the worldview of the observer. While an interpretive systems approach allows for divergent views, it assumes that there is a level of sharing of interest with stakeholders, where they see this outlook as a way of cooperation. Interpretive or soft systems thinking can accommodate a significant degree of human complexity and a diversity of interest and values; however, this approach cannot necessarily manage technical complexity (Daellenbach, 2001). Table 4-1 illustrates the differences between hard and soft systems approaches

Table 4-1: The hard and soft traditions of systems thinking (Checkland, 1985).

The 'hard' systems thinking of the 1950s and 1960s	**The 'soft' systems thinking of the 1980s and 1990s**
Oriented to goal-seeking	Oriented to learning
Assumes that the world contains systems that can be 'engineered'	Assumes that the world is problematic, but that it can be explored through system models
Assumes systems models to be models of the world (ontologies)	Assumes systems models to be intellectual structures (epistemologies)
Talks the language of problems and solutions	Talks the language of issues and accommodation
Advantages	**Advantages**
Allows for the use of persuasive techniques	Is available to both problem owners and professional practitioners; keeps in touch with the human content of problem situations
Disadvantages	**Disadvantages**
May need professional practitioners	Does not produce final answers
May lose touch with aspects beyond the logic of the problem situation	Accepts that an inquiry is never-ending

4.6.1 Hard Systems Thinking

Hard systems thinking according to Checkland (1985) assumes that:

- the problems associated with particular systems are well-defined;
- they have a single, optimum solution;
- a scientific method will be the best means of assessing problems; and
- technical influences will dominate problem solving.

Checkland (1999) argues that hard systems provide a skewed picture of the reality of human systems, due to a shortfall in identifying conflict that exists in social systems; this results in systems that are unsuitable to address social systems problems.

4.6.2 Soft Systems Thinking

According to Checkland (1999), there are various types of systems, namely, natural systems, designed physical systems, designed abstract systems, and human activity systems (HAS); all of these systems are different in nature and purpose. He further states that a soft systems approach is best suited to human activity systems. Churchman reiterates and advocates for an ethical systems theory, as well as for morality in human systems inquiry (Churchman, 1979, 1982).

4.6.2.1 Soft Systems Methodology

Checkland, while at the University of Lancaster in the United Kingdom during the 1960s, developed a road map for Soft Systems Methodology (SSM). Initially, SSM was developed as a modelling tool; however, through the years it was elevated to learning and development tools. While the methodology develops models, these are not meant to emulate the real world but to utilise system rules and principles to allow its structures to begin to think of the real world. The models have been found to be neither descriptive nor normative (Williams, 2005), although they may have characteristics of both. Checkland envisaged that the development of systems concepts and thinking could assist with the understanding of the world and subsequently in trying to resolve real-world problems. As a result, he and his colleagues have developed the methodology on how to deal with 'soft' problem circumstances (Mingers, 1980).

SSM permits the researcher to address soft problems, using a Mode 1 'investigation' or a Mode 2 'investigation'. A Mode 1 'investigation' is a formal application of an 'intervention' into the 'problem situation'. The Mode 2 'enquiry' is carried out before action is taken. Mode 2 is an 'interactive' process that aims to improve a 'problem situation' through learning about the root causes of the problem (Checkland & Scholes, 1990).

This methodology entails the following phases, according to (Checkland, 1999):

a) Establishing the problem situation by means of rich pictures and root definitions;

b) Based on the above, developing conceptual models;

c) Assessing the problem situation by comparing the conceptual models to reality; and

d) Implementing appropriate changes associated with the problem situation.

The initial phase of the SSM application, namely the drawing of a rich picture, presents a holistic technique for illustrating the problem. The key stakeholders and their benefits, views, and interactions are illustrated through rich pictures (Checkland & Poulter, 2010). Figure 4-1 illustrates the rich picture of a distance learning state by means of an example. The essence of the technique is that it forces the creator to think thoroughly about the problem, and to further understand it to the extent that it can be summarised pictorially. It also forms the basis for further investigation of the problem situation.

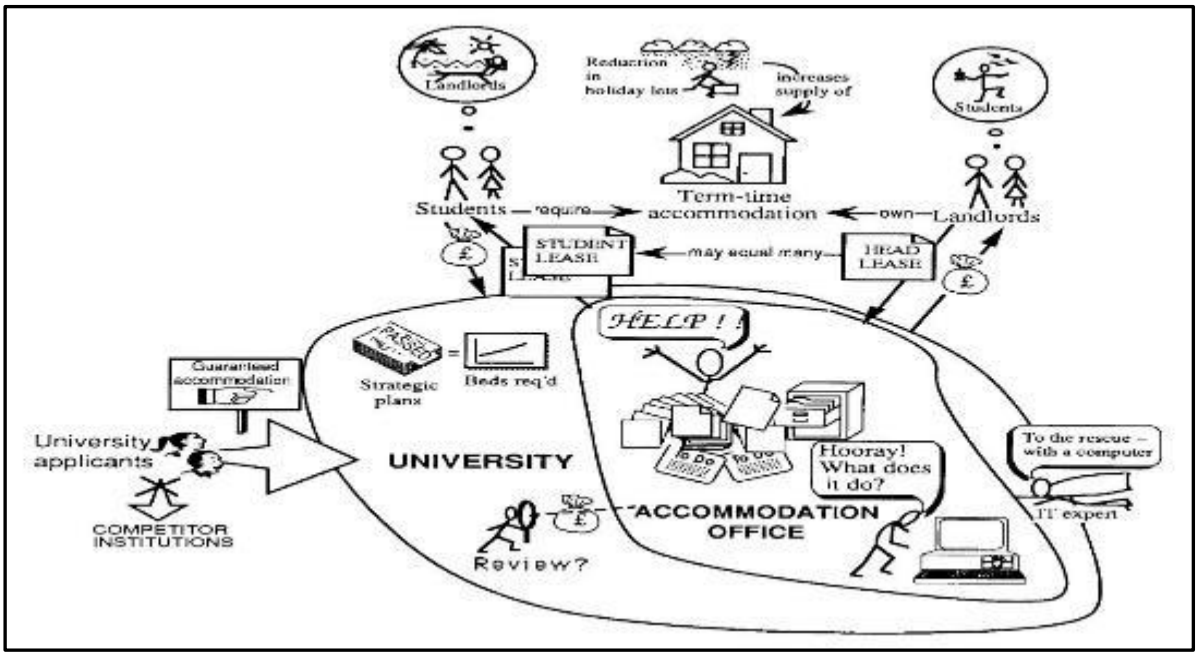


Figure 4-1: Illustration of a rich picture
Source: Checkland and Poulter (2010)

The development of a root definition is the subsequent phase to the rich picture. It highlights the different perspectives and views on the problem situation and can be viewed as the concise description of the relevant system based on a particular outlook. Root definitions are an illustration of the capability of the system (Christis, 2005). The CATWOE technique was introduced by Checkland (1981) as a means of formulate the root definition in SSM.

The CATWOE mnemonic assists in identifying the role players in the systems, and to describe their actions towards transformation. *Transformation (T)* is central to the root definition, as it encompasses the concepts of the system and articulates any significant activities that "*transforms input into output"* (Hardman & Paucar-Caceres, 2011). During this phase, multiple role-players or people involved in the situation reflect their divergent views (Rodríguez-Ulloa, Montbrun, & Martínez-Vicente, 2011) and agree on a shared purpose of the relevant system which, as a means of driving transformation (Burge, 2015).

Table 4-2: Checkland (1981) introduced the CATWOE mnemonic

C (Customers/Clients)	These are the people who stand to benefit or suffer due to a change in the system. The initial step in a CATWOE technique is to identify customers/clients.
A (Actors)	The actors are the people involved in making changes in the system.
T (Transformation)	This is the change that takes place by defining inputs and turning them into defined outputs
W (Weltanschauung)	Weltanschauung, also known as "Worldview", is the view of the transformation that will impact the system.
O (Owner)	These are the people who own and have the authority to make changes to the system.
E (Environment)	This is the broader system of which the action is a part. It refers to the constraints and boundaries that will impact the resolution.

Whilst the root definition symbolises the relevant system, the conceptual models symbolise the activities that the system must execute to demonstrate the system that was defined in the root definition (Checkland & Tsouvalis, 1997).

Checkland (1996) accentuates that, when developing conceptual models, action words ought to be used to express the necessary actions within the root definitions. In the comparison phase, the conceptual models are evaluated against the problem situation with the aim of identifying possible changes to the system. The envisaged changes have to display systemic desirability and cultural feasibility.

The Multiple Perspectives Approach

The Multiple Perspectives approach (MPA) is a framework that was introduced by Mitroff and Linstone (1993), that is suitable for the analysis of messy social systems in developing country settings (Turpin, Phahlamohlaka, & Marais, 2009). The MPA proposes that problems emerging from social systems should be approached from various perspectives during analysis. It promotes interdisciplinary and intercultural competencies to problem situation aligned to sustainability, which is central to people's values and worldviews (UNESCO, 2012). Each perspective carries its own worldview that challenges other perspectives' ideas and solutions (Mitroff & Linstone, 1993). The MPA incorporates views of individuals, groups, companies or systems; however, it is impossible to account for all the network's relationships. By involving various stakeholders' perspectives, insights are usually revealed on how to deal

with a problem situation. Moreover, employing the MPA is an attempt to expand the traditional mindset (Werhane, Kelley, Hartman, & Moberg, 2009).

The MPA groups potential perspectives on the situation into the following classifications: Technical, Organisational, Personal, Ethical and Aesthetic. The Technical (T) perspective highlights the empirical method, as established in the school of science and engineering, and hence viewed as the rational approach to solving problems (Mitroff & Linstone, 1993). The Organisational (O) and Personal (P) perspectives characterise the respective subjective views of the stakeholders in a formal and informal manner. Mitroff and Linstone focus on the T, O and P perspectives, whilst the Ethical (E) and Aesthetic (A) perspectives were later added.

It must be noted that the framework has encountered challenges. Because it is philosophical in nature, it provides minimal guidance for implementation (Turpin et al., 2009).

4.6.3 Complex Systems Theory

A “complex system" refers to a group or business that is constituted of various interacting components. Each component of the system is autonomous to a certain point, but components interact with one another, directly and indirectly, thus making the overall behaviour of the system very difficult to predict (Heylighen, Cilliers, & Gershenson, 2006). A complex system also considers the behaviour of systems components that consist of two or more parts, where there is a fine line between order and disorder (Mitchell & Newman, 2002). An ecosystem serves as an example of a complex system. Depending on one’s outlook, one may think of individual organisms or entire species as the agents from which an ecosystem is built.

Complex systems display some of the following systemic characteristics: emergent behaviour, non-linearity, feedback loops, openness, the whole is more than the sum of its parts, nested systems and boundaries (Ramalingam & Jones, 2008).

4.6.4 Critical Systems Thinking

4.6.4.1 Critical System Heuristics

According to Daellenbach and McNickle (2005) the legitimacy and effectiveness of any system are determined by choosing an appropriate boundary and a suitable environment. Ulrich (1983), in his critical systems heuristics (CSH), depicts a process to be utilised when selecting a boundary and its associated judgements. Boundary judgments refer to the exploration of observation and values, deciding what is relevant and what is less relevant. Since they include both "facts" and "values," boundary judgments play a significant role when assessing the significance and merits of a claim. The idea behind CSH is that problem descriptions in

proposals for improvement are all reliant on the previous judgement about the whole system under consideration. As human beings interpret the “real-world” through perception, these perceptions are affected by personal interests, values and worldviews. In any situation, humans judge which facts are relevant to a situation, and their interpretation therefore depends on their interest, values and worldview. As a result, values and facts cannot be viewed individually. Ulrich (1983) therefore refers to the relationship as the ‘eternal triangle of the reference system, facts and values’ (Figure 4-2).

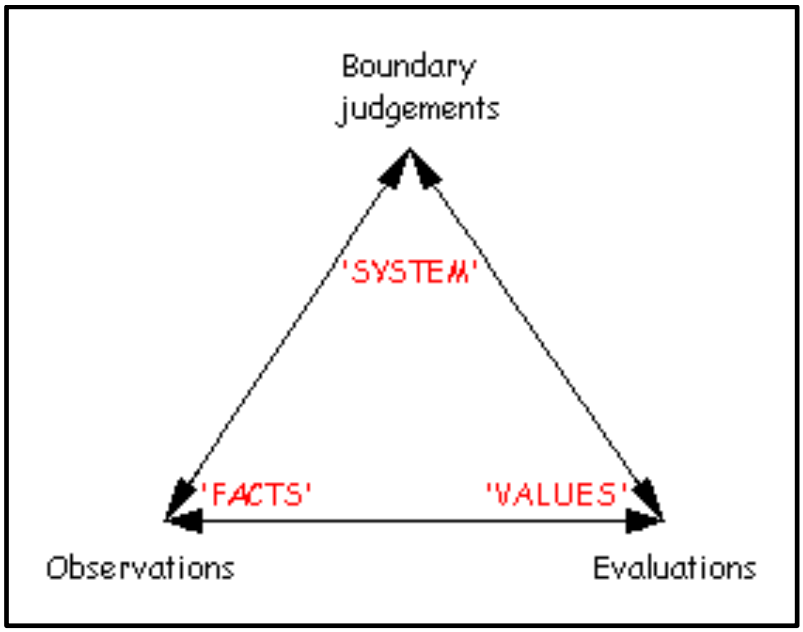


Figure 4-2: Ulrich's 'eternal triangle of reference system, facts and values’.

Ulrich claims that, when assessing the boundaries of a system, you need to engage with four types of stakeholders, namely: the client, the decision-maker, the planner and those who are affected by the system but not involved. Ulrich further states that the criteria to assess a boundary might not always yield the correct answers. Twelve critical boundary questions represent classifications (Figure 4-3) of relative *a priori* judgements (Ulrich, 1998). They are referred to as a *priori* because they are understandably and temporally positioned prior to analysing a problem situation. This framework of boundary questions may be used for selecting boundaries for the system (Ulrich, 2000).

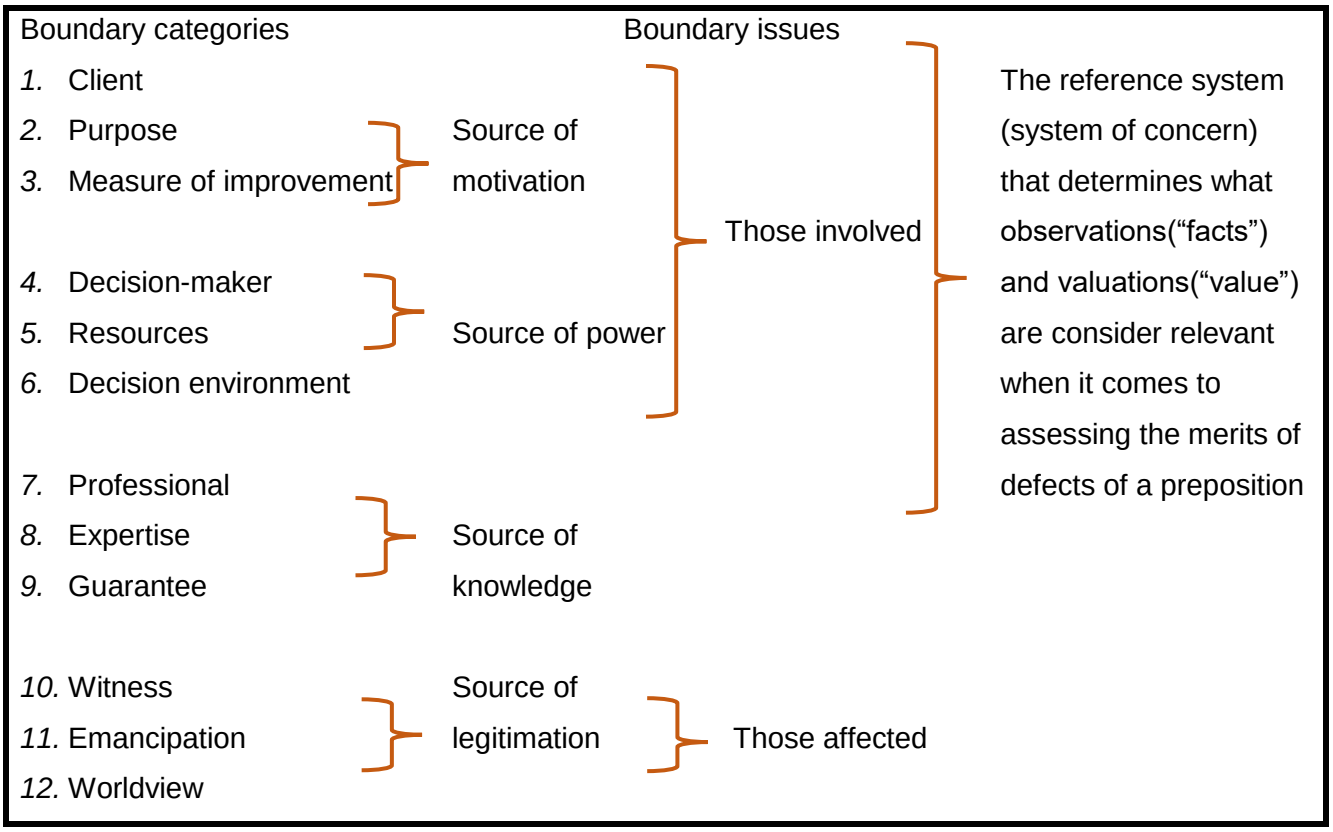


Figure 4-3: The boundary questions of critical systems heuristics
Source: (Ulrich, 2000)

4.6.4.2 Critical Systems Thinking

The term critical systems thinking was devised around 1980, and emanated from two philosophical schools, namely, CSH by Ulrich and work commissioned by Jackson, Keys, and other researchers.

Jackson acknowledges the interest that Churchman, Ackoff and Checkland had in the radical change of the world. However, Jackson (1982) believe that their methodology will not affect the change they anticipated. He further argues that Checkland's SSM, in its emphasis on finding agreement between stakeholders, neglects to deal with concerns of conflict and compulsion. Jackson continued to work on a critical approach to systems thinking. He had an understanding of an approach that was based on critical theory, the theories that were made popular by post-Marxists social theory and the research work of Jürgen Habermas (Jackson, 2001). Jackson, alongside Robert Flood, began to develop critical systems thinking (CST) in the 1980s. CST's primary domain is clustered into five promises: "it seeks to demonstrate critical awareness; it shows social awareness; it is dedicated to human emancipation; it is committed to the complementary and information development of all the different strands of

systems thinking at the theoretical level, it is committed to the complementary and information use of systems methodologies" (Jackson, 1991, pp. 184-185).

Jackson later changed the focus of his approach from promoting emancipation to critical systems thinking (Bowers, 2014). This approach refuses to accept the positivist epistemology of "hard" systems thinking, and offers a post-positivist epistemology for "soft" systems with a main focus on liberation through "communicative action" (Banathy & Jenlink, 2004). CST consists of three philosophical tenets, namely: critique, emancipation and pluralism (Watson & Watson, 2011).

4.6.4.3 Critique

Boundary critique was promoted by Churchman (1970) after realising the shortfalls of hard systems thinking. He developed an argument for viewing systems thinking critically as a system by itself, and further challenged systems academics to be open to a systemic analysis of systems thinking. This concept encourages researchers to take into account methods, practices and underpinning theories. In addition, the concept appeals to researchers in that, when undertaking research, they should not be looking at the assumptions and conceptual traps of the current research but should instead strive to create new ones. The critique concept is vital in considering issues of power and emancipation.

4.6.4.4 Emancipation

Emancipation emphasises the liberation of society's members, and the transformation of society's systems, governing policies and processes that promote oppression and social injustice. This notion of emancipation is seen in the works of Jackson (1985), where he calls for an "emancipatory systems approach", and Flood (1990) "liberating system theory" for liberation and critique. In the work of Oliga (1991), the emphasis is on empowerment and transformation of social systems. In addition, Ulrich (1987) considers equal community participation in development. CST guides researchers on the understanding of complex situations, where contentions are based on power or oppression (Watson & Watson, 2011).

4.6.4.5 Pluralism

This approach challenges researchers to free themselves of traditional research methodologies, and promotes the use of varied, creative design and the recognition that an assortment of systems methods are available (Watson & Watson, 2011). Pluralism detaches itself from the prescribed methods of pragmatism that combines a toolkit of proven methods, and further rejects the use of a sole theory (Flood & Jackson, 1991).

4.6.5 Total Systems Intervention (TSI)

In 1991, Flood and Jackson introduced TSI as a mechanism that would enable managers to operationalise the philosophy and principles of CST. According to those authors, TSI is a meta-methodology that infuses a variety of metaphors, a framework of systems methodologies and a number of systems approaches to enable creative problem solving. The following metaphors by Flood and Jackson (1991) are used to view an organisation: machine, organism, brain, culture, political system and coercive system. By utilising the metaphoric concepts, managers of organisations are able to sort in order of importance those objectives that are key to the organisation and to aid them in strategic planning.

TSI is made up of three aspects, namely: creativity, choice and implementation. In complex situations, managers are encouraged to think creatively in order to come up with solutions to address emerging problems. Managers are encouraged to use metaphors to gain an in-depth understanding of a complex problem. The process enables managers to come up with multiple solutions to choose from. The appropriately selected methodology is then employed to address the problem at hand. This acknowledges that TSI puts the tenets of CST into practice (Warren, 2002). As research progresses, the latest TSI-related development comprised the release of Local Systemic Intervention (LSI) which encourages learning more about the problem area and devising a solution to address the situation (Flood & Romm, 2007).

4.7 Application of systems thinking to CSI

This section reviews the contribution that systems thinking has made in the domain of Corporate Social Investment (CSI). From a system thinking perspective, companies and communities are open social systems that must deal with cultural, environmental and organisational uncertainties. Because they are influenced by external forces and environmental conditions, companies and communities cannot control their own behaviours (Cummings & Worley, 2004).

4.7.1 Application of systems thinking to Organisations

Various examples exist of the application of systems thinking to the study of companies (Mingers & White, 2010). Systems approaches play a significant part in organisational theory. Burrell and Morgan provide a comprehensive study of the application of systems models of organisations and their equivalent theoretical foundations, in which they publicised the relationship patterns within the system and between the system and its environment (Burrell & Morgan, 1979). The acceptance of systems thinking in companies is demonstrated in the

ways in which they use their resources and the adoption of concepts such as feedback and input, transformation and output.

4.7.2 Previous Applications of systems thinking to Corporate Social Investment

Two significant and interconnected streams constitute the core of CSI. First, CSI seeks to cultivate sustainable development, and to reflect companies' role in terms of 'triple-bottom-line reporting' (Mingers & White, 2010). Second, in relation to sustainable development, there is a growing interest to view CSI situations from a systems perspective (Elkington, 1994; Mingers & White, 2010).

Corporate social investment (also referred to as corporate social responsibility) is viewed as the manner in which companies align their principles and behaviour with the expectations and needs of different stakeholder groups (Lee, 2008). For a business the latter may include owners, investors, customers, suppliers, employees, local communities and government. These groups often formulate partnerships that have more bearing (influence) than a stakeholder alone (Vos, 2003). CSI requires that companies manage their socio-economic developments and the environmental impacts of their processes in order to maximise profits, whilst striving to minimise the risks for their stakeholders (Zwetsloot, 2003). According to Knez-Riedl et al. (2006), CSI can be viewed as a process between local communities and companies that redresses the complex situation of community behaviour, community interest and community capability. They further stipulate that community behaviour is influenced by the economic theory of rationality, greed and equilibrium. In the current economic situation, the rich become richer whilst ignoring the needs of the less fortunate. Systems thinking emphasises a way of understanding reality and relationships or interconnections. In the context of CSI and communities, it is essential to understand the community as a whole with its many and varying interrelationships. Communities too can be viewed as a system.

Systems thinkers like Ackoff view CSI undertakings as activities that a company can undertake in addressing its own benefits and the interests of the broader society. However, the complexities in CSI practices have led to the criticism that companies partake in CSI initiatives despite not being clear of who stands to reap the benefits of business, society or both (Aguilera, Rupp, Williams, & Ganapathi, 2007). The increasingly significant discourse on sustainable development and CSI requires companies to consider relevant holistic approaches, such as a soft systems approach, which can deal with the complex situations of CSI and sustainable development (Zlatanović, 2015).

The following section discusses the various systems approaches used by scholars in CSI initiatives.

4.7.2.1 Soft Systems Methodology

It is assumed that systems methodologies are able to address differences in stakeholder groups (Porter, 2008). Additionally, Soft Systems Methodology (SSM) has been advocated as the most appropriate methodology to deal with CSI situations (Córdoba & Campbell, 2008). This is because SSM has the capability to see through an ill-defined complex situation or 'mess'. To illustrate, one of the critical features of soft situations is the presence of diverse, contrasting outlooks of problem situations, which may result in a number of "relevant problems" (Zlatanović, 2015). SSM involves incorporating diverse insights of reality, advancing the learning process by exploring and discussing multiple viewpoints on the way to purposeful achievements and development (Jackson, 2003, p. 185).

The application of SSM in corporate social investment, as demonstrated by Zlatanović (2015), entails drawing a rich picture of the situation to formulate the root definition. The root definition is a concise depiction of the relevant system. When formulating root definitions, key challenges and principles of CSI need to be taken into account. Consequently, CSI as a relevant system can be presented using the CATWOE technique. The second phase then entails the development of conceptual models relevant to the system, after which these are compared in alignment to the real world. The use of SSM to CSI provides a holistic investigation into the diverse, contrasting views and analyses of the pertinent stakeholders, including identifying the systemically and culturally possible changes that improve CSI and sustainable development.

4.7.2.2 Critical Systems Thinking

Critical Systems Thinking (CST) in CSI initiatives provides an opportunity to establish boundaries for each position to explore who and what is included and excluded, and to further understand who makes decisions and who is not part of the process (Midgley, 2000). After a structured CST process on system boundaries has been followed, stakeholders are well informed and better prepared to engage in productive discourse and are also in a position to suggest solutions to address a complex situation. Ulrich's (1996) emancipatory employment of boundary judgements seeks to highlight power, deception and dogmatism claims. The purpose is to ensure that respective parties disclose their motives or interest; its claims tend to rely more on boundary judgments. Critical Systems Heuristics (CSH), as derived from the traditional CST, can assist in resolving the stakeholder identification problem, especially with regard to the category of the affected (Vos, 2003). The applicability of CSH is evident in Ulrich

(1996), who outlines four CSH categories, namely: *source of influence (*motivation, power, knowledge, and legitimacy*), stakeholders* (groups of people relevant in the system)*, stake* (core benefits or interests*), and stakeholdings* (conveys ideas that stakes are not residual entities but relational attributes).

4.7.2.3 Complex Systems

A complex system encompasses a vast number of internal parts that are connected together (Rihani, 2002). These systems are bound by ethics, memory and history. Queiroz (2014) asserts that complex systems have an element of surprise, ambiguity and contradiction. They are nested, interrelated systems – for example, the economy, society and ecosystems. It is beneficial to understand how they are all associated. All the levels are both a whole and apart at the same time, whereby stakeholders interact to create new results, or new value. Although individualism can be emphasised, the integrity of the whole should not be undermined. These interactions often result in complex adaptive systems (CAS), where the collective have the ability to adapt to the new environment in a systemic manner (Frederick, 1998). Organised groups of living things (e.g., a pride of lions, a church, a business, a community) are regarded as complex adaptive systems.

Benn and Bolton (2011) explored CSI in relation to a complex system. They regard complex systems as a representation for creating new ideas in managing behavioural change in the system. This implies a need for creativity, growth and self-organisation when stakeholders find themselves in a complex situation. The complex adaptive systems' sustainability process is built on principles that promote better insights into addressing social ills and interaction between companies, society and the natural environment (Porter, 2008)

Queiroz (2014) further suggests for organisations to move away from their "simple" corporate attitudes, to seeing communities as an integral part of the system or business, and for the employees of companies to view themselves and their work as part of the larger system. Queiroz (2014) propose a business case for CSI, which would build integrative capacity and encourage pragmatism.

4.7.2.4 Systems Dynamics

System dynamics has been used in CSI to understand the interaction of stakeholders whose opinions and actions have an impact on corporate initiatives. The exploration indicates a complex interaction of feedback loops, demonstrating how different stakeholders play a significant role at different instances in defending their own views and interests. Over time, the

delayed responses of stakeholders form new influences that could either stabilise or destabilise the entire system (Besiou, Hunter, & Van Wassenhove, 2010).

4.7.2.5 Dialectic Systems Theory

Dialectic Systems Theory (DST) is a version of systems theory (François, 2004) that does not afford tools for people to use; however, it attempts to impact human thinking and their feelings, because the degree of holism to be achieved in their insight, thinking, decision-making process and activities depend on their thinking and feelings. Mulej was disgruntled with writers that ignored interdisciplinarity as a precondition of holism in their contributions concerning cybernetics and systems theory. Thus, he introduced the concept of a “Dialectical System”, which is a system of all vital systems that present the same topic in contrasting but interdependent viewpoints (Mulej, 1977; Mulej & Ženko, 2004).

According to the definition of Knez-Riedl et al. (2006), corporate social investment needs humans to think and act decisively on a scale that exceeds the mere focus on profits. The perception is that a profit-only emphasis leads to too many avoidable problems and costs (Dyck & Mulej, 1998), therefore the authors are advocating for using dialectic systems thinking in addressing socio-economic issues.

4.7.2.6 Cybernetics

Espinosa, Harnden, and Walker (2008) propose the application of a cybernetic approach to sustainability, which they link to social responsibility. This suggests a continual process consisting of dynamic relationships between companies and the environment: sustainability is connected much more to the circumstances than to the companies themselves. Espinosa and Walker (2011, pp. 65-67) indicate the significance of the Syntegrity approach in addressing sustainable development challenges. This approach is the logic of inter-human communication and brain-oriented processes. It places a group of stakeholders into a single operating think tank (Beer, 1994). The Viable System Model is used by Espinosa et al. (2008) to assist in portraying the co-existence of social systems of different scales and categories. A viable system is viewed as a system or sophisticated unit that is capable of preserving an independent existence – not an existence detached from its environment, but one where structural variation takes place without it losing its identity (Espinosa et al., 2008).

4.7.2.7 Multiple Methodologies

Corporate Social Investment as a concept is filled with complexities. This has led to researchers exploring CSI using a combination of systems thinking methodologies, rather than a single methodology. Multi-methodology provides a tactic for dealing with the complexities of the real world (Mingers & Brocklesby, 1997). Therefore, it would be beneficial for researchers to move from a single methodology to employing a combination of methodologies. Multi-methodology approaches take this aspect of critical thinking one stage further to recognize the value of combining techniques from several hard, soft or custom methods as needed (Mingers & Gill, 1997).

The following three studies are examples of where multiple methodologies have been applied in CSI. In the first study, Córdoba and Campbell (2007) combined SSM and CHS methodologies to assist with the facilities of enquiries on how to tackle a complex situation, and to further assist with the definition of actions to improve the societal situation. In the second study, Porter (2008) proposed the combination of interpretive systems and a complex adaptive systems approach. Porter (2008) refers to CST as an alternative to the interpretive process, one that is designed mainly for complex situations whereby there is conflict amongst stakeholders' viewpoints (Ulrich, 1983). In the third study, Setianto (2015), amalgamated three methodologies in the research on smallholder beef farming in rural Indonesia. The motivation for the combination of SD, SSM and CSH methodologies was that, because smallholder beef farming is influenced by socio-cultural, wealth, status and family savings considerations, a single methodology would not be appropriate in understanding the problem holistically. Setianto (2015) incorporated SSM and CSH into the SD framework. The use of the SD framework is for its strength in producing rigorous models; the SSM elaborates on stakeholder's perspective; and the CSH addresses the power irregularity concerns Table 4-3

summarises literature where systems thinking concepts were applied to corporate social investment. This shows that there is no single systems method that stands out in CSI applications; however, there are common characteristics. Midgley and Reynolds (2004) caution that, regardless of the systems method that is selected, there will always be challenges with the application because social issues are complex and ambiguous, and always include different perceptions, outlook and political agendas that affect the stakeholders.

Table 4-3: Systems thinking concepts applied in CSI

Authors	Systems approaches	Concepts used	Project
Córdoba and Campbell (2008)	Soft Systems Methodology (SSM)	Root definitions, CATWOE, Conceptual Models	Systems thinking and corporate social responsibility
Vos (2003)	Critical Systems Thinking	Critical Systems Heuristics	Corporate social responsibility and the identification of stakeholders, the Netherlands
Benn and Bolton (2011)	Complex Systems	Complex Adaptive Systems (CAS) pattern	Key concepts in corporate social responsibility, Sydney
(Besiou et al., 2010)	Systems Dynamics	Causal loop diagrams	A crowd of watchdogs: Toward a system dynamics model of media response to corporate social responsibility and irresponsibility initiatives, Danone and BP cases, France
Knez-Riedl, Mulej and Dyck (2006)	Dialectic Systems Theory	Three elements (law of holism, entropy, hierarchy and interdependence) and three relations (guidelines on subjective starting points, rules on policy survival, methodology of creative activities)	Corporate social responsibility from the viewpoint of systems thinking
(Espinosa et al., 2008)	Cybernetics	Viable System Model	Systems thinking approach to develop smallholder beef farming in rural Java, Indonesia
Mkhize (2010)	Soft Systems Methodology (SSM)	Rich picture, CATWOE, Conceptual Model, VSM	Systems thinking-based approach for improving the sustainability impact of the South African Telecommunications Industry
(Maluleke, 2014)	SD	SD Models	A systems approach to sustainable development through resource beneficiation - a case of system dynamics modelling, South Africa
(Wing, 2016)	SSM	Rich picture, CATWOE, Conceptual Model	On improving the understanding of software requirements by clients, South Africa

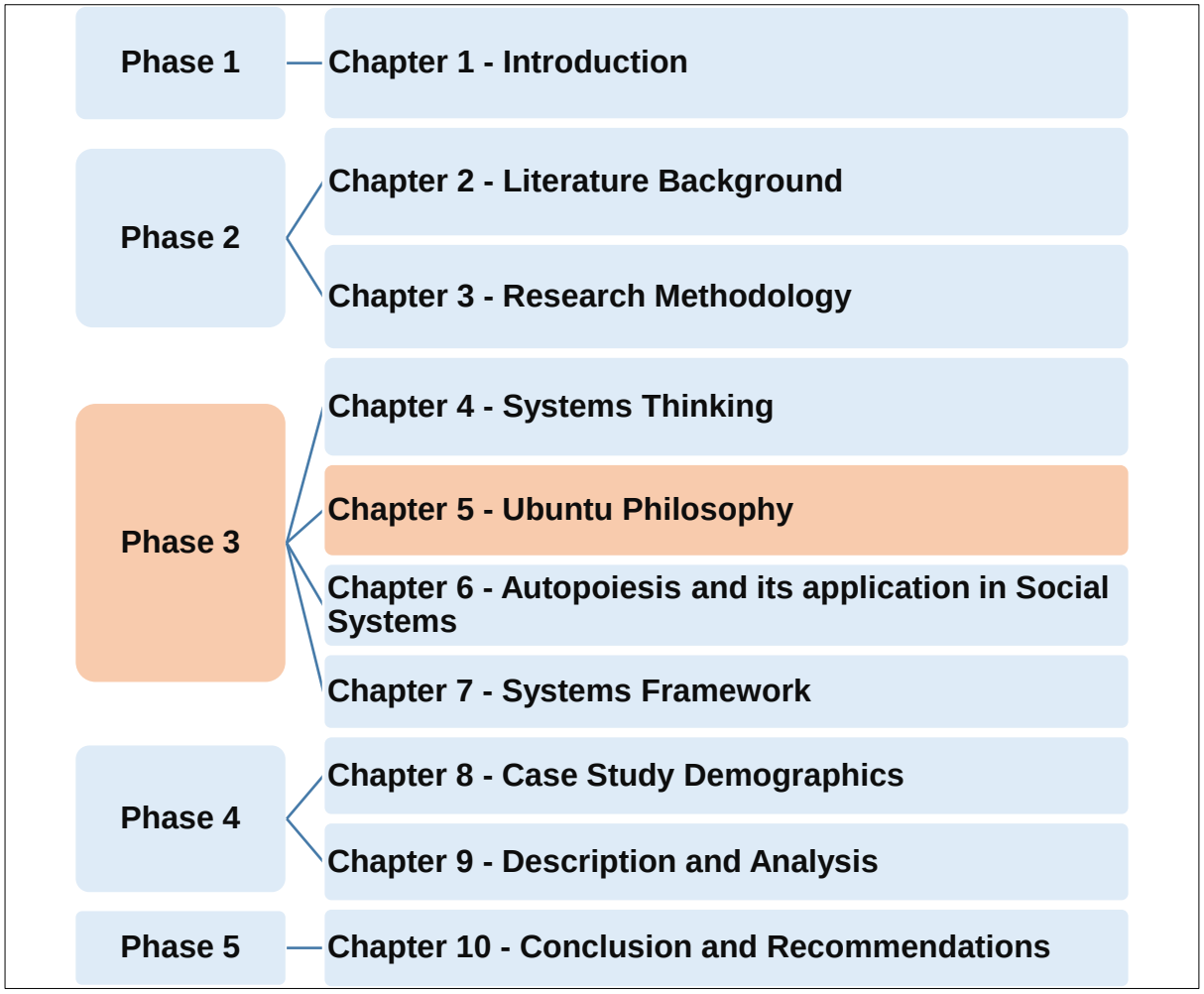
(Sima, 2015)	SSM	Rich picture, CATWOE, Conceptual Model	Corporate social investment as a means to achieve sustainable development, South Africa
(Nikolić & Zlatanović, 2018)	Dialectical Systems Theory (DST) Soft systems methodology Systems Dynamics (SD)	Three elements (law of holism, entropy, hierarchy and interdependence) and three relations (guidelines on subjective starting points, rules on policy survival, methodology of creative activities) CATWOE Analysis, Conceptual Model Causal loop diagrams	Corporate governance and corporate social responsibility synergies: A systemic approach
(Roth, Valentinov, & Clausen, 2019)	Autopoiesis	Luhmannian systems theory	Dissecting the empirical-normative divide in business ethics, the contribution of systems theory

4.8 Conclusion

This chapter introduced systems and systems thinking concepts, with the aim of laying a foundation for the concepts of systems thinking and systems approaches in searching for an appropriate framework for describing the social system in this study. It explored the application of systems thinking in corporate social investment, as well as the combination of various methodologies to address societal challenges. In order to apply system thinking in the analysis of the impact of CSI ICT projects, it is vital to understand the underlying philosophies that are attributed to systems thinking concepts.

In the following chapters, the selection of an appropriate systems approach for this study is explored further.

5 CHAPTER 5 UBUNTU PHILOSOPHY



5.1 Introduction

The previous chapter introduced the concepts of systems thinking and systems approaches in searching for an appropriate systems approach to apply in describing social systems in this study. This chapter proceeds with this search by exploring the potential of Ubuntu to contribute to a systems framework for CSI. Ubuntu philosophy emphasises that an individual is an individual through other people. In a community, the individual does not look out for self-interest, but seeks the interest of the greater social system as a community; this demonstrates wholeness.

The chapter aims to address the following sub-research question:

- How does Ubuntu contribute to an understanding of the success (or not) of CSI ICT projects?

The chapter proceeds with the exploration of the origin and characteristics of Ubuntu as an African philosophy that emphasises 'being human through other people', and its location within the community. It discusses the application of Ubuntu in the African context as well as in various domains such as theology, politics, the justice system, workplaces and computer science. In addition, the chapter discusses the weakness and scepticisms around Ubuntu. Lastly, an attempt is made to relate the tenets of Ubuntu to those of systems thinking.

5.2 Ubuntu Background

Ubuntu is core to the African philosophy of life and the belief systems within which the African people and communities reflect on their lived experiences (Ramose, 1999). The teachings of Ubuntu are taught throughout generations from childhood to adulthood (Mugumbate & Nyanguru, 2013). It deals with the goodness that joins all life from the lowest level of community life to the highest.

5.2.1 Philosophy of Ubuntu

Ubuntu is viewed as the root of African philosophy (Ramose, 2003). The understanding that we have of a tree is the result of the oneness and wholeness of the environing soil, the root, stem, branches and leaves; so is it with Ubuntu. The environment, foundation, soil within which the tree is planted, as well as the building must be viewed as wholeness rather than independent parts of reality.

Ubuntu is a word derived from the Nguni languages in Southern Africa (Mawere & Mubaya, 2016, p. 94). It should also be acknowledged that the word Ubuntu can be expressed in other South African languages: botho in Setswana/Sesotho/Sepedi, vhuthu in Tshivenda, and

bunhu in Xitsonga. The word is a combination of two words UBU and NTU, which are rooted in several African languages. The word consists of the prefix ubu and the stem ntu (Ramose, 2003). Ubu- suggests the idea of being. It refers to an enclosed being, before it reveals itself as a solid object. Ubu is always slanting towards ntu. From the ontological view, there is not a mutual separation between ubu and ntu (Coetzee & Roux, 2002). Ubuntu is the central ontological and epistemological grouping in the African thoughts of the Nguni speaking people. Therefore, African ontology and epistemology must be understood as two elements of the same reality (Ramose, 2003). In isiZulu, *umuntu* means 'the person'. The Xhosa people refer to African humanity as *umzi ka Ntu,* which translates into the “family or dependents of Ntu” (Bhengu, 1996). Like other Nguni communities, the Zulus historically believed that the cosmic order was an infinity, such that it was unity and that it was the environment in which the person really existed. The people and their environment were inseparable complements. This relationship gave rise to the following derivatives for Ntu (Bhengu, 1996):

Ulunto – the nameless something; a phenomenon; substance;

Uluntu – the vital force; Umuntu is a personification of Ntu, the person;

Isintu – humanity; and

Ubuntu – the art of being human.

The description above can be explained thereby that a person cannot exist by or for himself/herself; we all exist in a community, and a community exists within societies and in the spiritual form.

Bhengu (1996) provides the following definition of Ubuntu:

1. Ubuntu means humanness. Being human encompasses values such as universal brotherhood for Africans, and sharing, treating and respecting other people as human beings.
2. Ubuntu is humanism. It is a belief in the centrality and sacredness and is a foremost priority of the human being in all our conduct, throughout our lives.
3. Ubuntu is a way of life that contributes positively towards sustaining the well-being of a person, community or society. This definition seeks to be inclusive rather than exclusive and, if read with the above explanation of the origin of Ubuntu, provides a clear understanding of the meaning of Ubuntu.

5.2.2 Ubuntu Characteristics

Ubuntu is a term similar to the word personhood in English (Ewuoso & Hall, 2019; Mbigi, 1997). It demonstrates itself through various human acts in different social circumstances. It is not just a philosophical concept, as it is part of the African life whereby collectively it is demonstrated through singing, dancing, pain, expressions of grief, celebrations, sharing and compassion (Msengana, 2006). The quality of Ubuntu is demonstrated in every human activity within the community and its environment. It is adopted by the people who distinguish themselves as 'we' and are connected to each other, their situation, their environment and community. It is a unifying feature that brings communities together, irrespective of their financial wellbeing and background (Sithole, 2001). Ubuntu recognises both the rights and responsibilities of every citizen of the country, and encourages individual and social well-being (Maphalala & Mpofu, 2018).

Ubuntu is characterised by the following: interconnection, collectivism, spiritualism, wholeness, caring, respect, sharing, interdependence, sympathy and kindness (Mbigi, 1997; Mugumbate & Nyanguru, 2013). Some key characteristics of Ubuntu are discussed below.

5.2.2.1 Interconnectedness

Ubuntu teaches us that we are interconnected. From an early age, it is entrenched in the members that an individual belongs to a bigger system, and that acts of kindness create and maintain interconnections among members (Broodryk, 2002).

Nussbaum (2003) argues that Ubuntu is a foundation of African community that emphasises interconnectedness and accountability, formed through personal connections. This notion is supported by Joseph (2018) when he mentions that, through connections, society is interconnected like brothers and sisters, and that these connections start from an early age and continue even after life in the form of ancestry. For instance, when a child is born, he or she is introduced to the ancestors through rituals, in order to connect to those who have departed. The researcher agrees with Nussbaum and Joseph, because she also underwent the same ritual after she was born of being introduced to the ancestors in her bloodline. This established connection and spiritual imprints between her, and the ancestors are a cornerstone of Ubuntu.

As part of a community, there are families, schools, churches, hospitals and shops that belong to a larger whole, and where the sub-systems or components serve and assist each other. In the context of Ubuntu, an individual is always connected to a family, community or village, hence the saying "it takes a village to raise a child" (Caracciolo & Mungai, 2009, p. 10).

5.2.2.2 Spirituality

In African communities, Ubuntu is a notion that is in communion with other people. This means that there is an association between God, ancestors, the community and the individuals within the community that leads to interconnectedness (Joseph, 2018). This view is supported by Chisale (2018) when she mentions that Ubuntu permits communities to co-exist in relationships with each other, God, ancestors, self and the universe. The image of God is respected in African communities, and it is often connected to African spirituality that moulds values and good character in a human being (Masango, 2006). The Nobel Laureate Archbishop Emeritus Desmond Tutu is the advocate of the Ubuntu philosophy, which is voiced through the saying "I am because we are". His view is that Ubuntu is the cornerstone of African spirituality through a person's relationship with others in the community. In addition, he stipulates that Ubuntu makes people resilient whilst enabling them to heal, forgive, conquer and appear human, despite attempts by the apartheid government to dehumanise them (Tutu, 2000). Spirituality relates to people's values and belief systems. Moreover, these concepts cannot be viewed from an individual's point of view, but from a societal, social, economic and political point of view; hence, they are seen to be contributing to nation-building (Masango, 2006).

5.2.2.3 Wholeness

Wholeness in a community means oneness of hearts, aiming to achieve a shared vision (Ajaegbu, Johnson, Ayokunle, & Ajaegbu, 2015). Relationships and family bonds need community members to work together as a collective to ensure the wellbeing of the whole community. Ramose (1999) explains the African proverb that says being human is to confirm one's humanity by acknowledging the humanity of other people. This translates to the community assisting any individual who is in need of assistance (Maqutu, 2018). When anything happens to an individual, it affects the entire community. In a study by Madaka (2019), she highlighted that the citizens of South Africa are an extended family, from an Ubuntu point of view. Hence, the citizens can live together as a composite whole that is aware that they belong to the greater whole (Ehlers, 2017).

5.2.2.4 Caring and sharing

Ubuntu is concerned with sharing available resources to benefit all the people in the community (Madaka, 2019). Sharing co-exists with caring in Ubuntu, because people would not share their resources without caring and having compassion for the next person. According to Madaka (2019), care from an Ubuntu worldview means considering another person's

welfare, safety, health and dignity. Being helpful towards others establishes a culture of sharing and caring, because all humans are interconnected (Mangaliso, 2001). In addition, Poovan, Du Toit, and Engelbrecht (2006) state that caring for each other allows members to work towards a shared vision, because members see themselves as part of a community. Ubuntu carries the value of compassion out of which care is developed, as such prompting people to undertake efforts and actions that make life tolerable for other people (Madaka, 2019).

5.2.2.5 Collectivism

Ubuntu as a people-centred philosophy, which emphasises that people's worth is influenced by their social, cultural and spiritual identities. It is a way of life that is in constant engagement with the community, and also an appreciation of the common good (Niankara, 2018).

This philosophy in its nature is based on the collectivist view, which expresses the worth of collaboration, togetherness, cooperation, sharing and community (Shutte, 2001). It embraces respect for everyone in the community, and the importance of combining individual efforts for the good of the community (Bolden, 2014). By working and doing things as a collective, one appreciates the diversity that comes with it and, despite people's differences, this goes to show that together they are human, and they strive to share and create wholeness (Broodryk, 2006). Solidarity encourages cooperation within a community that allows individuals to contribute their best efforts for the betterment of the community and towards achieving a common goal (Niankara, 2018).

The notion of 'self or I' becomes rooted in the community, and an individual's identity disappears. In this context, the collective "we" plays a more significate role than "I" (Ramose, 1999, p. 49; Shutte, 2001, p. 23). Ubuntu denies that an individual can be defined only by physical and psychological properties. Madaka (2019) mentions that a person is defined in reference to the community. Community needs are therefore more crucial than personal needs. The spirit of unity is infused in all corners of an African life, and is demonstrated through song, initiations or rites of passage, praise and worship, storytelling, festivities, rituals and family life. (Madaka, 2019). In addition, Ubuntu is an inclusive approach that encourages dignity and mutual respect in relationships with other community members.

5.2.2.6 Respect

Respect is a building block of Ubuntu and is displayed in relationships with other human beings. It is expressed by having a non-discriminatory ability to engage and connect with other people without prejudice, whilst upholding a high regard for people's values and beliefs. When

coupled with dignity, it requires valuing the worth of the next person, as this supports respect (Mangaliso, 2001).

5.2.2.7 Interdependence

The interdependence of community members on one another signifies Ubuntu. This embraces reciprocal relations that stresses a change from solitary to solidarity and from individuality to the community (Manda, 2009). Gianan (2011) adds that people do not live in isolation but should be seen as people because of other people. Interdependent communities coordinate their activities with the aim of achieving a particular purpose.

People in a community are entitled to respect, dignity, caring, association and acceptance by its members. This translates to Ubuntu being similar to a web of life which offers a structure on how to interpret the world (Madaka, 2019). Interdependence is essential for continued existence; this is narrated by John Donne in his famous poem, “No man is an Island”, in which he appreciates the connectedness and interdependence of human beings (Donne & Fallon, 1988). Ubuntu supports the notion that people are associated with each other and are interdependent.

5.2.2.8 Compassion and kindness

Compassion and kindness are pillars of Ubuntu (Nussbaum, 2003). Compassion can be traced back to several religious, spiritual and philosophical beliefs of humanity, and has been found to be one crucial pillar that cuts across through humanity and religious beliefs (Poovan et al., 2006). It is a human quality that seeks to understand the situations of others and want to assist them. Compassion is extending a hand to assist other people in the community (Broodryk, 2002), as well as to walk in the shoes of one’s neighbour and listen with compassion (Masondo, 2017). Compassion is about an individual’s expression of kindness out of concern for another person, which is seen as sacrificing one’s own self-interest to help others (Molose, Thomas, & Goldman, 2019). For instance, this was demonstrated by a petrol assistant who assisted a female driver with R100 for petrol when the lady forgot her purse at home. The attendant paid for the lady’s petrol in order for her to get home safely, without expecting anything in return (Grobler, 2019). This demonstrated the act of compassion and selflessness that is core to Ubuntu.

The discussion above shows that Ubuntu characteristics are closely interlinked, and that they play a significant part in the lives of community members. Moreover, the characteristics work together to achieve a shared vision and to benefit others.

5.3 Community

A community is a cornerstone in the African culture with critical principles of cooperation and collaboration. An African is not just an individual, but a member of a community. “People are not individuals, living in a state of independence, but are part of a community, living in relationships and interdependence” (Turaki, 2006, p. 36).

Community identity is determined by various factors such as geography, history, and economic activity. A community is not only constituted of physical aspects within it, but also of activities and events that bring members together. In addition, a community is defined by its internal dynamics, shared experiences, struggles, values and common interest that bind its members (Spain, 1993). Support for each other is one of the critical pillars of demonstrating Ubuntu in a community. A community is a cohesive support network that enhances the quality of life of its members. It is a place where people live, help and support each other through good and bad situations. For example, a young couple got married, and two of their neighbours loaned them one cow and one bull so that the newlyweds can start a life for themselves; this is a demonstration that Ubuntu within communities encourages support and distribution of wealth (Nussbaum, 2003). In addition, the researcher herself has witnessed that, in a time of sadness such as bereavement, the community contributes money, transport, food, moral support and other needs to the bereaved family. Ubuntu is practised rather than theorised, and it can be understood by observing the daily life of people in the community, where the values are inculcated throughout generations within families, friends and in places where people gather to share and assist each other (Bhengu, 1996). It epitomises the strength of the community support through collectivism, mutualism and community commitment. Within the community, Ubuntu spreads to people outside your immediate family. For example, neighbours refer to female members of the community as “sisters”, while they may not necessary be biologically associated. The “family surrounding” in the community is rich with group solidarity, reciprocity and interdependence (Kamwangamalu, 1999), and encourages sound relations between members, with the role of promoting problem-solving amongst members. It is worth noting that the western approach to problem solving is through an astute manner, whereas the African perspective towards problem solving is a situational experience (Biko, 1974).

The Ubuntu philosophy advocates for a community to share the wealth between community members (Prinsloo, 2000). For instance, a cow is slaughtered and shared amongst the community members for mutual benefit and in the interest of building the community as a whole. Cultural dimensions and cultural leadership styles in the community are observed in

support of the success of community initiatives. The success of African communities depends on sensitivity and leadership that listens (Hailey, 2008).

5.4 The Application of Ubuntu

The application of Ubuntu is universal on the African continent, and it is practised and integrated into the daily lives of the people that live in the communities. The philosophy is applied in various facets of life, such as the justice system, family, education, spirituality, leadership and workplace, as is discussed below.

5.4.1 Ubuntu in the workplace

In the workplace, Ubuntu is displayed in the following ways. First, it is shown through compassion, where employees express a sense of caring and understanding towards each other. Ubuntu is embodied as a shared value system, which implies that team members are energised to collaborate towards a common goal; it outlines values that promote working together as a team. It is a form of strategy to boost team spirit between the team members. In group solidarity, team members cooperate competitively to contribute to the betterment of the entire team as well as company profits (Poovan et al., 2006).

Second, companies have established the importance of having a relationship with the communities in which they do business. Through corporate social investment activities, companies are involved in their communities by means of environmental care, sports and other social upliftment projects (Venter, 2008), and to show sharing and caring. Companies demonstrate the principle of caring for each other and the spirit of mutual support, and this has an impact on the sustainability of communities and the organisation (Khomba, Vermaak, & Gouws, 2011). For instance, a businessman in Limpopo showed his spirit of Ubuntu by buying up to 100 sewing machines, which he donated to a community that wished to establish a sewing business, but lacked resources (Nussbaum, 2003). This act of kindness encourages the intertwining of relations and social upliftment of communities, thus fostering human dignity (Ngoenha, 2006, p. 125).

5.4.2 Ubuntu in computer science

In the computer science domain, Linux in the United States developed Ubuntu open source software with the view of bringing the spirit of this African philosophy to the world of computers. The motive is to provide free software to the people. The software development team was led by Mark Shuttleworth in designing and developing of the Ubuntu operating system. The vision

behind the provision of free software is part of social and economic development (Shuttleworth Foundation Trusts, 2007).

5.4.3 Ubuntu in the Justice System

There is a belief that an ideal South African justice system is one that is cohesive and plural in nature (Keep & Midgley, 2007). Ubuntu is classified as an African value system; it symbolizes inclusivity, making it a "suitable principle for expressing shared values", and making it suited to inspire a plural justice system (Keep & Midgley, 2007, p. 48). For example, the Constitutional Court in South Africa adopted Ubuntu values into their justice system when they passed legislation that stipulated that insurance companies should not exclude anyone due to their pre-existing health condition (Nussbaum, 2003). In addition, the Truth and Reconciliation Commission in South Africa granted amnesty to wrongdoers, who in return were willing to divulge the truth about the crimes that they have committed towards their fellow human beings and to further apologise. These decisions were agreed to in pursuit of nation-building (Truth and Reconciliation Commission, 1998). In a case of the late rapper HHP Jabulani Tsambo, Lerato Sengadi took Tsambo's family to court in an attempt to stop his funeral because the family refused to recognise her as the customary wife. Judge Ratha Mokgoatlheng ruled that Lerato Sengadi is recognised by law as the customary wife of the late Jabulani Tsambo. In addition, the Judge pleaded with Sengadi, who filed for an interdict to stop the funeral, to practise Ubuntu; therefore, the judge denied her an interdict to stop the funeral (Thakurdin & Msibi, 2018).

These examples illustrate the functional role and application of Ubuntu in various spheres of life, and that is not a mere philosophical concept, but that it is practical and beneficial to all role players.

5.5 Weaknesses and Criticism

The literature on Ubuntu reflects an optimistic outlook on its role and value in the community; however, there are weaknesses in promoting Ubuntu and accepting its values. First, critics are questioning whether Ubuntu can be applied across cultures, taking into consideration that Ubuntu does not have a robust framework, its significance is not known and it cannot be theorised (Hailey, 2008). However, those who practice it have come to its defence by stating that globally accepted practices such as democracy are not widely accepted but have found a place in communities.

A second weakness relates to Ubuntu values. It has been debated that some of the values cripple communities. For instance, respect for authority, conforming to oppression and lack of

openness to new ideas have been noted as a contributory factor to colonisation in Africa, which promoted marginalisation, culture loss and dependence. This may have lead Africans to be submissive and dependent (Hailey, 2008). Third, scholars have criticised Ubuntu for its collectivist orientation, citing that individualism is not tolerated in the tenet of Ubuntu. This works against promoting individual freedom, which is geared towards the liberal tradition (Metz, 2011).

Fourth, sceptics question the relevance of Ubuntu in modern South Africa because of its traditional origin. Their scepticisms arose on the basis that Ubuntu is associated with spiritual notions such as a relationship with the ancestors, in which western people do not believe (Metz, 2011). Lastly, it is vital to note the undesirable consequences of the relationship between an individual and the community, where communities with strong, cohesive identity may result in individual members supporting evil acts in the name of Ubuntu. These forms of evil events in communities are rarely reported in western communities (Nussbaum, 2003).

5.6 Ubuntu as a form of systems thinking

A community as a social system is an organised network of meaningful interactions amongst its members. There is a coherent whole that exists between individuals and the community. Each community is constituted of geographical boundaries, which are influenced by its internal and external environment. A community is described by its functions when each element contributes to an integral whole. As part of a system, there are families, schools, churches, hospitals and shops that that contribute to the community in their own way (Santiago & Edwin, 2014).

Ubuntu philosophy strongly emphasizes the belief that an individual is an individual through other people. It acknowledges mutual benefits amongst community members. Ubuntu values include that individuals, families, communities and societies should harmoniously co-exist. Systems thinking, as discussed in Chapter 4, focuses on parts and the interactions between them to the benefit of the whole.

Literature suggests that there are similarities between systems thinking and Ubuntu. The emphasis of both principles is on collaboration with individual parts for the common good within a community. Ubuntu, like systems thinking, is a framework for seeing interrelationships in terms of a whole rather than individual parts (Chuwa, 2014; Senge, 1990). The principles are an arrangement of interdependent and interactive parts that are connected and aimed at a commitment to relationships and collaboration (Gharajedaghi, 2006; Lephalala, 2010). This encourages collectivism and interdependence (Mapadimeng, 2007), and affirms that people

within a community are connected not only by resemblance, but by trade-offs that are entrenched in the interdependence of all people (Goduka, 2000; Shaked & Schechter, 2017).

Systems thinking considers the impact of feedback loops on how a system behaves, by analysing situations in order to explain the behaviours. Systems behaviour is not caused by the impact of external forces, but by changes to the system's structures (Doyle & Ford, 1998). Similarly, Ubuntu creates a platform for the community to discuss the behaviours and attitudes of community members (Mkabela, 2014). Furthermore, Ubuntu advocates behaviour that focuses on love**,** sympathy, kindness and sharing. This is done by continually providing support and reinforcement that results in feedback loops with a strengthening effect. Feedback loops manage communities' constantly changing behaviour. In Ubuntu, caring is one of the pillars associated with kindness towards other community members. In systems thinking, living together in a system means enlarging not only the time horizons and thought horizons, but also enlarging the horizons of caring for each other (Meadows, 2008). Moreover, there is a moral obligation towards caring for each other; systems thinking provides the practical reasons as context, as no individual is separate from the other members of the community.

Both systems thinking and Ubuntu acknowledge the interactions amongst a system and its external environment, the influential resources that the system interrelates with throughout its processing, and that it is demarcated by a boundary (Khomba et al., 2011; McNamara, 2006). Systems thinking recognises that all systems have boundaries through which feedback is exchanged and understood. Ubuntu also recognises that it is essential that cultural analysis is grounded in the local environment, considering historical experiences, internal politics and other socio-cultural forces (Khomba et al., 2011).

Both systems thinking and Ubuntu require defining a relationship between the problem and the other parts in the system in order to reach a mutual solution. Ubuntu aims for problems to be solved within the community and by its members (Shanyanana & Waghid, 2016). This promulgates collaborative problem-solving methods that build trust between community members. Systems thinking seeks to intervene in problem situations based on the principles and concepts of the systems archetype by intervening with processes that fit the problem (Mchunu, 2015).

Table 5-1 illustrates the characteristics that reflect the linkages between systems thinking and Ubuntu.

Table 5-1: Linkages between systems thinking and Ubuntu

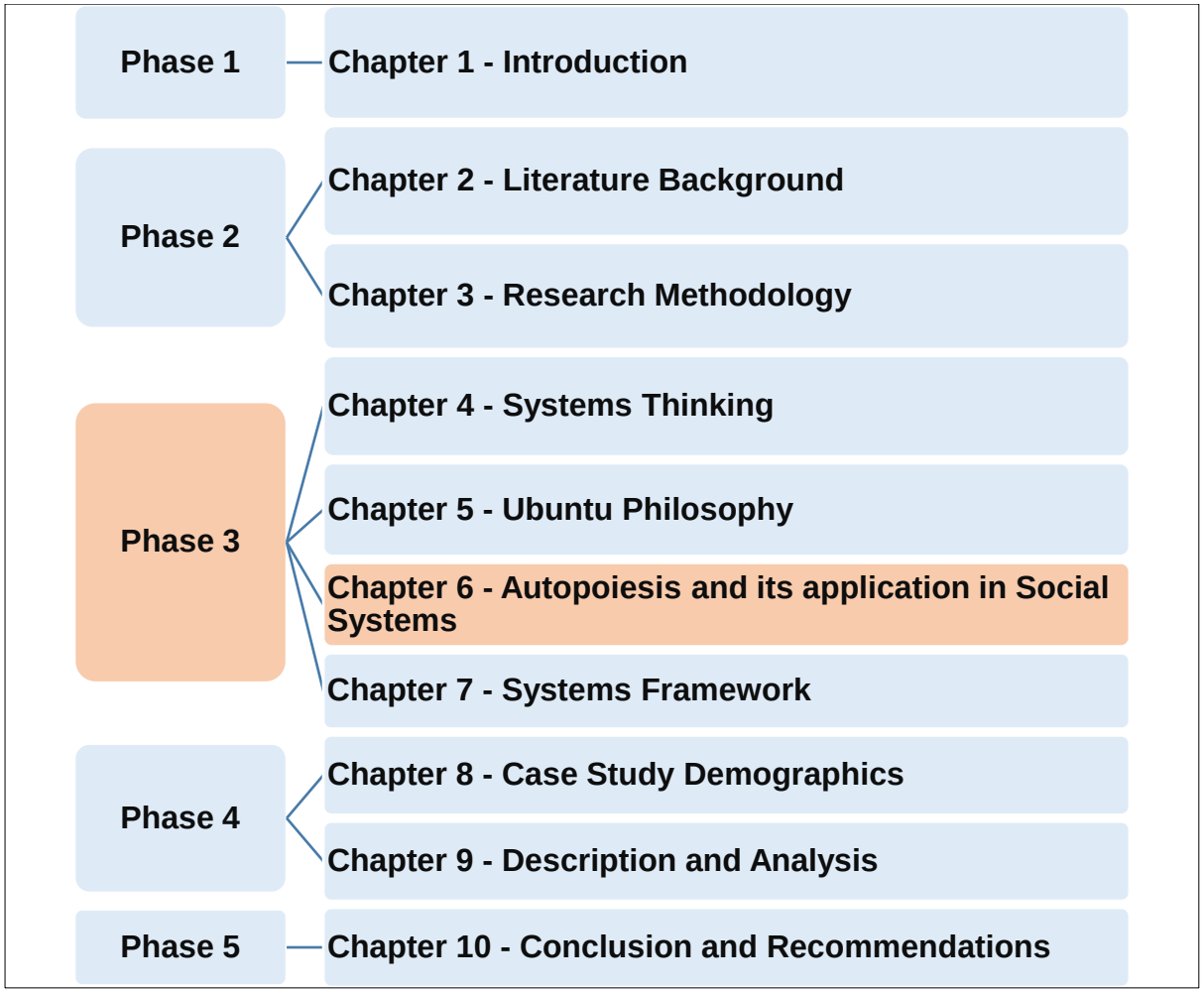
Concepts	Systems Thinking	Ubuntu
Interconnectedness	X	X
Collective	X	X
Wholeness	X	X
Boundary	X	X
Structure	X	X
Reproduction	X	
Environment	X	X
Feedback	X	X

It appears from the literature review that both Ubuntu and systems thinking recognise interconnectedness and collaboration of parts or members of the community. Both concepts focus on interrelationships and the whole rather than individual parts, and both recognise the interactions between a system and the external environmental forces that could affect the system. Thus, a conclusion can be drawn that Ubuntu and systems thinking both comprise a framework that views things from a holistic perspective. Therefore, this indicates that Ubuntu is commensurate with systems thinking and can be used as a part of a systems approach.

5.7 Conclusion

This chapter reviewed the literature on Ubuntu and its application. Ubuntu is characterised by interconnectedness, collectivism, communalism, spiritualism, holism, wholeness, caring, respect, sharing, respect, sharing, interdependence, sympathy, openness and kindness. The chapter provided background on the Ubuntu philosophy, and argued for its relevance as part of a systems framework. In the following chapter, autopoiesis and its application to social systems is discussed.

6 CHAPTER 6 AUTOPOIESIS AND ITS APPLICATION IN SOCIAL SYSTEMS



6.1 Introduction

This chapter reflects on autopoiesis and its application to social systems, with the aim of investigating the applicability of autopoiesis as part of a systems framework for this study. The motivation to include autopoiesis concepts in the systems framework stems from the notions of self-production and sustainability that are contributed by autopoiesis. Autopoiesis will contribute a means to analyse the self-producing ability of the systems served and the impact of CSI ICT project, which are relevant for socio-economic development. Accordingly, this chapter seeks to address the following sub-research question:

- In which manner do principles of self-production contribute to an understanding of the success (or not) of CSI ICT projects?

This chapter presents an overview of the theory of autopoiesis. There are different (and sometimes incompatible) conceptualisations of autopoiesis in biology, sociology, organisation theory, and the information sciences (Schatten & Bača, 2010). This chapter touches briefly on the biological origins of autopoiesis, from where it proceeds to a discussion on its social applicability. Although there is an array of literature on autopoiesis, the researcher focuses on the main traits of the theory and its application in the social domain. The application of autopoiesis in social systems attracted criticism from some scholars, which are discussed in the concluding section of this chapter.

6.2 Origin of autopoiesis

The theory of autopoiesis was conceived during the 1960s by the two biologists Humberto Maturana and Francisco Varela. Their quest was to find the essence of living systems. They found that: a living system reproduces itself and exists in the physical space (Mingers, 1995). The term autopoiesis was invented from the Greek words “auto” (self) and “poiesis” (creation; production), meaning self-production (Maturana & Varela, 1991). Mingers (1989, p. 162), contributes by saying it is: ” …a living system: a system which is organised in such a manner that all its elements and processes together, they produce those self-same elements and processes, thus establishing an autonomous, self-producing entity”. Zeleny (1981) cautioned against using similar terms to refer to “self-production”, such as: self-organisation, -renewal, -creation, -generation, -maintenance, and -perpetuation.

Central to the concept of autopoiesis is self-reference and self-reproduction, which refer to the relationship between elements that create a living system and their environment (Maturana & Varela, 1991). Self-reference refers to a process where each living system element interacts with each other, with no influence from external factors. The internal makeup of each system

is generated through interaction between its own elements. Self-reproduction, on the other hand, is the process whereby elements are created within the living system from self-referential interactions (Lourenço, 2010).

An autopoietic system is organisationally closed (Teubner, 1988) and reproduces itself. The system's behaviour is not influenced by its environment but by its structure, which stipulates how the system should behave in all situations. The system is therefore seen to be structure-determined (Maturana & Varela, 1991, p. 112). However, it should be recognised that the system does not detach itself from its environment, but continues to interact with it; this interaction was termed "structural coupling" by Maturana and Varela (1987). Both the system and its environment, through the process of interaction, continue to be the cause of common perturbation to each other. The changes that are brought by the environment are often triggered by the system structure, and not determined by the environment (Maturana & Varela, 1991).

6.3 Basic Concepts of Autopoiesis

In order to obtain a better understanding of autopoiesis, the basic concepts that relate to it will be discussed.

6.3.1 Unity, Organisation and Structure

Unity: A system that is a self-referential, self-regulating, self-producing, self-organising entity that is distinguished from its environment by the observer, and that can maintain a constant state. The observer interacts with other observers, and they can stay external to the entity (Zeleny, 1981).

Organisation and structure: Maturana and Varela (1991) distinguish between structure and organisation. Structure is seen as something that is observable by observers from outside the system, whilst organisation is something that is unobservable; it is the abstract arrangement (or “design”) of the system. The structure has a boundary that demarcates the system (Zelený & Hufford, 1992). A systems organisation establishes its properties as a unity within the environment in which it operates. While the system obtains inputs from the external environment, it still maintains its own identity and continues to self-reproduce. Structure refers to the unity’s elements that continue to change over time and does not regulate the overall identity of unity; it only controls "...the space in which it exists and can be perturbed" (*Ibid.*). A unity may change its structure without losing its identity; however, it needs to maintain its organisation (Schatten & Žugaj, 2011).

6.3.2 Organisational closure

Autopoietic systems are open from a structural point of view (Turpin, 2012). However, this openness does not consider the exchange of information that emanates from another system (Baxter, 1998). The system is referred to by Maturana and Varela as operationally closed (Mingers, 1997), and these systems are seen to be autonomous (Varela, 1979).

6.3.3 Structural Coupling

According to Maturana and Varela (1987), structural coupling refers to the process when two or more operationally closed systems interact with each other recursively while retaining their individuality. This process leads to one system being an environment of the other system (Poli, 2010). Different systems may be related to each other in the form of structural coupling, whereby one of the systems becomes the environment of the other system. In the end, both systems can become an environment for each other. It should be noted that, when different systems are structurally coupled, the interactions that take place between them may cause perturbations in the system; these may trigger structural changes (Poli, 2010).

6.4 Characteristics of autopoietic systems

According to Luisi (2003), three characteristics can be used to decide if a system is autopoietic, namely: (1) a system needs to have boundaries of its own making, (2) a system needs to have the capability of maintaining its own identity through dynamic processes; and (3) the system should be able to self-reproduce through interactions with the environment. These criteria can be used to assess whether a system is autopoietic or not. If all the requirements of the assessment are met, a system can be declared as autopoietic.

The above criteria are relevant when deciding whether a social system is autopoietic or not

6.5 Application of Autopoiesis Concepts to Social Systems

Following the initial work of Maturana and Varela on autopoiesis, other scholars attempted to apply autopoiesis concepts to social systems. Niklas Luhmann was one of the scholars who extended it to the domain of the social sciences (Luhmann, 1986). Section 6.5.1 discusses the application of autopoiesis in social systems. Luhmann, a German sociologist, introduced the theory of autopoiesis to the social sciences. He accordingly developed an organisational theory to describe the essence of life (Schatten & Bača, 2010). Luhmann's social autopoiesis is based on communication; he uses the term "autopoiesis" to illustrate the recursive nature of self-referential systems (Luhmann, 1990).

Luhmann (1990) states that autopoietic systems do not only self-organise, self-produce and change their structure, but that their self-referential nature also relates to the production of additional components. This relates to the organisation, structures, boundaries and processes of the system (Luhmann, 1990). Luhmann further identified other autopoietic systems, apart from social and psychic systems (Seidl, 2004); he focuses less on psychic systems, and puts more effort on understanding social systems (Poli, 2010). According to Luhmann (1995), there are three forms of social systems, based on communication: Societies, organisations and face-to-face interactions. Social systems use communication as their means of autopoietic reproduction. Communication is continuously produced and reproduced, and cannot take place outside of such a system (Mingers, 1994).

Luhmann's concept of communication differs from the conventional understanding of the term (Seidl, 2004). He derives the impression that communication is three-fold: information, utterance and understanding. Information is a selection of what must be communicated from all that could be communicated. To retain relevance, autopoietic social systems must continuously increase their flow of information from the external environment, and internal structures must absorb and process it into the form in which it will be contributed into the structure (Carvalho & Deakin, 2008). An utterance is a manner in which information is conveyed, which represents how and why something is being uttered. Understanding is theorised as a distinction amid information and utterance whereby, for communication to be understood, information must first be differentiated from the utterance. In other words, that what is being communicated must be differentiated from how and why is it being uttered (Luhmann, 1995).

As illustrated above, following Luhmann's outlook, social systems use communication as their method of autopoietic reproduction. Their elements are communications that are recursively produced and reproduced by a system of communications, and that cannot exist outside the boundaries of that system.

6.5.1 Limitations of Luhmann's theory

Some scholars have criticised Luhmann's theory of autopoiesis of social systems. First, Luhmann redefined the majority of the ideas that he borrowed from other authors, with the view of fitting them into the context of his other concepts. This resulted in the misalignment of his adopted idea with the initial concept, as Luhmann has often affirmed (Mingers, 2002; Seidl & Becker, 2010). Further, Luhmann's view on the treatment of human beings as the environment of the social system has attracted criticism (Mingers, 2002). In addition, critics are not in agreement with Luhmann's view on the role of perturbation, where he had referred

to external factors as "perturbation", and that these external factors are processed according to the self-referential nature of the system (Adler, Du Gay, Morgan, & Reed, 2014). To conclude, Luhmann's conceptualisation of social autopoiesis appears to violate not only some central tenets of autopoiesis, but also our understanding of society.

6.5.2 Mingers' Contribution

Mingers contributed to the autopoiesis discourse by critically considering the extent to which the theory of autopoiesis was initially defined, as well as its application to social systems. In his contribution, he is cautious when discussing the social application of autopoiesis. He took some of the conceptualisations from Maturana, Varela, and Luhmann (Mingers, 1992; Mingers, 2002). Subsequently, Mingers explored Giddens and Bhaskar's social theories with a focus on describing self-producing social systems, of which both these theories are centred around continual self-production of society (Mingers, 2004).

Mingers acknowledges that there are difficulties in transferring the physically oriented concept to realms that are essentially nonphysical, as well as in simplistically applying autopoiesis in social systems; however, he proceeds with his attempts to investigate its applicability (Mingers, 1989, 1992; Mingers, 2002). He first points out that Maturana and Varela never claimed that social systems are autopoietic. Maturana states that social systems are not autopoietic, but that they have a medium in which other autopoietic systems exist and interact. Varela maintains that social systems are not autopoietic, but are organizationally closed (Varela, 1979). Mingers asserts that the application of autopoiesis in its original form may be difficult to sustain; however, it is possible to apply Varela's general version of organisational closure (Mingers, 2002).

Mingers went on to assess Luhmann's theory, which he deems as a more advanced application of autopoiesis in social systems (Mingers, 2002). Luhmann's theory is discussed in Section 6.5.1; Minger's contention about this theory is the persistence in viewing systems from a communications point of view, and not from the view of a living organism. Instead of seeing people as systems that exist within different cultural environments, Luhmann maintains that these environments (society) comprise a system of communications, which happens independently of the people who inhabit that society (King, 1996). Mingers does not accept this notion that communications are able to produce other communications (Mingers, 2002).

Mingers then proceeds to assess Giddens and Bhaskar's theories on their application in the social domain. Giddens (1984) developed structuration theory — a social theory that is based on a distinction between (agency) system and structure, and that is concerned with the

characteristic of social structures to maintain and produce themselves over time**.** Giddens views systems as the actual, observable social systems of interaction between actors and collectives, as they are understood in several social practices (Giddens, 1984).
Giddens' structuration theory is compatible with Maturana's theory; however, it requires rework for the autopoietic domain. It is concerned with the continual, recursive, (re)production of social structure over time, thus aligning to the concepts of self-producing systems (Mingers, 1996).

Mingers further highlights the similarities between structuration theory and autopoiesis:

- Both theories accentuate that explanations should be non-functionalist and non-teleological;
- Both theories have a manner of identifying what is observable and intangible, for Maturana (structure and organisation) and Giddens (system and structure); and
- Both theories have a relational view of social systems, recognising three sets of relations: constitution/space, order/time and specification/ paradigmatic.

Bhaskar developed his transformational model of social action (TMSA) based on critical realism (Mingers, 1996). Bhaskar's theory seems at first sight as if it is compatible with structuration theory in relation to the duality of structure, and of the continual reproduction and transformation of society. It views social structure as only existing in and through the actions that it governs. However, there is a debate about their similarities.

Mingers argue that Giddens' and Bhaskar's theories, in fact, are potentially compatible. Bhaskar's view of structure and agency appear in dualism, in contrast to Giddens' agency and structure that are a duality. Moreover, in comparison to Bhaskar's realist stance, Giddens' theory includes subjectivism in relation to his opinion on structure. Having considered both theories, Mingers concludes that Bhaskar and Giddens' ideology is potentially compatible to allow for the combining of critical concepts, phrased as follows: "Social structures, consisting of position practices, rules and resources, are generating mechanisms that, through their complex interactions, enable and constrain observable and social activity, which in turn reproduces and transforms these structures" (Mingers, 2014, p. 106). This follows the notion that society is a combination of temporally situated activity and structure (Mingers).

Mingers uses Bhaskar's and Giddens' theories as a basis from which to develop his social application of autopoiesis. In Mingers' application of Bhaskar's and Giddens' social theories, a number of concerns have been raised from previous criticisms of social autopoiesis. Mingers acknowledges that this remains a concern with respect to his own conceptualisation.

1. The initial concern is with the physical space in which social autopoiesis should happen. Maturana and Varela's conceptualisation of autopoiesis is identified in the physical space. Mingers states that any effort to describe social autopoiesis must position the discussion within the social domain (Mingers, 1995). Luhmann, in his autopoietic system of communication, eliminates human activity; as a result, his system occurs in a non-physical space, which attracts criticism from Mingers as he questions how communication can happen without people. Mingers incorporates human activity and tacit social structure in his autopoietic production process. While human activity happens in the physical space, its nature is social and thus in the "social domain". As a result, Mingers' conceptualisation happens in the social domain (Turpin, 2012).

2. The second concern relates to the nature of the boundary of a social system. The production process of an autopoietic system needs actively participating boundary components. Luhmann's work is criticised by Mingers (1995) for only defining a boundary of distinction, because it does not have boundary components. However, Mingers (2014), in his own conceptualisation, defines a boundary of distinction. He uses the boundary of distinction for the social domain as his interpretation of Varela (Turpin, 2012). Therefore, it is prudent for Mingers to be realistic in the possibility of applying the boundary of distinction in social systems.

3. The last concern is the condition of organisational closure. Mingers (1995) disagrees with the boundary distinction by Luhmann on societal sub-systems by mentioning that, in reality, a social system cannot have a visible identity and boundary. Mingers acknowledges that this remains a concern in his own conceptualisation. Social systems are not, and cannot be, organisationally closed. This is a reflection on the nature of social systems, and any theory that makes such a statement will only be able to formulate its social system as an 'ideal type' of a social embodiment of autopoiesis (Turpin, 2012).

Following the above discussion on the social application**,** various scholars have indicated that the principles of autopoiesis can be applied to a social system without claiming upfront that the system is autopoietic or even organisationally closed (e.g. Maturana and Varela, 1987; Mingers, 2006). Irrespective of whether or not social systems are autopoietic, the concepts supporting autopoietic theory could provide useful methods to conceptualise, model and enable decision-making (Kay, 2001). Mingers, after much consideration, comes to the deduction that the acceptance of social autopoiesis will depend not so much on its absolute truth but "on its effectiveness, its usefulness, as part of an ongoing conversation among observers" (Mingers, 1995: 205).

6.5.3 Turpin's social autopoiesis framework

The Social Autopoiesis Framework forms a contribution to the autopoiesis discourse by Turpin (2012) for assessing the contribution of an ICT4D project. The framework combines concepts from systems thinking, autopoiesis and structuration theory.

Turpin uses SSM concepts (rich pictures and CATWOE description) from Checkland (1999), which are from the systems thinking domain, to describe the ICT4D project and the community as social systems. She further incorporates Giddens' structuration theory as reconceptualised by Mingers (2004) for the social autopoiesis domain to describe the social self-production of the social system. Giddens' structure of signification is used to study the reproduction of sense-making processes in the community. The structure of legitimation is incorporated to investigate the social norms and values that were reproduced, while the structure of domination is used to look at the manner in which social power is reproduced. The structure of domination is further split into allocation and authoritative resources, where allocation refers to power relations to material resources, while authorities' resources relate to social authority (Turpin, Alexander, & Phahlamohlaka, 2013).

The framework incorporates autopoiesis concepts, derived from the structuration description performed earlier, to assess the self-producing ability of the systems served, including the influence of the ICT4D project on the systems served. The autopoiesis concepts used in the framework include *structure* to describe social practices as defined by Giddens (1984). *Organisation* is used to identify characteristics in terms of social structure. Structural drift represents changes in the autopoietic structure over time between social systems and the environment. *Structural coupling* is used to define the interactions between two or more sub-systems. *Organisational closure* reflects the way in which a social system creates its own boundary. *Sustainability* is the derived concept that is used to assess the ability of a social system to self-produce in a way that sustains the system (Turpin, 2012; Turpin, 2017; Turpin et al., 2013).

Application of Turpin's Framework

Turpin used Checkland and Holwell's (1998) concepts of "systems served" and "serving system" when she applied the framework in a case study. The case study comprised of three social systems, namely, the ICT4D projects team as a serving system, and the church mission and wider Zulu community as two social systems served (Turpin et al., 2013).

The framework was applied in a remote rural Zulu village in South Africa where the ICT4D intervention was initiated. In applying the framework, it was demonstated how capability and knowledgeability of the mission members were improved during and after the ICT4D project,

as well as how the wider community was improved. In addition, the framework was used to explain the differences in social structres (e.g., norms, values, ways of understanding the world) among the ICT4D project team and the Christian mission members.

Strength and weaknesses of the Social Autopoiesis Framework

Steyn and van Greunen (2015) points out that the main strength of the framework rests in its ability to investigate whether a community has been assisted to become self-sustaining following the introduction of an ICT4D intervention. The framework provides a holistic way to explain the social context, based on the systems approach. Turpin aligned concepts of autopoiesis with the notion of development. She bases her definition of development on that of Roode et al. (2004), which stipulates that a self-reliant human scale development moves from the individual, local, regional and national heights, and is horizontally interdependent and vertically complementary. The self-reliant notion of development is aligned to the autopoiesis concepts of self-production and interdependence. In systems thinking, the development of a social system is demonstrated in the system's ability to self-produce and have interdependent relationships with other social systems.

The weakness of the framework is its combination of concepts from multiple disciplines (systems thinking, biology and sociology), of which some require that a better understanding is gained before it can be applied (Steyn & van Greunen, 2015; Turpin & Mwenda, 2014). Second, the framework has only been applied in one case study, and it can benefit from more practical application (Turpin, 2012).

During the application of the framework, evidence showed that the two social systems that were studied interfaced successfully in accommodating or influencing the other system's social structure. This demonstrated that the serving system (ICT4D project) indirectly contributed to the self-sustaining ability of the served system — the Christian mission and wider Zulu community (Turpin et al., 2013). Turpin's work demonstrates how autopoiesis principles can be successfully applied to assess the sustainability of an ICT4D intervention that was introduced into social systems.

6.5.4 Sustainability

According to Capra (2015), sustainability leans on the principles of systems thinking and is represented by interconnected pillars such as environmental, social and economic. Academics have created a renewed interest in social system sustainability (Shkliarevsky, 2015; Turpin, 2017). The latter focuses on human livelihoods as an essential part of achieving ecologic goals of that system, through economic support that "helps the needs of the present

system without damaging the chances for future generations to meet their own requirements" (Eizenberg & Jabareen, 2017). In the systems field, a system is deemed to be sustainable if it sustains the inputs it started with through its processes (Zeleny, 1997). Correctly configured sustainable systems survive and grow, even when the people do not converse about sustainability. They have the capability of maintaining and increasing their capacity to organise their activities. A concern on the sustainability of social systems has reignited an interest in autopoiesis as a conceptual approach for describing, analysing, and assessing a social system's sustainability (Valentinov, 2014). Self-maintenance is a feature of autopoiesis, because it is based on a process of self-generation from within the boundary. Zeleny (1997) further posits that any successful self-sustainable system must protect, improve and reserve interaction between its elements for current and future generations. This also engages the argument by Roode et al. (2004) that a social system needs to be self-reliant for it to be declared as sustainable, which is related to the tenets of autopoiesis. Self-reliance is related to self-production and structural coupling, which is a key concept of autopoiesis (Turpin, 2017).

6.6 Applicability of autopoiesis in a systems framework

Section 6.3 discussed the basic concepts of autopoiesis and its applicability in the social domain. However, the applicability of autopoiesis in the social context is not straightforward and should be interpreted with caution, without discarding the possibilities. Some of the authors referred to above, such as Mingers and Turpin, have indicated the possibility of applying autopoiesis in a social context without claiming upfront that social systems are autopoietic.

In terms of the applicability of social autopoiesis in the proposed systems framework for understanding the success of CSI ICT projects, the researcher considers Maturana and Varela's key elements of autopoiesis as the foundation from which to explain how a single living cell operates as an autopoietic system, and how a multicellular organism evolved as a result of close structural coupling between unicellular organisms. Mingers' contribution is considered because he argues that the principles of autopoiesis can be applied to the social context in a pragmatic manner, without claiming upfront that the social systems are autopoietic. Lastly, Turpin's social autopoiesis framework is drawn upon because it uses autopoiesis to assess the ICT intervention's impact on the self-producing ability and the sustainability of the social systems that were studied. This researcher is cognisant not to argue that social systems are autopoietic, but to consider a pragmatic approach when applying autopoiesis principles. The proposed systems framework elements will be applied towards a synthesised description of the social system, using autopoiesis to analyse the self-sustainability of the learning centres in poor urban communities.

6.7 Conclusion

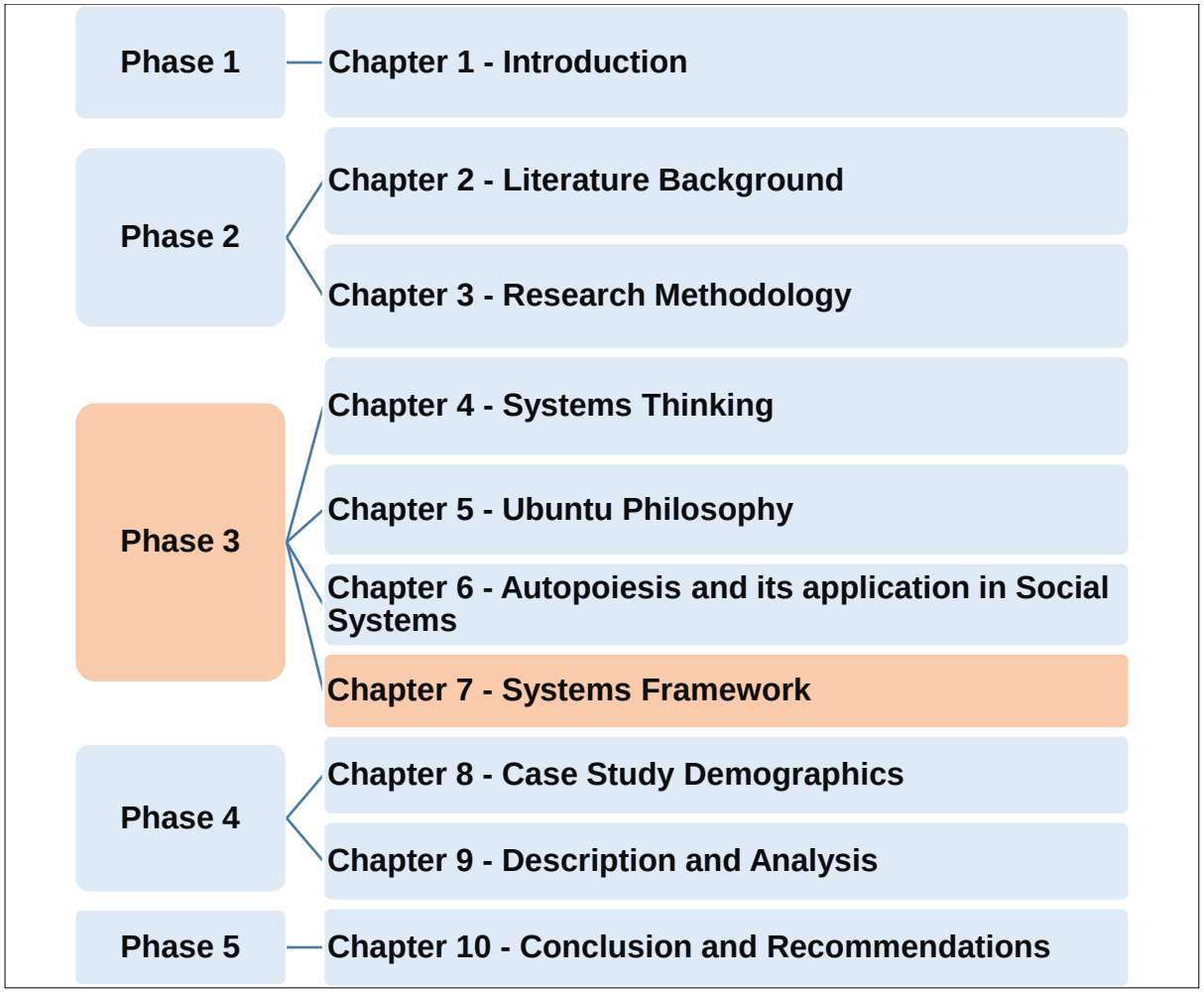
This chapter briefly discussed the basic concepts of autopoiesis as conceived by Maturana and Varela. Central to the concept of autopoiesis is self-maintenance and self-reproduction, which refer to the relationship between elements that create a living system and their environment. In the process of self-reproduction, the system's behaviour is not influenced by its environment but its own structure, which stipulates how the systems should behave in all situations. Maturana and Varela reflected on the concept of structural coupling, where two or more operationally closed systems interact with each other while retaining their individuality.

The chapter progressed to discuss the application of autopoiesis, with Luhmann's general concept of autopoiesis illustrating how it was conceived from the biological concept by Maturana and Varela. The concept of a social system as an autopoietic system of communication, where communication reproduces communication, was conferred. The three forms of social systems, namely, society, interaction and organisation, were described. It further discussed the limitations of Luhmann's theory on autopoiesis, raised by other scholars.

Mingers contributed to the social autopoiesis discourse by critically considering the extent to which the theory of autopoiesis is applied to social systems. In his contribution, he is cautious when discussing the social application of autopoiesis. He took some of the conceptualisations from scholars such as Maturana, Varela, Giddens and Bhaskar, who have indicated that the principles of autopoiesis can be applied to social domains without claiming upfront that the social systems are autopoietic or even organisationally closed. Mingers, after much consideration, concludes that the acceptance of social autopoiesis will depend not so much on its absolute truth, but "on its effectiveness, its usefulness, as part of an ongoing conversation among observers". The chapter concludes with a discussion on the applicability of social autopoiesis in the proposed systems framework, with reference to Turpin's (2012) study as a previous practical application of social autopoiesis in an ICT4D context.

The next chapter proceeds to use the concepts of autopoiesis as part of a systems framework that will be applied to the case studies in Chapter 9.

7 CHAPTER 7 A SYSTEMS FRAMEWORK FOR CSI ICT PROJECTS



7.1 Introduction

The objective of this study is to analyse the impact of South African CSI projects with an ICT focus. To this end, the main research question is:

- What is a suitable systems framework for analysing the impact of CSI ICT projects in a poor urban community in South Africa?

This chapter seeks to address the main research question by suggesting a systems framework for analysing the impact of CSI ICT projects in poor urban communities in South Africa. Various theoretical frameworks exist in relation to CSI, as indicated in Chapter 3 and 4. Therefore, the aim is to develop a framework that will assist in understanding the system and exploring relationships and interactions among the elements within the larger system.

This proposed framework is informed by the literature discussed in Chapters 4 – 6, and additionally by project data. The literature that informed the framework draws from Soft Systems Methodology, Ubuntu and Autopoiesis principles. The concepts incorporated from Checkland's (2000) soft systems methodology seek to summarise the problem situation and context. The concepts included from Ubuntu accentuates the belief systems by which people and communities make sense of their daily life experiences. Lastly, autopoiesis is incorporated in the development of the framework to describe the self-production and self-maintenance of the systems of interest.

The researcher envisages that, by combining elements from these theories, the knowledge gaps identified in the literature review, as well as the research questions stated in Chapter 1, will be addressed. Moreover, combining these theories will create a framework for addressing soft problems. The systems framework developed in this chapter is used to analyse and interpret the case study in the chapters that follow.

This chapter is arranged as follows. First, it demonstrates the process undertaken to arrive at the proposed systems framework, as illustrated in Figure 7-1. The chapter starts with SSM, which focuses on investigating a problem situation. It then proceeds to discuss the Ubuntu Philosophy and the autopoiesis concepts that are incorporated in the systems framework.

7.2 Soft Systems Methodology

This section starts with a motivation for using SSM as described in Chapter 4, which is then followed by presenting the SSM concepts to be included in the framework.

SSM provides steps to guide a qualitative study that seeks to address complex situations (Checkland, 2000). It focuses on investigating a problem situation where human activities are key to the tasks that are performed.

For the researcher to have a better understanding of the system under investigation (called the system of interest), she needs to collect relevant data pertaining to the situation. In this study the researcher employs the SSM Mode 2 'inquiry' developed by Checkland and Scholes (1990), as discussed in Section 4.6.2.1; it represents an interactive process for learning more about the root causes of the problem. Hence, SSM is used at the outset in an attempt to gain a better understanding of the problem situation and the roles of the multiple parties involved.

The following SSM concepts are deemed relevant to the framework, in order to obtain an initial understanding of the problem situation and the systems of interest: rich picture, root definition (CATWOE analysis) and conceptual models. These concepts were discussed in detail in Chapter 4. They will be used to provide a descriptive summary of the four learning centres as social systems, while considering their respective CSI ICT projects.

Rich pictures graphically illustrate the problem situation by presenting a holistic view thereof. After drawing a rich picture, CATWOE analysis is used to develop a root definition, by describing the human activity and situation of each stakeholder group from their particular perspective. *Transformation (T)* is at the heart of the root definition. It articulates the significant activities that "*transforms input into output"*. Transformation can also be regarded as the overall purpose of a system.

Following the articulation of the root definition, conceptual models of the ideal situation are developed to understand the activities that are required to bring about change in the system, and to construct a system that presents the views of the people involved and the associated human activities (Checkland & Scholes, 1990). In addition, Klein & Myers' (1999) principle of contextualisation is applied, which requires the researcher to reflect on the social and historical background of the social systems. Therefore, SSM enables the researcher to develop a good overview of the situation.

7.2.1 Conclusion on SSM

SSM contributes by summarising and contextualising an overall situation in order to have a better understanding of the social systems of interest within that context. The CATWOE analysis assists the researcher to describe the social systems in terms of their various role players and transformation processes. The root definition informs the development of conceptual models to present a systemic way to address the problem situation.

Section 7.3 discusses the role of Ubuntu in the systems framework.

7.3 Ubuntu Philosophy

Ubuntu is an African philosophy that is practised rather than theorised. It can be understood by observing the daily lives of people in the community, where the values are inculcated through interactions with families and friends, and in places where people gather to share and assist each other (Bhengu, 1996). Ubuntu was not initially intended to be part of the systems framework. However, during the site visits for the first case study, evidence of the practising of Ubuntu was observed. The researcher decided to formally include Ubuntu in the framework, to capture what has been observed in practice. In addition, the systemic elements of Ubuntu resonate well with a systems framework that describes and analyses an African social setting. Ubuntu views a community as a social system with meaningful interconnections and collectivism amongst its members. The researcher considered interconnections and collectivism as building blocks of the systems framework because they reflect the practice of Ubuntu that has been observed.

7.3.1 Interconnectedness

Where Ubuntu is practised, it teaches us from an early age that we are interrelated to one another and that sharing and giving is a way of living. Already at that age, it is entrenched that an individual belongs to a bigger system, and that acts of kindness create and maintain interconnections among members (Broodryk, 2002). As a result, members within a social system are willing to help others within and outside their system. For example, a social system is described by its functions when each element forms an integral whole. As part of a system, there are families, schools, churches, hospitals, and shops that belong to a larger whole, and where the sub-systems or components serve and assist each other. In this context, an individual is always connected to a family, community or village, as in the saying “it takes a village to raise a child” (Caracciolo & Mungai, 2009, p. 10).

7.3.2 Partnerships

Development partnerships are becoming increasingly important where partners share an intent to achieve socio-economic development objectives (Werker & Ahmed, 2008). Learning centres are an important means to drive socio-economic development objectives, because they bring together role players with the passion, experience and knowledge for addressing the needs of the communities, who might not have the ability to reach the services that are

offered by companies. Consequently, the new era requires companies to take into account the problems of their stakeholders in their environment, and to further engage with them in a meaningful way to address broader societal problems. Local communities and their socio-cultural elements are recognised as the main external stakeholders of an organisation.

Business behaviour must address societal requirements, increase revenue and still make a profit, create jobs, invest in the growth of the company and contribute to the societal and business environment. Considering the social facet, the concept of the African environment was introduced, which is characterised by a socio-cultural framework that is humanist, community-based and socialist (Broodryk, 2005; Mangaliso, 2001; Mbigi & Maree, 2005). Centred on the Ubuntu philosophy, African societies consider the community and its norms and standards (Khomba, 2011).

Under the realm of the Ubuntu philosophy, different stakeholders are encouraged to be seen as being part of one community that addresses the same course. A partnership is viewed as a collaborative relationship between companies with a shared vision that work to achieve common objectives (Strengthening Nonprofits, n.d.). Whilst this definition is not very detailed, it assists in differentiating partnerships from other types of financial assistance.

While each partner may have their own underlying motivation for their involvement, they must have a joint understanding of the reasons behind the establishment of the partnership. When partners agree on a shared vision, this works towards achieving a collective understanding and provides a basis for determining goals and implementation plans (Mukherjee & Reed, 2008). In addition, they can collaborate to develop solutions that will uplift the communities.

The complexity of socio-economic development projects requires an understanding of the community needs, and the capability to deliver projects that will benefit poor urban communities. In addition, there are other elements that need to be considered for an effective partnership such as trust, community buy-in, alignment and partnership duration (International Financial Corporation, 2010).

In the field of community development, mutual trust and respect are key requirements for an effective partnership, as well as shared responsibility for the education of the children (Epstein et al., 2018; Steyn, Rampa, & Marais, 2013), as will be demonstrated in the case studies to follow in Chapter 9. Mutual trust and respect can be illustrated by the formal and informal meetings between companies and community leaders. It is assumed that the community is a beneficiary of the CSI ICT project. Hence, community buy-in is key for the sustainability of the project (Naik, 2018). All partners need to have the comfort that they are benefitting from the intervention.

7.3.3 Collectivism

Ubuntu philosophy is based on a collectivist orientation, which articulates the worth of collaboration, togetherness, cooperation, sharing and community (Shutte, 2001). In a community, members depend on each other, and their behaviour is largely geared to maintain a communal way of living. This shows that people do not live in a state of independence but rather as part of a community where there are relationships based on mutual interdependence (Msengana, 2006). By doing things as a collective, one appreciates the diversity that comes with it and, despite people's differences, this serves to demonstrate that all together they are human, and that they strive to share and create wholeness (Broodryk, 2006).

Ubuntu advocates solidarity in the face of adversity (Prinsloo, 2000). For example, the entire community would participate in a protest for free housing for all, even those who are not in need of housing. This act of solidarity demonstrates that this view is not individualistic, but it stands to benefit the entire collective. In this context, the collective "we" play a more significate role than "I", by saying: *umuntu ngumuntu ngabantu* – interpreted as: "a person is a person through other people" (Ramose, 1999, p. 49; Shutte, 2001, p. 23).

7.3.4 Conclusion on Ubuntu

To conclude, as Dr Mamphela Ramphele put it in Enslin and Horsthemke (2004, p. 548): "*Ubuntu* as a philosophical approach to social relationships must stand alongside other approaches and be judged on the value it can add to better human relations in our complex society". In this context, Ubuntu philosophy is used as part of the systems framework to analyse the impact on CSI ICT projects in poor urban communities. The motivation for using Ubuntu as a theoretical lens to analyse this case study is to illustrate how the practising of Ubuntu contributes to the success of the CSI ICT project (mutuality). An Ubuntu philosophy emphasises that an individual is an individual through others. In a community, the individual does not look out for their own interest but for that of the community (the greater social system), and this demonstrates wholeness. Therefore, Ubuntu is considered to be applicable in this study, to analyse the impact of the CSI ICT projects.

The next section discusses the autopoiesis concepts that form part of the system's framework.

7.4 Autopoiesis

In Chapter 6, an account of autopoiesis was provided, based on scholars such as Maturana and Varela, Zeleny, Mingers and Luhmann. Autopoiesis is a theory that originates from the biological field, while there has been an attempt by scholars such as Luhmann to apply it to social systems. However, some scholars, including Mingers, share a discomfort about

Luhmann's conceptualisation of social autopoiesis. For the purpose of this study, the framework is based on the original versions by Maturana and Varela and the contributions by Mingers, similar to the application by Turpin, Alexander and Phahlamohlaka (2013).

An autopoietic system is composed of elements that interact in such a manner that the system maintains and reproduces its elements together with the relationships. In the process, the organisation of the systems remains constant (Robb, 1991). The key concepts of autopoiesis were introduced in Chapter 6. Of these, organisation and structure, structural coupling, and sustainability were considered to be relevant to the systems framework. Section 7.4.1 presents the concepts of autopoiesis, to be included as part of the systems framework for analysing the impact of South African CSI ICT projects.

7.4.1 Organisation and Structure

In the language of autopoiesis, a system's organisation is practically manifested in its structure. While the structure interacts and changes over time, it maintains the organisation and the system retains its identity (Maturana, 1970). The structure is observable, while the organisation is something that is unobservable; it is the abstract arrangement (or "design") of the system. Organisation refers to the relations between elements that give a system its identity (Magalhães & Sanchez, 2009).

From time to time structural change happens, because of interactions with the environment in which the system exists or as a consequence of its internal dynamics (Maturana & Varela, 1987). Considering the changes that may occur in the system, Maturana (1970) affirmed that a system is structure-determined. By this, he means the changes that the system experiences depend on its structure. Changes to the structure may happen due to internal interaction or external influences; however even with external changes, the consequent changes are established internally, and this is only triggered by the environment (Maturana & Varela, 1987).

Organisational closure and self-referentiality is the combination that is required to define a social system as autopoietic (Magalhães & Sanchez, 2009). In the social domain, different systems and sub-systems that create a social system become closed, autonomous realms of communication, whilst maintaining their interdependence (*structural coupling*) because these systems depend on one another, using their functions to serve society (Magalhães & Sanchez, 2009). As Zeleny (2009) mentions, an organisationally closed system cannot be totally closed from its environment, because it cannot be isolated from environmental impact. Through frequent environmental impacts and triggers, systems may become *coupled* to their environment. In practical situations, it is key for an organisation's agents to understand the impacts of the environment and what it can do to the organisation. Therefore, the researcher

considered this concept from the perspective of exploring the elements that contribute to organisational identity and organisational closure of the systems in this study, namely, the learning centres that form part of the empirical study.

7.4.2 Structural Coupling

Structural coupling is concerned with systems interacting with their environments to yield structural congruency between the systems. Structurally determined systems, determine the interactions in whicih the system can participate (Mingers, 1994). Structural coupling occurs when there are structural changes in the systems due to interaction between the systems, as well as systems interacting with their environment (Maturana & Varela, 1980).

For example, the concept of structural coupling can be applicable in communities and business, where each of them have their own structure. Some of the ongoing interactions between them happen due to environmental influences that could be beyond corporate social investments. In addition, structural coupling will be applied in investigating the interdependence between the learning centres, their partners and the environment.

7.4.3 Sustainability

In social autopoiesis, the prominent feature of autopoiesis is self-maintenance based on a process of self-generation from within the boundary. Luisi (2003) acknowledges that, while this thinking was from the analysis of living systems, it can metaphorically be applied to social systems. Sustainability is considered as a key property of a social system (Hofkirchner, 2012). Social systems always remain themselves, and they maintain their own identity, because they reproduce within their own boundary. Therefore, the activities that are taking place inside the boundary are seen as self-sustaining (Hofkirchner, 2012).

Consider Roode et al. (2004) definition on sustainable development as self-reliant human centred development at the community, regional and national levels, which is horizontally interdependent and vertically complementary. In systems thinking, the development of a social system is demonstrated in the system’s ability to self-produce and have interdependent relationships with other social systems. The researcher argues that the social system’s development is dependent on adequate functioning of self-production processes, which may lead to a strengthened and more self-reliant system. Investigating how the self-production processes work in the systems served, after a project's introduction, will indicate if CSI ICT projects were impactful.

7.4.4 Conclusion on Autopoiesis

Autopoiesis is selected to be included as part of the theoretical lens for analysing the impact of CSI ICT projects in poor urban communities, specifically to investigate their organisational identity, structural coupling and how these systems continue to self-produce to make themselves sustainable, which is critical in ICT4D projects. Moreover, the researcher considered autopoiesis because it provides a perspective from which to conceptualise what to include and what to exclude, in order for a system to maintain and reproduce its elements together with the relationships. In addition, the elements that contribute to the organisational closure of the learning centres can be explored.

In the case of the CSI ICT projects in the study, sustainability plays a significant role in that initiatives have to meet the needs of the affected communities in such a manner that the communities can be better self-sustained. In this study, sustainability and other aspects that lead to development are investigated. Autopoiesis is considered as a suitable theoretical lens for analysing the case studies, because it is concerned with the self-production of living systems. The researcher asserts that the social system's development is dependent on self-production mechanisms that operate in a manner by which a system is strengthened and becomes more self-reliant. Following the introduction of the projects in Chapter 9, an investigation of how the self-production mechanisms work in the systems served will indicate if the CSI ICT projects were impactful.

7.4.5 The proposed systems framework

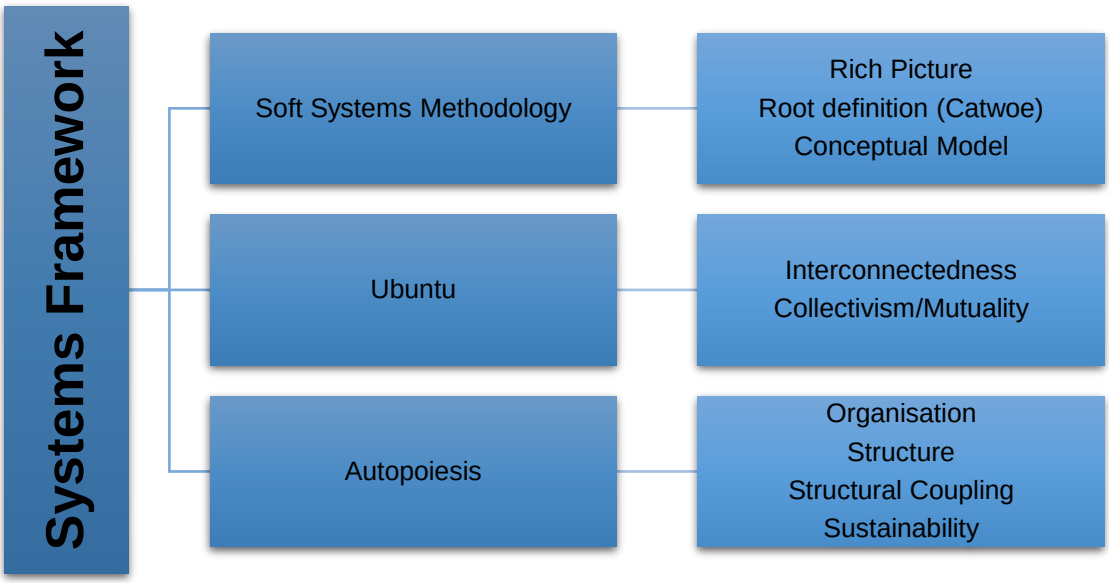


Figure 7-1: Proposed Social Systems Framework

The proposed systems framework is presented and summarised in Figure 7-1. The first building block contains the SSM concepts: rich picture, CATWOE and conceptual models which analyses the case studies by summarising and contextualising information in order to have a better understanding of the social systems. A CATWOE analysis is done to describe the social systems in terms of their various role players and transformation processes. Conceptual models are constructed, first of ideal type then comparing them with the real-world situation.

Ubuntu concepts are included in this framework as a theoretical lens to illustrate how practising Ubuntu contribute to the success of the CSI ICT project (mutuality). Ubuntu philosophy emphasises that an individual is an individual through other people. In a community, the individual does not look out for self-interest but those of the greater social system being a community and this demonstrates wholeness.

Lastly, autopoiesis is included to analyse the impact of CSI ICT projects in poor urban communities because it provides a means to describe the organisational identity and structural coupling of the social systems of interest, and how these social systems continue to self-produce to make themselves sustainable, which is a crucial component for development.

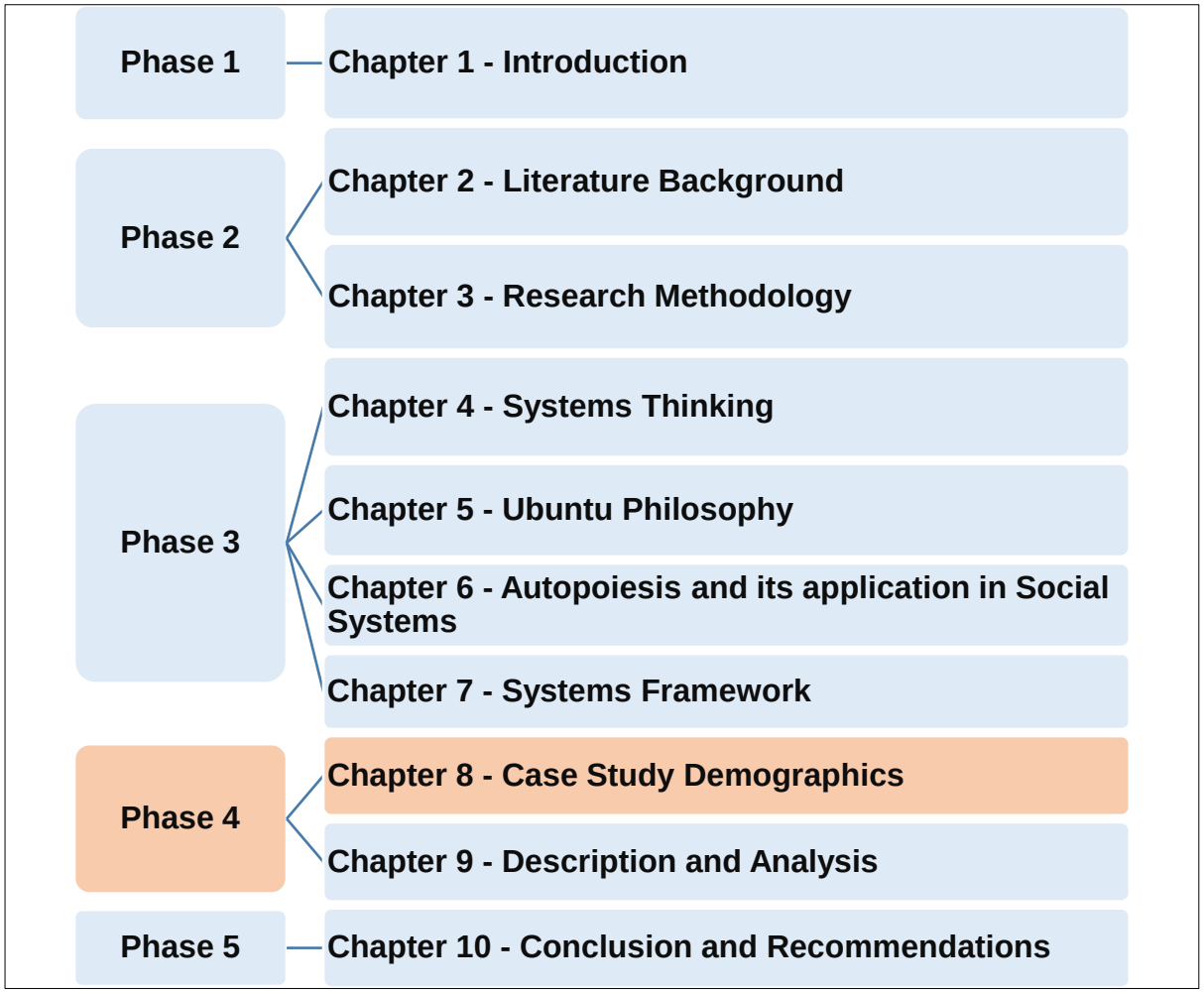
7.5 Conclusion

This chapter presents the proposed systems framework for analysing the impact of CSI ICT projects in poor urban communities in South Africa. The framework is developed using a combination of concepts from SSM, Ubuntu and autopoiesis. The chapter addressed the following research question:

- What is a suitable systems framework for analysing the impact of CSI ICT projects in a poor urban community in South Africa?

The systems framework combines three theoretical bodies of knowledge namely: SSM, Ubuntu and Autopoiesis. SSM concepts are included to analyse the case studies by summarising and contextualising information in order to have a better understanding of the social systems. Ubuntu concepts are used to illustrate how practising Ubuntu contributes to the success of the CSI ICT project (mutuality). Autopoiesis concepts are incorporated to analyse the self-production of systems served which is a crucial component for development. It is envisaged that the combination of the three lenses, as discussed above, will provide the researcher with a suitable means to analyse the impact of CSI ICT projects in a poor urban community in South Africa. Chapters 8 and 9 focus on first describing and then analysing the CSI ICT case studies using the systems framework.

8 CHAPTER 8 CASE STUDY DEMOGRAPHICS



8.1 Introduction

The previous chapter presented the theoretical framework for analysing the impact of CSI ICT projects in poor urban communities in South Africa.

The purpose of this chapter is to set the scene for the case studies by providing a demographic overview of the case contexts. First, a historical overview is provided of the City of Johannesburg. The chapter then proceeds to provide a brief history of Soweto, including its socio-demographics, socio-economic development, culture and languages. This chapter applies the principle of contextualisation (Klein & Myers, 1999) in providing context and background to the cases.

8.2 Historical overview of Johannesburg

Johannesburg is located in the Gauteng province of South Africa. It is regarded as the country's financial capital and is recognised as a vibrant metropolis. The section that follows presents its history, which is important for understanding the socio-economic context of the case.

Johannesburg was founded during the world's biggest gold-rush, which occurred in the Witwatersrand in the year 1886. It was established as a mining town following the discovery of the gold reef. The city first evolved into a tin shanty town, after which brick buildings and eventually tall structures were erected (Howie, 1947). During this period, gold mining drove South Africa's economic growth into a state of self-sustained development, and shaped an integrated labour market throughout southern Africa (Harrison & Zack, 2012). The economic growth of Johannesburg continued, and the urban economy diversified and became flexible. While growth was primarily attributed to the mining sector, there was a commensurate development of the manufacturing sector.

Following the discovery of gold in Johannesburg, an estimated 100 000 people migrated there. Subsequently, the following suburbs were established: Booysens, Fordsburg, Langlaagte, Braamfontein, Auckland Park, Marshall's Town, Coolie Location and Jeppe's Town. By 1896 Johannesburg had a population of 102 078, of which 61 292 lived within a few kilometre radius of the Market Square, whilst 40 786 lived outside of Johannesburg (Cripps, 2012).

Johannesburg grew to become the largest urban space in sub-Saharan Africa, and saw the establishment of the Johannesburg Stock Exchange in 1887 (Harrison & Zack, 2012). The JSE supported the requirements of the mining industry and was an essential factor in the development of Johannesburg's position as the hub of South Africa's growing industrial and business economy.

At the end of the 19th century, the South African Republic was confronted with the Anglo-Boer war between the British and Boers over the discovery of gold and diamonds (le Roux, 2016). This was at the time when mining activities were halted, but these reopened again after the war in 1902 with high confidence. The British triumph guaranteed that the mines were in operation again after Britain defeated the Afrikaners. After the war, Johannesburg continued to develop in terms of power, economic size and population, and manufacturing became as significant to the economy as mining. The manufacturing industry contributed 10% to the country's GDP in 1918, and to 25% in 1945 (Harrison & Zack, 2012).

The mining activities attracted men from rural villages, and they left their homes to come to find work in the mines. This saw the black population grew by 59% to almost 400 000 people in the 1930s. During the same period, the white population was 29% (South African History Online, 2011). Miners lived on the mines in rooms that they had to share with other men. During this time, women increasingly followed suit to seek work as domestic workers (Campbell-Pitt, 1949-1987). As the economy grew, the commerce, mining and manufacturing industry saw an increase in the labour force, which prompted the use of cheap labour from rural villages (Campbell-Pitt, 1949-1987). To accommodate the workers, the municipality established 9573 low-income dwellings and made available 7270 beds in male, single-sex hostels. The majority of the workers were forced to move illegally into vacant informal settlements in areas such as Orlando, Pimville, Dube, Newclare and Alexandra, thereby expanding the informal settlements around Johannesburg.

The city informally adopted the name Egoli or Gauteng, meaning a "place of gold", after the discovery of gold. Currently, Johannesburg is seen as one of Africa's advanced commercial cities and the driver of the South African and regional economy. Because of its economic activities, the city has become home to the wealthy as well as the poor, residents and refugees, global corporations and emerging enterprises (City of Johannesburg, 2012). The city today houses a lifestyle that is rich with diverse cultures, booming businesses, places to play, and venues for the die-hard entertainment seekers (South African History Online, 2011). Johannesburg is currently the largest city in South Africa, with a population of 4.9 million people (Statistics South Africa, 2020), accounting for about 36% of Gauteng's population and 8% of the national population (Municipalities of South Africa, no date). In 2016, the population growth per annum was 2.49% and the city received approximately 3027 migrants per month (Municipalities of South Africa, 2012 - 2018). In the last decade, the city has continued to grow and attract people from other provinces and internationally, who are looking for better economic opportunities and quality of life. Johannesburg is not only the economic hub of South Africa, but also the first choice of job seekers countrywide (Municipalities of South Africa, 2012 - 2018). Censuses conducted in 1996 and 2001 showed that 25% of all national migrants were

from the South African province of Limpopo, and 13% from the Eastern Cape and Mpumalanga. The second largest proportion of migrants are from North West, followed by Kwazulu-Natal (Cross et al., 2005).

The City of Johannesburg Metropolitan Municipality is one of three metropolitan municipalities in Gauteng Province. The city is also referred to as Joburg, Jozi, or Egoli, and accounts for 16% of South Africa's economy. The city has an estimated 2 261 490 economically active residents (employed or unemployed but looking for work); of these, 32.7% were unemployed in the first quarter of 2020 (City of Johannesburg, 2020) and the COVID-19 pandemic according to ILO Monitor is further exacerbating the unemployment across all industries including South Africa (International Labour Organisation, 2020). Approximately 30% of the city's population are living below the poverty line. The city reflects the social and economic inequality in the country (Crankshaw & Parnell, 2002). Most of the residents live in townships (traditionally, black residential areas outside of the city), and the middle class are mainly located in the suburbs. An estimated 20% of people live in informal settlements with a lack of electricity, proper roads or any form of municipal service, while 40% of people live in inadequate housing or poor municipal housing (Statistics South Africa, 2020).

The 2011 census reported that there were 1 434 856 homes in the City of Johannesburg at the time, with an average household size of 2.8 persons; 64.7% of households had access to piped water, 26.9% had water in their yard, and only 1.4% of households had no access to piped water (City of Johannesburg, 2018b).

The administration of the City of Johannesburg Metropolitan is decentralised into 7 regions, each of which is operationally responsible for their own service delivery targets — see Figure 8-1 for an indication of the administrative regions:

- Region A – Diepsloot, Midrand, Fourways, Sunninghill, Woodmead
- Region B – Rosebank, Bryanston, Randburg
- Region C – Bram-Fischer Ville, Thulani, Florida, Roodepoort
- Region D – Soweto
- Region E – Parkwood, Highlands North, Sandton, Alexandra, Wynberg, Morningside, Douglasdale
- Region F – Glenvista, Ormonde, City Deep, Benrose, Kensington
- Region G – Orange farm, Ennerdale, Eldorado Park and Protea

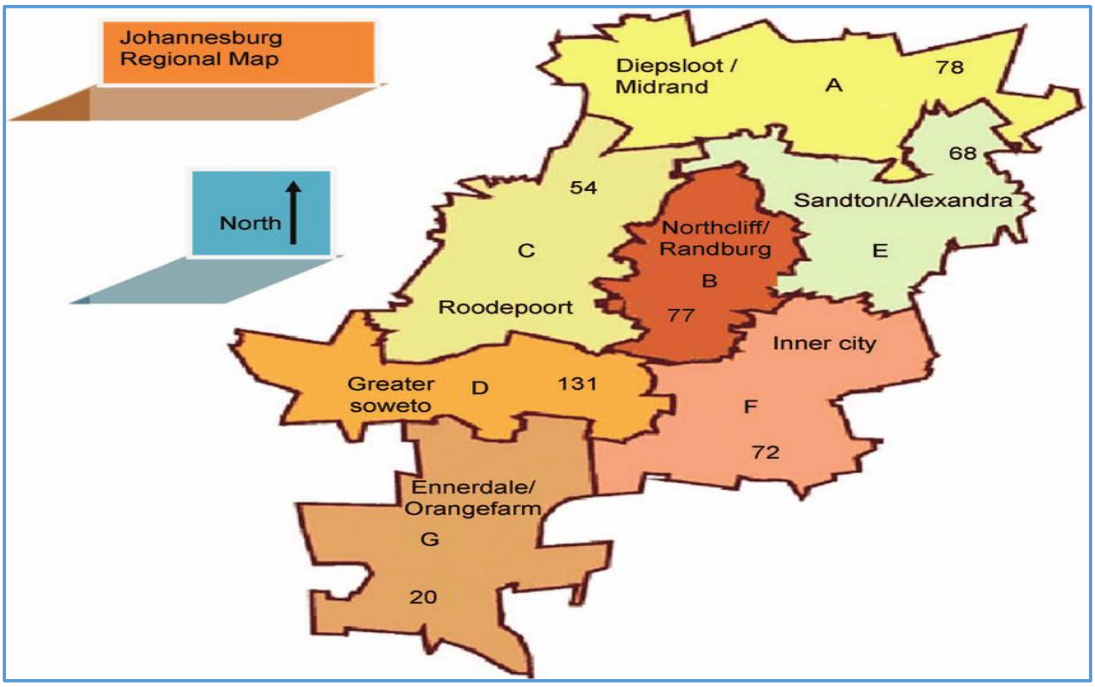


Figure 8-1: Seven administrative regions of Johannesburg from A to G
Source: (City of Johannesburg, 2012)

According to Global Insight (2013), Region **D** (Soweto) has the largest population at 25.18%, followed by regions **C** (15.28%), **A** (15.27%), **G** (13.67%), **E & F** (12.24%) and **B** (7.62%).

8.3 Overview of South Western Townships (Soweto)

The section that follows provides contextual information on Soweto, which is the setting of the case studies. Visual representation of Soweto is illustrated in Figure 8-2.

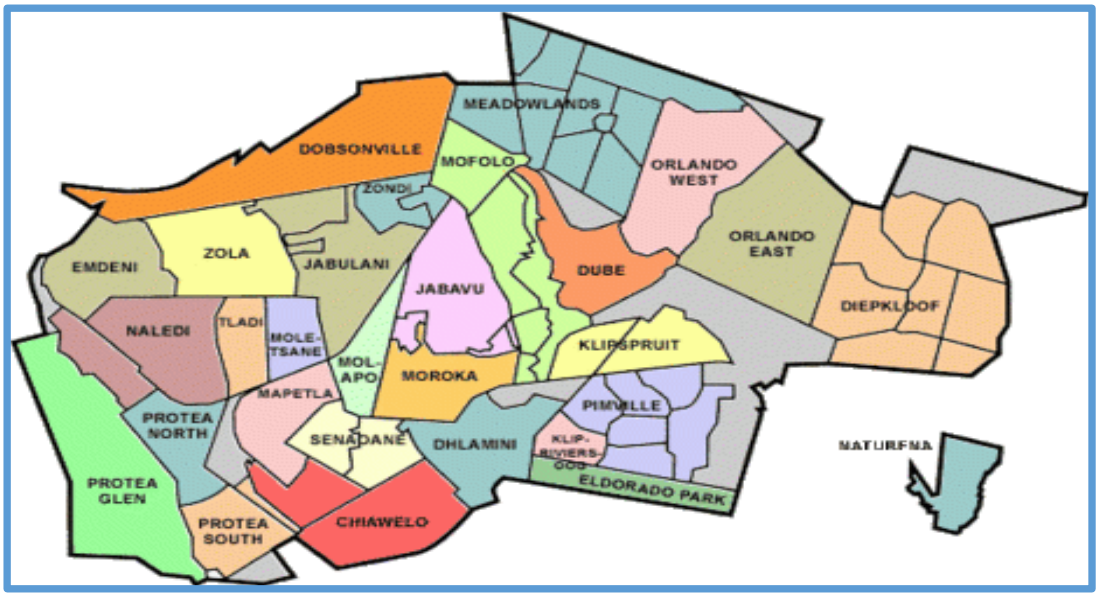


Figure 8-2: Map of Soweto

8.3.1 History of Soweto

Soweto derived its name from the first two letters of each word in the phrase 'South-Western Townships' (So-We-To). The name was selected after a public competition that was launched by Johannesburg City Council. In the 1950s, the apartheid government forcefully removed non-white (Blacks, Coloureds, and Indians) residents of Sophiatown to townships, in accordance with the policy of separate development. They moved them to townships such as Soweto, Eldorado Park and Lenasia, as illustrated in

Figure 8-3. Soweto became one of the largest historically black residential areas in South Africa, with a recent population count of 1 271 628 people (Statistics South Africa, 2011). The primary reason for Soweto's existence was to create a dormitory town for black African migrants who worked in the mines as well as in white people's houses, factories and industries. The economic development of Soweto was harshly reduced by the apartheid regime, which provided minimal infrastructure and prohibited citizens from being entrepreneurs. For example, many roads remained untarred, and many citizens were forced to share a single tap between four households. The Sowetans conquered hardship and oppression by creating social spaces for themselves (Bogatsu, 2014).

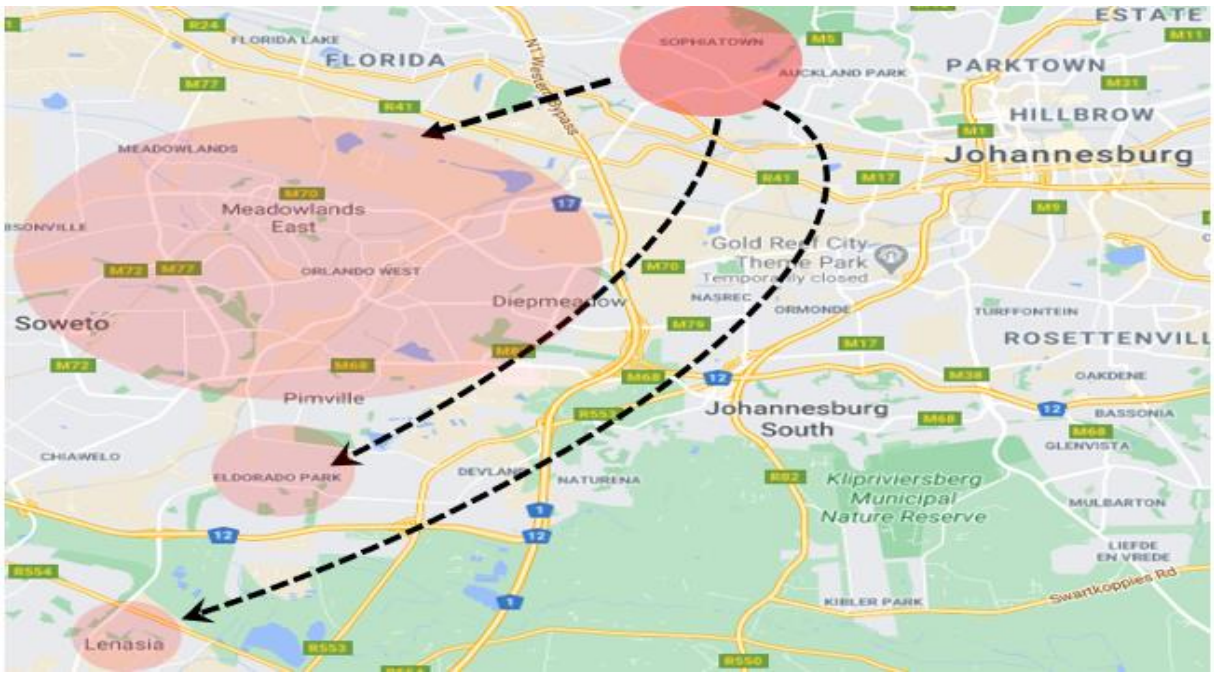


Figure 8-3: Removals from Sophiatown townships

Severe uprisings took place in 1976, during the height of the apartheid regime. While there were reforms following the unrests, new riots flared up again in 1985, and continued to do so until the first democratic elections were held in April 1994. Since 1994, there have been changes in the city's political and administrative structures, and Soweto has been reallocated several times from one administrative region to another. The process of integration that seeks to overcome a long history of racial — segregation as well as much of the built environment, commercial development and infrastructural context of Soweto — have been shaped by forces and processes that are historical as well as structural. In terms of economic activities, *spaza shops* are the pillar of South African townships' informal economy. Historically, spaza shops were established and operated from houses to sell a few items such as eggs, bread and other small essentials, but gradually evolved and changed form as the business grew in size (Sustainable Livelihoods Foundation, 2015). In late 1990, as apartheid was nearing its end, Soweto's first shopping mall was opened in Dobsonville, followed by other shopping centres. In 2007, the affluent Maponya Mall was opened. This was one of the symbols of economic development in the area.

8.3.2 Social Demographics

The population of Soweto is predominately black African (98.5%), while 0.1% are Coloured, 0.1% are Indian/Asian and 0.1% are White people (Stats SA, 2011). In terms of education, 3.1% of the population over the age of 20 had no schooling in 2011, 38,3% held a matric certificate and 9,3% had higher education. Considering income, 50% of households did not have income at the time, while 62% of households had an average income of less than R1 500 a month, thus highlighting that the majority of the population lived below the breadline (City of Johannesburg, 2018a).

Many parts of Soweto are still amongst the underprivileged in Johannesburg; however, individual suburbs comprise a mix of middle class and poorer residents. Soweto can be viewed as a community of extremes, with squatter areas that personify utter poverty, contrasted against extraordinary wealthy suburbs such as Diepkloof Extension, where residential properties are valued at over R1 million each (Gold Reef Guides, 2003). While parts of the region remain poverty-stricken, many middle-class residents are relocating back from posh suburbs in Johannesburg (Luthuli, 2016). The City of Johannesburg made an undertaking to transform the economic landscape of Soweto whilst concurrently strengthening the delivery of essential services. As a result, 91.6% of Sowetans to date have flush toilets connected to sewerage, whilst 96.5% of residents have refuse removal services; 55% of households have piped water inside their homes, while 93.1% of homes use electricity for lighting (Statistics South Africa, 2011).

8.3.3 Language identity

Eleven (11) official languages are spoken in the region: isiZulu (37.1%), Sesotho (15.5%), Setswana (12.9%), Xitsonga (8.9%), isiXhosa (8.7%), Sepedi (5.1%), Tshivenda (4.5%), English (2.3%), isiNdebele (1.4%), Afrikaans (1.3%) and siSwati (0.7%). It should be noted that 0.5% of the population uses sign language. The language distribution reflects the cultural diversity. Numerous Sowetans speak fluently between three and five languages (Brook, 2010). In addition, another language was formulated by streetwise Sowetans, referred to as *tsotsi-taal* (Gunnink, 2014). During the apartheid era, tsotsi-taal was established by people who were dislocated from their sense of identity (Brook, 2010).

8.3.4 Community

Even though the region was initially incorporated into the framework of the City of Johannesburg though segregation and oppression boundaries, it managed to develop its own traditions and rules. Bieber (2015, p. 3) mentioned that “Soweto operates in a completely different way to the other suburbs of Johannesburg”. The region functions in a manner that reflects organised chaos. Through Bieber’s observation of Soweto, children have the liberty of playing on the pavement, there are people playing soccer on streets, and adults chat with their neighbours – which is something rare in other suburbs with high walls. She goes on to mention that, in this type of community, two neighbours could be playing loud music in close proximity without disturbing each other. The region possesses a complex social system that is evidently understood by Sowetans, and it is this social system that assists in joining the broader community together through shared values (Bieber, 2015).

8.3.5 Socio-economic Development

Since 1994, there has been substantial socio-economic transformation in and around the City of Johannesburg. Socio-economic development aims to contribute to the growth and performance of previously disadvantaged communities. The government of South Africa, through Broad-Based Black Economic Empowerment (B-BBEE), encourages companies to contribute towards social upliftment of poor urban communities. This process demonstrates a commitment from the Government to eradicate poverty and unemployment by creating jobs where disadvantaged people become involved. Moreover, this process aims to integrate the jobs created into feasible sectors with the aim of benefitting the entire community. The outlook for these communities is anticipated to result in economic energy. The empowerment prospects are encouraged to support the capability of these poor urban communities to be self-sufficient and to uplift their livelihoods.

The African National Congress, at their National Policy Conference in Midrand, (2017), made an undertaking to advance socio-economic transformation by:

- Promoting growth and development and eradicating unemployment, poverty and inequality;
- Increasing government infrastructure investment targeted at improving social and economic infrastructure;
- Promoting youth employment, entrepreneurs and co-operatives; and
- Building a developmental state with the technical and political capacity to lead the development and transform the economy.

The current government is committed to accelerating and consolidating the processes of economic transformation with the aim of more effectively touching the lives of those millions of mainly black South Africans who have not yet experienced the betterment of life that held such promise at the dawn of freedom in 1994 (African National Congress, 2017). According to the B-BBEE Act of 2003, its objective is to empower poor urban communities by providing access to economic opportunities, land, infrastructure, ownership and skills (The Department of Trade and Industry, 2017). Companies are encouraged to give back to communities because they are economic units in society, and they assume a pivotal role in addressing social ills such as poverty and inequality. Moreover, because they make profits from rendering goods and services, it is essential for them to give back to communities. This has been demonstrated by many organisations that have contributed to poor urban communities through their CSI programmes.

To conclude the section on Soweto, it can be seen from the historic, demographic, economic and cultural overview that Soweto is a diverse community with a rich history and culture, but with severe economic challenges.

8.4 Overview of the four case study contexts

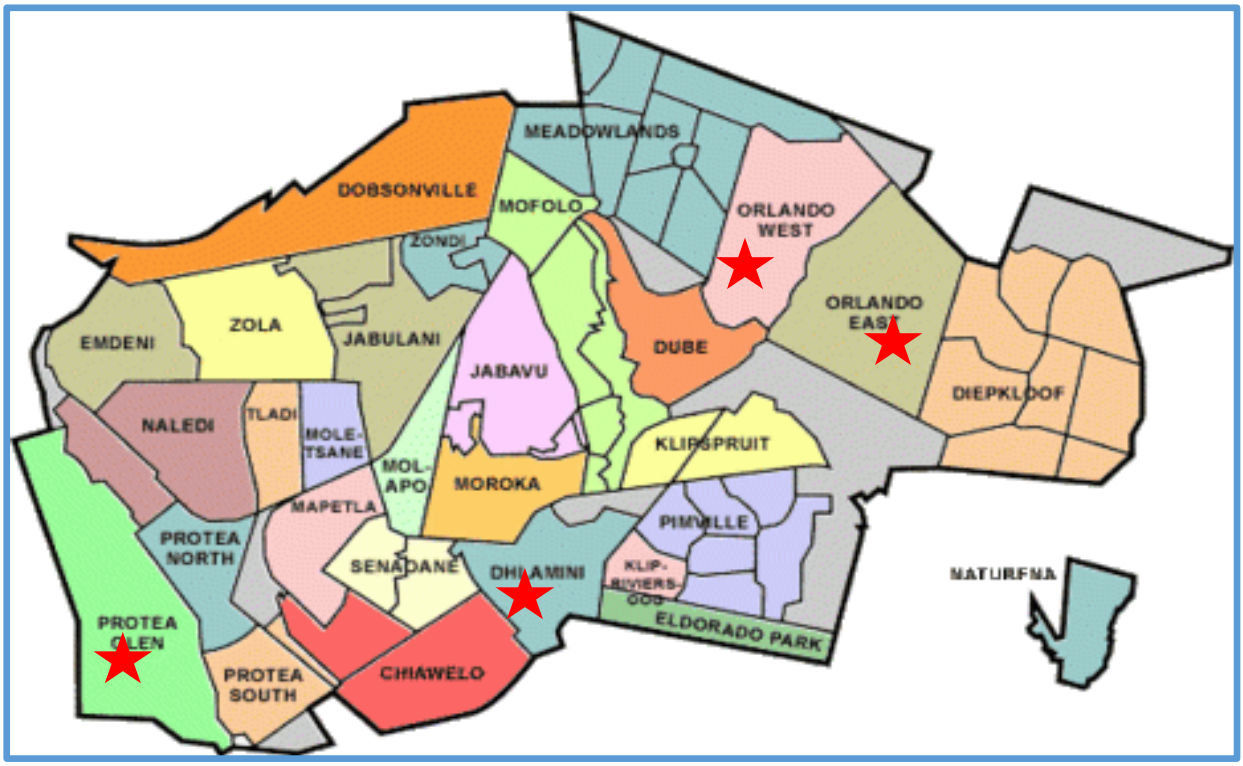


Figure 8-4: Visual representation of selected communities in Soweto
Source: (City of Johannesburg, 2018c)

After having sketched a general demographic overview of Soweto in the context of the larger Johannesburg, this section proceeds to discuss the four communities within Soweto where the case studies were situated, namely: Orlando East, Orlando West, Protea Glen and Dhlamini. The four communities are indicated by stars in Figure 8-4.

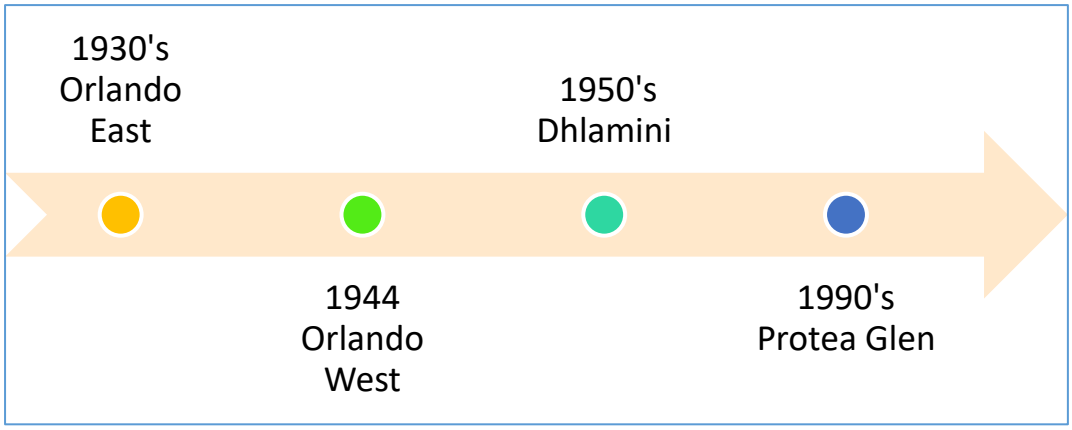


Figure 8-5: Soweto developmental timeline

The timeline of when each township was established is illustrated in Figure 8-5. Orlando East was the first township to be established around the 1930s, and was named after the Mayor of Johannesburg, Mr Edwin Orlando Leake (Lewis, 1966). In subsequent years, Orlando West, Dhlamini and Protea Glen were established. The sections that follow present the background and context of each community in the stated townships.

8.4.1 Orlando East: Demographic context

In the 1930s, the City of Johannesburg bought 1 300 morgen of land on the farm Klipspruit No. 8, with the intent to build 10,311 houses (Lewis, 1966). The city further built 4,045 temporary single-room shelters to house migrant workers. During the development, provision was made for administrative offices, a public hall, hospital, clinic, police station, post office and district offices, a fire station, schools, religious site and shopping centre (Lewis, 1966). The 2011 census data reported the population of Orlando East at an estimated 68,210 people (Frith, 2011). The number of households was estimated at 22,416 which is almost double the number of the 1930s. The surface area of Orlando East is 4.47 km², and the population profile is Black African (99.12%), Others (0.41%), Coloureds (0,23%), Indians and Asian (0.13%), and White (0.12%), as shown in Figure 8-6.

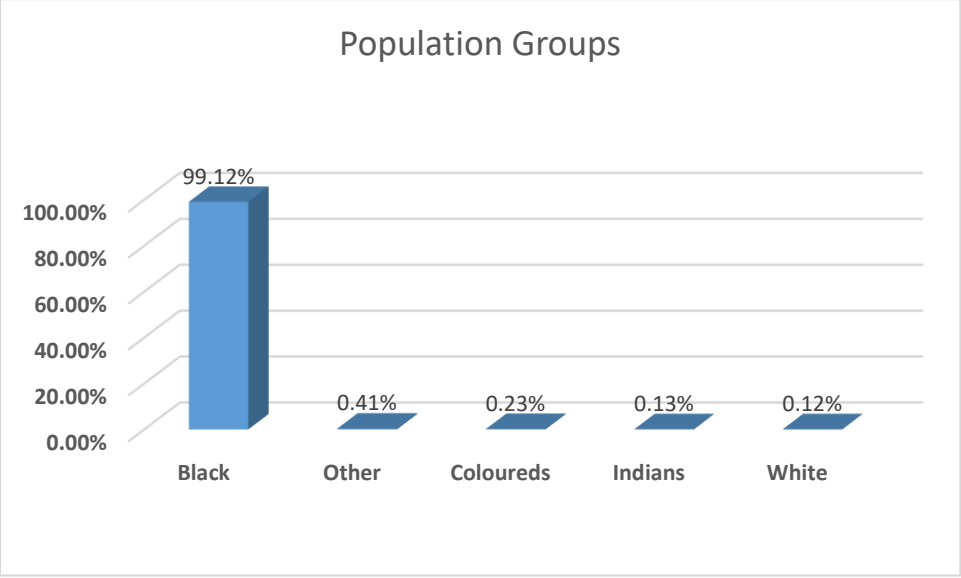


Figure 8-6: Orlando East Population Groups

The languages spoken in Orlando East, as per population group, include isiZulu (34.02%), Sesotho (17.30%), Xitsonga (15.48%), isiXhosa (14.82%), Setswana (6.25%), Sepedi (3.34%), Tshivenda (2.43%), English (1.74%), Other (1.53%), isiNdebele (1.30%), SiSwati (0.83%), and Afrikaans (0.55%). The language distribution reflects the cultural diversity.

The area hosts the Orlando Stadium, home of the Orlando Pirates Football Club. The stadium is used mostly for football matches. The stadium becomes livelier when there is a soccer derby between the arch-rivals Orlando Pirates and Kaizer Chiefs – also known as Phefeni glamour boys (Kaizer Chiefs, 2019). During the 2010 FIFA world cup, the stadium was used as a training venue for some of the visiting teams that took part in the tournament.

The Orlando township is separated into two areas, namely, Orlando East and Orlando West, which are separated by a street and railway line.

8.4.2 Orlando West: Demographic context

Around 1944, there was an influx of migrants that Orlando East could not accommodate. Therefore, informal settlements were set up in what is now Orlando West. The move to settle in Orlando West was led by James Mpanza and organised by a group that called themselves the Sofasonke (we will die together) squatter's movement. Mpanza led many families across the railway line to occupy vacant land (South African History Online, 2013). As a result, the town council was obligated to set up emergency camps to accommodate the settlers.

Various historic events took place in Orlando West against the apartheid system. Clashes between the police and the anti-apartheid demonstrating students first started in Orlando West when Phefeni Secondary learners refused to attend classes, and mobilised learners from nearby schools to boycott classes (Rakometsi, 2008). Around this period (1976), the 12-year-old Hector Peterson was killed. The Hector Peterson Memorial Museum was erected in the area to commemorate that event. Moreover, the Nobel Laureates Nelson Mandela and Archbishop Emeritus Desmond Tutu lived in the same area and same street. The township of Orlando West is also sometimes referred to as Phefeni.

Orlando West extends over an area of 5.54 km², with a population of 40,603 people, comprising predominately Black Africans (99.50%), followed by Coloureds (0.29%), Others (0.08%), Indians or Asians (0.07%), and Whites at (0.07%) (Frith, 2011).

8.4.3 Dhlamini: Demographic context

Around the 1950s, the city established the Dhlamini township along with Tladi, Zondi, Chiawelo and Senaoane, with the intention of providing accommodation for isiZulu and isiXhosa speaking people (Küsel, 2016). Currently, according to census 2011 statistics, Dhlamini still has a majority of isiZulu (65.08%) speakers, followed by the isiXhosa (7.88%). However, other languages are spoken in Dhlamini, such as Sesotho (6.58%), Xitsonga (6.05%), Setswana (3.60%), Tshivenda (2.43%), isiNdebele (2.13%), Sepedi (1.80%), English (1.65%), Other (0.92%), SiSwati (0.77%), Afrikaans (0.65%) and Sign language (0.48%).

The geographical area of Dhlamini is estimated at 2.19 km², with a total population of 16,739 (7,655.76 per km²) (Frith, 2011). There are 4,317 households in the area.

The area was initially designated for Black Africans (99.44%), who represent the majority of the population; other population groups account for the minority at 0,56%.

8.4.4 Protea Glen: Demographic context

Protea Glen was developed around the 1990s, following a long battle between the Township Realtors and the city, represented by the Department of Community Development, regarding the right to develop properties across Klipspruit in terms of Act 4 of 1984, the Black Communities Development Act, which was revoked in 1991 (Township Realtors, 2018). Following the dispute, the Township Realtors were granted rights to build in the area. As a result, 1 315 stands were serviced, and 34 500 townhouses and flats were developed (Township Realtors, 2018). Currently, according to census 2011, there are 21,424 (1,632.80 per km²) households in Protea Glen.

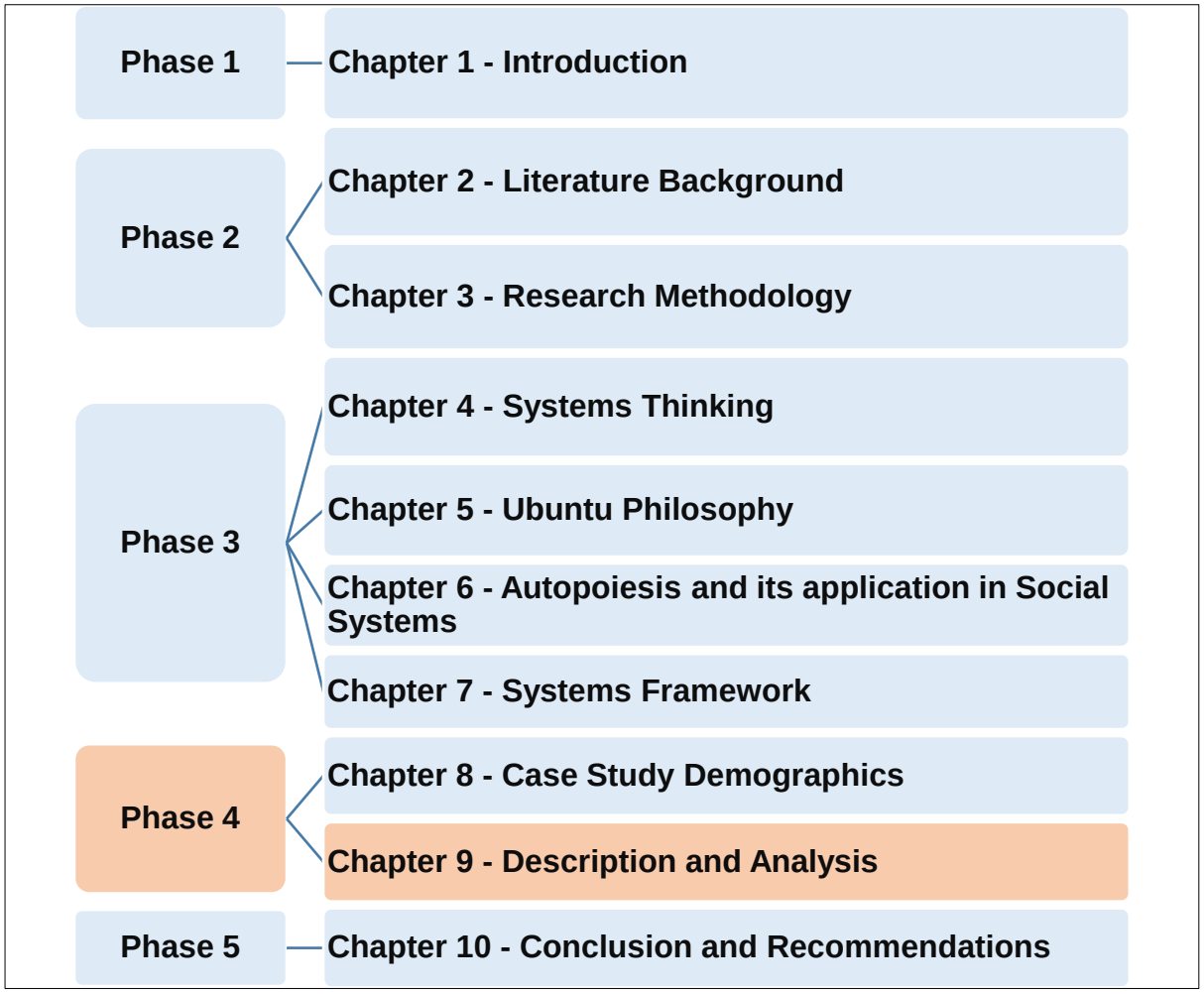
Protea Glen is on the outskirts of the City of Johannesburg (Todes & Meth, 2019), and covers 13.12 km² of land. In the last 25 years, the following was developed: four shopping centres, two garages, a private hospital, clinic, crèches, churches, primary and high schools. Further developments include offices for the Local Councillor and Local Community Development Forum, and a Library and Community Hall on the land that was donated by the developer (Township Realtors, 2018). In addition, a fully operational police station was built in the area. The population in the area is 75,634 (5,764.35 per km²), comprising mostly Black Africans (98.96%), with the rest comprised of Coloured (0.58%), Other (0.20%), Indian or Asian (0.15%) and White 0.11% (Frith, 2011).

8.5 Conclusion

This chapter set the scene by providing background to the four case study sites. Context was provided on the larger Johannesburg in terms of its history and demographics. Subsequently, Soweto was discussed, followed by an overview of the demographics of the four case study sites.

Chapter 9 provides a case study description and analysis of the four sites, using the systems framework that was presented in Chapter 7.

9 CHAPTER 9 DESCRIPTION AND ANALYSIS OF CASES



9.1 Introduction

The previous chapter presented the background, history and demographics of the four case studies within the larger Johannesburg area. This chapter seeks to address the following questions:

- How does Ubuntu contribute to an understanding of the success (or not) of CSI ICT projects?
- What concepts of autopoiesis or self-production are relevant to include in a systems framework for analysing the impact of CSI ICT projects?

This chapter provides a description and analysis of the cases within the broader context, while addressing the research questions. Data used for the description and analysis was collected during learning centre site visits, and include interviews, fieldnotes, annual reports, pictures, and websites. The analysis is performed using a systems framework that combines concepts from SSM, Ubuntu, and autopoiesis.

In this analysis, SSM is used to provide a descriptive summary of a social system, using the interview transcripts and observation fieldnotes. Rich pictures are drawn to illustrate the problem situations, followed by a CATWOE analysis that describes the human activity systems and situations of each community, referred to as a social system, with the view of gaining a multiple stakeholder perspective. Conceptual models are then generated to represent the real-world situation. Further, Ubuntu is used to analyse the case studies to illustrate how the practising of Ubuntu concepts contributes to the success of the projects (mutuality). Lastly, Autopoiesis is used to see how these systems self-produce to make themselves sustainable.

The chapter proceeds by defining the social systems of interest for each of the four cases, so as to describe the system using SSM. Subsequently, it analyses the systems using Ubuntu concepts. The case studies are further analysed using autopoiesis theory. The analysis process presents the data in an interpretable manner with the view of identifying relations and providing meaning while addressing the study objective. Moreover, the analysis discusses the sustainability and impact of the ICT4D projects on the four cases. The chapter concludes with the refined systems framework, based on insights derived from the analysis.

9.2 Defining the social systems of interest

Systems thinking is a mechanism for understanding how things influence each other within a whole (Arnold & Wade, 2015). According to Checkland and Holwell (1998), the basic principle of systems thinking is embodied when a system serves another system. In this study,

information systems exist to serve human activities in a social system (Checkland & Scholes, 1990).

As coined by Checkland and Holwell (1998), an information system entails two systems: a system served and a serving system. According to Hirschheim (1985), information systems are social systems that depend on information and communication technology to function. This study has various social systems of interest, namely: the communities at large, learning centres, and CSI ICT projects.

As Zelený and Hufford (1992) stipulate, the researcher has a choice in how to define the social systems that they aim to investigate. In the context of this study, the community is referred to as a system served, while learning centres and CSI ICT projects are referred to as serving systems. The researcher further distinguished between an overarching serving system (learning centres) and a sub-serving system (CSI ICT projects) – see Figure 9-1. In Chapter 3, CSI ICT projects were selected for inclusion in the study. These projects serve the poor urban communities in Soweto. Within each community, there is a learning centre that implemented CSI ICT projects to serve the communities with the assistance of the technology partners. The learning centres are:

- Orlando Pirates Learning Centre, serving the community of Orlando East;
- SAAYC – Intel Clubhouse, serving the community of Orlando West;
- Nanga Vhutshilo, serving the community of Dhlamini; and
- Boys and Girls Club, serving the community of Protea Glen.

Learning centres first need to understand community needs in order to devise an appropriate solution, so as to be able to serve the communities. For the purpose of this study, learning centres are overarching serving systems that provide non-technological services, while the CSI ICT projects are sub-serving systems within the learning centres that provide technology services to the community.

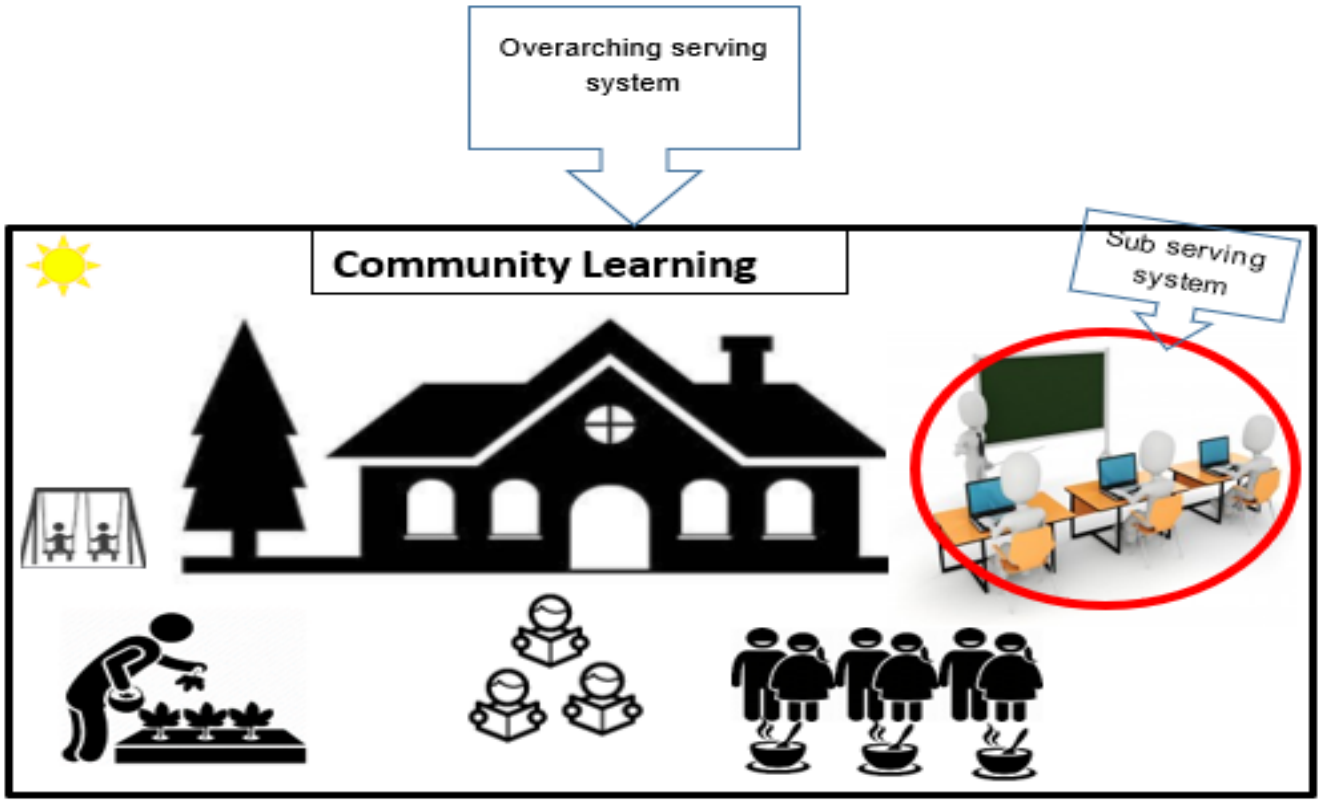


Figure 9-1: Overarching and sub-serving systems

The following section describes the background and context of the various systems served by the learning centres, the technology partners as sampled in Chapter 3 and the CSI ICT projects.

9.3 Case 1: Orlando Pirates Learning Centre

9.3.1 Case 1 Background

Orlando Pirates Football Club is a professional South African football club. The club was founded in 1937 and was initially based in Orlando East, Soweto. The founders of Orlando Pirates included descendants of migrant workers who moved from rural areas to work in the gold mines of Gauteng. Young males in Orlando came together at every available opportunity in open spaces and in informal groupings to play football. That original club was called the Orlando Boys Club (Maguire, 1991).

Dr Irvin Khoza is the chairman of Orlando Pirates Football Club since 1991. The Orlando Pirates Football Club was the first football club since the beginning of the Premier Soccer League in 1996 to have won three major trophies in a single season back to back, following their Absa Premiership league win (USN, 2017). The Orlando stadium, based in the community of Orlando, Soweto, is the home venue for the club.

Orlando Pirates Football Club believes that it is their responsibility to give back to the community through corporate social investment projects with which they associate their brand. For this reason, the club entered into a partnership with the Department of Education, Acer Africa, and other partners since 2012, to establish the Orlando Pirates Learning Centre (OPLC) with the aim of improving education and ensuring that future leaders are produced in and around the Orlando community. The OPLC is a serving system, serving the school children and the unemployed youths in Orlando East and surrounding communities (see Figure 9-2).

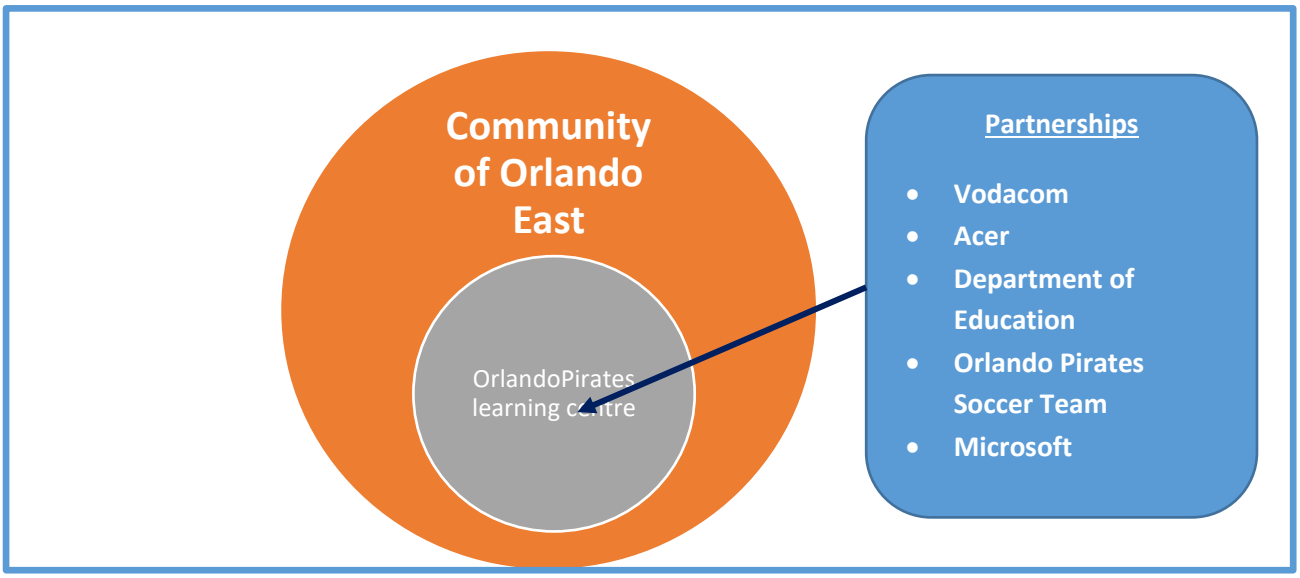


Figure 9-2: Serving system and systems served – Orlando East Community

Partnerships

The OPLC, as a community-based learning centre, relies on several sources for funding and operational support, including philanthropic foundations, in-kind support, software, and training. Table 9-1 depicts some of the OPLC partners, as listed on their website (Digital Classroom, 2014). However, this study is based on the sampling process described in Chapter 3, which identified the primary technology partners (in this instance, Acer).

Table 9-1: OPLC list of partners

Partners	Type of support
Vodacom	Internet connectivity, capacity building, content, and CISCO training
Acer	All-in-one **computer** solution
Department of Education	Collaboration to promote community cohesion, education, and lifelong learning
Orlando Pirates Soccer Team	In-kind (motivating and inspiring the learners through various educational activities)
Microsoft	Provided software

Based on the sampling described in Chapter 3 (i.e., the initial sample), Acer was selected because they had a CSI ICT project hosted at OPLC. While it emerged during data collection that the centre was working with other partners as well, the focus of this case is on Acer.

9.3.2 Technology Partner: Acer for Education

Acer Group is a hardware, software, and services company that was established in 1976 (Acer, 2017). The company focuses on research, design, marketing, sales, and support of innovative products that improve the livelihood of people. Products include PCs, displays, projectors, servers, tablets, smartphones, and wearables. The company is also venturing into cloud computing. They exist in over 160 countries and employ approximately 7,000 people worldwide (Acer, 2017). They are enthusiastic about designing IT products that enhance usability and add value to their customers' needs, albeit professional or personal.

Acer Group is an international leader in personal computing solutions, with the focus on providing innovative and cost-effective solutions to the education community. Their education product offerings include tablets, Chromebook, notebook, and desktop PCs (including touch-enabled), LCD monitors, and projectors (Acer, 2019). Acer has sales, marketing, and after-sales service operations in Europe, Middle East, and Africa, and Acer Africa oversees the South African operations (Helwick & Du Plessis, 2003).

Corporate Social Investment

Acer is an international company, and therefore do not subscribe to B-BBEE; however, they have a CSI programme. Acer realised that technological innovation is the driver that propels social progress. The company committed its corporate funding, to giving back to the communities, in alignment with their primary focus areas of education, the environment, and charity. They further emphasize the value of acquiring local experience, and as such have developed long-term relationships with local partners to ensure that resources are put to the most effective use (Acer, 2016). Under Acer's education focus area, they established the Acer for Education initiative.

Acer for Education

Acer for Education focuses on the provision of education to equip people in communities with the knowledge to find and seize opportunities. By putting to use their core competencies, they aim to attain the following goals: 1) Increasing digital inclusion, offering more people knowledge about and access to technology; 2) Cultivating the next generation of scientists and technologists, creating opportunities for youth; 3) Deepening the application of technology in education, using technology to transform education; and 4) Addressing the lack of educational resources, to assist children to continue with their education (Acer, 2016).

Technology is a fundamental enabler of education, as it fast-tracks access to information and deepens connections with the world. Acer offers programmes and develops technologies to bridge the digital divide, utilising programmes in disadvantaged communities such as the Cloud Professor IoT Starter Kit (Acer, 2016).

9.3.3 CSI ICT Project 1 – Orlando Pirates Learning Centre Project

The OPLC is a brainchild of the Chairman of Orlando Pirates, Dr Irvin Khoza. In 2012, Orlando Pirates Football Club entered into a partnership with Acer Africa; that partnership saw the establishment of the OPLC, which operates as the CSI ICT project for the Orlando Pirates Football Club.

The learning centre, with the assistance of Acer for Education, aims to build successful relationships with schools and the various local communities, to develop and deliver exciting education initiatives that will inspire learners to achieve their learning goals. In addition, the centre aims to develop independent, motivated and confident learners who are able to access learning opportunities. It aims to maintain a learning environment that is both secure and exciting, thus encouraging high levels of participation and expectations of achievement. The

OPLC was established to improve the numeracy and literacy skills of children from the community.

The purpose of this CSI ICT project is to address socio-economic development problems in Orlando East through the provision of ICT training and services. The OPLC, as a serving system, predominately serves the community of Orlando East; however, it also serves surrounding communities such as Noordgesig, Diepkloof, and Meadowlands. The learning centre has grown over the years, becoming a thriving hub for education in the community of Orlando East. The programmes are designed to add to the current schooling curriculum. The centre, in collaboration with participating schools, conducts a process for selecting the learners who will be using the centre.

The OPLC has partnered with the Department of Education and schools around the community to promote community cohesion, education, and lifelong learning. The Centre is located on the premises of Orlando Stadium. Figure 9-3, taken 31 May 2018, illustrates the facility, which is equipped with state-of-the-art equipment such as tablets, desktops, and full interactive whiteboards from the Acer product portfolio.

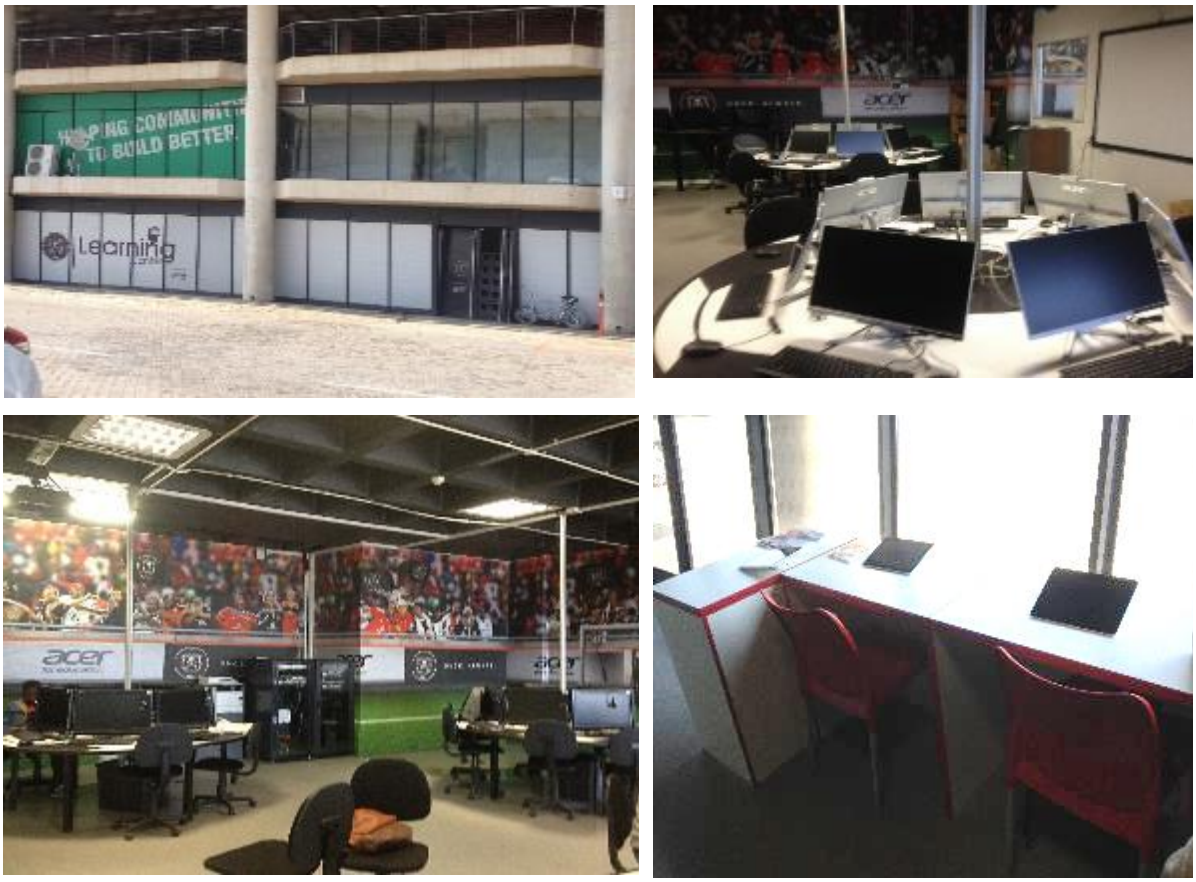


Figure 9-3: Orlando Pirates Learning Centre

The centre has worked with over 7500+ young people since 2012, helping them improve their Maths, English, and ICT skills. It has also empowered over 300 school teachers from 21 nearby primary and high schools by improving their professional development and IT skills. Over 120 unemployed young adults have benefitted from using the centre (OPLC progress report, 01 Feb 2018). They were able to enrol for a 12-month CISCO-accredited IT course, which enhanced their employability. The centre adheres to the community's needs by delivering educational programmes that empower the community through education. The centre is also open to walk-in learners or unemployed youths who want to do Internet research using state of the art equipment. Figure 9-4 lists the services that the learning centre offers to the community.

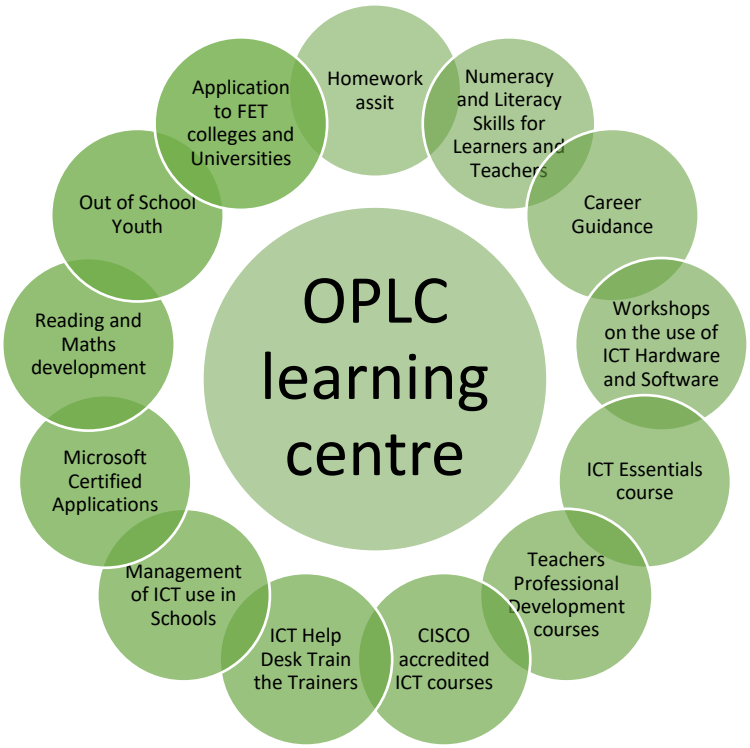


Figure 9-4: OPLC Services

The centre has established meaningful partnerships and sponsorships with other educational organisations to enhance and complement the delivery of their initiative. As a serving system, the centre continues to serve the community by delivering projects that meet their needs.

The following section describes the system using SSM constructs.

9.3.4 Systems description using SSM

This section provides a systems description of the OPLC using SSM constructs. As explained in Chapter 4, SSM has been used as a methodology for information systems development

projects. It is therefore justifiable to use SSM to gain a better understanding of the contextual situation between the multiple partners.

The following SSM concepts are used to provide a descriptive summary of the OPLC as a social system: rich picture, CATWOE analysis, and conceptual models. In this manner, the data collected during interviews and observations are used to provide a descriptive summary of the social system. Rich pictures are drawn to illustrate the problem situation, after which CATWOE analysis describes the human activity system and the situation of each community, referred to as a social system, with the view of understanding multiple partner perspectives. Conceptual models are then generated in comparison with the real-world situation.

9.3.4.1 Rich Picture

The investigation of the problem situation started with site visits, interviews, focus group discussions, and documentation review. The interviews included the CSI manager, learning centre manager, and users of the centres. The interviews and focus group discussions were aimed at visualising the social system overview, and also at setting a foundation for structuring “the problematic situation”. This approach was necessary, because it was imperative to get multiple perspectives from all people who are involved. The researcher used her fieldnotes and transcriptions to illustrate the rich picture (Figure 9-5), which is an unstructured descriptive situation of the OPLC that involves human activities. The rich picture was used to identify connections, influences, interactions, and relationships between the actors, sub-systems, and the environment and the researcher’s perceptions. It highlights what is identified as problematic areas. Further, the picture reflects on other social systems that are linked to the learning centre.

The picture does not depict the real world, but how the researcher views the situation. During discussions with the people involved (Learning centre manages, CSI manager, and centre users), new aspects of the situation emerged. Figure 9.5 outlines the rich picture that illustrates the social system’s richness and complexity.

Following development of the rich picture, root definitions and conceptual models were developed to express the situation in systems terms, by illustrating dependencies and relationships.

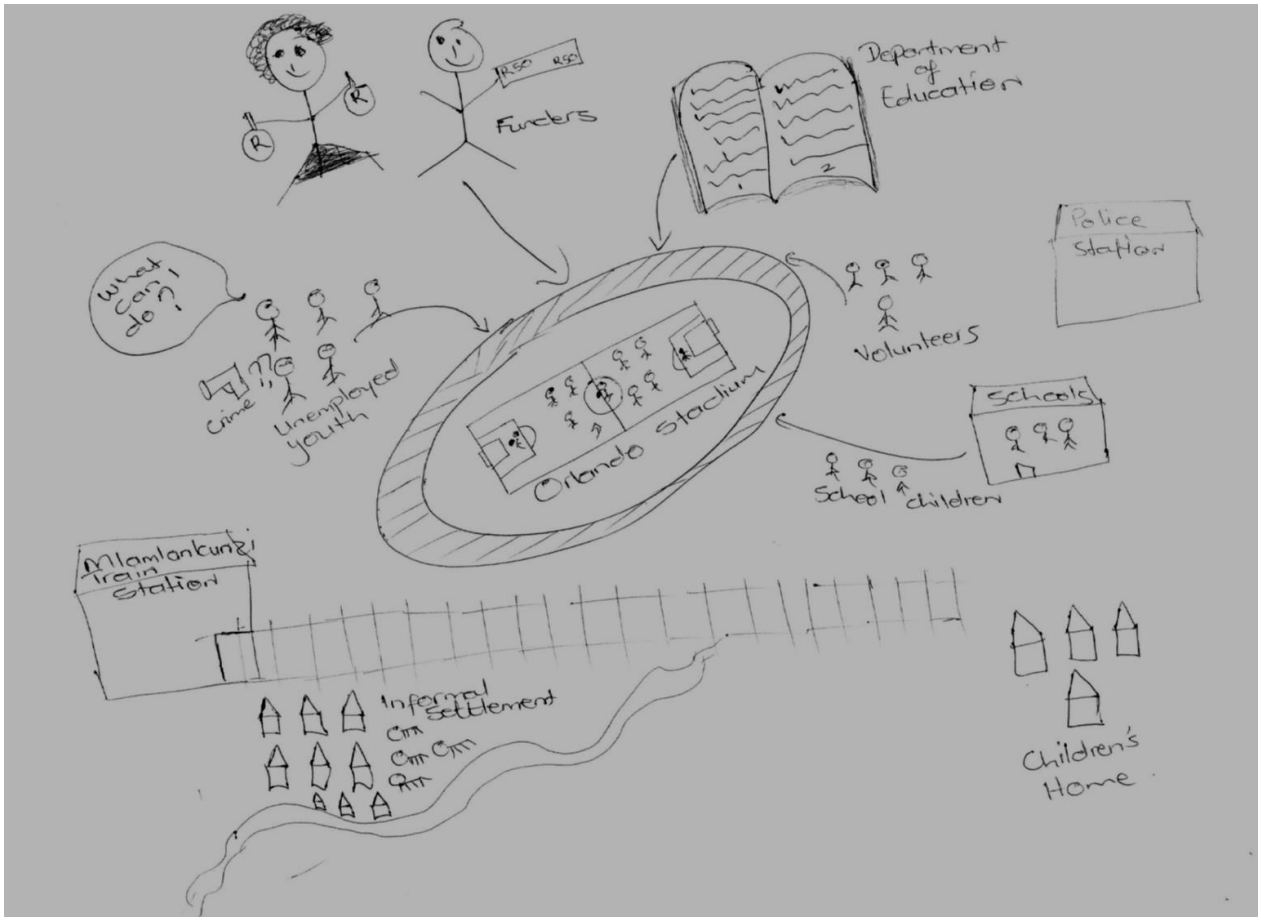


Figure 9-5: Rich Picture – Orlando Pirates Learning Centre

9.3.4.2 CATWOE Analysis

Based on the rich picture illustrated in Figure 9-5, this section describes the human activity system, as well as the situation of the community and the learning centre (referred to as overarching serving system). Chapter 4 described the SSM, discussed the acronym CATWOE. The CATWOE analysis depicts the root definition for the serving system, which reflects the worldview of the CSI ICT project in the community. The analysis simplifies a complex situation, which leads to an improved description of the problem under investigation. The process involves defining the customers, actors, transformation process, worldview, the owner(s), and environmental constraints that are pertinent to the learning centre's sustainability. Table 9-2 outlines the CATWOE analysis for the serving system.

Transformation followed by worldview are key elements that need to be defined prior to any intervention, because they will assist the role players with a correct understanding of the problem situation. Transformation within a community is central to its improvement, and the upfront definition of a shared purpose enables multiple role players to align their belief systems towards a shared goal. The quest to improve the socio-economic situation of a community

starts with a vision. The Chairman of the Orlando Pirates football club had a vision of transforming the lives of the young learners and unemployed youth of Orlando East by "*providing education-based curriculum using state-of-the-art computer equipment*". Acer for Education shared the sentiments of the Chairman of Orlando Pirates, and supported the club in realising the vision by providing a state-of-the-art facility. In addition to their vision, it would provide the children and the unemployed youth of the Orlando East community with a safe environment. The users of the centre have indicated that this safe space benefits them in two ways: it offers them ICT training, while also keeping them occupied by taking them off the streets. OPLC User2 reflected that the centre keeps them out of trouble, because their time is now spent at the centre where they attend IT training.

Table 9-2: CATWOE Analysis of the OPLC

Component	**Transformation process**
Transformation	Providing an education-based curriculum to school learners, and ICT training to unemployed youth using state-of-the-art computer equipment.
Customers	Community of Orlando East School-going children and unemployed youth
Actors	Parents Schools Acer Orlando Pirates Soccer Team CISCO
Owners	Funders (Acer Africa) Orlando Pirates Soccer Team
Worldview	Bridging the digital gap through education, and helping young people living in the area to achieve their potential and become confident, contributing members of society
Environmental constraints	Funding to sustain the OPLC

The root definition of the OPLC provides clarity and understanding of the system. The OPLC is a system owned by the Orlando Pirates Soccer Team, and their main partner is Acer Africa, which provided the centre with a state-of-the-art computer centre. The Orlando Pirates Team recognised the need to give back to the community, mainly to bridge the digital gap of children and unemployed youth living in and around Orlando East, while contributing to curriculum-based numeracy and literacy education. Bridging the gap is achieved by providing access to information, homework support, and ICT training using a state-of-the-art computer centre with

Internet connectivity. Volunteers provide ICT training and homework support to young children.

The researcher developed a conceptual model, based on the root definition process outlined above.

9.3.4.3 Conceptual Model

Drafting a conceptual Model is a process of conceptualising a system of interest (Daellenbach, 1994). This process requires the researchers to separate themselves from the real world area of concern (Patel, 1995).

The researcher used the root definition to extract the necessary activities required to develop the conceptual model, as shown in Figure 9-6. These activities took place within the boundaries and environment of the Orlando East community and the OPLC Learning Centre. Moreover, the model illustrates the human activities that are necessary for transformation. The activities include inputs, which are transferred into outputs, connections, and boundaries. The transformation for the OPLC Learning Centre includes education, access to information, access to state-of-the-art computer equipment, and access to volunteers.

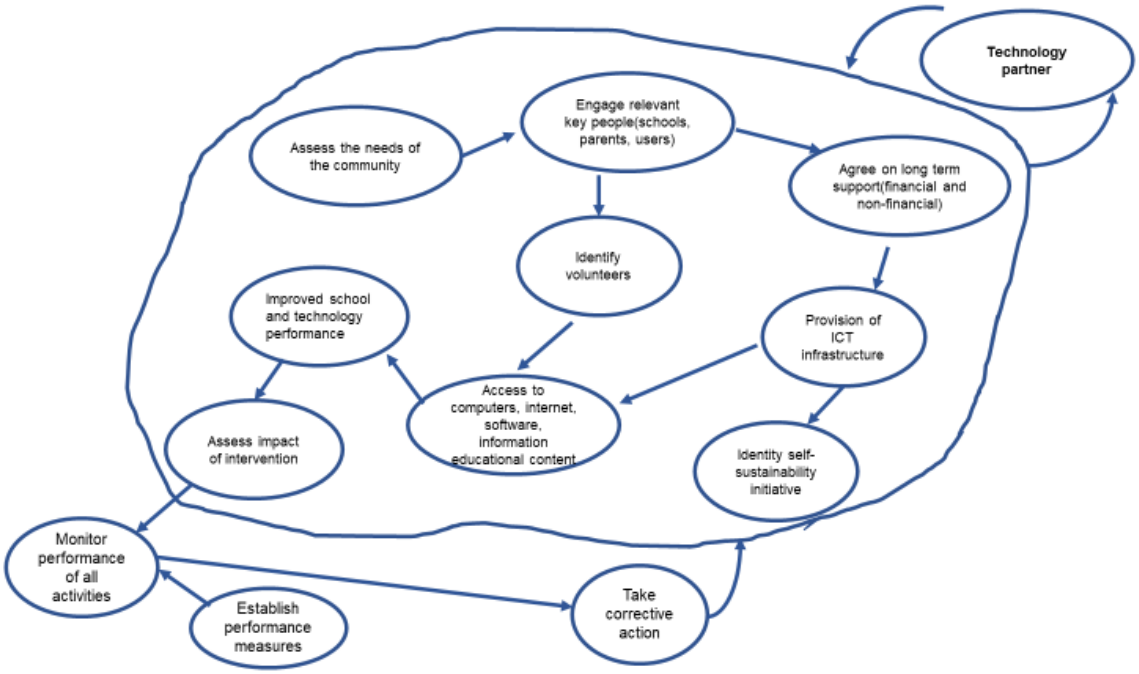


Figure 9-6: Conceptual Model Orlando Pirates Learning Centre

The following sections analyse the system, using the systems framework concepts of Ubuntu and Autopoiesis, and supports the application of the framework with comments from the participants.

9.3.5 Systems description using Ubuntu

This section provides a systems description of the OPLC using Ubuntu. The latter is used as a theoretical lens to analyse this case study in order to illustrate how the practise thereof contributes to the success of the CSI ICT project (mutuality). Ubuntu philosophy emphasises that an individual is an individual through others. In a community, the individual does not look out for self-interest but for the greater social system being a community; this demonstrates wholeness. Hence, Ubuntu is applied in this case study to analyse the impact of a CSI ICT project in poor urban communities in Soweto.

Using the data collected during site visits and interviews, the Ubuntu concepts of interconnectedness and the collective are used to further describe the social system. Themes that emerged from the data are discussed in all four case studies, with supporting quotes from the interview transcripts. The emerging themes are tabulated in Table 9-3, and discussed thereafter.

Table 9-3: Ubuntu emerging themes

Original concepts	**Emerging theme**
Interconnectedness	Partnerships
Collective	Volunteering

9.3.5.1 Interconnectedness

The reflection above demonstrates that two social systems share a transformation agenda that is geared towards improving the lives of the poor. Being part of a community is demonstrated by interacting with multiple players and embracing shared values and goals (Sanders, 1994). The OPLC engaged with Acer for Education to achieve the desired transformation, because they share a vision and have the resources to realise it. The worldview that this CSI ICT project is trying to address, is centred around education as part of Ubuntu. The analysis also considered actors such as parents, schools, centre managers, and the CSI manager as the people who carried the activities defined in the system.

Partnerships

The complexity of socio-economic development projects needs high levels of technical expertise, understanding of the community needs, and the capability to deliver projects that will benefit the disadvantaged communities. In addition, other factors need to be taken into account for an effective partnership, namely: trust, community buy-in, alignment, and the duration of the partnership. In the sphere of socio-economic development, mutual trust and respect is key for an effective partnership, as is shared responsibility for the education of the children (Epstein et al., 2018; Steyn et al., 2013). In addition, Magalhães and Sanchez (2009) state that partners should respect the rules that govern their relations. In this case study, trust was demonstrated by transparency and accountability, where the centre manager provided a status report to Acer as the technology partner and, as a result, there has been continuous support by the partner since the establishment of the learning centre in 2012. In addition, Acer have reached out to some of their partners to enhance the OPLC partnership; this was affirmed by the CSI Manager: ”*we have got international software partners we've partnered with, they give us the software, so we put in the hardware they put in the software*” (CSIM1).

It is assumed that the community is a beneficiary of the CSI ICT project; having said that, community buy-in is key for project sustainability (Naik, 2018). The community of Orlando East have welcomed this initiative, and some of the schools have identified learners to participate. Moreover, parents of some of the unemployed youths are in support of this initiative, because it provides a safe environment by keeping the youth off the streets. Furthermore, because some of the families are too poor to send their children to conventional university, this centre offers the youth with the necessary training to enhance their employability. As affirmed by one user who lives in the surrounding area: “*our parents give us transport money to commute to the centre*” (OPLC 3). There is therefore empirical evidence of supportive partnerships within the community, as well as with external stakeholders.

It is encouraged for learning centres to align themselves to companies and government planning (Franks, 2012; Reid, Hayes, & Stibbe, 2014). The OPLC is currently aligned with its main partner, as well as with the Department of Education, on matters related to the Maths and English curriculum.

The Centre manager mentioned that the OPLC established partnerships with 21 schools in and around Orlando East, and that these schools send their learners to the centre. In addition, the participating schools have sent 10 teachers for a personal development programme at the OPLC (CM1).

When companies enter into a partnership, it is prudent to agree on the duration thereof. However, it should be acknowledged that there could in some instances be an agreement in

place that does not specify the duration of the partnership. For companies to achieve a long-term impact on socio-economic development, they need to establish partnerships that are long-term in nature, because there is no quick fix for societal issues. Duration of a partnership is significant because it sometimes takes a while to realise the full impact thereof. In this case the study partnership that was established between OPLC and Acer for Education in 2011 is still ongoing. At the time of data collection, Acer for Education was still their main technology partner.

Learning centre-parents-schools partnership

The various partnerships that the learning centre have entered into are listed in Section 9.3.1. The learning centre has established meaningful partnerships with other companies that support education to enhance and complement their programme delivery. As Williams and Sullivan (2011, p. 14) state, partnership is about working together systematically to solve socio-economic situations; this orientation is core to systems thinking.

OPLC has a strong partnership with parents and local schools. As Ubuntu philosophy would affirm: “it takes a village to raise a child”; in this instance, it takes a village to educate a child. The learning centre–parents–school partnerships are collaborative associations and activities that involve schoolteachers, headmasters, parents, and other family members of students that visit learning centres. The learning centre has partnered with 21 schools in and around Orlando East, and the learners visit the centre on a rotational basis (Fieldnote, 05 Jun 2018). The participating schools have also allowed their teachers to attend personal development programmes at the OPLC.

The discussion above reveals that the OPLC has established strong relationships with other social systems (i.e., parents, schools, Department of Education, other partners, and the community at large). Systems thinking is epitomised by the interconnections between the learning centre and other social systems, with the quest of bridging the digital gap in their community while contributing to the education of young and unemployed people.

9.3.5.2 Collective Volunteerism

Ubuntu is a concept of togetherness and sharing (Shutte, 2001). In a community, members depend on each other, and their behaviour is largely aimed at maintaining a communal way of living (Khomba, 2011). By doing things as a collective, one appreciates the diversity that comes with it and, despite people’s differences, this serves to illustrate that all together they are human, and they strive to share and create wholeness (Broodryk, 2006).

The United Nations Volunteer programme reports that the role of volunteerism in socio-economic development projects is key to sustainable development (United Nations Volunteers, 2011). Collective volunteerism is sharing of knowledge and skills for the benefit of others as well as showing compassion. Compassion is one of the fundamental social values of Ubuntu (Zungu, 2018). The learning centre currently has about 50 volunteers who weekly visit the centre to assist the learners. Some of the volunteers affirmed this "…*when I was doing Grade 9 I started doing volunteering to helping the learners who came after me with the work that I did the last year and since then I have been a volunteer* "(OPLC User 1). The second user validated that "they *attend an IT class in the morning from 9:00 am till 13:00. Then after 13:00 until 17:00, all of us we do volunteer to help the schools that are coming here, help some learners with their applications*" (OPLC User 2). This social value is a human quality for understanding other people's problems, as reflected by the saying "*being in other people's shoes*" and assisting them where possible. Broodryk (2006) states that when someone is helpful and not thinking about themselves, they develop a sense of compassion to meet the needs of others. Their act of compassion demonstrates that, despite people's differences, human beings share and create wholeness together. In this case study, the unemployed volunteers were showing compassion and selflessness by training young school children on how to use the computer and by developing other life skills. The work that the volunteers are doing is a depiction of the saying "Motho ke motho ka batho" meaning *a person is a person through others* in Setswana, which demonstrates Ubuntu.

Ubuntu represents a collective viewpoint, cultural, spiritualty, shared vision, collective responsibility, and collective empowerment (Ntseane, 2011). The philosophy of Ubuntu includes a holistic view on issues related to sustainable development.

According to Caprara, Mati, Obadare, and Perold (2016), volunteerism can be classified as structured or unstructured. They reported that structured volunteering in the Southern African context can be structured by agreements and may include stipends. In this case study, the learning centre has a structured volunteer programme where they pay a stipend to volunteers.

In summary, the discussion above presents evidence that the learning centre as a social system practises Ubuntu daily. Since its inception, the centre has established long-term partnerships with critical stakeholders, all of whom share the vision of bridging the digital gap and providing a safe space for young school children and the unemployed youth. The partnerships between the various role players suggest, through system thinking, that they can strengthen working together to achieve their vision. This case study further suggests that, by aligning the learning centre goals with those of their partners, they stand a better chance of being supported in their quest to improve socio-economic development because they would

have aligned their development priorities with those of their partners. In addition, the duration of the partnership plays a significant role in the long-term impact of the learning centre. This is validated in this case study, as the learning centre entered into a partnership with their technology partner since 2012; this partnership is ongoing. The positive consequences of this relationship are demonstrated by several people that have been impacted by the ICT services that the centre offers. Ubuntu represents a collective viewpoint, collective responsibility, and collective empowerment (Ntseane, 2011); the centre established a voluntary programme that consists of previous beneficiaries and some of their current unemployed youth who attend the IT courses. These volunteers are paid a stipend.

Another act of Ubuntu that the researcher observed during the site visit was when the centre provided fruits and snacks to volunteers because they had realised that these volunteers due to challenging situations at their homes, some days they would come to the centre with no food and this would lead to diminished attentiveness (Fieldnote, 31 May 2018). Therefore, the centre through the spirit of Ubuntu provided basic nutrition to the volunteers.

Ubuntu also recognises the relationship between the past, present, and future generations. This means that any CSI ICT projects that are introduced in poor urban communities with the view of closing socio-economic gaps should be sustainable, for the benefit of future generations.

The next section discusses the interactions and transformations that lead learning centres to continue producing and maintaining themselves.

9.3.6 Systems description using Autopoiesis

Autopoiesis is a suitable theoretical lens for analysing these case studies, because it describes the living system construct and how these systems self-produce for sustainability – self-determination. The OPLC case study will now further be described and interpreted, based on the data collected during site visits and interview transcriptions.

9.3.6.1 Organisation and Structure

A system's organisation is established through its structure; however, while it is the structure that interacts and change, it is prudent that the structural changes maintain the organisation and that the system retains its identity (Maturana, 1970). Organisational identity is a critical element of autopoiesis that defines a system. While social systems may share the same identity, they are distinguished by their structures and differentiate themselves and the environment in order to create their identity and the boundary. The identity of the OPLC is based on their mission, vision, objectives, rules, regulation, roles, procedures, processes, and

the nature of their activities. As part of the Orlando Pirates identity, the inside of the centre was painted with the football club colours and it even had goalpost drawings on the wall (Fieldnote, 05 Jun 2018). The centre is established as a technology centre, and not a charity organisation. However, they offer other services such as life-skills, homework assist, research, matriculants' university assistance, printing, and scanning to their users and members of the public (Fieldnote, 05 Jun 2018).

The interactions between learning centre management and users shape its identity. Autopoietic systems are said to be operationally closed (Zeleny, 2009). The OPLC is an operationally closed network of processes, whereby the external environments or their partners do not determine the learning centre's identity or its structure. Furthermore, this case study confirms that there is a clear boundary between internal and external interactions, and that all partners know their role with regards to the CSI ICT project (Digital Classroom, 2014). The project is driven and managed from the inside, which means that it has its own drive and internal strength.

The learning centre is a social investment initiative of the Orlando Pirates Football Club. The centre is led by the Chairman and managed by the centre manager. As required by law, there are founding documents such as the rules of operation, and the required governance charters for an initiative like the OPLC Learning Centre.

When partners select communities to work on socio-economic development projects, they approach established, registered learning centres that have structures in place. Before engaging with the OPLC, the technology partner required the learning centre to meet several criteria — for instance, the primary criterium was for the centre to have strong security; other criteria included functional data connectivity and the centre should not be too curriculum-driven (CSIM1). The researcher observed during the site visit that there was a security guard at the main gate, and there were cameras in and around the facility (Fieldnote, 05 Jun 2018) which met the selection criteria. Moreover, the learning centre offers other services beyond curriculum-driven mathematics and English, including life skills, ICT, and homework assistance (CM1). Therefore, the OPLC met all the of the technology partner's required criteria.

9.3.6.2 Structural Coupling

The learning centre is continuously engaging with the larger social system, namely, the community, as well as companies with their own identity and structure. When implementing a CSI ICT project, it is essential to consider how external partners engage and interact with the community and learning centre.

The OPLC has established numerous partnerships, as well as the roles of each partner. Their partners include families, schools, the Department of Education, and their main technology partner Acer for Education. Through those partnerships, it is clear that structural coupling exists between the OPLC and their partners. Moreover, it should be recognised that internal systems also play a role in managing the learning centres' survival knowledge.

9.3.6.3 Sustainability

Research in the socio-economic development field repeatedly state that, without a solid sustainability plan, any development project will be short-lived, and that this may result in unintended consequences (International Telecommunication Union, 2017). Considering partnership engagements between ICT companies and learning centres, the sustainability of CSI ICT projects requires the continuation of project activities and sustenance outcomes after the funding has ceased. When developing a sustainability plan, ICT companies and learning centres should consider financial sustainability, organisational sustainability, and project or programme sustainability planning (Sontag-Padilla, Staplefoote, & Gonzalez Morganti, 2012). An observation, made during the OPLC site visit, is the availability of financial resources and infrastructure to carry out its operations for contributing positively to community upliftment (Fieldnote, 22 Aug 2018).

Autopoiesis is concerned with self-maintenance, based on a process of self-reproduction within the OPLC; this is visible in the way the centre operates. Through its volunteer programme, the centre is proving to be self-producing and self-sustaining, because the volunteers are themselves beneficiaries of the learning centre or members of the community who are giving back to the community by offering their time, services, and skills at the centre.

The OPLC centre has partnered with 21 local schools and has benefitted 200 out-of-school unemployed youths who are doing IT certificates to become more employable, as well as young school children. As a way of self-producing, the learning centre has replicated its model and opened its second learning centre in Heidelberg, based on the success of the first centre in Orlando East, Soweto.

Sustainability of the CSI ICT Project

ICT is a significant enabler of development priorities and socio-economic sustainability (Silvius, van den Brink, & Smit, 2009). The sustainability of CSI ICT projects plays a vital role in meeting the needs of communities, including having the capability of meeting the needs of future generations. In order to sustain the project at OPLC, the technology partner, through their ongoing partnership, upgraded the learning centre with 60 new Acer Desktops; the old

ones were used to establish the Heidelberg central centre. This is evidence of a system building upon itself; as a result, the CSI ICT project for the Orlando East community was able to replicate itself to a CSI ICT project in another community.

When ICT equipment of the OPLC requires repairs, the IT learners use broken equipment as part of their training, and they repair it. This shows that the CSI ICT project is a self-producing system, as the learners can repair the equipment when required.

In summary, the OPLC is an operationally closed network with clear boundaries between internal and external interactions and all their partners. The learning centre is structurally coupled within the community of Orlando East and continues to interact with its partners. As a way of self-producing, the learning centre has replicated its model and opened its second learning centre in Heidelberg, based on the success of the first centre in Orlando East, Soweto. This exhibits that the OPLC community centre is a system that builds upon itself and continues to be self-maintaining and self-producing. Table 9-4 summarises the OPLC's social system, according to the analysis performed.

Table 9-4: OPLC Summary

SSM	
Transformation	The transformation that OPLC and Acer strived for is to provide an education-based curriculum to school learners, and ICT training to unemployed youth using state-of-the-art computer equipment.
Ubuntu	
Interconnectedness	In order for the OPLC to realise its objective, they partnered with like-minded companies that share the vision and have the resources to realise the vision. Their partners include schools, parents, government departments, and other companies. The connections between the learning centre and other social systems epitomise systems thinking.
Collective volunteerism	The centre has a structured volunteer programme, and pays the volunteers a stipend
Autopoiesis	
Structure	The learning centre is identified and characterised as a registered non-profit organisation that offers ICT training to the community of Orlando East. The interactions between the learning centre's management and users shape its identity. The OPLC is an operationally closed network of processes, whereby the external environments or their partners do not determine the learning centre's identity or its structure. Furthermore, this case study confirms that there is a clear boundary

	between internal and external interactions, and that all partners know their role with regards to the CSI ICT project.
Structural Coupling	The OPLC has established numerous partnerships and each player knows their role; therefore, it is clear that structural coupling exists between the centre and its partners, and that no partner may determine the structure of the learning centre.
Sustainability - Learning centre	It is evident that the learning centre is self-producing and self-maintaining, because it is financially sustainable, and it has replicated the model and opened their second learning centre in Heidelberg, based on the success of the first centre in Orlando East, Soweto.
Sustainability - CSI ICT Project	As a way of sustaining the CSI ICT project, the IT learners repair broken IT equipment as part of their training. This shows that the CSI ICT project is not only self-producing but also self-sustaining in nature, as the learners can repair the equipment when required.

The OPLC has met Luisi (2003) revised criteria for assessing autopoiesis, self-boundary, self-maintenance, and self-reproduction. Therefore, the OPLC can be viewed as a self-producing and self-maintaining system, which implies that the system is sustainable and impactful.

9.3.7 Reflecting on the impact of the OPLC CSI ICT Project

Assessing the impact of ICT4D projects has been defined in a specific manner by international bodies such as OECD. They define it as “an assessment of how a project being assessed affects outcomes, whether these effects are intended or unintended” (Chartered Institute of Management Accountants, 2017).

Measuring the impact of CSI ICT projects can assist learning centres to demonstrate to their communities and other role players, that their activities create benefits for the communities they serve. Moreover, it is vital for IT companies to provide evidence of impact and to demonstrate their commitment towards the sustainable development of the communities.

The OPLC learning centre has benefited the community in a number of ways. It provides a safe environment, mostly to school-going children and unemployed youth, whereby the learning centre hosts about 60 users from Monday to Friday. The users include unemployed youth who have signed up for the ICT training course, members of the public who are using the learning centre for services such as printing, Internet, cv typing, teachers who attend teacher-related training course, and school-going children who use the centre after school.

Communities are confronted with ongoing changes in the socio-economic landscape, and in this changing context ICT training capacitates young people to enter the job market. This is corroborated by the types of ICT training that the children and youth are receiving from learning centres. The centre manager affirmed that "*The CSI ICT project affords the users the opportunity to use the latest hardware and keep up with the technology that corporates use*" (CM1). The centre has benefitted over 120 unemployed young adults by offering them an accredited IT programme in support of their employability. The accredited IT programme is offered over a period of 9 months, and the classes are from 9:00 am until 13:00pm. The researcher had the opportunity to observe one of the classes in session, which was attended by about 20 young adults (Fieldnote, 06 Jun 2018). Upon completing the training, the users are awarded certificates of recognition at a special graduation ceremony. The certificates are useful when applying for work. The OPLC has afforded 19 young learners and 14 teachers an opportunity to go on International Exchange programmes to London and Germany.

The centre has assisted school-going learners to improve their English grades by 20%, and they subsequently improved their mathematics grades by 25%. Since the users are from poor urban communities, they do not have computers at home and their local libraries have a limited number of computers and slow connectivity, as was mentioned by one of the users: *"You get almost 50 users there but there is only 2 PC's and that is limited connectivity*" (OPLC User 3). Therefore, the centre plays a vital role in bridging that gap and providing IT training and Internet access.

Acer is an international brand that does not have South African subsidiaries; therefore, they do not subscribe to B-BBEE. Acer's CSI manager for Africa indicated that they benefitted indirectly from this initiative: this CSI ICT project gave their brand a competitive advantage and a local profile. The company is aware that, from an ethical perspective, they must be economical, operate legally, and contribute socially. Data collection in 2018 indicated that the company contributed 1.5% of their gross profit of NT$ 25.8 billion towards social investment.

It is through CSI ICT projects that the company is able to meet their ethical obligations towards socio-economic development.

It is essential for the OPLC to demonstrate impact to the community of Orlando East and its partners, because funders want to know how their funds were used to improve the socio-economic situation in the community. Not only do partners require to establish the value and impact of their CSI ICT projects, but they also need to validate the assumption that these projects can transform communities.

9.4 Case 2: Southern African Association of Youth Clubs (SAAYC)

9.4.1 Case 2 Background

The Southern African Association of Youth Clubs is an NGO, established in 1937, mainly to serve young people and youth clubs**.** It is aimed at empowering Southern African young people to gain their independence, realize their self-worth, develop a positive image about themselves, and restore their dignity. It also provides a training programme that supports youth leaders, youth clubs, individuals, professionals, youth workers, and youth. Moreover, they advocate for youth issues. Figure 9-7 reflects on the services that they are offering the community, which includes: capacity building, advocacy for youth work, computer training, training in leadership skills, information hub, education programmes, youth camps, and holiday programmes for young women and men (SAAYC website, 2019).

Figure 9-7: SAAYC Learning Centre Services

The association has clubhouses in the following communities: Soweto (Orlando West), Etwatwa, Orange Farm (Gauteng), and in the Free State. For the purpose of this study, the focus is on the clubhouse in the community of Orlando West. SAAYC is a serving system, that serves the young school children and the unemployed youth of Orlando West. Figure 9-8 below, illustrates the SAAYC Learning Centre as well as the community it is serving.

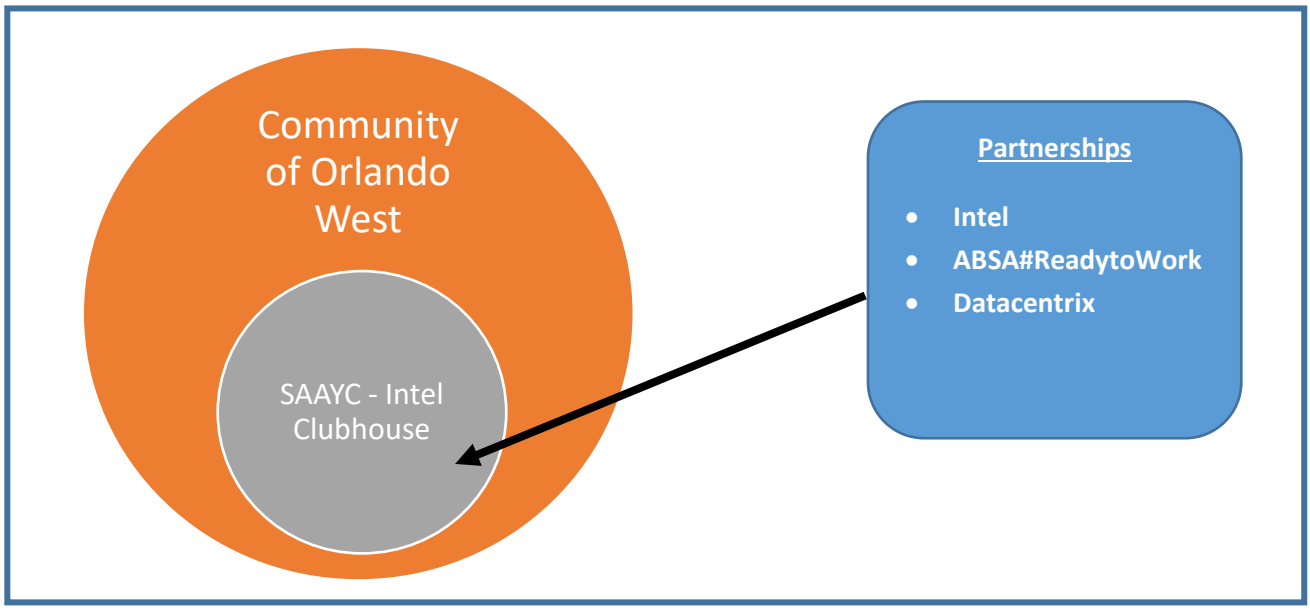


Figure 9-8: Serving system and systems served – Orlando West Community

Partnerships

SAAYC Learning Centre as a community-based centre depends on several sources for funding and operational support. Funding sources include membership fees, philanthropic foundations, donor funding and investing in shares. Table 9-5 below depicts some of the SAAYC partnerships as listed on their website and it is not exhaustive.

Table 9-5: SAAYC list of partners

Partners	Type of support
ABSA#ReadytoWork	Training – entrepreneurial skills, money skills, people skills and work skills
Intel	State of the art clubhouse with – 14 multimedia workstations networked, software and with access to the Internet, music and video-editing studio, keyboards and sound-mixing system, digital video camera and video editing suite. Financial support
Datacentrix	Installation and technical support

Intel is the technology partner for SAAYC in the context of this case study.

9.4.2 Technology Partner: Intel Corporation

Intel Corporation is a world leader in the design and manufacturing of essential products and technologies that power the cloud and a connected world. Intel was incorporated in California in 1968 (and reincorporated in Delaware in 1989), and technology has been at the heart of its

computing breakthroughs ever since. The Corporation has evolved from a PC-centric company with a server business to a data-centric company (Intel Corporation, 2018).

Intel expanded their operations to Johannesburg, South Africa when they established the South African sales and marketing office that provides world-class sales and support at the original equipment manufacturer, developer, and end-user levels. Their primary responsibility includes delivering innovative products to consumer and original equipment manufacturer markets, creating demand for Intel's products, and driving the market to recognise Intel's role on the Internet (Intel Corporation, 2017).

Corporate Social Investment

Intel's commitment to corporate responsibility and sustainability leadership is deeply entrenched within their business. They focus on driving improvements in environmental sustainability, supply chain responsibility, diversity and inclusion, and social impact programmes. The company established the Intel Foundation to drive its corporate citizenship initiatives. The Intel Foundation serves as the primary body through which the company reaches out to their stakeholders (employees, customers, suppliers, government, and communities), and implements corporate social responsibility programmes to satisfy stakeholders' interests. The foundation supports community diversity, and skills development for disadvantaged communities (Intel Corporation, 2018).

Since 2000, Intel Corporation sponsored an initiative called the Computer Clubhouse Network, to open 100 Computer Clubhouses around the world (Intel Corporation, 2006). The philosophy of the Computer Clubhouse programme is "beyond access", which means that a Computer Clubhouse is more than just a place with computers and Internet access. The programme is guided by four principles:

- Support hands-on design experiences;
- Help youth to build on their own interests;
- Serve an emerging community of learners; and
- Create an environment of respect and trust.

Intel identifies community organisations, which are then selected to host Computer Clubhouses. They receive assistance and resources for this purpose. The selection criteria require that the community organisation should have a youth-focused mission, a community-based location with 110 square meters of space available, and established resources.

Through this programme, Intel provides the necessary tools for students, who are seen to be the next generation of innovative thinkers. The company undertook to support teacher training,

science and mathematics, technology innovation at universities, and community learning support. Intel did not restrict itself to the United States, but expanded their support globally (Mohamed, 2019). South Africa is one of the countries that Intel identified for socio-economic development support.

Intel established three Clubhouses in the Gauteng province of South Africa, in the following areas: Orlando West, Soweto; Newton, Johannesburg; and Ethwatwa, Ekurhuleni. The South African Association for Youth Clubs was identified to host the Ethwatwa and Orlando West Clubhouses (Van Rooyen & Chetty, 2003).

9.4.3 CSI ICT Project 2 - Southern African Association of Youth Club Learning Project

In 2003, Southern African Association of Youth Club (SAAYC) was identified by Intel to host the Intel Clubhouse project. For the purpose of this research, the SAAYC Intel Clubhouse is referred to as the SAAYC Learning Centre which is a CSI ICT project.

The learning centre is based on the Intel Clubhouse model, whereby Intel provides start-up costs, builds capacity in the NGO, and provides professional development and new technology innovation, in order for the sustainability of the learning centre. Intel's requirements for setting up the clubhouse includes that the learning centre should be a registered NGO and they should have mentors with subject- or content-specific skills.

According to the CSI Manager, Intel selects the learning centres to host the clubhouse by means of a number of basic components: first,

"*you need to have an existing NGO because NGOs know their expertise for working in the communities and the learning centre's mission should be youth-focused, with the willingness to provide young people from the ages 10 -18, from previously disadvantages communities such as Orlando West, with opportunities to be in a safe space after school for a minimum of 20 hours per week" (CSIM2)*.

Second, the learning centre should be located where the community could have access, with an available space of 110 square meters. Lastly, the learning centre should be financially sound, with audited financial statements and documentation that states its tax-exemption status (Pryor, Culp, Lutz, & John, 2001). Based on the selection criteria outlined by Intel, SAAYC, Orlando West meets all the criteria and was therefore adopted as a learning centre for Intel in 2003 (Breslow, 2005) .

The intel clubhouse funds the clubhouses on a sliding scale, which is apportioned over several years. The period of funding for the SAAYC Learning Centre was four years, starting in 2003.

For year one and year two, the Intel Foundation installed $60 000 worth of equipment, and provided $60 000 for the learning centre manager's salary and centre running costs (CSIM2). The centre received $30 000 in year three, and a final grant of about $15 000 in year four. During this period, the "*clubhouse manager, executive or an appointed representative are taken to the United States of America for training to building capacity on skills as well as sustainability*" (CSIM2). When the four-year lapsed, Intel foundation ceased the grant, and the learning centre was expected to be sustainable.

The learning centre operates on Intel's mission that promises to "provide a creative and safe learning environment where young people from disadvantaged communities work with adult mentors to explore their own ideas, develop skills, and build confidence through the use of technology" (The Clubhouse Network, 2020).

The philosophy of the Intel Clubhouse is said to be "beyond access" — which means that a Clubhouse is more than just a place with computers and Internet access. The project is guided by four principles (Pryor et al., 2001):

- Support hands-on design experiences;
- Help youth to build on their own interests;
- Serve an emerging community of learners; and
- Create an environment of respect and trust.

During capacitation, the centre's employees were trained to include young people in projects such as computer-generated art, music and video production, animation, robots, and website development. The learning centre teaches the youth not only to use technology, but also to design and create it:

"*With this programme it makes us stand out because now they want to see, but how do you do that? Moreover, now we can show them projects that these our kids are doing. They are designing games, for heaven's sake. Instead of playing games, they are designing games. So, we do not have an arcade, but we are creating arcades*" (CM2).

The centre's services include SAAYC-specific services as well as Intel Clubhouse services such as digital literacy, education support programmes, and life skills. Digital literacy covers: Intel® Learn Easy Steps; Cisco Networking Academy® IT Essentials: PC Hardware and Software; CompTIA IT Fundamentals; and HP Life Social Entrepreneurship. The Cisco Networking Academy® IT Essentials training is delivered to unemployed youth over a period of six months by an accredited instructor. Other services include printing, homework assist for young learners, typing of CV's, and access to the Internet for research purposes. Figure 9-9

shows the layout of the inside and outside of the SAAYC Learning Centre facility, which is a requirement by the Intel Clubhouse Network.

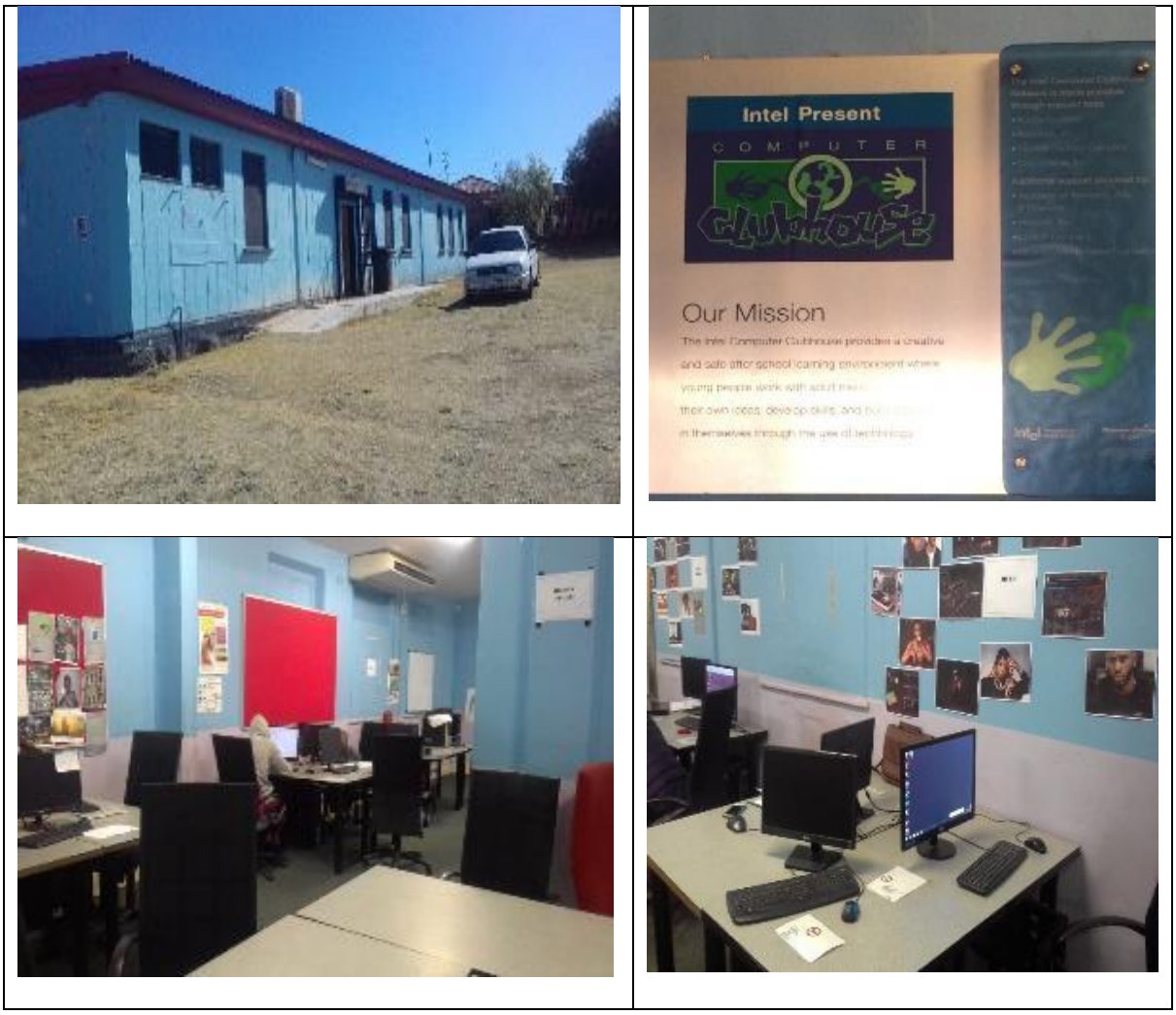


Figure 9-9: SAAYC Learning Centre

The following section describes the system using SSM concepts.

9.4.4 Systems description using SSM

9.4.4.1 Rich Picture

The investigation of the problem situation started with site visits, interviews, focus group discussions, documentation review, and observations. Interviews were conducted with the CSI manager from Intel, the learning centre manager, and users of the centres. The interviews and focus group discussions were aimed not only at visualising the social system overview, but also at laying a foundation for structuring “the problem situation”. This approach was necessary because it is imperative to obtain multiple perspectives from all participants. The

researcher used her fieldnotes and transcriptions to draw the rich picture below (Figure 9-10) as an unstructured descriptive situation summary of the human activities at the SAAYC Learning Centre. SAAYC's rich picture was used to identify connections, influences, interactions, and relationships between the actors, sub-systems, and the environment and the research's perceptions. In addition, the picture reflects on other social systems that are linked to the learning centre, including aspects that are perceived as problematic.

The picture is not a depiction of the real world, but of the researcher's perspective on the situation. During discussions with the people involved (learning centre managers, CSI manager, and centre users), new aspects of the situation emerged. Below is a rich picture to illustrate the social system's richness and complexity.

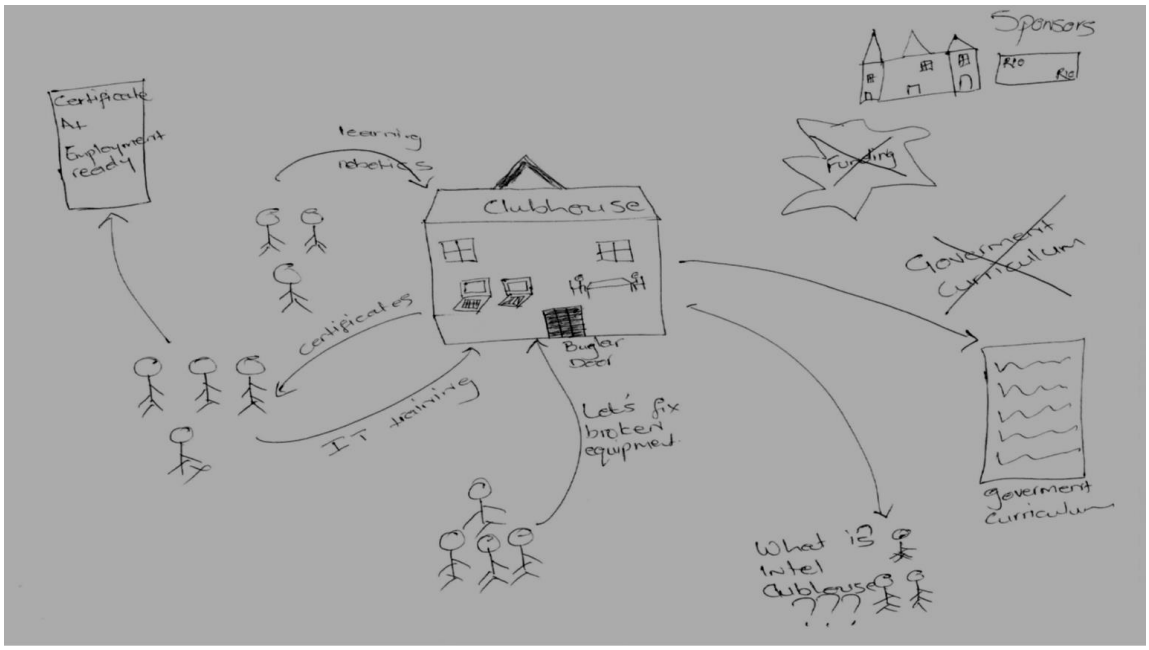


Figure 9-10: Rich Picture – SAAYC Learning Centre

9.4.4.2 CATWOE Analysis

Based on the rich picture in Figure 9-10, this section describes the human activity systems of the community and the learning centre referred to as an overarching serving system. The CATWOE analysis depicts the root definition for the SAAYC, which reflects the worldviews of the CSI ICT project (sub-serving system) in the community. The CATWOE analysis simplifies a complex situation, thus providing an improved description of the problem under investigation. The process involves defining the customers, actors, transformation process, world view, owner(s), and environmental constraints that are pertinent to the learning centre. Table 9-6 outlines the CATWOE analysis for the social system.

Defining the transformation process is the first step in developing the root definition; this is then followed by specifying the worldview. These two elements are complementary to each other in understanding the problem situation. This case study reflects on the agreed shared purpose between the SAAYC and the Intel Foundation of transforming the community by "*providing young people with the opportunity to work in a collaborative, supportive environment to use technological tools to express their own ideas and perspectives*". The shared purpose taps into role players' commitment to improving the socio-economic situation of the youth of Orlando West. The first step in any transformation is for partners to approach communities and learn what assistance is needed, by asking people and talking to organisations. The Intel Foundation assessed areas in Pretoria and Soweto, Johannesburg in searching for an appropriate learning centre to host the Intel Clubhouse. They eventually agreed to partner with the SAAYC Learning Centre in Orlando West, Soweto, because they assessed their needs and both organisations shared the same vision. The *weltanschauungen* or worldview that these CSI ICT projects are trying to address are centred around education as part of Ubuntu, as reflected in the African proverb that says: "It takes a village to raise a child", which means that it takes an entire community to educate children and provide a safe environment. The CATWOE analysis revealed Ubuntu aspects that indicate that it is the responsibility of the community to take care, educate, and look after the children. The researcher noted through fieldnotes that customers or beneficiaries included school children, unemployed youth, and community members. The analysis also considered actors such as schools, centre managers, and the CSI manager as the people who carried the activities defined in the system, as detailed in the fieldnotes (Fieldnote, 01 Aug 2018).

Table 9-6: CATWOE Analysis of SAAYC

Component	**Transformation process**
Transformation	Seeks to provide young people the opportunity to work in a collaborative, supportive environment and to use technological tools to express their own ideas and perspectives.
Customers	Community of Orlando West Youth between ages 8– 24yrs SAAYC Learning centre
Actors	Parents Schools Intel SAAYC
Owners	SAAYC South Africa Intel

Worldview	To provide education and training in IT for disadvantaged youth.
Environmental constraints	Funding to sustain the learning centre Lack of marketing; as a result, the centre is unable to attract users and funding

The root definition shows that the SAAYC Learning Centre is a system owned by the Southern African Association of Youth, supported by the Intel Corporation. It seeks to provide young people the opportunity to work in a collaborative, supportive environment to use technological tools to express their own ideas and perspectives. The aim of the system is to provide education (life skills) and ICT training for disadvantaged people, predominantly the youth. The SAAYC achieved this through the support of Intel, by collaboratively providing a state-of-the-art facility where youth from the community have access to information, Internet, computers, ICT training, and multimedia sound equipment. The system is faced with constraints such as a lack of marketing, as they cannot reach the majority of the youth that they are targeting.

Following the root definition process above, a conceptual model was developed, as shown in Figure 9-11.

9.4.4.3 Conceptual Model

Drawing a conceptual model is a process of conceptualising a system of interest (Daellenbach, 1994). This process requires the researcher to separate themselves from the real world area of investigation (Patel, 1995).

The researcher used the root definition to extract the activities that are required develop a conceptual model, as shown in Figure 9-11. These activities took place within the boundaries and environment of the Orlando West community and the SAAYC Learning Centre. The model illustrates the human activities that are necessary for transformation. The activities include objectives, inputs, outputs, connections, and boundaries. Transformation of the SAAYC Learning Centre includes providing young people with the opportunity to work in a collaborative, supportive space using technology to express their own ideas (CM2). This is presented as a conceptual model of human activities, where there are essential activities to achieve the transformation.

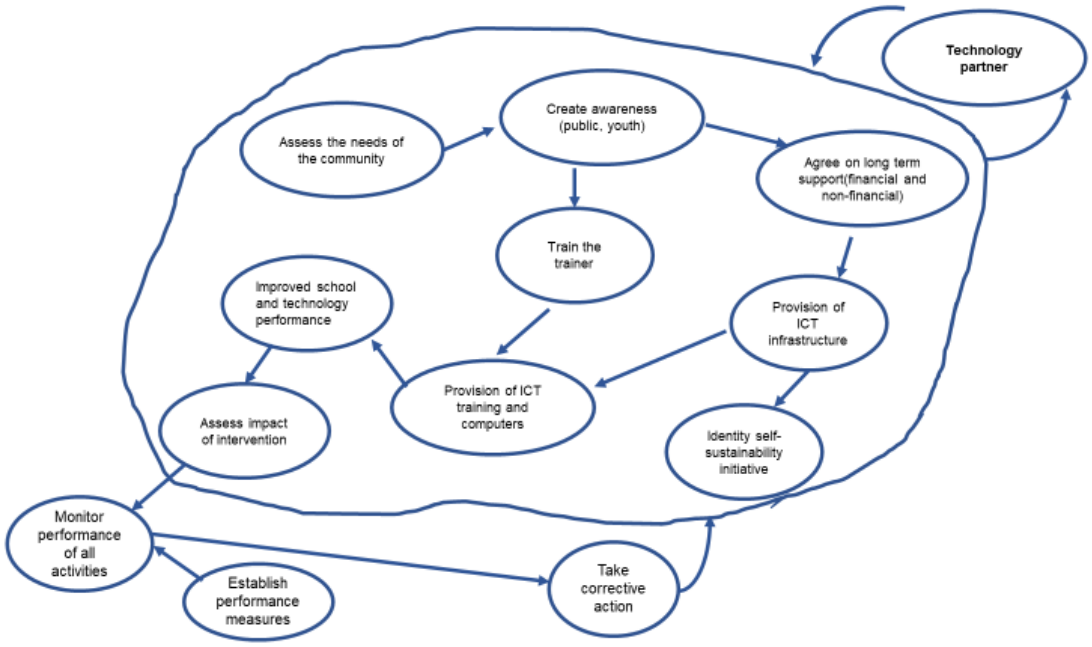


Figure 9-11: Conceptual Model SAAYC

The following section analyses the social system using Ubuntu and Autopoiesis concepts, and further supports the application of the framework with comments from the participants.

9.4.5 Systems description using Ubuntu

This section provides a systems description of the SAAYC, using Ubuntu. The motivating factor for using Ubuntu as a theoretical lens to analyse this case study is to illustrate how the practising of Ubuntu contributes to the success of the CSI ICT project (mutuality). The Ubuntu philosophy emphasises that an individual is an individual through others. In a community, the individual does not look out for self-interest, but for that of the greater social system of being a community; this demonstrates wholeness. Hence, it is applied in this case study to analyse the impact of the CSI ICT project.

The SAAYC case study is now further described and interpreted based on the data collected during site visits and interview transcriptions. Furthermore, the Ubuntu concepts of interconnectedness and collectiveness are used to describe the case study. In addition, the themes that emerged from the data are discussed, with supporting quotes from the interview transcripts.

A community consists of various characteristics, including spatial, historical, and economic aspects. In addition, a community as a social system is an organised network of meaningful interconnections, is purposeful, and values collectivism.

9.4.5.1 Interconnectedness

This section shows the systems that are interconnected within the SAAYC Learning Centre. The centre is described by its functions and comprises relationships between corporates and the centre.

The system includes families, schools, churches, hospitals, and shops that are part of an interconnected unit that is concerned about others' wellbeing. Further, Ubuntu emphases that, as a human being, our potential can only be realised in partnership with others. This means that an individual is always connected to a family, community, or village — hence the saying *"I am because we are"*.

Partnerships

An effective partnership is dependent on factors such as trust, community buy-in, alignment, and partnership duration. Mutual trust and respect can be illustrated by companies that meet formally and informally with the learning centre's leadership. According to the CSI Manager, the SAAYC entered into a partnership with Intel Africa in 2003. Part of Intel's requirements was to enter into an agreement with a learning centre with a clean record and SAAYC's financial audits indicated that it was a suitable candidate. As part of their agreement, the learning centre submits a monthly progress report to the Intel Clubhouse network (CSIM2). The analysis highlights that there is trust between the two entities; as a result, Intel has trust in the way that the learning centre is running their programme, and would not hesitate to release the grant for the following year. Engaging community role players in CSI ICT projects is vital for obtaining buy-in from the community at large and ensuring successful project delivery. In this instance, the community was not adequately engaged, because some of the community members did not know what the learning centre was about; as a result, the centre had break-ins where equipment was stolen.

In order to gain support from government and companies, learning centres are encouraged to align themselves to government planning and business priorities (Franks, 2012; Reid et al., 2014). The SAAYC centre manager expressed that they are not aligned to any government initiative because the government expects them to operate like a charity organisation rather than a technology centre. As per their four-year funding agreement, year one is aimed at implementing the programme; once SAAYC demonstrated success, funding for the following three years would be approved. From the inception of the partnership, one of the requirements was for SAAYC to provide a sustainability plan that will carry the centre beyond the four-year funding agreement.

Learning centre-parents–school partnership

Establishing an effective partnership requires time and perseverance. The learning centre has established several partnerships with companies that believe in and share their vision. The centre manager further expressed that they continue to work on establishing partnerships, as they are struggling financially to run the centre.

The learning centre–parents–school partnership for school-going children is designed to improve the learner's achievement. However, SAAYC does not have a partnership with either group; as a result, they are struggling to attract and retain users. Though it should be noted that the centre manager is aware of this, and he is approaching

"*soccer teams and we are telling the coach we need to develop you or develop your committee and develop the whole team and do those things for free. Because we feel that we are nicely positioned as an organisation and our centres are a resource to the community because it is not an Internet café, per se, but a place for young persons to get in and use a computer without any limits*" (CM2).

Wildridge, Childs, Cawthra, and Madge (2004) posit that partnerships do not happen overnight, as it requires time and effort — this is something that the centre managers need to be aware of.

9.4.5.2 Collective Volunteerism

The SAAYC has an established volunteer programme, where they teach volunteers the concept of volunteering, principles of volunteering, benefits of volunteering, the role of the youth leader, and volunteer rights and responsibilities. The volunteers impart ICT skills to the young children to advance their academic credentials, which lay a foundation towards their education. The centre manager reflected that he started as a beneficiary, and started to volunteer upon completing his IT training: "*the staff that is here is people who came with passion who started like me as a beneficiary, then as a volunteer, then eventually being a manager*"(CM2). Some of the volunteers have received contracts. This social value is a human quality for understanding other people's situations and assisting them where they can. Broodryk (2006) states that when someone is helpful and not thinking about themselves, they develop a sense of compassion to meet the needs of others. This was demonstrated by the SAAYC Users, who also go to the centre to assist other children; they mentioned:

"..*yes we assist in this because kids come here and maybe they have assignments and they don't even know how to start with their assignments. They give us that paper that has questions and assist them, research, print, for them then they go*" (SAAYC User1).

Another user said:" I *come and help kids — it keeps kids out of trouble, boyfriend trouble*" (SAAYC User2). This shows that SAAYC users do not only look out for their own personal interests, but also assist other users who visit the centre, which demonstrates Ubuntu.

The next section discusses the interactions and transformations that lead the learning centres to continue to reproduce and maintain themselves

9.4.6 Systems description using Autopoiesis

According to Varela, Maturana, and Uribe (1974), a central feature of a living system is autonomy and any form of systemic organisation. An autopoietic system is composed of elements that interact in the form of activities. During this interaction, the system maintains and reproduces its elements, together with the relationships. In the process, the system's organisation remains constant (Robb, 1991). Ubuntu acknowledges the relationship between the previous, current, and future generations. This means that any CSI ICT projects that are introduced in disadvantaged communities should be sustainable, for future community members to benefit from (e.g., 64 million people benefitted from the YMCA that was founded in 1884).

9.4.6.1 Organisation and Structure

The identity of an organisation is a critical element of autopoiesis, because it defines a system. Social systems may share the same form of identity, but their structure is different. These types of systems distinguish themselves and the environment in order to create their identity and the boundary. In the instance of this case study, all the Intel Clubhouses in the Clubhouse Network 100 are required to have the same features, such as computers in clusters, studio lighting, exhibition space for youth work, and paint colour schemes (Pryor et al., 2001). As part of the Intel Clubhouse requirement, each club must display the mission and vision on the wall, as illustrated by the picture in Figure 9-12 that the researcher took during the site visit. This demonstrates that the identity of the clubhouses may be the same, while their structures may differ. According to Zeleny (2009), autopoietic systems are operationally closed, meaning that there are enough processes within the system to maintain the whole. The SAAYC Learning Centre is an operationally closed learning centre, such that the same organisation of processes is maintained and reproduced through the interactions, and that the external environments do not control the learning centre's identity or its structure.

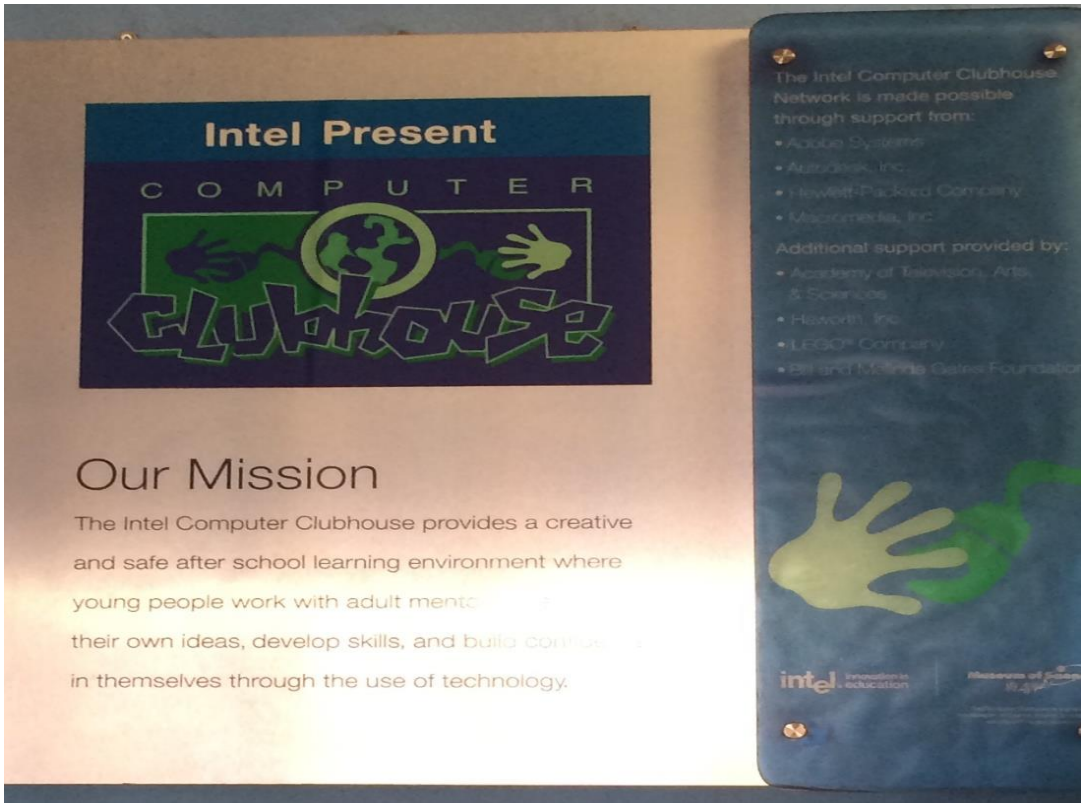


Figure 9-12: Intel Clubhouse mission

The SAAYC is governed by board members who jointly oversee the activities of the learning centre. However, the learning centre is structured to fulfil the objectives of two models: 1) the South African Association of Youth Centres and 2) the Intel Clubhouse Network mission. As required by law, the SAAYC is governed by founding documents such as the constitution, memorandum, and articles of association.

Without compromising the identity and structure of the learning centre, when Intel approached the SAAYC they required that the learning centre meets the following criteria: the SAAYC needed to demonstrate that they: had a respected track record of achieving their youth objectives; are financially stable; have volunteers with a specific skill set that they can share; embrace new technologies; would recruit a full-time coordinator; would show that the learning centre can sustain itself for an extended period; and would offer space to house the clubhouse. Magalhães and Sanchez (2009) state that during these partnerships, partners mutually need to respect the rules that govern relations. This can be achieved by having a partnership agreement in place; in the case of SAAYC, the CSI Manager mentioned that there was a four-year funding agreement in place that solidified their partnership: "*over four years we fund the NGO, we provide all the equipment and then we build capacity for them to be able to sustain themselves focusing on these programmes*" (CSIM2).

9.4.6.2 Structural Coupling

Structural coupling describes the interaction between the system and the environment (Maturana & Varela, 1980). Since its inception, the SAAYC has established a number of effective partnerships. Changes to the system may occur from time to time in response to both internal dynamics and interactions with external systems. In this case study, “perturbation” from the external environment affected the learning centre in this way: the SAAYC Learning Centre grant ceased after the four-year funding agreement and, as a result, they were forced to survive on their own. However, from inception, Intel required that the learning centre should be sustainable beyond the four-year agreement. Every second year, the learning centre manager and a number of users attend the Intel alumni programme in Boston, Massachusetts, as was corroborated by the Centre Manager: ”every *second year, within the clubhouse programme, there’s what we call the Teen Conference bi-annually it’s in Boston MIT Lab. So, even this year in July, we taking two kids that we’ve chosen on the programme” (CM2)*. The trip to Boston provides young people with an opportunity to engage with their peers within the Intel international community and to share the work that they are doing in their local Clubhouses. Therefore, this demonstrates that SAAYC, Intel, and the community act as systems that shape each other's environment and increase their structural complexity.

9.4.6.3 Sustainability

Sustainability is a significant feature in development projects, and sustainability planning needs to be incorporated in the implementation plan from project inception (Thomas, 2018), as it is essential for the social system’s survival (Hofkirchner, 2012). The socio-economic development discipline reflects that, without a sound sustainability plan, any development project will not result in long term impact (International Telecommunication Union, 2017). Characteristics of survival are that learning centres should preserve their organisation, life, and identity, as well as their projects or programmes for future generations to benefit from. When developing a sustainability plan, partners should consider financial sustainability, organisational sustainability, and project or programme sustainability planning (Sontag-Padilla et al., 2012).

The section below discusses the sustainability of learning centres as overarching serving systems that provide non-technological services, and their CSI ICT projects as sub-serving systems that provide technology services to the community.

9.4.6.3.1 Learning centre sustainability

Learning centres are an essential platform for providing ICT services in communities and require financial resources to be able to continue their operations. In the absence of Intel funding, the centre depends on membership fees, fundraising efforts, and equity investments. In previous years, the centre invested in shares, which they are now using to run the centre. However, the centre manager raised concerns about the finances:

"*So, there has been two to three years that we went without funding whatsoever, until we got payment back from the shares that we invested in mining. Moreover, now I think we have been doing pretty well for about five years. However, now, we are going back to that period. I think whatever funding we have left is for the next year or two. After that then people will feel unemployed again, because running this type of centre is really daunting, especially when you are making no profit whatsoever*" (CM2).

For the learning centre to survive, fundraising efforts need to be intensified and partners found that have a shared vision and financial resources.

While the above discussion demonstrates that the SAAYC experienced an 'irritation' when Intel ended their funding, the learning centre continues to maintain and reproduce itself.

9.4.6.3.2 Sustainability of CSI ICT Project

Sustainability of CSI ICT projects is important towards meeting the needs of the present communities, including having the capability of meeting the needs of future generations. During site visits, the researcher observed that the learning centre had state of the art ICT and sound-making equipment. The centre has established a variety of ways to sustain the projects. They offer a five-month accredited IT course for the unemployed youth and learners who did not complete Grade 12. Initially, they charged R2000 for the course, but soon realised that they had many dropouts; hence, they revised their fees to R800. The centre manager indicates: "*If we make it free, then we cannot pay for their exam in Boston because their exams are not written here. We are a training centre but not a test centre*" (CM2). Part of the fees is used to sustain the project. On the other hand, when computers are broken, the trainees use that as a learning opportunity to repair computers. The centre manager affirmed that they fix computers as part of building capacity in the centre so that they would not have outsource for that specific skill when needed.

In summary, in the absence of their main technology partner, the Intel Foundation, the SAAYC learning centre demonstrates that it is able to self-sustain and self-maintain its operations. The SAAYC Learning Centre is an operationally closed network with clear boundaries between

internal and external interactions. The learning centre is structurally coupled within the community of Orlando West, and they continue to interact with their partners. This shows that the SAAYC community centre builds upon itself and continues to be self-maintaining and self-producing. Table 9-7 below summarises SAAYC's case study analysis.

Table 9-7: SAAYC summary

SSM	
Transformation	Seeks to provide young people with the opportunity to work in a collaborative, supportive environment to use technological tools to express their own ideas and perspectives.
Ubuntu	
Interconnectedness	In order for the SAAYC to realise their objective, they partnered with like-minded companies that share the vision, and have the resources to support its realisation. Their partners include schools, parents, government departments, and business. The interconnections between the learning centre and other social systems characterise systems thinking.
Collective volunteerism	The SAAYC has an established volunteer programme, where they teach the volunteers the concept of volunteering, principles of volunteering, benefits of volunteering, the role of the youth leader, and volunteer rights and responsibilities.
Autopoiesis	
Structure	The SAAYC is an operationally closed learning centre, such that the same organisation of processes is maintained and reproduced through the interactions, and that the external environments do not control the learning centre's identity or structure. The centre is governed by board members who jointly oversee the activities of the learning centre.
Structural Coupling	Since its inception, the SAAYC Learning Centre has established a number of effective partnerships.
Sustainability - Learning centre	The SAAYC Learning Centre as an overarching serving system sustains itself through fundraising efforts, paid membership, fees from their accredited IT course, and equity investments.
Sustainability - CSI ICT Project	As a way of sustaining the CSI ICT project, the IT learners repair broken IT equipment from the centre as part of their training. This shows that the CSI ICT project is self-producing, as the learners can repair the equipment when required.

9.4.7 Reflecting on the impact of SAAYC CSI ICT Project

The SAAYC Learning Centre has afforded the community and its beneficiaries several benefits. The centre offers a safe environment to mostly school-going children, those who did not complete school, and the unemployed youth. This is further corroborated by the type of ICT training that the children and unemployed youth is receiving from the learning centre. The SAAYC learning centre has a structured five-month ICT training course. The centre operates from 8:00 – 17:00; however, the ICT training takes place from 9:00 until 13:00, after which volunteers assist young children as part of their practicals from 14:00 onwards. They charge a small fee, unlike standard university fees; this affords poor children an opportunity to take part in the IT training. Upon completing the training course, the users are awarded a certificate at a special graduation ceremony, which the researcher was invited to attend (Fieldnote, 21 Jul 2018). The centre used this occasion to reach out to new users. The certificates are useful when applying for jobs, since some certificates are accredited. Every second year, the centre takes several users, the centre manager, and support staff to Boston's MIT Lab for the Teen Conference.

Assessment of the impact of CSI ICT projects can assist learning centres to demonstrate to the communities and other role players that their activities create benefits for the community in which they are operating. Moreover, it can demonstrate to companies what and how their CSI ICT projects have contributed towards socio-economic development in poor communities.

It is essential for CSI ICT projects to demonstrate that they benefit the individuals and communities that they serve. This is increasingly important, because learning centres are funded by outside partners. Not only do partners require to establish the credibility and value of their CSI ICT projects, but they also need to validate the assumption that these projects can transform communities. For Intel, it is critical to continue demonstrating impact to South Africa and the rest of the world that they are committed to sustainable development. Intel has established a set of indicators to evaluate the impact of their intervention. The SAAYC Learning Centre is bound by the agreement, by which they are required to submit their progress report to Intel's head office in Boston. The learning centre has two sets of indicators: 1) assessment for the SAAYC programmes, and 2) assessment for the Intel Clubhouse, which includes technology use, academic credentials, and social emotional development activities. The SAAYC also assesses impact using the following indicators, based on the user number: digital literacy, education support programme, clubhouse, HP Life programme, and life skills.

Intel is an international company that does not abide by the South Africa legislation on B-BBEE. However, as a company, they have a corporate social investment programme, even though it is not aligned to the South African legislation. Their programme focuses on

empowering poor communities through education and technology. In 2018 Intel donated almost $40 million towards empowering students and communities around the world (Intel Corporation, 2018). As part of their corporate giving, the CSI manager indicated that they do not benefit directly from this CSI initiative; however, for them it is about having an ICT literate community and delivering training on the meaningful use of ICT (CSIM2).

9.5 Case 3: Nanga Vhutshilo

9.5.1 Case 3 Background

Nanga Vhutshilo was established in 2006 by MaSibongile, a mother whose only child disclosed about 26 years ago that he was HIV positive. This was in the era when people had a negative perception about people living with HIV. Through her own personal experience, MaSibongile was directly confronted with the impact of this illness; this resulted in her establishing the centre, which was hence called Nanga Vhutshilo, or 'Choose Life'. The community-based centre is registered as an NGO that focuses on Early Childhood Development (ECD). There are 35 children between the ages of 2-5 years enrolled at the centre. Their mission is to empower vulnerable and HIV-affected children, orphaned children, and child-headed families in Soweto to become self-sufficient, educated, and healthy adults (Nanga Vhutshilo, 2019). They identify children whose well-being is compromised by social ills, HIV, and poverty, and put them on a path to success**.** The centre supports about 300 children**,** their families, and the broader community.

Nanga Vhutshilo is an NGO that relies on donations from individuals, businesses, and foreign funders in order to serve the community of Dhlamini. On their website, the centre displayed ways in which to get involved (Nanga Vhutshilo Website, 2019). Involvement can be in the form of a financial donation, donations in kind, volunteering, and long-term partnerships. The financial donations are structured as follows: (a) R50,000 provides educational supplies for one small group at the Nanga for one year; (b) R8,400 provides one child with all aspects of the Nanga programme for one year; and (c) R3,000 provides one child with meals and a school uniform for one year (Nanga Vhutshilo website).

According to its B-BBEE rating, Nanga has been accredited as a Level 1 B-BBEE contributor, meaning that any South African business that gets involved with Nanga may earn B-BBEE scorecard points (Nanga Vhutshilo, 2019).

Young children will not thrive later in life unless a solid foundation is laid in their early years, comprising of language exposure, well-structured cognitive education, and stimulating human interaction (Nanga Vhutshilo website, 2019). Nanga's Early Development Centre provides a set of crucial surrounding programmes to ensure that children stay there as they grow older; these include Nanga School Support, the Nanga Health and Nutrition programme, and the Nanga Community Network – refer to Figure 9-13. A vital role of the centre's is to provide food parcels to several households that are headed by children in Soweto (Nanga Vhutshilo, 2019).

Since its establishment, Nanga ensures daily meals for at least 300 orphans and underprivileged school children up to 22 years, which are essential for children's' mental

development. Further, the Centre Manager mentioned that "*the centre has seen at least 31 children graduate from college*" (CM3).

Nanga Vhutshilo is a serving system that is continuing to serve the young people and their families during non-school hours in the community of Dhlamini.

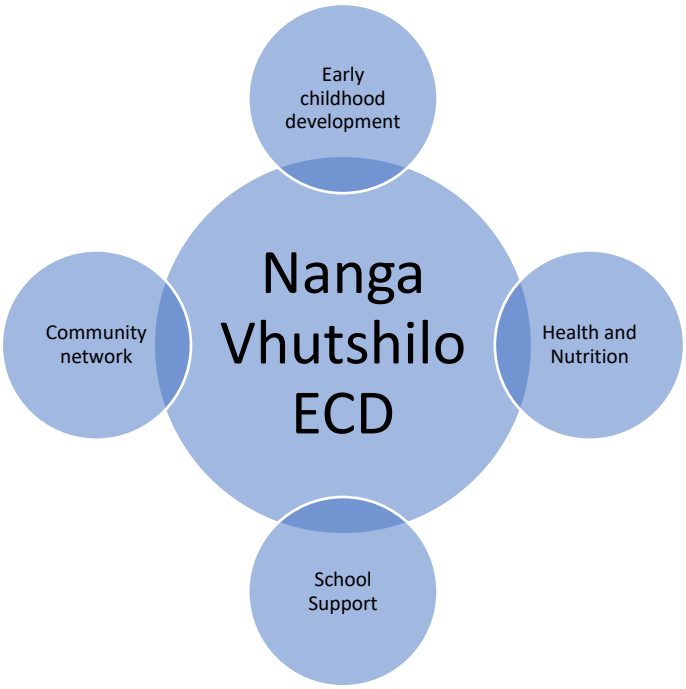


Figure 9-13: Nanga Vhutshilo Services

Nanga monitors the children's learning progress, physical health, and overall well-being.

Partnerships

The Nanga Vhutshilo community-based centre relies on various sources for funding, salaries, operational support, and overhead costs. Funding sources include philanthropic foundations, government grants, and in-kind support. Figure 9-14 showcases the relationship between Nanga Vhutshilo as a serving system and the community of Dhlamini as the served system.

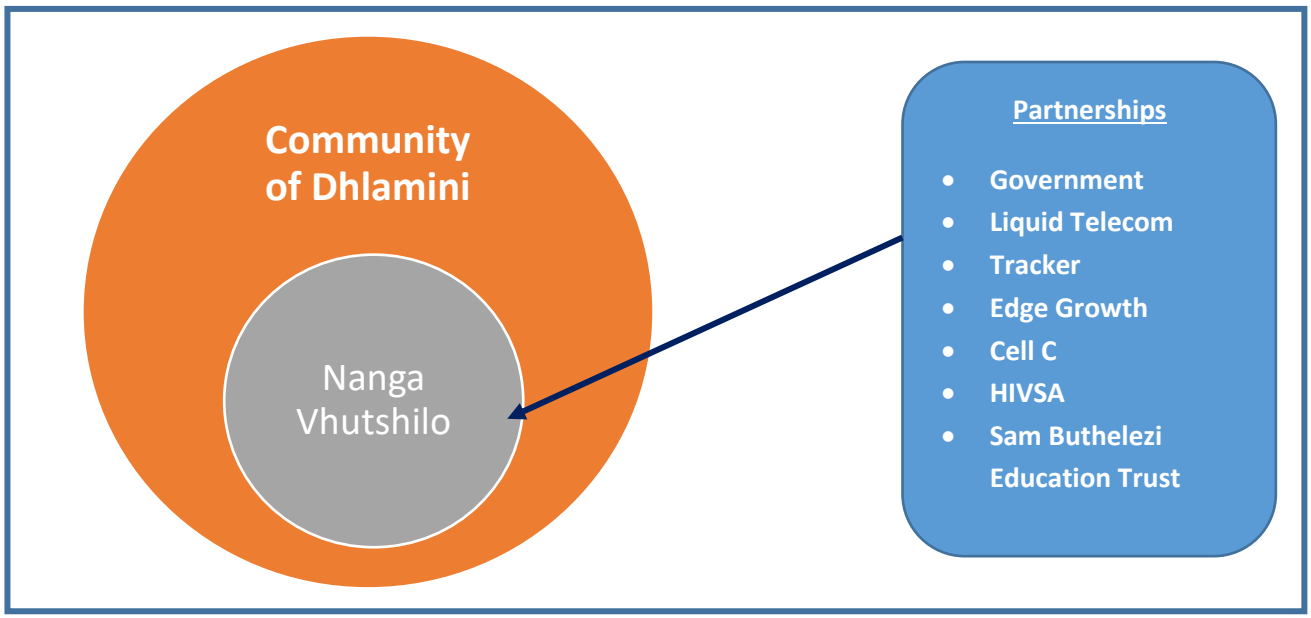


Figure 9-14: Serving system and systems served – Dhlamini Community

Table 9-8 tabulates some of Nanga Vhutshilo's partners, as listed on their website; the list it is not exhaustive. For the purpose of this study, the technology partner is Liquid Telecom, since they are a technology company that initiated the CSI ICT project at Nanga through their enterprise development program.

Table 9-8: Nanga Vhutshilo list of partners

Partners	Type of support
Department of Social Development	Financial and non-financial support
Liquid Telecom	Community Internet café
Tracker	Motor vehicle Employment opportunities for Grade 12 Financial support
Edge Growth	Financial and non-financial support
Cell C	offer discounted products to our beneficiaries
HIVSA	Financial support

9.5.2 Technology Partner – Liquid Telecom

In 2011, Liquid Telecom identified Nanga as a beneficiary of their Internet café CSI initiative. Liquid Telecom, formerly known as Neotel, is a leading independent data, voice, and IP provider in Eastern, Central, and Southern Africa, Europe, North America, and Asia Pacific. It supplies fibre optic, satellite, and international carrier services to Africa's largest mobile network operators, ISPs, and companies of all sizes. It also provides payment solutions to

financial institutions and retailers, as well as award-winning data storage and communication solutions to companies across Africa and beyond. “Put simply, we connect people” (Liquid Telecom, 2019b).

The expansion of Liquid Telecom into South Africa through the acquisition of Neotel initiated the establishment of the most extensive fibre network and B2B communication service provider that offers international connectivity to connectivity to telecom operators, governments, and companies via a single fibre network across sub-Saharan Africa. Other services of the company include Virtual Private Networks, hosting, and satellite services.

Corporate Social Investment

Liquid Telecom’s approach to corporate citizenship is a commitment that is aligned with their business goals. Their key focus areas were chosen to align their key competencies and strategic objectives with socio-economic development requirements.

The organisation's social upliftment programme focuses on education, health, entrepreneurship and job creation, and environmental sustainability. They have recognised their responsibility towards their stakeholders and the communities within which they operate.

Liquid Telecom’s job creation initiative is geared towards empowering people and creating sustainable development interventions through the transfer of technology, education, and skills in an effort to bridge the digital divide (Media Update, 2011). As part of this initiative, they established Internet cafés'/Multi-Purpose Centres in disadvantaged communities since 2011, with the view of bringing affordable and secure Internet access to these communities. These Internet cafés provide communities with access to the Internet at affordable rates in a user-friendly, comfortable, and educational environment. Moreover, some of the services include photocopying, faxing, laminating, scanning, printing, typing, and public phones. In other areas, the Internet cafés design and host websites.

The selection process of establishing Internet cafés commenced with identifying entrepreneurs and NGOs in disadvantaged communities, after which feasibility studies were conducted to ascertain whether they qualified to host an Internet café (Rasool, 2010). Once all the criteria were met, the Internet café was established. The Nanga Vhutshilo NGO in Dhlamini, Soweto, was one of the identified beneficiaries of the Internet café.

9.5.3 CSI ICT Project 3 - Nanga Vhutshilo Learning Centre Project

As part of the Liquid Telecoms community upliftment programme, the company set out to bridge the digital divide by setting up Internet cafés in disadvantaged communities in Gauteng

and the Western Cape. In 2011, the company identified Nanga as one of the beneficiaries of their 14 Internet cafés. The Internet café included 22 computers, scanners, printers, unlimited data, and a computer training course for the trainers. Liquid Telecom further arranged 6 months free Internet connectivity for the Internet café, including entrepreneur training and IT support. Figure 9-15 shows the container classes at the Nanga Vhutshilo Learning Centre premises.

Figure 9-15: Nanga Vhutshilo Learning Centre

9.5.4 Systems description using SSM

9.5.4.1 Rich Picture

The investigation of the problem situation started with initial site visits, interviews, focus group discussions, documentation reviews, and observations. The interviews included the CSI manager from Liquid Telecom and the learning centre manager. The interview discussions were used as a basis from which to view the complex situation. This approach was necessary because it is imperative to get multiple perspectives from all people that are involved. The researcher used her fieldnotes and transcriptions to draw the rich picture (see Figure 9-16), which is a descriptive situational summary of the Nanga Vhutshilo Learning Centre that involves a human activity system (Fieldnote, 05 Oct 2018). The rich picture was used to identify connections, interactions and relationships between the actors, other systems and the environment, and the research's perceptions. It further depicts the perceived problem areas. In addition, the picture reflects other social systems that are linked to the learning centre.

The picture does not represent the real world, but the researcher's interpretation of the situation. During discussions with the people involved (learning centre managers, CSI

managers, and centre users), new aspects of the situation emerged. The rich picture illustrates the social system's richness and complexity.

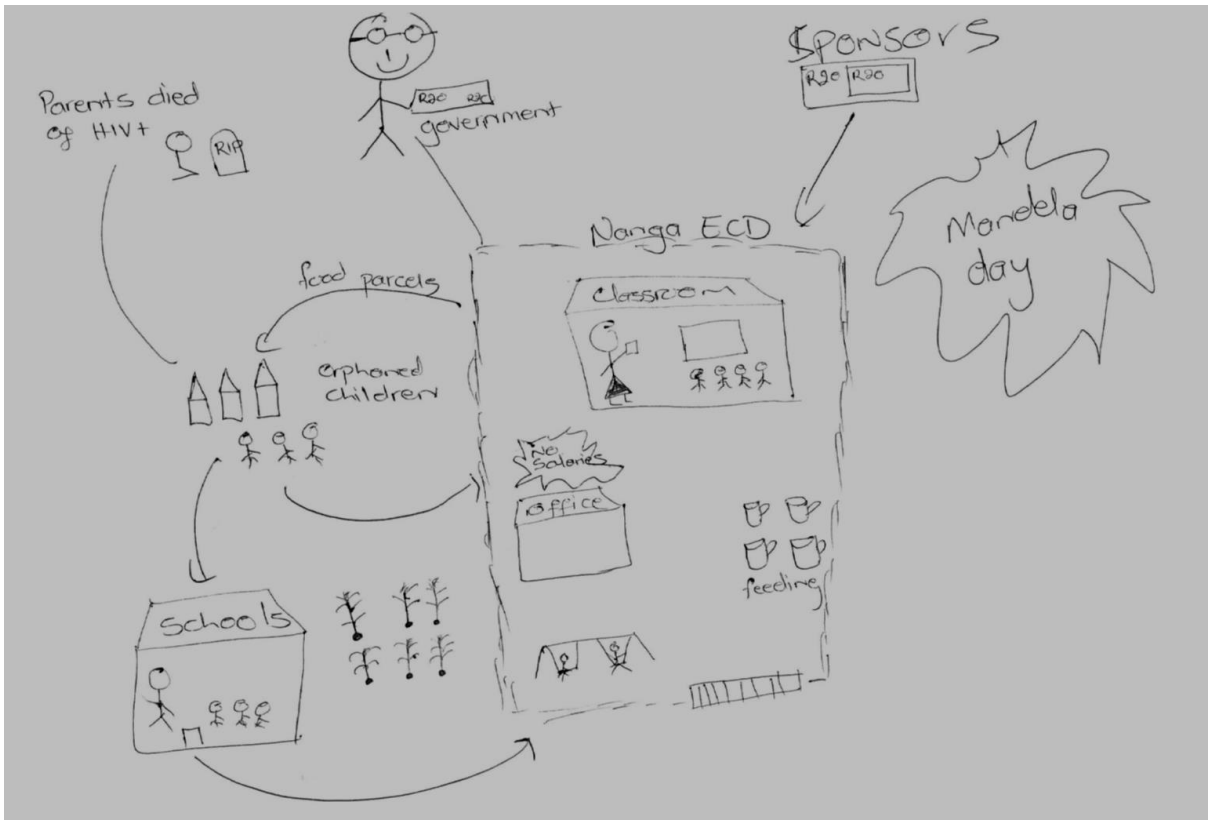


Figure 9-16: Rich Picture – Nanga Vhutshilo

9.5.4.2 CATWOE Analysis

Based on the rich picture, this section describes the human activity system and situation of the community and the learning centre, referred to as a social system and illustrated in Figure 9-16. The CATWOE analysis depicted the root definition for each community, which reflected the worldviews of the CSI ICT project in the community. The analysis summarises a complex situation, thus providing an improved description of the problem under study. The process involves defining the customers, actors, transformation process, worldview, owner(s), and environmental constraints that are pertinent to the learning centre. Below is the CATWOE analysis for the social system.

The initial step of the root definition is the identification of the required transformation. For the community of Dhlamini, the required transformation is *"provision of high-quality early development curriculum and accompanying programs to children in one of Soweto's most vulnerable community".* This transformation was to be achieved by first having multiple role players agreeing on the purpose of the required socio-economic interventions. Sanders (1994) suggests that being part of a community entails interacting with role players and embracing

shared values and goals. Therefore, this resulted in companies using their corporate social investment programmes to give back to communities by implementing CSI ICT projects. In 2011 Liquid Telecoms, through their CSI programme, approached Nanga Vhutshilo with a vision of uplifting the community. Their vision was investing in the community's education and bridging the digital divide in Dhlamini. The purpose for their transformation initiatives was aligned to that of the learning centre.

Part of developing a shared vision is assessing the needs of the social system. Assessing the needs of the community is key to improving the socio-economic situation of the social systems. This further provides the business with a better understanding of the nature of the problem. This process entails investigating social-related problems, and the companies that use their resources to solve the identified problems (Gupta, Sleezer, & Russ-Eft, 2011). The key message is for companies to go out into communities and learn what assistance is needed by asking people and talking to surrounding organisations. This notion was corroborated by a participant stating that:

"the model is that we identify entrepreneurs and NGOs and conduct a study to determine if there is a need to set up Internet cafés in these areas. After all, criteria are met, we then proceed to establish the Internet cafés" (CSIM3).

Prior to Liquid Telecom's working with Nanga on the CSI ICT project, they used to donate money on an ad hoc basis. However, following an assessment in 2011 of what the community required, Liquid Telecom donated an Internet café that comprised of about 22 computers, scanners, printers, unlimited data, as well as a computer training course for the trainers. Liquid Telecom further arranged 6 months free Internet connectivity for the Internet café, including entrepreneur training and IT support. The root definition demonstrated that, according to Ubuntu, it is everyone's responsibility to educate and look after each other. The customers or beneficiaries included school children and community members. The analysis also considered centre managers and the CSI manager as the people who conducted the activities defined in the system.

Table 9-9: CATWOE Analysis of Nanga Vhutshilo

Component	Transformation process
Transformation	Provision of a high-quality early development curriculum and accompanying programs to children in one of Soweto's most vulnerable communities
Customers	Community of Dhlamini Nanga Vhutshilo (Learning Centre)
Actors	Government Liquid Telecom
Owners	Community Nanga Vhutshilo (Founder)
Worldview	To provide a high-quality early development curriculum and accompanying programmes to children in one of Soweto's most vulnerable communities.
Environmental constraints	Funding to sustain the learning centre Crime

The root definition shows that Nanga Vhutshilo is a system owned by its founder, a mother referred to as MaSibongile. The primary purpose of establishing the learning centre was to provide a high-quality early development curriculum and accompanying programmes to children in one of Soweto's most vulnerable communities. Through enterprise and supplier development, Liquid Telecom partnered with Nanga Vhutshilo and provided a container that was to be an Internet café, in order to bridge the digital divide and provide an early development curriculum to children and the community of Dhlamini. However, due to environmental constraints, the computer centre does not exist anymore because of theft.
Following the root definition process above, the conceptual models were developed, as shown in Figure 9-17.

9.5.4.3 Conceptual Model

The researcher used the root definition to extract the activities that are required to develop a conceptual model, as shown in Figure 9-17. These activities took place within the boundaries and environment of the Dhlamini community and the Nanga Vhutshilo Learning Centre. The model illustrates the human activities that are necessary for transformation, and include objectives, inputs, outputs, connections, and boundaries. Transformation for the Nanga Vhutshilo Learning Centre comprises of a high-quality early development curriculum and accompanying programs for children in the Dhlamini community, and also the development of Nanga as a learning centre through an enterprise supplier development program. This is presented as a conceptual model of human activities, which include activities that are essential to achieving the transformation.

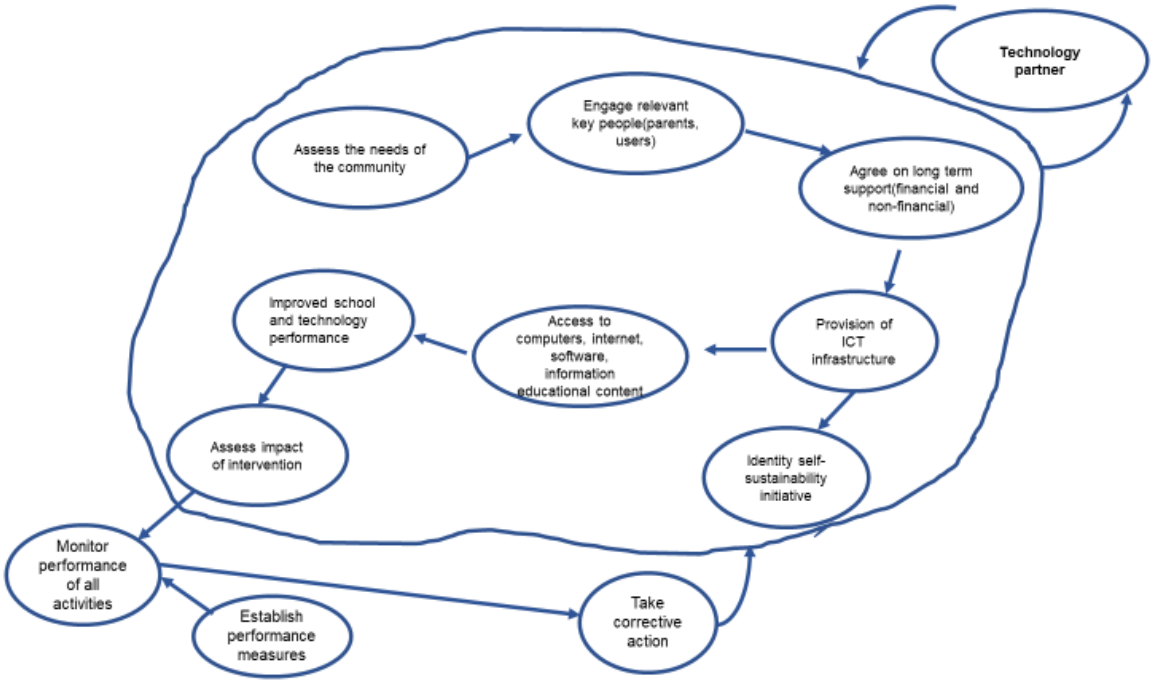


Figure 9-17: Conceptual Model Nanga Vhutshilo

The following sections analyse the system using Ubuntu and Autopoiesis concepts, and further supports the application of the framework, with comments from the participants.

9.5.5 Systems description using Ubuntu

The case study demonstrates that there is a shared vision between the technology partner and the learning centre, which balances and interconnects the social and economic interest. Moreover, it is emphasised through Ubuntu that there should a balance between role players and the learning centre, whilst preserving the social system.

9.5.5.1 Interconnectedness

Nanga Vhutshilo is a learning centre that provides tutoring, day-care, psycho-social services, nutrition, and medical support; it serves around 230 orphans and vulnerable children and over 100 families — this epitomises Ubuntu. In doing this work, Nanga Vhutshilo established partnerships with various companies that share their vision.

Partnerships

Section 9.5.1 reflects on the various partnerships into which the learning centre has entered. Liquid Telecom (technology partner) partnered with Nanga in the provision of an Internet café that would bridge the digital divide through technology access. However, due to a lack of buy-in from some of the community members, equipment was stolen from the Internet café. Liquid Telecom's vision of uplifting the community led them to replace the stolen equipment, but it was unfortunately stolen again. It was at this point that the learning centre manager approached their partner Liquid Telecom and requested them not to replace the equipment. During the site visits, the researcher noted that the Internet café is not operational and has since been closed.

Nanga Vhutshilo's programmes and services are aligned to the Department of Social Development, as a result of which they receive grant funding from them. Moreover, the centre aligns to the requirements of private and foreign funders.

The long-term success of an initiative is dependent on the ability of partners to have engagements that focus on goodwill, are long-term, are based on trust, have a shared vision, and are meaningful (Reid et al., 2014). In 2011 Nanga was one of the beneficiaries of the Liquid Telecom Internet cafés — an initiative that progressed their ad-hoc engagement with Liquid Telecom to a partnership. However, the Internet café partnership was short-lived after the theft of equipment.

9.5.5.2 Collective Volunteerism

The employees that are employed at Nanga are paid a salary, which is apportioned by the Department of Social Development. However, due to the nature of the learning centre, funding is vital for their survival. The centre manager mentioned that there are months during which the department does not release the funds, or releases them late; however, the employees would still come to work. Due to South Africa's high unemployment rate (30.8% in Quarter 3 of 2020 (Statistics South Africa, 2020)), the employees of Nanga cannot afford to stay home, even when they have not received their salaries; they remain hopeful that they will be paid when the department releases the funds. In addition, it gives them the pride to know that they are helping orphaned and vulnerable children, which is an act of Ubuntu.

Working together is an act of Ubuntu that acknowledges the relationships between the past, present, and future generations. This perspective implies that any CSI ICT projects that are introduced in poor urban communities with the view of closing socio-economic gaps should be sustainable for future generations to benefit from.

9.5.6 Systems description using Autopoiesis

9.5.6.1 Organisation and Structure

Social systems differentiate themselves and the environment in order to create their identity and boundaries. In this case, Nanga Vhutshilo's identity is their mission, vision, objectives, regulation, and social activities, which clearly identify the reason for their existence. The centre is an operationally closed network of activities that interacts with the external environment, which does not determine the learning centre's identity or structure. The case study showed that there are clear roles between partners and the centre, as will be indicated in the sections below.

9.5.6.1.1 NGO as a structure

Nanga Vhutshilo is a registered non-governmental organisation under South African law. As required by law, this learning centre is governed by founding documents such as the constitution, rules of operation, and charters.

9.5.6.2 Structural Coupling

Nanga Vhutshilo engages with its partners, namely, the community at large, companies and government departments; each of these partners represent social systems with their own organisation and structure. Section 9.5.1 detailed the partners affiliated with the learning centre and their roles in the partnership. Changes to the system may occur in response to both internal dynamics and the interactions with the external systems. In this case study, perturbation came from the external environment. Eighteen months after the Internet café was launched, Nanga Vhutshilo Learning Centre experienced perturbation caused by malicious community members when they stole the ICT equipment that was donated by the technology partner Liquid Telecom.

9.5.6.3 Sustainability

The sustainability of a learning centre is critical in delivering a CSI ICT project within a community. Nanga Vhutshilo depends on government grants and foreign partnerships for its sustainability. A financial resource is one of the key aspects of sustainability, and the investigation revealed that Nanga receives a government grant. Nanga Vhutshilo's financial support goes beyond the ICT services, to cover salaries for their personnel; it also feeds the orphans that come to the centre for nutrition. However, the centre manager raised a concern that government funding is irregular and is sometimes not received on time. As a way of

financially sustaining themselves, Nanga Vhutshilo is continuously requesting for donations, and have published donation packages on their website. Therefore, since its inception, the centre is proving to be self-sustaining and self-maintaining.

9.5.6.3.1 CSI ICT Project Sustainability

The sustainability of CSI ICT projects plays a significant role in meeting the needs of present communities, including having the capability to meet the needs of future generations. However, due to unforeseen circumstances, ICT projects are sometimes unstainable. This was demonstrated in the Nanga Vhutshilo case study, whereby Liquid Telecom donated an Internet café with 22 computers in 2013, which were stolen 18 months later. This led the centre manager and its board to reach an agreement that Liquid Telecom should cease replacing the equipment; as a result, the Internet café was closed (CM3). The notice board outside the learning centre is the only remaining evidence that the Internet café was in existence (see Figure 9-18, taken 05 Jun 2018). It is evident that the CSI ICT project was unsustainable, since the technology partner and the learning centre could not continue to replace equipment, only for it to be stolen by some community members who did not share the vision of the project.

Figure 9-18: Nanga Vhutshilo Internet Cafe Advertisement Board

The learning centre's sustainability is centred on their core programmes such as school support, health, and nutrition, rather than on the Internet café CSI ICT project.

9.5.7 Reflecting on the impact of the Nanga Vhutshilo CSI ICT Projects

Rothenberg-Aalami and Pal (2005) state that, for companies to assess impact, there needs to be a set of indicators that are being assessed. Indicators are central to assessing the impact of social projects. During this study, the researcher observed that Nanga Vhutshilo had

established impact indicators for their other services, but not for the CSI ICT project. They continually collect data about their programmes to determine the indicators and use the data to improve their services. However, the researcher could not establish the impact indicators of the impact made by the CSI ICT project, since the Internet café was no longer operating.

Malm (2012) mentions that CSI ICT projects are seen to be remedial in nature, because the focus is on short-term needs as opposed to long-term community empowerment. This is confirmed by the recent fundraising activities that Nanga has embarked on, to raise funds to reopen the Internet café.

Liquid Telecom is committed to empowering communities where they have a local presence. The CSI manager highlighted that CSI benefits are unquantifiable, and not clearly translatable to return on investment. However, he affirmed that CSI projects contribute towards the companies B-BBEE rating; this is important since, without a good BEE rating, the company cannot participate in state-owned entity tenders and business: *"We are currently a BEE Level 4 contributor. Yeah, so we do subscribe to BEE" (CSIM3)*. In 2018, the company contributed 2.33% of their net profit after tax towards corporate social investment, which positioned them as a Level 4 B-BBEE contributor (Liquid Telecom, 2019a). The other benefit that the company derived from CSI is an excellent corporate image. The CSI manager affirmed that, during their partnership with Nanga Vhutshilo, the company benefitted in terms of their B-BBEE rating and enhanced company reputation. Ndhlovu (2009) asserts that companies derive benefits from taking part in CSI initiatives. Mohamed (2019) and Sivaranjini, Rekha, and Nisha (n.d.) corroborate the statement that companies throughout the world use socio-economic development as a mechanism to derive value, by promoting their companies, retaining and attracting new business, retaining productive employees, and enhancing their reputation.

According to Crowther and Aras (2008), socially responsible behaviour is good for business, not just ethically but also financially, because companies use this to position their brand. Therefore, Liquid Telecom benefitted from their partnership with Nanga; however, the system being served did not benefit from this CSI ICT project.

Table 9-10 below summarises Nanga Vhutshilo's case study analysis.

Table 9-10: Nanga Vhutshilo summary	
SSM	
Transformation	Both Nanga and Liquid Telecom had a shared vision of providing a high-quality early development curriculum and accompanying programs to children in one of Soweto's most vulnerable communities.
Ubuntu	
Interconnectedness	Nanga and Liquid Telecom initially had short term partnerships through ad hoc donations. However, in 2011 Nanga was one of the beneficiaries of the Liquid Telecom Internet cafés, which progressed their partnership from an ad hoc engagement to a partnership where Liquid Telecom would continuously visit the Internet café. However, the CSI manager mentioned that their relationships were short term. Their partnership was terminated when the Centre Manager indicated to them that they should not replace the stolen equipment. However, the learning centre still has partners with whom they work with.
Collective volunteerism	The staff that works at Nanga are paid salaries
Autopoiesis	
Structure	The learning centre is characterised as a registered non-profit organisation and is governed by board members. The learning centre is operationally closed and, as a result, there is a clear distinction of operations between the learning centre and their partners.
Structural Coupling	The learning centre is structurally coupled with the community of Dhlamini. As a serving system, the centre services the children and their families. In addition, they interact with the Department of Social Development and other companies that support the centre.
Sustainability - Learning centre	It is evident that the learning centre as the overarching serving system is not based on technology services; it is self-producing, as it is operationally closed; and it continues to be structurally coupled to other social systems and other partners that facilitate its sustainability. It should be noted that the learning centre has been receiving the grant since its inception, mainly from the Department of Social Development. While the centre is sustainable, the board needs to work on solid financial sustainability plans.

Sustainability - CSI ICT Project	Due to recurring theft of ICT equipment, the centre manager and the board of Nanga Vhutshilo reached an agreement that the technology partner should cease replacing the ICT equipment. Therefore, the CSI ICT project was not sustainable in line with its intended objective.

Reflecting on the above, the Nanga Vhutshilo Learning Centre has established boundaries, and is maintaining and reproducing itself. However, the CSI ICT project could not re-establish itself, due to recurring theft of ICT equipment and a lack of financial resources. Therefore, the CSI ICT project was not sustainable.

9.6 Case 4: Boys and Girls Club

9.6.1 Case 4 Background

The Boys and Girls clubs is a registered non-profit organisation - modelled on the Boys & Girls Clubs of America. It is an after-school programme for school-going children in disadvantaged communities that operates Mondays to Fridays from 14:00 to 18:00. Their main aim is to enhance and align their programme to the education system. Three priority outcomes of the clubs are good character and citizenship, healthy lifestyles, and academic success. The clubs provide a safe and supportive environment where children are encouraged to unleash their potential; they are kept away from disruptive influences. In addition, the children are offered academic supervision, a meal, and extramural activities including technology, drama, sport, art, and music, as shown in Figure 9-19 (Boys and Girls Club, 2019).

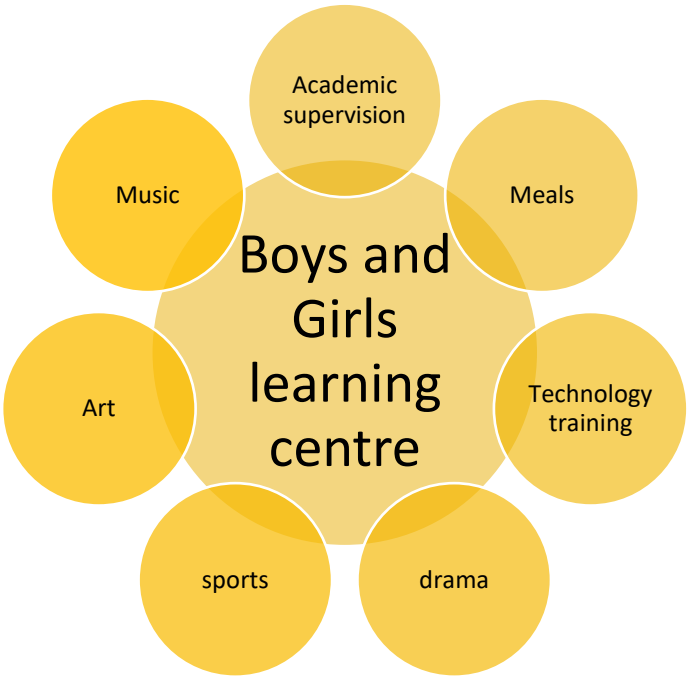


Figure 9-19: Boys and Girls Club Services

There are three established Boys and Girls Clubs in Pimville, Protea Glen, and Bertrams, all based in Gauteng. This study focusses on the Boys and Girls Learning Centre in the community of Protea Glen that was established in 2016.

Figure 9-20 showcases the partners that are supporting this centre.

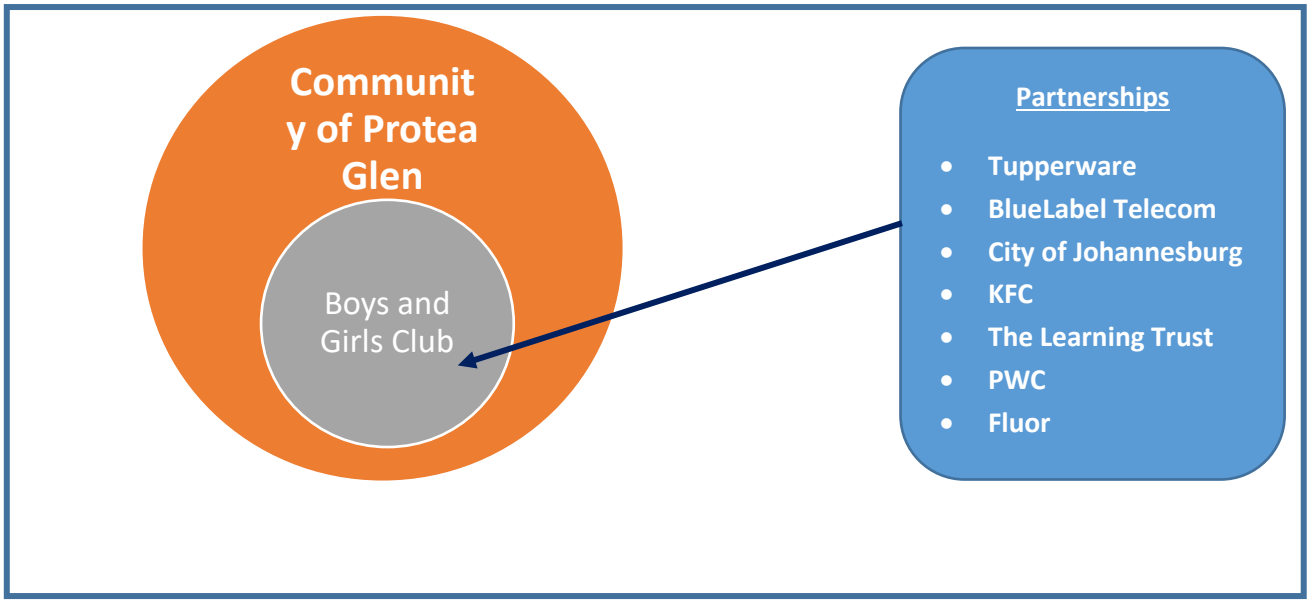


Figure 9-20: Serving system and systems served – Protea Glen Community

Partnership

The Boys and Girls Learning Centre is a community-based centre that relies on several sources for funding and operational support. Funding sources include philanthropic foundations, in-kind support, and donations. Blue Label Telecom is the technology partner of Boys and Girls; however, during the iterative research process, the researcher discovered that the club has other partners, as illustrated in Table 9-11. However, the key focus is on Blue Label Telecom, which was selected as part of the sample.

Table 9-11: Boys and Girls Learning Centre list of partners

Partner	Type of support
Tupperware	Funding and provision of non-financial support
Blue Label Telecom	Built the Boys and Girls Learning Centre in Protea Glen
City of Johannesburg Department of Community Development	In-kind contributions Earmarking currently under-utilized, under-resourced Sports and Recreation Community Centres in order to fulfil the purpose for which they were initially intended.
KFC	Financial support
The Learning Trust	The Learning Trust looks to key partners to create collaborative networks in Gauteng with NGOs focused on learner support.
PWC	Audit services in kind

Fluor	Weekly mathematics tutoring in partnership with the Fluor Development Trust

9.6.2 Technology Partner – Blue Label Telecom

Blue Label Telecom is an innovative technology company that distributes physical and virtual prepaid airtime, secure electronic tokens of value, and starter packs in South Africa and other developing economies. The company was established in 2001 by two brothers, and is listed on the Johannesburg Stock Exchange (Blue Label Telecom, 2015). The company targets a variety of their services at customers who do not have easy access to a bank account, to afford them the convenience of transacting at their own time. They further align their approach to social transformation, staff development, and having a positive impact on South Africa as a whole (Blue Label Telecom, 2015).

Corporate Social Investment

Blue Label Telecom's socio-economic development focuses on the youth, sports, and technological development. Their flagship project is the Boys and Girls Learning Centre South Africa in Protea Glen, Soweto.

9.6.3 CSI ICT Project 4 - Boys and Girls Project

The purpose of the CSI ICT project is to improve the socio-economic situation in the community of Protea Glen by providing an education facility with a technology centre. For the purpose of this study, the Boys and Girls Club in Protea Glen is referred to the Boys and Girls learning centre.

Since 2016, the learning centre hosted over 200 school children between the ages of 6 and 19 years, supervised by trained mentors who provide structured activities. The learning centre is a state-of-the-art facility comprising of a computer room with 22 computers, printer/scanners, access to the Internet, a kitchen, classrooms and sports facilities – see the photograph in Figure 9-21, that was taken by the researcher on 07 Jun 2018.

The Boys and Girls Learning Centre, as a serving system, is continuing to serve the young people and their families during non-school hours in the community of Protea Glen. The researcher noted that the learning centre serves learners who come from mainly single-parent households; the observation was made that unemployed single mothers were the only ones available for interviews (Fieldnote, 30 May 2018).

Figure 9-21: Boys and Girls Learning Centre

9.6.4 Systems description using SSM

9.6.4.1 Rich Picture

The investigation of the problem situation started with initial site visits, interviews, focus group discussions, documentation reviews, and observations. The interviews included the CSI manager from Blue Label Telecom, the learning centre manager, and parents of the minor users. The interviews and focus group discussions were aimed not only at visualising the social system, but also at providing a foundation from which to structure “the problem situation”. This approach was necessary, because it is imperative to get multiple perspectives from all people who are involved. The researcher used her fieldnotes and transcriptions to develop the rich picture in Figure 9-22, which is a descriptive situational summary of the Boys and Girls Learning Centre and its human activities. The rich picture was used to identify connections, influences, interactions, and relationships between the actors, and the environment and the researcher’s perceptions. Moreover, it describes what is perceived as problem areas. The picture reflects on other social systems that are linked to the learning centre.

The picture is not a depiction of the real world, but rather how the researcher views the situation. During discussions with the people involved (learning centre managers, CSI managers, and centre users) new aspects of the situation emerged. The rich picture illustrates the social system’s richness and complexity.

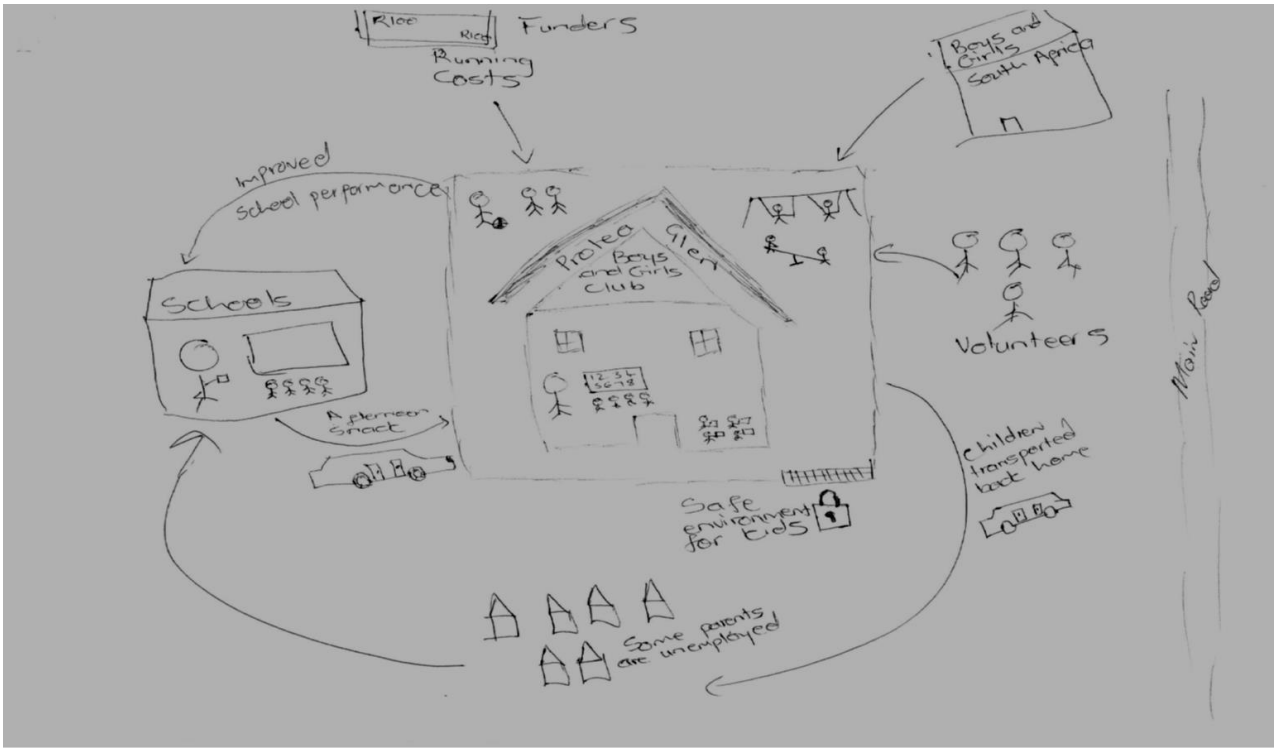


Figure 9-22: Rich Picture – Boys and Girls Learning Centre

9.6.4.2 CATWOE Analysis

Based on the rich picture illustrated above, this section describes the human activity system and situational summary of the community and learning centre, referred to as a social system, as tabulated in Table 9-12. The CATWOE analysis depicts the root definition for each community, which reflects the worldviews of the CSI ICT project in the community. Below is the CATWOE analysis for the social system.

The Boys and Girls Learning Centre in Protea Glen was established with the purpose of *"providing curriculum-based education, safe space and access to state-of-the-art computer equipment" (Boys and Girls Club, 2019).* This purpose was shared by the partners that agreed to work with Boys and Girls in realising this vision and transforming the community. The Centre Manager echoed that the centre provides *"education, IT and career, health and life-skills, arts and culture, character and leadership, sports and recreation and nutrition" (CM4)* to the young children from the community. Blue Label Telecoms was one of the main partners that shared the same transformation vision and committed a portion of their corporate social investment budget in assisting this centre to meet its objectives.

Prior to companies declaring their commitment towards a shared vision, they first need to assess and understand the needs of the social system. A needs assessment is vital for companies to improve the socio-economic aspects of social systems. This further provides the business with a better understanding of the nature of the problem and affords companies

with an opportunity to devise a solution that can solve the problem. This process entails investigating social-related problems, and companies using their resources to solve the identified problems (Gupta et al., 2011). Companies are required to engage with communities and learn what assistance is needed by asking people and talking to organisations. Upon observing the progress of the Boys and Girls Club in Pimville, Blue Label Telecoms expressed their keenness to establish the learning centre in Protea Glen. In considering building the learning centre in Protea Glen, Blue label Telecoms and Boys and Girls Learning Centre took into account demographics, spatial development, and community education needs prior to building the centre. The 700-square metre learning centre was built using 217 000 interlocking plastic water bottles filled with sand inside a steel structure (CSIM4). The worldview for this CSI ICT project is centred around education as part of Ubuntu. The customers or beneficiaries include school-going children and community members. The analysis considered actors such as parents, the centre manager, and the CSI manager as the people who carried out the activities defined in the system.

Table 9-12: CATWOE Analysis of Boys and Girls Learning Centre

Component	**Transformation process**
Transformation	Providing curriculum-based education, safe space, and access to state-of-the-art computer equipment
Customers	The community of Protea Glen Schools children from Grade 0 – 12
Actors	Blue Label Telecom by the provision of funding and support Boys and Girls Learning Centre Parents Volunteers (Teachers)
Owners	Boys and Girls Club SA Blue label Telecom Volunteers (Teachers)
Worldview	Bridging the digital gap by promoting academic success through access to technology, career guidance, and a safe environment.
Environmental constraints	Availability of volunteers (teachers) Funding to sustain the learning centre

The root definition of this system is that the Boys and Girls Learning Centre is a system owned by Boys and Girls South Africa, that was built by Blue Label Telecom. The primary purpose of establishing the learning centre is to bridge the digital gap by promoting academic success through access to technology, career guidance, and a safe environment. This is achieved through the support of Blue Label Telecom, by providing a state-of-the-art facility where

community children from Grade 0 to Grade 12 are in a safe environment with access to volunteers and information. The primary constraint faced by the centre is the unavailability of volunteers (teachers), as the centre thrives on their services.

Following the root definition process above, the conceptual models were developed, as shown below.

9.6.4.3 Conceptual Model

Conceptual Modelling is a process of conceptualising a system of interest (Daellenbach, 1994). This process requires the researchers to remove themselves from the real world area of concern (Patel, 1995).

The researcher used the root definition to extract the necessary information to develop the conceptual models. These activities took place within the boundaries and environment of the community and the learning centres. Figure 9-23 illustrates the Boys and Girls conceptual model, which showcases the human activities that are necessary for transformation. The activities include inputs to the system that are transferred into output, connections, and boundaries. Transformation for the Boys and Girls Learning Club comprises curriculum-based education, access to information, access to state-of-the-art computer equipment, and access to tutors. This is presented as a conceptual model of human activities, which include essential activities to achieve the transformation.

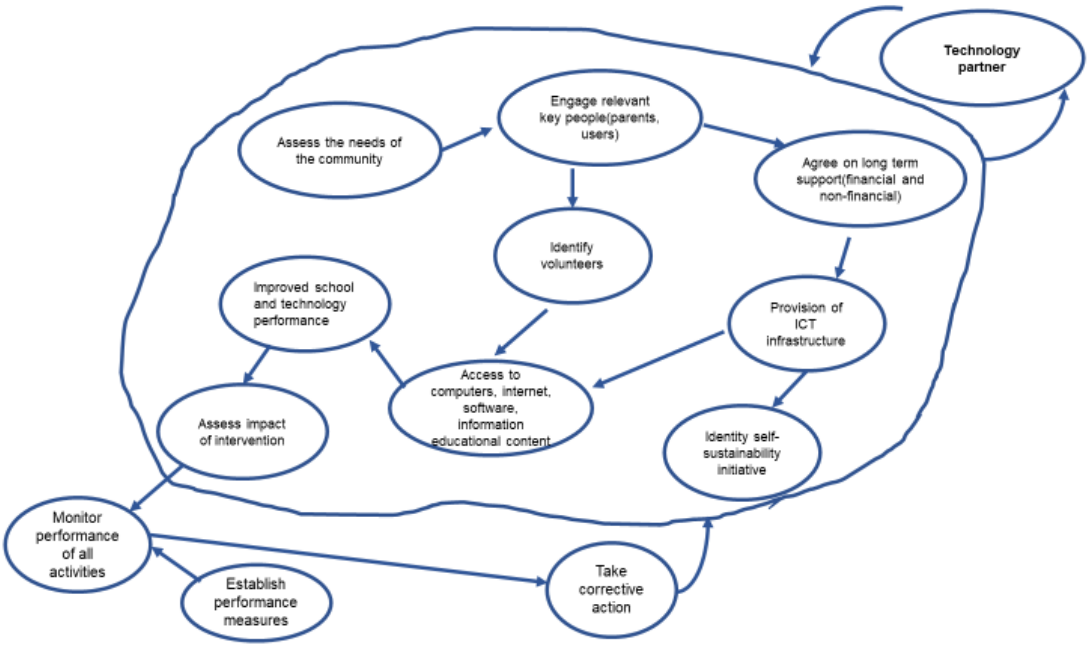


Figure 9-23: Conceptual Model Boys and Girls Learning Centre

The section below proceeds to analyse the system using Ubuntu and Autopoiesis concepts, and further supports the application of the framework with comments from the participants.

9.6.5 Systems description using Ubuntu

This section provides a systems description of the Boys and Girls Learning Centre using Ubuntu. The Ubuntu concepts of purpose, interconnectedness, and collective are used to describe the case. In addition, the themes that emerged from the data are discussed, with supporting quotes from the interview transcripts.

9.6.5.1 Interconnectedness

Interconnectedness at the Boys and Girls Club is rooted in the young children who visit the centre daily, because they grow up knowing that they belong to a bigger community outside their immediate homes. The centre is interconnected to schools and families that are concerned about the wellbeing of the young children.

Partnerships

For a partnership to be effective, learning centres and companies should trust each other, there needs to be community buy-in and alignment, and the duration of the partnership should be agreed upfront. In community upliftment projects, mutual trust and respect is key for an effective partnership, as well as shared responsibility for the education of the children (Epstein et al., 2018; Steyn et al., 2013). All partners need to have the comfort that they are benefitting from the intervention. learning centres are encouraged to align themselves to government planning and to business initiatives (Franks, 2012). The Boys and Girls Learning Centre is aligned to the government-based curriculum, as well as to business corporate social investment initiatives.

A partnership between the Boys and Girls Learning Centre and Blue Label Telecom started prior to the opening of the centre in Protea Glen. Blue Label Telecom and the Boys and Girls Learning Centre started their partnership in 2011 when they launched the Pimville, Soweto centre (Boys and Girls Club, 2019). Subsequently, their relationship expanded when they expressed their interest in 2015 to continue with their commitment of building a learning centre in Protea Glen. It should be acknowledged that there are other role players in the successful running of the centre; however, Blue Label Telecoms is their technology partners. The CSI Managers said that "…*we try have a more of a business partnership relationship as opposed to I'm your donor, you the beneficiary*" (CSIM4); this demonstrates that Blue Label Telecoms

strive for more formalised interconnections with the learning centre to ensure its future sustainability.

Learning centre–Parents–School partnership

Section 9.6.1 reflects the various partnerships of the learning centre. It is evident that a centre such as this requires a number of partnerships in order for it to deliver its objectives of uplifting the community. In their reflection, Boys and Girls have recognized that some of their partners have been with them "*since 2011 which is a long-term investment that is reviewed year to year. However, the funding is by no means guaranteed, but ultimately, there is some level of commitment to building this organisation long-term*". It should also be noted that centres such as these rely on any form of funding from donations, either long term or short term. However, the operation of an impactful centre requires upgrades, maintenance, and repairs; therefore, long-term partners such as those of the Boys and Girls Learning Centre are required.

The Boys and Girls Learning Centre in Protea Glen has established a strong partnership with parents and local schools. The parents–school–learning centre partnerships are collaborative associations and activities that involve schoolteachers, the headmaster, parents, and other family members of students who visit the learning centre. As a collaborative effort, one parent mentioned that "*at the end of every term, the centre requires for parent to submit their children school performance cards so that they can check how the children are performance at school" (P3).* Moreover, the Boys and Girls Learning Centre has established a committee consisting of parents, the learning centre manager, and centre teachers who ensure that they achieve the transformation results that they are seeking.

The centre manager mentioned that, even with effective long-term partnerships:

"*you are not going to solve any challenge in the first six months or in a year of funding or in a year of operation and so in order to really get community buy-in and get community engagement and parent buy-in you need to be there long-term. There needs to be mutual trust and once they start to see the results in the kids – which again the intervention is long-term because it takes a long time to make a difference in a child's life*" (CM4).

This reflects that communities require long-term collaborative partnerships for program continuity and for realising the full benefits of their initiatives.

9.6.5.2 Collective Volunteerism

Voluntary work creates strong relationships that may lead to various types of collaboration; it is based on mutual appreciation of each other's knowledge and skills, and is embedded within communities. This section discusses the Boys and Girls CSI ICT project with an emphasis on volunteering.

Volunteering

The United Nations Volunteer programme reports that the role of volunteerism in socio-economic development projects is key to sustainable development (United Nations Volunteers, 2011). This social value is a human quality for understanding other people's problems, such as the saying "*being in other people's shoes*" and assisting them where they can. In addition, Broodryk (2006) states that, when someone is helpful and not thinking about themselves, they must develop a sense of compassion to meet the needs of others. Their act of compassion demonstrates that, despite people's differences, human beings share and create wholeness together. In this case study, the volunteers, who are young adults, are showing compassion by training young children on how to use the computer and other life skills. The centre manager mentioned that they "*guide people that are coming in as volunteers as to what we need help with, and it generally is not painting the wall"*. In addition, they *"need to be highly skilled volunteers*" (CM4); these volunteers show compassion by teaching and assisting the school children with schoolwork and assignments. Moreover, they impart the knowledge and skills that the children require in order to survive life in their communities. The CSI Manager further added that the voluntary program:

"alleviates a lot of stress for your working mothers and fathers and even on working grannies and because it's usually single parent or non-parent households. They are not equipped to assist from an academic perspective, from general sort of life skills, so it gives them a lot of support on the social issues that these families are faced with. Providing a meal, providing a safe haven, providing a safe haven" (CSIM4).

The learning centre also bridges the gap between the after-school period and when the parents return from work; it acts a safe haven for the school children.

According to Caprara et al. (2016), volunteerism can be classified as either structured or unstructured. They reported that structured volunteering is governed by agreements and may include paying of stipends. The Boys and Girls Learning Centre has trained salaried professionals and volunteers to whom they pay a stipend. The centre manager said that

"*This club is a safe space for young people after school and there's traditionally and un-supervised in idle hours as well as a place where they can connect with adults and mentors and get complementary programmes that they may or may not be getting at school" (*CM4).

This shows that the volunteers collectively assist to bridge the digital gap by volunteering their time and skill to teach the children, and by providing career guidance.

Section 9.6.6 discusses the interactions and transformations that lead the learning centres to continue to reproduce and maintain themselves.

9.6.6 Systems description using Autopoiesis

9.6.6.1 Organisation and Structure

While social systems may share the same form of identity, they are distinguished by their structures. These systems separate themselves from the environment in order to create their identity and boundary. The organisational identity of the Boys and Girls Learning Centre in Protea Glen is based on the mission, vision, objectives, rules, regulation, roles, and procedures of the American Boys and Girls Club model. The CSI Manager mentioned that:

"the boys' and girls' program is actually, it's an American based program that but it's a completely independent operation. They do not get finance or support from America however they do, the benefit there is they get to leverage off structure, the programs within the club that they run, some of the IP" (CSIM4).

While it should be noted that, even when the Protea Glen Boys and Girls Learning Centre shares the same vision as the American model, their structures are different. In addition, the Protea Glen learning centre is designed to suit the needs of South African communities. Before launching the model, focus groups and community assessments were conducted to ensure that the American model would fit in the South African communities. It was important for the assessments and due diligence to be conducted to avoid unintended consequences.

A system is said to be closed if all its operations stay within the same system (Varela, 1979). The Boys and Girls Learning Centre is an operationally closed network of processes, such that the same organisation of processes is reproduced; however, interactions and external systems do not determine the learning centres identity or its structure. The Boys and Girls Learning Centre is governed by board members who jointly agree on the operations of the club. In this instance, it should be noted that the Blue Label Telecom, as technology partner, has appointed its CSI manager to sit on the board of the Boys and Girls Learning Centre, this demonstrates that there is a structural coupling between the two entities.

The Boys and Girls Learning Centre is a registered non-profit organisation and, as required by the law, it is governed by founding documents such as the constitution that states what the organisation does, the structure of the organisation and its operations, as well as the duties of each office-bearer. Other documents that are required by the Non-profits Organisation Act No 71 of 1997 include charters and operating standards (Department of Social Development, 1997).

When partners selected the communities with which they intend to work on socio-economic development projects, they approached established and registered learning centres. The participants expressed the following: "*that is why we like boys and girls…They do their part, they the non-profit we as a corporate, we each have a role to play. Furthermore, we see them as a partner that is fulfilling their role*" (CSIM4). In addition, Magalhães and Sanchez (2009) state that these partnerships should include mutual respect of the rules that govern relations. This is achieved by having partnership agreements in place that delineate the roles of each partner.

9.6.6.2 Structural Coupling

The analysis showed that, since its inception in 2016, the Protea Glen learning centre has been engaging with the community and with its partners. All systems have clearly defined structures and roles to play. For instance, some of the partners provide financial support, auditing services, and curriculum support, and Blue Label Telecom as the technology partner built the learning centre; all the partnerships are complementary to the successful running of the learning centre. This designates relations between the Boys and Girls Club and its partners, which in the long run influence the self-produced structures of the system, to be better interconnected with the environment while maintaining its identity and autonomy. This demonstrates that structural coupling facilitates the influences of the environment on the system.

9.6.6.3 Sustainability

Features of survival are witnessed across generations amid environmental changes, and a learning centre such as the Boys and Girls Learning Centre should preserve its organisation, life, and identity, as well as their projects or programmes for future generations to benefit from. When developing a sustainability plan, ICT companies and learning centres should consider financial sustainability, organisational sustainability, and project or programme sustainability planning (Sontag-Padilla et al., 2012).

9.6.6.3.1 Learning centre sustainability

Learning centres such as the Boys and Girls Learning Centre in Protea Glen play an important role in socio-economic development; therefore, they require financial resources for their continued operation. This was supported by the CSI manager when she said that:

"*we not looking to build, non-profit does not mean it's a charity, it just means that you want to have a sustainable business that is just not going to paying dividends but the only way that you are going to I think have longevity and create impact, is if to some extent you can stand on your own feet*" (CSIM4).

The intended meaning is that the company strives for long term partnerships to ensure successful impact and more efficient use of resources, and sustainable partnership activities.

Currently, the centre has main partners that support them financially as well as with other resources. In addition, they request the general public on their website to donate R 100.00 to support a learning centre Member for a week; R 400.00 to support a Member for a month; or R 5000.00 to support a learning centre Member for a year (Boys and Girls Club, 2018). The learning centre also charges a nominal fee of R50 for a program per child per year, and R100 for a holiday programme as a way of sustaining itself; however, the learners do not pay for any other services that the learning centre offers. The centre had about 415 members (CM4) in their first year of operation and has also generated revenue from the sales of goods. Lastly, the learning centre receives income from some of their investments (Boys and Girls Club, 2019). The above demonstrates the measures that the learning centre has put in place to ensure that they are sustainable.

9.6.6.3.2 CSI ICT Projects Sustainability

Table 9-13: Boys and Girls Club Summary	
SSM	
Transformation	Providing curriculum-based education, a safe space, and access to state-of-the-art computer equipment
Ubuntu	
Interconnectedness	Blue Label Telecom and the Boys and Girls Learning Centre started their partnership in 2011 when they launched the Pimville learning centre. Subsequently, their relationship expanded when they expressed their interest in 2015 to continue with their commitment to build a learning centre in Protea Glen
Collective volunteerism	The Boys and Girls Learning Centre employs trained salaried professionals, and volunteers whom they pay stipend.

Autopoiesis	
Structure	Boys and Girls Protea Glen is based on the American model. Their identity is built on their mission, vision, objectives, rules, regulation, roles, and procedures. The Boys and Girls Learning Centre is a registered non-profit organisation that is governed by board members. As required by the law, they have a constitution that stipulates how they should operate, the mission, vision, operating structure, and their governance board.
Structural Coupling	Since its inception in 2016, the Protea Glen centre has been engaging with the community and their partners, and each system has a clearly defined structure and role to play.
Sustainability - Learning centre	A membership fee per is charged per child for a year, as a way of sustaining the learning centre. They also generate revenue from the sale of goods and receive income from investments. The above demonstrates the measures that the learning centre has put in place to ensure sustainability.
Sustainability - CSI ICT Project	To sustain the CSI ICT project, the technology partner Blue Label Telecom is notified when equipment should be fixed or upgraded; the technology partner ensures that equipment is working optimally, and also renews software licences.

9.6.7 Reflecting on the impact of the Boys and Girls Learning Centre CSI ICT Project

For impact to be assessed appropriately, the learning centre and ICT companies need to define impact indicators. The Boys and Girls Learning Centre did not define indicators for the impact of the technology centre, because this project exists within their overall CSI project. However, they are tracking other indicators, such as academic success, a healthy lifestyle, and character and leadership. In relation to the technology centre, the parents of the minor users of the centre indicated that they were pleased that, since their children started being part of the learning centre, there have been significant changes to their children's performance. One mother indicated that her son could not read and write; however, since they started attending the club, this has changed:

"my child is in grade 9 – but since grade R, I was always called at school and they complained that my child was slow and he cannot read and write. Since the establishment of the centre, he is able to read and write" (P2).

The learning centre introduced a reading programme called 'Reading Eggs', which is installed on the computers in the technology centre. In addition, the parents reflected that, prior to their children using the centre, some of them were struggling at school; however, since they started attending the Boys and Girls Learning Centre, their performance at school improved. The centre manager further mentioned that the parents and schools have also seen a positive change in behaviour, because the children are also thought life skills (CM4).

One of the parents reflected that, prior to having the learning centre, learners who needed to do research "*would go to the Internet café and they would pay*" (*P1*). However, due to lack of employment, some parents do not have money for Internet cafés. This was echoed by one parent, who stated that: "*we take money out of the pocket and pay the Internet café and we don't work"*. Therefore, the learning centre is affording young learners an opportunity to access and use computers and takes away the burden from parents who are already struggling financially.

Blue Label Telecommunication is aligned to socio-economic development through South Africa's B-BBEE codes, as was corroborated by the CSI manager: *"Yes, we do subscribe to B-BBEE" (CSIM4).* In the 2018 annual report, Blue Label Telecom reported that they spent R9.2 million of their profit towards their corporate social investment programme. The company and its subsidiaries are rated as a Level 7 contributor (B-BBEE scorecard, 2018). For a company to be fully compliant, they should be at least Level 4, where Level 1 is the desired rating. The company indicated that there is no direct benefit for them from this CSI ICT project. This is corroborated by their B-BBEE rating, which is currently at an unacceptable level. Therefore, this shows that the company sincerely aims to create a positive impact on South African communities. Moreover, because the company did not have an underlying agenda, they committed and built the Boys and Girls Club Protea Glen.

The sections above analysed the four social systems, using the systems frameworks of soft systems methodology, Ubuntu philosophy, and Autopoiesis.

In this chapter, the systems framework was used to describe the four social systems of interest. Section 9.7 is the combined reflection on findings, by applying the systems framework to the four cases.

9.7 Characteristics of sustainable and impactful CSI ICT Projects

This section reflects on common themes, which suggest common principles of impact and sustainability of CSI ICT projects. The principles were derived from the four case studies that were investigated in this study.

It should be noted that each CSI ICT project in the learning centres is unique in nature and to the environments in which they have been implemented; this includes internal and external environments such as culture, socio-economic, situational, and political influences (Schwalbe, 2006).

9.7.1 Principle 1: Transformation

As for any other project, a successful CSI ICT project should plan for the expected transformation that is required, which can also be regarded as the overall purpose of a system. This was evident from the root definitions of each case study, which articulated the significant activities that are required for learning centres to transform. Moreover, transformation processes need to be identified. In addition, Schwalbe (2006) asserts that any socio-economic development projects, including ICT, that aim to fulfil community needs should be viewed holistically and within the context of the community, which is what Ubuntu advocates for - viewing a system holistically. In analysing the four case studies, it was established that all four learning centres had a clear purpose for their intervention and transformation processes. Additionally, prior to the introduction of CSI ICT projects in the communities, the learning centres and the technology partners engaged the communities, which led to the community sharing in the vision; this is one of the characteristics of Ubuntu.

9.7.2 Principle 2: Interconnectedness – the partnership

Interconnectedness is one of the significant values of Ubuntu, by which a community works together to achieve a shared transformation vision and takes a collective stand to seek solutions to address their common problem. Moreover, it is vital for learning centres to forge strong partnerships with other companies that believe and support the vision (Batchelor, Norrish, Scott, & Webb, 2003), as well as companies that can provide the infrastructure and finance to sustain the project. Therefore, it is prudent for learning centres to seek partners that can complement their strengths and provide the resources that the learning centre requires. For an effective partnership, all parties should consider mutual benefits from projects, as well as trust, alignment, and community buy-in.

Evidence from the four case studies suggests that impact and sustainability are achieved through strong partnerships. Three learning centres are aligned to the objectives of government departments, where their relationship is curriculum-based, or where the government provided the infrastructure that is housing the learning centres. However, one of the learning centres reflected that they are not aligned to any government departments, because the government prescribes how they should run their community centre. This

demonstrates that there is no shared vision between the government and the learning centre. Another critical factor to be considered for CSI ICT projects to be impactful and sustainable is community buy-in. The introduction of the CSI ICT projects were preceded by community engagements, where the needs of the communities were assessed. However, once projects were fully implemented, there were break-ins at two of the learning centres, and ICT equipment was stolen. The other two learning centres hired security guards from the community. It is unfortunate that there are community members that do not support the shared vision. The learning centres have established partnerships with companies that have supported them through CSI ICT projects. Based on these partnerships, the centres can offer its members ICT services or training – such as assisting Grade 12 learners to apply online for university; computer networking; teaching young children to read using computers; teaching robotics and coding; and web development. All learning centres demonstrated that there was trust between all involved parties, and that they ensured transparency and accountability.

In order for learning centres to achieve a long-term impact on socio-economic development, they need to establish long-term partnerships. The analyses of the four learning centres highlighted that two of the centres are still in partnership with their initial technology partners. One learning centre had a short-term partnership with their technology partner, and both the partner and centre agreed not to continue with the partnership after their ICT equipment was stolen.

The other learning centre entered into a four-year timebound funding agreement, with the condition that the centre would be sustainable once the funding stopped. The observations revealed that the centre is still sustainable. To continue its operations, the centre will require a technology partner to share their vision, so that the centre can continue to benefit the current and future generation; after all, Ubuntu advocates for continuous development.

9.7.3 Principle 3: Collective volunteerism

For developments to be sustainable and impactful, Ubuntu suggests collective volunteerism. Ubuntu represents a collective viewpoint, shared vision, collective responsibility, and collective empowerment (Ntseane, 2011). The contribution by each volunteer to the learning centre's social system incrementally increases the value of the collective. Broodryk (2006) mentions that, when someone is helpful and not thinking about themselves, they develop a sense of compassion to meet the needs of others. This compassion was witnessed in these case studies: the learning centres are building capacity, and have recruited volunteers to help them attain their mission, vision, strategy, and objectives. It is imperative for learning centres to recruit the right resources. All learning centres have instituted a formal and structured

volunteer programme, and they follow a suitable process to recruit their volunteers. As a result, the volunteers are paid a stipend, or are employed as salaried workers. Through the spirit of collectivism, the learning centres have realised that voluntary work is critical for their CSI ICT projects to be sustainable and to make an impact in the communities.

The learning centres are proving to be self-producing and self-sustaining, because the volunteers are beneficiaries of the learning centres, or members of the community who are giving back by offering their time, services, and skills at the centre.

The study showed that collective volunteerism can lead to the success of CSI ICT projects in poor communities. It highlighted that the help extended by volunteers to young children and other visitors to the learning centres contributes to the positive upliftment and wellbeing of the community and its members. Moreover, this showed that the young children who visit these centres are afforded opportunities to realise their full potential and to grow into better adults through the support of the volunteers. Ubuntu is demonstrated through the selfless acts of the volunteers when they put the needs of others before theirs.

9.7.4 Principle 4: Organisational identity and structure of learning centres used by ICT companies to implement CSI ICT project

The organisation is established through its structure; however, while it is the structure that interacts and change, it is prudent that the structural changes maintain the organisation and that the system retains its identity (Maturana, 1970). Organisational identity defines a social system. Social systems may share the same identity; however, they are distinguished by their structures and they differentiate themselves and the environment in order to create their identity and boundary. The analysis established that all learning centres are registered centres with a clear mission, vision, objectives, rules, regulation, roles, procedures, processes, and activities. They are operationally closed, and their environment does not prescribe how they should function or how they should be structured. The learning centres have clearly defined the boundaries between internal and external interactions, and all partners know their roles.

Three of the learning centres are governed by board members, and one centre is led by the Chairman and the centre management team. As registered centres, they have the following documents: constitution, memorandum and articles of association, rules of operation, and the charters that are required to govern their operation. In addition, the technology partner of two of the learning centres had pre-selection criteria such as having strong security, functional data connectivity, a stable financial record, a respected track record of achieving their youth objectives, and embracing new technologies. Nanga and the OPLC have established their

own operating model, unlike the other two learning centres that are based on international models.

The analysis revealed that the four learning centres are structurally coupled to other systems such as families, schools, government departments, and other partners. In addition, the internal systems also play a pivotal role in managing learning centres' survival knowledge.

9.7.5 Principle 5: Learning Centre Sustainability

For learning centres to be sustainable, they must be viable and adequately managed, according to the Corperation for National & Community Service (n.d.). Developing capacity is crucial for the sustainability of learning centres and techmology partners, as it leads them to fulfil the needs of the community. With the quest to be sustainable, the four learning centres have employed various strategies to enable them to stay afloat and to diversify their revenue streams.

Because these centres are registered NGOs, they are always raising funds. Some of the fundraising efforts result in partnerships, once-off donations, or in-kind investments. By analysing how they operate, it was noted that the relationship of one of the centres with the technology partner enabled them to be sustainable — when they need the replacement of machines, the partner supplies them with new equipment. Therefore, they do not have to be concerned about the financial sustainability of the centre. Two of the centres have invested in equities, as this will provide a safety net for the centres. Their investments were corroborated by their financial statements. Two learning centres charge a membership fee, even though they do not charge for their other services.

The overall observation is that all four learning centres' non-technological operations were sustainable at the time of data collection; however, some of them have raised concerns regarding their financial sustainability, as illustrated in Table 9-14. As a way of self-producing, one of the learning centres has replicated its model and opened its second learning centre, based on the success of the first centre.

Table 9-14: Learning Centre and CSI ICT project sustainability

Learning Centre Name	Learning Centre Sustainability	CSI ICT Project Sustainability
1. OPLC	Yes	Yes
2. SAAYC	Yes	Yes
3. Nanga Vhutshilo	Yes	No
4. Boys and Girls Club	Yes	Yes

All the centres operationally demonstrated characteristics of autopoiesis, whereby they are self-producing and self-maintaining, although some of the centres need to focus on ensuring their financial sustainability.

9.7.6 Principle 6: CSI ICT project Sustainability

The sustainability of ICT4D projects, in this instance the CSI ICT projects which represent a sub-system of the learning centre, is vital in meeting the needs of the present communities, while also having the capability of meeting the needs of future generations. Long-term CSI ICT projects require sustainability plans to ensure lasting changes, which could emerge from the internal or external environments. One learning centre's CSI ICT project ceased to operate after its Internet café equipment was stolen and the board members agreed for the equipment not to be replaced. Therefore, the project was short term, unsustainable, and did not impact the intended community members. On the other hand, three of the learning centres' (OPLC, SAAYC and Boys and Girls Club) CSI ICT projects, as shown in Table 9-14, have been operational since inception, which demonstrates that the CSI ICT projects are sustainable and impacting the community positively.

By way of being a self-producing and self-sustaining system, one of the centres was able to replicate itself to a CSI ICT project in another community. This showcases the characteristics of a self-producing system. In addition, another characteristic of autopoiesis that is demonstrated by the learning centres is the ability of the CSI ICT project to self-maintain. Two of the centres indicated that, when ICT equipment requires repairs, the IT learners at the centre repair the equipment as part of their training. This shows that the CSI ICT project is self-maintaining in nature, as the learners can repair the equipment when required.

9.7.7 Principle 7: Assessing the impact

Assessing the impact of current and future ICT4D projects is important, because it allows partners and beneficiaries to have a clear understanding of what they can expect from the use of ICT in communities (Amariles et al., 2006). This study demonstrated the importance of having impact indicators to assess the impact of the CSI ICT project. The Partnership on Measuring ICT for Development developed and grouped impact indicators into four categories, namely: 1) ICT infrastructure and access; 2) access to, and use of, ICT by households and individuals; 3) use of ICT by companies; and 4) ICT sector and trade in ICT goods. The most applicable indicator for this study is ICT infrastructure and access. The learning centres, together with their technology partners, provided state-of-the-art ICT infrastructure in poor urban communities to give access to ICT training and services. To date,

the communities have been benefitting in various ways. Most of the beneficiaries are school-going learners and unemployed youth. Gomez et al. (2001) maintain that impact assessment also focuses on access, meaningful use, and social appropriation of ICT resources. This was revealed during the investigation of the case study. The benefits from the existing CSI ICT projects include having access to state-of-the-art computers; young children were able to read by using the computers; there were opportunities to go on an international student exchange programmes; learners had access to accredited ICT training; employment was available for some of the learners who have used the centres; and capacity was developed through volunteer programmes. This is a clear demonstration that the existing CSI ICT projects have contributed impactfully in poor urban communities in Soweto, and businesses have also benefitted from these projects.

Companies demonstrated that not all of them are in it to benefit from government business as only two of the four companies subscribe to B-BBEE. The other two companies are contributing to community upliftment to fulfil their corporate responsibility objectives which is focused on the application of technology and by being responsible, inclusive, and sustainable and that they are constantly assessing impact of their investments.

The presented case studies afford an opportunity for critical learning, and provide recommendations for government and decision-makers, in similar CSI ICT projects in the South African context.

The combination of the SSM, Ubuntu and autopoiesis perspectives has led to the development of guiding principles for assessing the sustainability and impact of CSI ICT projects. The principles focused on effective social systems, which are grounded in the characteristics of Ubuntu and autopoiesis, in order to meet the needs of the communities.

9.8 Conclusion

This section summarised the results of the data analysis chapter. For each case study, the narrative of the learning centre was first described in the case study background. Each learning centre presented a particular CSI ICT project that was supported by a technology partner. An account of data collection and analysis was provided. The case study participants included CSI managers, centre managers, users and, in one instance, parents of minors who used the centre. The case study descriptions presented an outlook on how these centres operate and how they are benefitting the communities.

The case studies were described by applying the social systems framework, which was based on SSM, the Ubuntu philosophy, and autopoiesis concepts, as explained in Chapter 7. Based on the findings of the systems analysis of the impact and sustainability of CSI ICT projects in

poor urban communities, the conclusion can be drawn that companies derive some form of benefit for contributing to CSI in poor communities. These benefits have a local presence, with companies achieving a better B-BBEE rating that enables them to do business with the government and to retain or attract new business. Subsequently, the communities and their members are benefitting from the CSI ICT projects; this demonstrated an essential element of Ubuntu, which states that collectively everyone should benefit. The CSI ICT projects strengthened the learning centres' ability to make a positive impact in the socio-economic development of communities. The unemployed youth became employable as they have been trained in ICT concepts, and school children are using ICT to enhance their school curriculum and to obtain ICT training. In addition, the learning centres are proving to be self-producing and self-maintaining, which implies that they are sustainable.

9.9 Refined Framework

During the data analysis, the researcher identified commonalities in experiences and insights that emerged during the interviews, in relation to common phenomena. After familiarisation with the data, the researcher used codes to recognise emerging themes in the dataset. The themes emerged from the framework that was used for data collection. Refinement of the framework was not an automatic process but involved careful thinking and iterative reflection. It also prompted the researcher to make judgments about the meaning and relevance of the emerging issues, including implicit connections between ideas. A refined systems framework gradually evolved from the data. As a result, the data analysis process provided additional insights that facilitated the extension and reconceptualisation of the framework.

The themes expressed by the participants formed the basis for refining the proposed systems framework that was presented in Chapter 7. The themes mainly emerged from the Ubuntu concept, and include: Interconnectedness (partnerships) and collective (volunteering).

Partnerships: The study provided evidence that suggests that partnerships, which include community buy-in, mutual trust, and alignment, play a significant role in the sustainably of the learning centres and CSI ICT projects.

Volunteering: The study showed that collective volunteerism must be present for developments to be sustainable and impactful in communities. Ubuntu represents a collective viewpoint, collective responsibility, and collective empowerment. Through collectivism, the learning centres have implemented a formal and structured volunteer programme. Contribution by volunteers to the learning centre incrementally increases the value of the collective, which indirectly promotes sustainability.

Partnerships and volunteering formed the basis of the framework refinement process. The results of the refined proposed systems framework are illustrated in Figure 9-24. By incorporating these elements, CSI ICT projects may be impactful and sustainable. This is envisaged to subsequently improving the socio-economic development of poor urban South African communities.

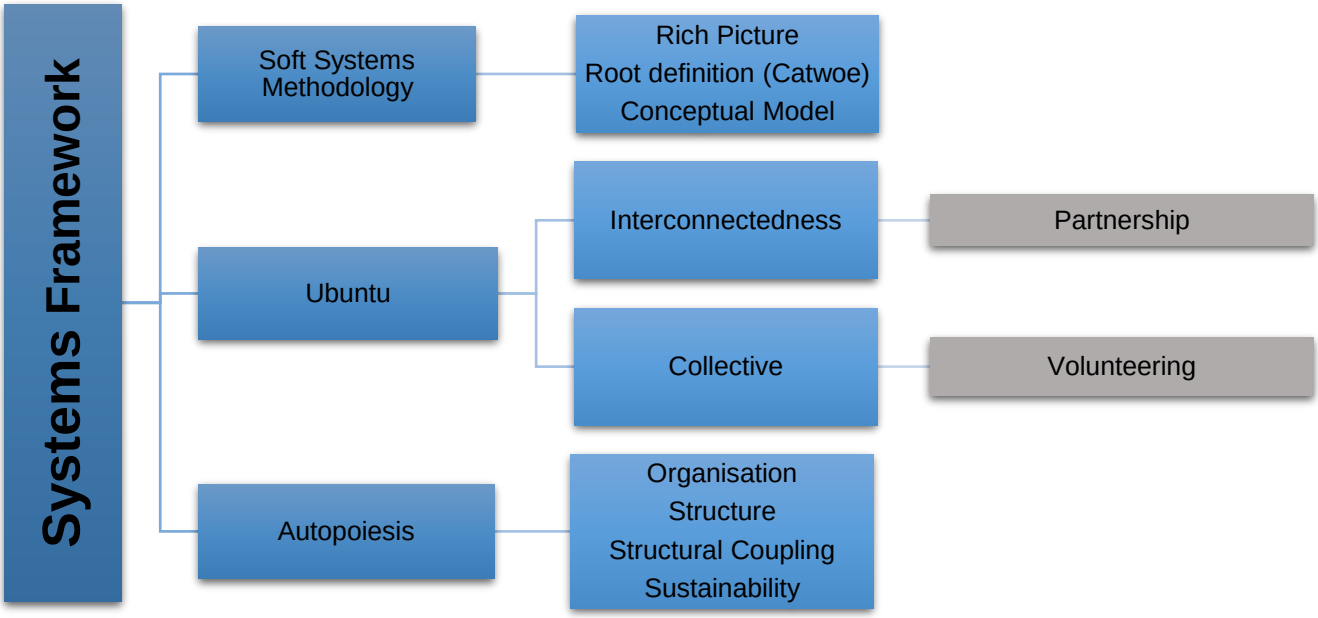
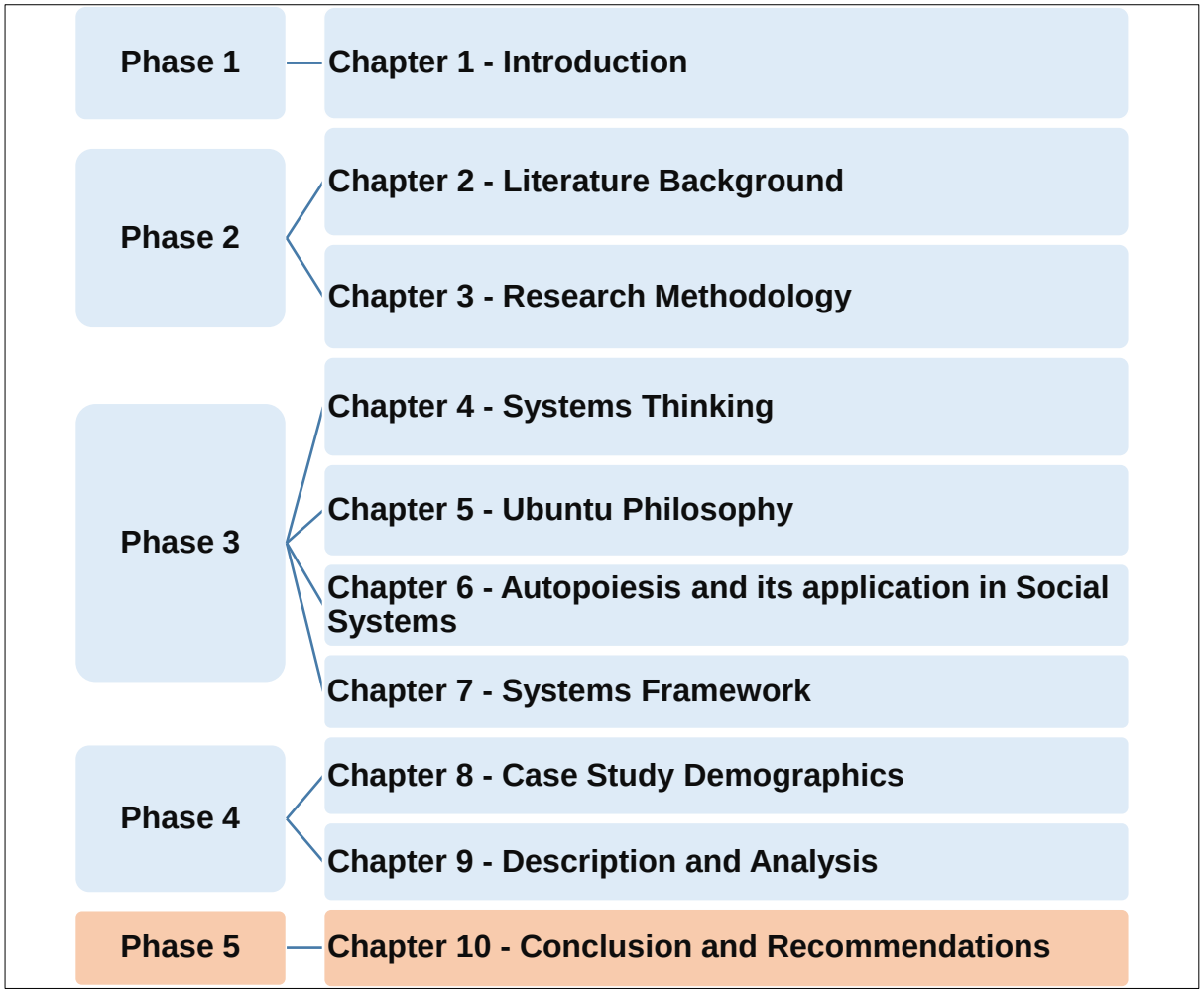


Figure 9-24: Refined Proposed Systems Framework

The next chapter concludes the research effort. It describes the contributions of the study to the body of knowledge. Moreover, it briefly evaluates the completeness of the interpretive research. It further assesses the theoretical contribution using Whetten (1989) theory assessment criteria. The chapter discusses recommendations for further research.

10 CHAPTER 10 CONCLUSION AND RECOMMENDATIONS



10.1 Introduction

This chapter concludes the study by revisiting the research questions and providing an overview of the entire research process.

This section reflects on the research findings in line with the research questions and discusses the contributions of the study to the body of knowledge. The study is evaluated using the principles of Klein and Myers (1999) for conducting and evaluating an interpretive study in the field of Information Systems. Subsequently, Whetten's (1989) criteria are employed to assess the theoretical contribution of the study. The final section discusses the limitations of the study and provides recommendations for further research.

The section below presents an overview of all the chapters.

10.2 Overview of the chapters

Chapter 1 – Introduction: provided a broad outline of, and direction for, the study. It described the current situation and background on Corporate Social Investment ICT4D projects in poor urban communities. This chapter described the problem statement and the associated research questions, assumptions, and limitations of the study.

Chapter 2 – Literature Background: defined the concepts that are key to this study. In addition, it discussed corporate social investment in South Africa, including social investment in the ICT context.

Chapter 3 – Research Methodology: outlined the philosophical assumptions underpinning this study. It presented the research methodology, planning, and theories that the study employed. The chapter included a description of the study population and the sampling procedures that were used. It covered the methods for collecting and analysing data.

Chapter 4 – Systems Thinking: provided an overview of systems thinking and its associated concepts. The chapter began by discussing the philosophy that is aligned to systems thinking. It provided an understanding of dealing with the complex and persisting problems that could be addressed by employing systems approaches.

Chapter 5 – Ubuntu Philosophy: explored the origin and characteristics of Ubuntu as an African philosophy that places emphasis on interconnectedness, collectivism, and purpose. It explored the concept of Ubuntu and its relation to systems thinking.

Chapter 6 – Autopoiesis application: provided an account of autopoiesis theory, its origin in biology, and its application in social systems.

Chapter 7 – Systems Framework - presented the proposed framework that was developed from literature and the collected data. The foundation of the framework is concepts from soft systems methodology, Ubuntu philosophy (which emphasises the belief systems in which communities reflect their experiences in their day-to-day life), and autopoiesis theory (which emphasises self-reproduction and self-maintenance).

Chapter 8 – Case Study Demographics: this chapter set the scene by providing background to the four case study sites. It provided the context of the larger Johannesburg, and its history and demographics. Moreover, it provided the background and contextualisation of the case study communities, which are located The City of Johannesburg.

Chapter 9 – Description and Analysis of Case Studies: provided contextual background on learning centres in poor urban communities in Soweto, South Africa. The chapter applied the system's framework to the learning centre. The guiding principles for analysing the impact of CSI ICT projects in poor urban communities were presented.

Chapter 10 – Conclusion and Recommendations: concludes the research effort. The chapter assesses the contribution of this research to the body of knowledge. The recommendations for future research are outlined, based on the insights obtained from this study.

10.3 Answers to the research questions

In Chapter 1, a set of questions were raised to analyse the impact of South African CSI projects with an ICT focus. CSI projects are assumed to have benefits for the partnering company as well as the community — but what, if any, are the longer-term benefits to the community? This section revisits the research questions and answers them based on the results obtained from the systems analysis of the case studies. Sub-questions are addressed first, followed by the main research question.

Sub-question 1: How does Ubuntu contribute to an understanding of the success (or not) of CSI ICT projects?

- What concepts of Ubuntu are relevant to include in a systems framework for analysing the impact of CSI ICT projects?

In addressing this sub-question, Chapter 5 provided literature on the Ubuntu philosophy, which emphasises that an individual is an individual through others. In a community, the individual does not look out for self-interest, but for those of the greater social system (namely, a community); this demonstrates wholeness. In the quest to address the research question, the researcher presented the alignment between Ubuntu and systems thinking. The motivating

factor for using Ubuntu as a theoretical lens to analyse this case study is to illustrate how the practise of Ubuntu contributes to the success of the CSI ICT project (mutuality). The concepts relevant to a systems framework for analysing the impact of CSI ICT projects in poor communities include interconnectedness and collectivism.

Chapter 9 addresses how Ubuntu contributes to an understanding of the success (or not) of CSI ICT projects through interconnectedness and collectivism. Interconnectedness is key to achieving a shared transformation, where like-minded partners forge strong partnerships in order to uplift communities. This study argued that, for a CSI ICT project to be a success, there needs to be an effective partnership where all partners should be aligned, trustworthy, and where there should be community buy-in and mutual benefit from projects. Moreover, partners should complement each other through their strengths and provide the resources where necessary to keep the projects going.

Second, the study further argued that Ubuntu is based on a collectivist orientation, which accentuates the importance of collaboration, togetherness, and cooperation. Collective volunteerism includes sharing of knowledge and skills for the benefit of others, as well as showing compassion, which epitomises the foundation of social organisation. The study showed that collective volunteerism contributes to the upliftment and well-being of the community and that, through the support of others, the children within the communities can achieve their full potential. Through this selfless act, volunteers are assisting the learning centres to be self-producing and, as a result, the CSI ICT projects are sustainable and impactful.

Sub-question 2: In which manner do principles of self-production contribute to an understanding of the success (or not) of CSI ICT projects?

- What concepts of autopoiesis or self-production are relevant to include in a systems framework for analysing the impact of CSI ICT projects?

Chapter 7 proposed a suitable systems framework for analysing the impact of CSI ICT projects in poor urban communities, which included autopoiesis concepts. Autopoiesis as a theoretical lens is considered because it provides a comprehensive view of living systems and how these systems continually self-reproduce for sustainability.

The researcher considered autopoiesis, because it provides a view to conceptualise what to include and what to exclude in order for a system to maintain and reproduce its elements, together with the relationships.

Chapter 9 applied the systems framework to analyse the case studies. During the analysis, the social systems, namely, learning centres and CSI ICT projects, demonstrated that they are self-sufficient and that they are able to maintain and reproduce their elements.

Main research question: What is a suitable systems framework for analysing the impact of CSI ICT projects in a poor urban community in South Africa?

This main research question was answered as follows. Based on the literature survey in Chapters 4-6, as well as preliminary case study site visits, a suggested systems framework was presented in Chapter 7. The systems framework combines elements of three theories, namely, SSM, Ubuntu, and Autopoiesis. The starting point was the SSM concepts: rich picture, CATWOE, and conceptual models, which analyse the case studies by summarising and contextualising information towards a better understanding of the social systems. Second, Ubuntu concepts were included in this framework as a theoretical lens to illustrate how the practising thereof contributes to the success of the CSI ICT project (mutuality). The Ubuntu philosophy emphasises that an individual is an individual through other people. Lastly, autopoiesis concepts were incorporated because they provide a view of self-production in living systems, and how these systems can continue to self-maintain and be self-sufficient.

Following the data analysis from the four case studies presented in Chapter 9, a refined systems framework is presented in Section 9.9. This framework incorporates the following learning, based on the case studies: A successful ICT4D project should plan for the expected transformation that is required, which is also viewed as the purpose of a system. The Ubuntu concepts of interconnectedness and collective volunteerism are key to achieving a shared transformation. Where there are partners who have the same vision, trust, alignment, and community buy-in, and who mutually benefit from projects, this leads to the success of CSI ICT projects. Moreover, collaboration, togetherness, and cooperation show that by sharing skills, knowledge, and support with others, the communities stand a better chance of being transformed. The learning centres are structurally coupled to other systems such as families, schools, government departments, and other organisations. All the centres demonstrated characteristics of autopoiesis from their operations, whereby they are self-producing and self-maintaining. The self-production and self-maintenance of an CSI ICT project is important to achieving the ICT4D needs of the present communities, while also having the ability to meet the needs of future generations.

The next section discusses the contributions of this study to the body of knowledge.

10.4 Contribution to the body of knowledge

This section describes the contributions of this thesis to the body of knowledge. It is arranged in three subsections, namely: theoretical, methodological, and practical contributions.

10.4.1 Theoretical contribution

The systems framework that was presented in Chapter 7, and that was refined based on the findings from the empirical studies, contributes theoretically to the domain of systems thinking. A combination of soft systems methodology, Ubuntu, and autopoiesis were used in the systems framework. This framework was then used to lead data collection efforts and to analyse the case studies. The framework may provide a theoretical lens to researchers to analyse sustainability and the impact of CSI projects in poor urban communities. It should be noted that there are various studies on analysing the impact of ICT projects in rural communities; however, none have investigated how SSM, Ubuntu, and Autopoiesis concepts can be incorporated to analyse the impact of CSI ICT projects in poor urban communities. Ubuntu's contribution is to accentuate the value of mutuality and partnerships, which are consistent with the premise that an individual is part of a community, and individuals therefore strive to assist others while putting the interests of the community above self-interest. The autopoiesis concepts contribute by accentuating the importance of learning centres' ability to self-reproduce and self-maintain, in order to be sustainable.

10.4.2 Methodological contribution

The research findings have the ability to guide the assessment of impact and sustainability in CSI projects that focus on ICT in South African poor urban communities. Additionally, the methodological contribution lies in the relevance of using systems thinking, Ubuntu, and a theory stemming from the biological domain to assess and guide ICT4D interventions. The successful application of the systems framework to the four case studies contributes towards an example that can be adopted in analysing the impact of socio-economic development projects that are aimed at delivering ICT in poor urban communities.

10.4.3 Practical contribution

The study contributes practically through an in-depth account of the four case studies, which represent social systems. The cases highlighted that CSI ICT projects should be assessed in their entirety to gauge their sustainability and impact in poor urban communities. This suggests that, for an effective assessment, the focus should be on understanding the community needs, and working as a collective towards sustainable and impactful projects.

Furthermore, this study contributes a systems framework and guiding principles to the ICT4D domain that companies and ICT4D practitioners could us to analyse the impact of CSI ICT projects that aim to achieve socio-economic development in poor urban communities.

Following the discussion on the contributions of this study, the next section presents a personal reflection.

10.5 Personal Reflections

This section reflects on my journey towards writing this thesis. Personal reflection is an important cognitive exercise in research (Mortari, 2015). I have always been intrigued by companies that "disposed or donate" their ICT equipment as CSI projects to poor communities; and once they have donated this equipment, the companies never returned to monitor or evaluate their CSI interventions and how they are impacting the communities. It is for this reason, and because CSI projects are assumed to have benefits for companies and not the community, that I decided to undertake this journey to write a thesis on an analysis of the impact of CSI projects with an ICT focus in South Africa. This process allowed me to engage in a selfless relationship.

A researchers' philosophical position is very important, because it triggers questions about the researcher's beliefs about the world, the sort of researcher that we strive to be, and our philosophical stance (Berger, 2015). This process requires time, lived experiences, and guidance in order to make the correct choices. This study is situated in the IS discipline; it thus assumed the interpretivist perspective, and therefore assisted me in increasing my understanding of the context of social and organisational issues related to CSI ICT projects in communities. I drew on a number of methods, tools, and techniques to gain an in-depth understanding of the phenomenon that I was investigating.

My self-reflection notebooks assisted me to note my experiences, thoughts, plans, research design, drawings of the proposed framework, coding, and data analysis process. As the journey unfolded, the notes in my notebooks made the messiness of the research process visible and clearer.

I systematically read through and analysed numerous appropriate literatures, scientific articles, and previous studies on the subject in order to gain insights and understanding of the research phenomenon. The techniques that are mostly used for IS research include interviews, which are associated with qualitative data. This research was case study-based, with the aim of understanding the phenomena. Interviews were primarily used as research

instrument, and I was the main human instrument in the data collection phase. The initial interviews were daunting, but with time I became at ease and started to gain more experience. Engagements with the participants provided valuable insights from direct lived experiences, which would have been difficult to obtain from scientific articles and literature alone.

According to Gregor (2006), theory incorporates methodical concepts and beliefs with the objective to explain, analyse, predict, and clarify a specific phenomenon. A theoretical framework is an important blueprint that guides a research process. It is a foundation from which knowledge is constructed for research. Osanloo and Grant (2016) mention that students must select and clarify a theoretical framework from the time that they conceptualise their research topic. However, this is not a straightforward process for many students (Jaccard & Jacoby, 2020), and this was no different for this research. Developing the theoretical framework was an iterative process, and I eventually reached an “aha moment”, with the guidance from my supervisor, where the theoretical lens emerged and was aligned to the objective of the study.

The building blocks of the theoretical framework included combining the three theories of SSM, Autopoiesis, and Ubuntu, which are not from the conventional IS domain. A systems approach afforded the researcher the opportunity to understand the systemic problems at the heart of the investigation. This assisted me to gain a better understanding of employing the theoretical framework when conducting interviews with relevant individuals. I acknowledge that further research work is required in advancing the SSM, Autopoiesis, and Ubuntu concepts in CSI ICT projects that aim to improve the socio-economic situations of poor urban communities.

At times the research journey was daunting, lonely, and very consuming, as I have had to balance my time and energy between bringing up very young children, advancing my career, and finishing my doctoral research. As the journey unfolded, I was on some days excited and motivated because ideas were flowing, while on other days I was anxious, unsure, had hit a roadblock, and battled to balance school and work deadlines. However, with the feedback, support, and guidance that I received from my supervisor Professor Marita Turpin; this journey was worthwhile. Her support and continuous guidance was invaluable, and it often challenged my thinking. Her assistance always revealed areas that needed improvement and contributed significantly to my motivation and the success of this thesis.

I gained theoretical knowledge about philosophical paradigms and methodologies and ventured into unfamiliar terrain when developing the theoretical framework - specifically the autopoiesis theory that is found in the discipline of biology. I had to learn to incorporate Ubuntu concepts into the framework through my own lived experiences under the teaching of

Ubuntu.

The critical success factors are attributed to constantly staying focused on the research problem. I followed a project plan, even on days when writing this thesis was in competition with work deadlines. Lastly, perseverance and always reminding myself of the reasons why I decided to study further were critical to success. Overall, this journey consumed many hours, with the slow emergence of new knowledge, but at the end it was rewarding and fulfilling. When I now look back, I can see how I have grown as a professional and broadened my knowledge. This also improved my overall skills as a researcher, as I charted into unfamiliar territory and gained insights. The opportunity now exists to further explore the findings of this thesis and to apply the systems framework in other CSI ICT projects to improve the socio-economic situations of poor communities.

10.6 Self-Evaluation of the study

This section reflects on the evaluation of the interpretive case studies. The seven principles suggested by Klein and Myers (1999) are used to conduct a self-evaluation of the study, including its philosophical basis.

Principle 1 – Hermeneutic circle

The *principle of the hermeneutic circle or process of sense-making* is the overarching principle from which the other principles extend. This principle recommends that the researcher understands the systems as a whole from assumptions about the meanings of its parts and their interrelationships, and vice versa. This study focused on the communities of Orlando West, Orlando East, Dhlamini, and Protea Glen. The researcher engaged with learning centre managers and the users in their social setting with the view of understanding how the CSI ICT project has impacted their socio-economic situations. CSI managers were also engaged as part of the process, because they are part of the entire social system. As part of an iterative process, the collected data ranged from company B-BBEE scorecards and annual reports in order to gain insight towards understanding the four learning centres and the CSI ICT projects, as well as to gain understanding of the motive of companies that contribute towards socio-economic development.

Principle 2 – Contextualisation

The *principle of contextualisation* recommends that the researcher studies the social and historical background of a case setting when interpreting the situation. By providing context, it benefits readers of the research. In Chapter 8 of this study, the principle of contextualisation

was applied, as the researcher reflects of the social and historical background, and the political and economic context of social systems, considering specifically the serving systems and the systems being served. This further assists the intended audience to have a picture of the current situation under investigation.

Principle 3 – Interaction between researcher and subject

The *principle of interaction between the researcher and the subjects* stipulates that there should be an acute reflection on how data was socially established through the interaction between the researcher and participants. During the empirical research of the four learning centres, it was critical for the researcher to reflect on how data was socially constructed by interacting with learning centre managers, CSI managers, and users. Moreover, the researcher acknowledged that these actors had an influence on the researcher, and equally that the researcher had an influence on them.

Principle 4 – Abstraction and Generalisation

The *principle of abstraction and generalisation* is the ability to conceptualise the collected data, and it is informed by the application of Principles 1 and 2, which refer to the understanding of the social situation as a whole, the research setting, and the theoretical underpinnings. The findings were generalised across the four case studies, based on the theoretical concepts drawn from the Ubuntu philosophy and autopoiesis theory. Moreover, the researcher was cognisant of the unique situations related to these concept(s), and that they were applied in multiple situations. Therefore, the researcher applied the concept of generalisation in analysing the impact of CSI ICT projects.

Principle 5 – Dialogical Reasoning

The *principle of dialogical reasoning* is a cycle that extends to include Principle 3, which establishes the need for a dialectic interaction until a common understanding is reached, where the researcher can opt to seek clarity by reviewing the assumption made at the beginning of the research. The principle of dialogical reasoning was applied during this study, whereby the researcher and the research supervisor engaged in dialogue to reason on certain ambiguities or confusion in the data. In situations that were ambiguous based on primary or secondary data, the researcher approached the participants for clarifications and validation, with continuous cycles of revision.

Principle 6 – Multiple Interpretations

The *principle of multiple interpretations* requires that the researcher should be open-minded about different possible viewpoints that emerge from the situation, and to make sense of possible explanations for the differing views. During this study, the researcher observed that there were multiple views pertaining to the situation. The views of the CSI managers were corroborated by the learning centre managers, and subsequently by the users or the parents of the minors. Therefore, there was no need to accommodate differing views.

Principle 7 – Suspicion

The *principle of suspicion* requires the researcher to be aware of inconsistencies in the data, and to probe the surface meaning of a participant's responses. The researcher observed for the failed CSI ICT project that the CSI manager was not open to engaging about the project. The researcher relied on data from the learning centre manager, and secondary data such as the company website and BBEE scorecards. In addition, the researcher exercised caution by examining the data for possible biases.

10.7 Assessing the theoretical contribution

This section assesses the theoretical contribution of this study to the existing body of IS knowledge. Dinham and Scott (2001) state that the purpose of doctoral research is to contribute to the body of knowledge in the field of study in which the research was conducted. The contribution is expected to advance knowledge from the theoretical, methodological, and practical viewpoints.

Part of theory development is that the theory should be assessed to measure its contribution to the body of knowledge (Whetten, 1989). In the article "What constitutes a theoretical contribution?" by Whitten, he identified four critical criteria to assess the theoretical contribution: What, How, Why, Who/When/Where.

- **What?** – refers to the concepts, variables, and constructs that should be considered when developing the theory.
- **How? –** refers to the relationship between constructs, variables, and concepts; this is often illustrated by arrows to show the relations.
- **Why?** – refers to the justification of selecting the factors that have been included in developing the theory. It further poses the question of why other research scholars should use the theory.
- **Who/Where/When?** – these questions set the boundaries of the theory

Chapter 7 presented the theoretical framework that underpinned this study; it addressed the "how" and "what" aspects of the theoretical contribution. Subsequently, the "why" aspect was addressed based on Chapter 1 but, more specifically, Chapter 3 discussed the rationale for using systems thinking approaches in analysing the impact of CSI ICT projects in poor urban communities in Soweto, South Africa. In addition, part of Chapter 3 described the planning for "who" to include in the study, "where" the study is geographically located, and the timeframes of "when" the CSI ICT projects were implemented. In Chapter 8, the specification of the case study is presented, detailing the "who/when/where".

Following the description and motivation of the theoretical framework, the subsequent step is to assess the theoretical framework by means of a set of questions developed by Whetten (1989).

What is new? Does this study make a significant contribution to the body of knowledge?

The contribution of this study is as follows: 1) Employing systems thinking to analyse the impact of sustainable CSI ICT projects, as there was limited literature on the subject; 2) the contribution is reflected in the empirical insights presented by the multiple case studies and the systems framework for systematic analysis of the sustainable impact of ICT projects. This systems framework can be employed to guide the implementation of CSI ICT projects in urban-rural communities; and 3) the combination and application of soft systems methodology, Ubuntu African philosophy, and the biological theory of Autopoiesis to investigate the impact of CSI ICT projects.

So what? Will the theory influence the way in which CSI ICT projects are assessed in poor urban communities in South Africa?

Any financial resources that are invested in CSI ICT projects, with the quest of socio-economic development, warrants some form of impact assessment. The value-add contribution made by the SSM, Ubuntu, and Autopoiesis theory is as a systems approach that provides a systematic way of analysing the sustainable impact of ICT projects. Chapter 3 details some of the theories that have been employed in the field of corporate social investment. This study extends the other theories, where the extensions advance knowledge in the ICT4D field. Moreover, the systems framework was employed in multiple case studies to showcase its practical applicability.

Why so? Is the underlying logic and supporting evidence compelling?

This study was guided by the primary research question that was formulated to support the purpose of the enquiry. Throughout the study, clear reasoning was followed as the basis for supporting logic that grounds this study, investigating existing work in the ICT4 domain, and

providing empirical evidence. Three theories were used to interpret the results of multiple case studies. The context of corporate social investment for ICT projects in South Africa was described. Chapter 3 discussed the research approach and existing theories in the CSI ICT space. This shaped the study by using the interpretive approach and multiple case study strategy. In Chapter 7, the framework for systematic analysis of the impact of CSI ICT projects was developed, based on the data that was collected and interpretation of the results of the case studies. Chapter 10 concluded the research efforts with conclusions that were deduced from empirical evidence.

Well Done? Does the study reflect completeness, seasoned thinking, and thoroughness?

The researcher applied the principle of the hermeneutic circle (Klein & Myers, 1999) throughout the study; this constituted careful thinking and reflection, and revisited theory as well as data. The research problem and findings of the multiple case studies were observed from different perspectives. For the entire duration of the study, the researcher was supported by her supervisor, who is seasoned in ICT4D. Striving for completeness, the researcher employed multiple data collection methods consisting of individual interviews, focus group interviews, observations, fieldnotes, and posters obtained from the participating companies. Document review was used to corroborate related data across varying data collection methods (Vaast & Walsham, 2013). In analysing the data, the researcher ensured that the process was systematic, sequential, verifiable, and continuous. For thoroughness, the researcher looked for opportunities to challenge earlier conceptualisations, and verified data with other sources on the same subject. Analysis of the results was undertaken by means of the systems framework in Chapter 9. The final chapter I used to review the contributions of this research to the body of knowledge.

Is it done well? Is the thesis well written? Are the central ideas assessed?

Each chapter, once completed, was submitted to the supervisor for review and feedback. The research is divided into several chapters and outlining it in this manner simplifies the assessment of central ideas. The first chapter provided the background and orientation of the study. The rationale for the study as well as the problem statement was presented. Moreover, the research objective is to analyse the impact of CSI ICT projects in poor urban communities in South Africa. CSI projects are assumed to have short-term benefits for the partners as well as the community. It further defined associated research questions to allow for systematic investigation of the study. Chapter 2 presented a literature review on corporate social investment in South Africa, as well as ICT projects that are implemented in poor urban communities as CSI intervention. The study progressed logically, with Chapter 3 showcasing the research design and the methodologies followed to answer the research questions. In

addition, different theories were reviewed that constitute the theoretical basis for this thesis. Throughout the study, the researcher reiterated the premise of the study. A theoretical framework using systems thinking was developed by first investigating systems thinking and identifying the appropriate social system theory that could be employed in CSI ICT projects. The empirical study was conducted in the context of poor urban communities in Gauteng, South Africa, and the findings were analysed by means of the social systems framework. Chapter 7 presented the proposed systems framework that was developed using concepts from soft systems methodology, Ubuntu, and autopoiesis. Chapter 8 set the scene for the case studies by detailing the background and context of the communities that have implemented CSI ICT projects in the greater Soweto area. Chapter 9 presented an analysis of the findings using the systems framework, and Chapter 10 evaluated the contributions of the study to the body of knowledge. The quality of this research was ensured by obtaining the services of a professional editor.

Why now? Is the topic relevant?

Socio-economic development is a topical subject in South Africa, because there are communities that are still living below the poverty line; with increasing developments such as the fourth industrial revolution, these communities are sadly left to play catch-up. The introduction of ICT in poor communities is working towards closing the technology divide. This study places emphasis on the systemic requirements for impactful CSI ICT projects in poor urban communities in South Africa. It responds to the call for more research on the systemic analysis of long-term benefits of ICT projects in poor communities around South Africa. Moreover, the combination of the Ubuntu philosophy and autopoiesis introduces new thinking in dealing with sustainable CSI ICT projects. In addition, Heeks and Molla (2009) encourage practitioners to conduct studies that assess the actual impact of ICT4D projects.

Who cares? What fraction of academics are interested in this subject?

The first person who cares about this study is the researcher. Second, ICT4D practitioners may be concerned with effecting sustainable socio-economic development in poor urban communities in South Africa, encompassing CSI managers, ICT professionals, and learning centre managers. This research may also be useful to companies that have an interest in working with poor communities to support socio-economic projects. Third, this study might be of interest to systems thinking practitioners who are concerned with applying a systems framework to social systems.

The section below discusses the limitations of the study.

10.8 Limitations of the study

This section reflects on the limitations of the study. The first limitation is associated with the fact that the system's framework for analysing the impact of CSI ICT projects in poor urban communities, derived in Chapter 7, was applied to the four case studies in the same geographical area and was not tested elsewhere. Considering that the proposed systems framework was tested once by the researcher, it is recommended that it be tested in other CSI ICT projects and refined during further research.

The second limitation is that the study focuses on the impact of CSI ICT projects, and on the members of the communities who are impacted directly by these projects; however, a limitation was the unavailability of the community members that were indirectly impacted. Since CSI ICT projects are geared to address the socio-economic impact on the community, it is recommended for further research to be carried out to assess the economic situation of those who are impacted, following ICT training offered by learning centres.

10.9 Concluding remarks

Sustainability and impact are the two aspects that will improve socio-economic developments in poor urban communities.

The theoretical framework that this study produced has broadly addressed the main research question: What is a suitable systems framework for analysing the impact of corporate social investment projects that focus on information and communication technology in poor urban communities in South Africa? This chapter provided a concise account of the rich narrative that has been presented through this study.

In conclusion, the objective of this study was addressed through the development of the theoretical framework that will assist ICT companies, learning centres, and other professionals to analyse the impact of their CSI ICT initiatives in poor urban communities.

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ANNEXURE A: ETHICAL CLEARANCE

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

Reference number: EBIT/8/2018 28 March 2018

Mrs ME Lefike
Department of Informatics
University of Pretoria
Pretoria
0028

Dear Mrs Lefike

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Approval is granted for the application with reference number that appears above.

1. This means that the research project entitled "Analysing the impact of corporate social investment information and communications technology projects in previously disadvantaged communities by means of a systems approach" has been approved as submitted. It is important to note what approval implies. This is expanded on in the points that follow.

2. This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Research Ethics Committee.

3. If action is taken beyond the approved application, approval is withdrawn automatically.

4. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

5. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

ANNEXURE B: INFORMED CONSENT FORMS

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

Informed consent form

(Form for research participant's permission)

1. Project information

1.1 Title of the research project: **A systems framework for analysing the impact of corporate social investment projects that focus on Information Technology**

1.2 Researcher details: **Mmatseleng Lefike, Department of Informatics,**

1.3 Research study description.

The aim of the study is an analysis of short-term vs long term benefits of CSI projects with an ICT focus. CSI projects are assumed to have short term benefits for the sponsoring company as well as the community, but what, if any, are the longer term benefits?

The participant will be required to take part in an interview. The entire interview process is estimated to take between 30min to 60min.

This study involves note-taking and digital recording of the interview with the researcher.

2. Informed consent

2.1 I, …….. hereby voluntarily grant my permission for participation in the project as explained to me by **Ms Mmatseleng Lefike.**

2.2 The nature, objective, possible safety and health implications have been explained to me and I understand them.

2.3 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

2.4 Upon signature of this form, the participant will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

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Informed consent form for Parents/Guardian of minor children

1. Project information

1.1 Title of research project: **A systems framework for analysing the impact of corporate social investment projects that focus on Information Technology**

1.2 Researcher details: **Mmatseleng Lefike, Department of Informatics,**

1.3 Research study description.

The aim of the study is an analysis of short term vs long term benefits of CSI projects with an ICT focus. CSI projects are assumed to have short term benefits for the sponsoring company as well as the community, but what, if any, are the longer term benefits?

The participant will be required to take part in an interview. The entire interview process is estimated to take between 30min to 60min.

This study involves note-taking and digital recording of the interview with the researcher.

2. Informed consent

2.1 I, ……..hereby voluntarily grant my permission for my minor child to participate in the project as explained to me by **Ms Mmatseleng Lefike.**

2.2 The nature, objective, possible safety and health implications have been explained to me and my child and I understand them.

2.3 I understand my rights and my child's rights to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

2.4 Upon signature of this form, the participant will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

ANNEXURE C: INTERVIEW GUIDES

Annexure C-1: CSI Managers

Annexure C-2: Learning Centre Managers

Annexure C-3: Focus Group Interviews

Annexure C-1: CSI Manager

1. Please tell me more about your company.
2. Does your company subscribe to B-BBEE?
3. How do you define corporate social investment (CSI)? What does it mean to your company?
4. Does your company have a CSI strategy? *What are the expected outcomes?*
5. Which area of corporate social investment is more significant to your company? (donations to organizations, sponsorship, community upliftment, cause related marketing campaign, partnership projects of social solidarity)
6. Does your company have a dedicated department/person that handles CSI?
7. The beneficiaries, how did you identify them as potential CSI beneficiaries?
8. How did you engage your beneficiaries?
9. When you engaged with communities for CSI, how long did you spend with beneficiaries?
10. What was your minimum timeframe of involvement in a CSI project and why?
11. Please may you tell more about the *learning centre X*?
12. From where did the need arise to support the *learning centre X*?
13. What was your vision when you approach learning centre X regarding CSI ICT Project Y?
14. What are the main benefits for the community in relations to the *learning centre X*?
15. Does your organisation have an overall monitoring and evaluation system for CSI?
16. How do you monitor your CSI investments you've made to *learning centre X*?
17. In your view is there a role for impact evaluation and why?
18. Were there any unintended impacts or consequences – either positive and/or negative?
19. How often did your company conduct social investment (community projects) audits of current and previous CSI projects in particular ICT?
20. What benefits did your company realise from this CSI activities?
21. Which are in your opinion problems related to CSI initiatives in the disadvantaged communities?
22. What plans do you have for this financial year?

Annexure C-2: Learning Centre Managers

1. Please tell me more about your learning centre?
2. What type of assistance do you receive from corporate companies?
3. Do you contact companies directly or they find you?
4. What are the basic needs of this community?
5. What was your role in this CSI ICT Project Y?
6. How would you describe your involvement in the day to day running of the CSI ICT Project Y?
7. What are the timeframes that corporates spend on these projects?
8. Has there been any IT companies that donated IT equipment? *If yes, probe*
    a. *Where is that equipment now?*
    b. *Does the equipment still work?*
    c. *In situations where the equipment does not work what do you do?*
9. For how long have you been in partnership with Company X on the CSI ICT Project Y?
10. Those companies that have assisted you in the past, do they come back to check on the status of the facilities?
11. When last was Company X here to see if the facility with ICT equipment is still working?
12. How has the community benefited from using learning centre X?
13. What impact has the CSI ICT project had in the community?
14. Have you been involved in any other activities in the community?
15. Before Company X has there, been any company that supported/donated with ICT equipment such as computers, printers, scanners?
16. The ICT equipment that was donated, does it still exist?
17. What is your approach towards upgrading ICT equipment in learning centre X?
18. Who is responsible for the upgrades of this ICT equipment?
19. Do you think the companies are doing enough on corporate social investment?

Annexure C-3: Focus Group Interviews

Users (users over the age of 12)
1. What type of information and communication technologies services are being offered at the learning centre X? 2. Think back over all the years that you've participated and tell us your fondest memory of CSI ICT Project. (The most enjoyable memory about project X.) 3. Tell me about positive experiences you've had from using learning centre X? 4. Tell me about disappointments you've had with learning centre X? 5. What influenced your decision to use the facility at learning centre X? 6. How do you feel now that the facilities that were used during this project do not exists anymore*? (if applicable)* 7. Where do you access this ICT equipment? *(if applicable)* 8. How has the learning centre X assisted you with training on how to use these the Internet, computer? 9. How do you get access to information? 10. What did you think of learning centre X? 11. Where do you get new information? 12. What did you like best about learning centre X? 13. What has been the overall benefit of learning centre X?
Parents of minor users
1. What are the needs of this community in relation to learning centre X? 2. What type of services did your children use at this learning centre? 3. How has the learning centre assisted your child/children's school performance? 4. How did you feel when you learnt that Company A will be opening learning centre to be used by the community? 5. How has the community benefitted from the learning centre X? 6. How have the minors benefitted from using the ICT equipment supported by *Company A*? 7. What is your involvement in learning centre X? 8. How do you feel now that the learning centre X do not exists anymore and where do you access ICT equipment?*(if applicable)*

ANNEXURE D: OBSERVATION GUIDE

Observer Name:	**Site:**	**Date:**	**Time:**

Activities	**Notes**
Learning centre premises	
Number of devices (laptops, desktops, tablets) in the learning centre have?	
Type of users	
Average time spent at the centre by users (e.g. Training, equipment use)	
Interaction between users and the tutors	
Types of services used in the learning centre	
Space for training	
Security	
Other….	