Social capital as a resource in the Village Operator model for rural broadband internet access and use

by

Mario Alphonso Marais

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Abstract

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Mario Alphonso Marais

Supervisor: Prof H H Lotriet

Co-supervisor Prof M C Matthee

Department: Informatics

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This study dealt with the issue of sustainability of ICT4D initiatives being a problem with few success stories (Heeks, 2002, Toyama, 2010). Many of these initiatives were planned and executed in a top-down fashion by large funders and governments, and these failures have stimulated the search for new strategies to achieve long-term sustainability.

One possible approach is to consider the different levels of systems that are involved. The reasons for failure lie inside the scope of a project, within the community itself, and outside the community in the larger socio-economic system which includes the economy. A systems approach with respect to the analysis of the sustainability (or lack thereof) of development initiatives was therefore adopted. The Choice Framework of Dorothea Kleine (2010) was used since it is a systemic approach, developed in the study of ICT4D initiatives, that embraces the complexity of engaging with development paradigms, societal structures and personal agency.

The research was done on a large South African government initiative, the Broadband-for-All (BB4All), community-based wireless mesh network project which aimed to provide a cost-effective way of enabling reliable broadband connectivity in rural areas. The project had two key aspects, the provision of a large-scale demonstrator of a wireless mesh network (WMN) as a broadband solution and the establishment of a Village Operator (VO) model to support access to and increase the use of the technology. The teachers and learners in more than 170 schools were the primary customers. Young people from local communities were trained as VOs to become local entrepreneurs (micro-enterprises) responsible for operating and supporting the BB4All service in their assigned cluster of schools and respective communities.

The research focus was the sustainability of the VOs. The Choice Framework was used to provide a context for the research regarding the role played by social resources (social capital) in contributing to the sustainability of the VO micro-enterprises. In-depth interviews were held with all but one of the 15 VOs in order to develop an understanding of their social capital and the influence thereof on them as entrepreneurs.

The importance and usefulness of social capital in supporting sustainability at VO and initiative level was analysed. Three major themes emerged that were analysed in detail, namely, the role of social capital, community service and social entrepreneurship, as well as the development of networks of innovation.

At a theoretical level, the research reflected on implications of the findings for the role of social capital in the Choice Framework. At a practical level, considerations for using a social capital perspective in order to improve the conceptualisation, design, implementation and transfer of ICT4D initiatives for sustainability were developed.

Declaration

I declare that

Social capital in the Village Operator model for rural broadband internet access and use

is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

M A Marais

Ethics statement

The author, whose name appears on the title page of this thesis, has obtained, for the research described in this work, the applicable research ethics approval. The author declares that he has observed the ethical standards required in terms of the University of Pretoria's Code of ethics for researchers and the Policy guidelines for responsible research.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABREVIATIONS

BB4All - Broadband-for-All

BEE - Black Economic Empowerment

CA - Capability Approach

CDW - Community Development Worker

CES - Capabilities, empowerment, and sustainability

CI - Community Informatics

CIDA - Canadian International Development Agency

COP - Conference of Parties

CSIR - Council for Scientific and Industrial Research

CV – Curriculum Vitae

DBE - Department of Basic Education

DFID -Department for International Development

DJ - Disk Jockey

DM - District municipality

DoC - Department of Communications

DoE - Department of Education

DSD - Department of Social Development

DST - Department of Science and Technology

DVD - Digital Versatile Disc (formerly informally know as Digital Video Disk)

EOI - Expression of Interest

EU- European Union

FET - Further Education and Training

FSC - Field Service Coordinator

FSM - Field Service Manager

HDI - Human Development Index

HPN - High Performance Node (a component of a Wireless Mesh Network)

HSD - Human scale development

ICASA - Independent Communications Authority of South Africa

ICT - Information and Communications Technology

IDPM - Institute for Development Policy and Management at Manchester University

IT - Information Technology

IP - Internet Protocol

IDS - Institute for Development Studies at Manchester University

ISP - Internet Service Provider

LAN - Local Area Network

MOU - Memorandum of Understanding

NPV - Net Present Value

NVC - New Venture Creation

PC - Personal Computer

PDF - Portable Document Format

PM – Project Manager

QoL - Quality-of-Life

SADTU - South African Democratic Teacher's Union

SARS - South African Revenue Services

SASSA - South African Social Security Agency

SETA - Sector Education and Training Authority

SLF - Sustainable Livelihoods Framework

TAM - Technology Adoption Model

UN - United Nations

UNDP - United Nations Development Programme

UNDPCSD - United Nations Division for Sustainable Development Department of Policy
Co-ordination and Sustainable Development

UNFCCC - UN Framework on Climate Change

UNISA - University of South Africa

USAASA - Universal Service and Access Agency of South Africa

USB - Universal Serial Bus is a type of computer port used to connect equipment , e.g. printers and external hard drives.

USB drive - (also called a USB stick) Solid State memory that is inserted in the USB port of a computer.

VO - Village Operator

VOIP - Voice over IP

Wi-Fi - Wireless network technology

WMN - Wireless Mesh Network

YAB - Yet Another Box. Hardware that runs mesh network management software on the BB4All Wireless Mesh Network

THESAURUS

Admin clerks – The term commonly used for the school administration clerks

Backbone - The long distance radio telecommunications network terminating at CSIR Meraka that connects the WMNs to the internet.

City of Tshwane Metro - the metropolitan area includes the city centre that is referred to as Pretoria.

Combined School - Grades 6 to 9.

eFiling - Filling in and submitting tax forms via the internet to the South African Revenue Services (SARS).

Eskom - The national energy utility company of South Africa.

Funeral parlour, funeral home, burial society - there are many small funeral parlours scattered across the VOs clusters and many different terms are used to refer to them.

Infomediaries – Intermediaries in an individual's progression from access to use of ICTs (Gigler, 2015).

Ja - Yes in Afrikaans.

Learners - also referred to as students. Children who are attending Primary or Secondary schools. Students are also used to refer to people studying at a tertiary education institution.

Non-profits - Entities not operating for commercial gain. An umbrella term that can be used for example, NGOs and churches.

Primary School - Grades R (age 6) to Grade 7.

Secondary school – Grades 8 to 12.

Senior Secondary School - Grades 10 to 12.

Shebeen - Saloon, tavern, lounge, a bar lounge, or a bar (often not licenced to sell alcoholic beverages).

Spaza shop (also called tuck shops) - Small shops that vary in size from an awning next to the road to a building that can be described as micro supermarkets. They sell a wide variety of goods in small packages such as vegetables, fruit, and groceries. They support convenience shopping by being located along major foot traffic routes and inside neighbourhoods.

telco - A telecommunications company.

VO cluster - A geographical area assigned to a VO. The VO is responsible for technical support to the schools and other entities that are connected to the internet by the BB4All project.

1 Introduction

1.1 Introduction

Development is a global challenge and the concept is used to label countries as "developed" or "developing", thus highlighting inequalities in the state of development of different countries. Inequalities in human development also exist within the population of a country. Development theories have evolved from economically based "catch-up" theories of development to sustainable development as a multi-dimensional concept, with the economic dimension (profit) being augmented with ecological (planet), social (people), and institutional dimensions (WCED, 1987; UNDPCSD, 1995, 1996; Payne & Phillips, 2010; Griggs, Stafford-Smith & Gaffney, 2013).

ICTs have been promoted as being able to increase the efficiency and effectiveness of work and as key enabler of development in general. There also have been signs that the pervasive use of ICTs is globally leading to the transformation of some societies into a new kind of society: the information or knowledge society (Unwin, 2009:19). As ICTs become more pervasive, it seems logical that they should be used to influence development strategies. Statements have been made that ICTs can be used in so-called leapfrogging strategies of development, where intermediate stages of industrialisation are skipped to reach the information society (Davison, Vogel, Harris & Jones, 2000).

Unwin (2009) summarised ICT for Development (ICT4D) practitioner insights in eight interrelated principles for ICT4D success: a focus on needs, designing appropriate technology solutions, sustainability, vision and commitment, infrastructure, effective partnerships, monitoring and evaluation and addressing issues of accessibility.

In spite of the emergence of criticism of such 'leapfrogging' strategies, a multitude of ICT4D initiatives were launched concurrent with the growth in prominence of ICT4D on worldwide policy agendas during the late 1990s (Leye, 2009). However, many of these initiatives have failed due to many different reasons. Of Unwin's interrelated principles, the sustainability of ICT4D initiatives has been identified as an unresolved problem with few success stories (Toyama, 2010, 2015; Heeks, 2002, 2008).

The sustainability of ICT4D interventions is the main concern that informs this research. Many reasons for failure have been advanced. Many ICT4D initiatives are planned and executed in a top-down fashion, are still *technocentric* and focused only on providing ICT and access to it, ignore 'socially-led' strategy (are not *sociocentric*), expect development to happen if access to technology was provided, and in practice disregard the actual needs of people (Chigona, Pollock & Roode 2009:3). Unwin (2009) developed two classifications of ICT4D, representing extreme points, that are useful to reveal the different sustainability issues: market-led ICT4D with an emphasis on economic growth and socially-led ICT4D that focuses on equality of access. Sustainability is therefore dominated by market forces on the one extreme, and by the direct interventions by civil society, government, funding agencies, and corporate social investment on the other extreme. Most ICT4D initiatives fall between these two extremes, for example, a "development through enterprise" strategy grapples with sustainability via bottom-up social development routes (Van Rensburg, du Buisson, Cronje, Marais & Haruperi, 2014; Van Rensburg, Cronje, Du Buisson, 2010). Enterprise-led

development strategies combine economic and socio-political sustainability dimensions, and are often seen as the solution to sustainability issues (Unwin, 2009; Boettke, 2007).

Many ICT4D initiatives target communities of the poorest of the poor and hence take place in a local community context that has minimal resources. This poses a challenge to all development strategies, including enterprise-led development strategies. Private sector companies have avoided these contexts, because enterprise in minimal-resource contexts is judged to not be profitable. The sustainability of such initiatives is therefore often dependent on resources outside the local community, for example on subsidies provided by the state.

A need exists to consider different levels of systems in evaluating and improving the sustainability of development strategies and development initiatives at the project and enterprise level. A narrow focus on the project itself does not suffice to surface the reasons for failure, or to identify the route towards sustainability. The reasons for failure lie inside the scope of the project, within the community itself, and outside the community in the larger socio-economic system. A systems approach with respect to the analysis of the sustainability (or lack thereof) of development initiatives is required.

1.2   Problem statement

1.2.1   Sustainable development

Unwin (2009:365) stated that sustainability is primarily a problem with "externally situated ICT4D programmes, and in part reflect a desire by those who create them to guarantee their continued success after the initial period of investment is over". His opinion was that too little attention is paid to how initiatives can become self-supporting, and he recommended that all ICT4D programmes that are introduced by external players have a framework for ensuring "continued viability beyond the initial period of funding" to not saddle the participants with the burden (ibid.). Unwin pointed out that the long-term sustainability of socially-led initiatives is often based on a planned or unplanned transition from donor or state funding to acquiring private-sector support by promising routes to increased profitability. A pathway to sustainability is required that is dependent on many actors in the wider system. A case in point is USAID funding for telecentre establishment in Sri Lanka that is tied to co-investment by the local private sector (Hosman, 2011). To Unwin (2009:374), the bottom-line is "such initiatives are not sustainable in the long-term, unless people can see real benefits from them for which they are willing to pay" and this depends on meeting people's needs in an appropriate, cost-effective way.

1.2.2   A framework to engage with sustainability

The problem then becomes: What is an appropriate framework to enable continued viability that is used to conceptualise, plan, execute and transition or transfer an ICT4D project that has the value proposition of meeting people's needs in an appropriate, cost-effective way so that people receive real benefit for which they are willing to pay?

This framework should guide the development of pathways to sustainability that cater for realities that people may be willing to pay, but may or may not be able to pay. The pathways should therefore foster alignment with the development and/or business agendas of key role players so

that there is a good probability of attracting short-, medium- and long-term support, to make a transition path possible for a variety of options.

Another key problem is expectations. Funders, especially governments, typically want to see as an end result a replicable and scalable 'recipe' or 'model' that can be rapidly rolled-out to achieve a large developmental impact in a short time. Unless the project promises to deliver on these demands, funding will not be forthcoming. This demand is difficult to reconcile with positions that maintain that sustainability of projects requires "socially embedded" innovation processes (Avgerou, 2010:3) or "per-poor innovation" (Heeks, 2008:30) that have a certain inherent pace that cannot be forced and is deeply contextual.

The framework to guide the development of pathways to sustainability should therefore investigate all local resources and local or external models that have shown or have the possibility of innovation by participants, preferably socially embedded innovation.

A systems approach, as mentioned in the previous section (1.1), is required to analyse the sustainability (or lack thereof) of development initiatives, but, from the above argument, the framework to guide the development of pathways to sustainability also requires a systems approach due to the many internal and external interactions in innovation and alignment of agendas of different types at various levels.

One such source of systems thinking and analysis, grounded in development theory, is the concept of self-reliant human scale development, as conceptualised by Max-Neef and collaborators (Max-Neef, Elizalde & Hopenhayn, 1991). It has been used to develop a definition of sustainable development (Roode, 2002), which was applied in the South African context to outline a sustainable development strategy that can be applied in a bottom-up fashion to influence top-down development (Chigona, Pollock & Roode, 2009). This strategy proposed that development activities commence at the local level, building relationships of self-reliance that stimulate similar behaviour at higher levels. To achieve complementary top-down development support, the bottom-up driven development of networks of relationships around aligned interests between the different levels is required (ibid.).

This sustainable development strategy discussed above is at a fairly high conceptual level and indicates what kinds of strategies should be executed throughout the various levels in the system, but does not provide a framework for describing the components of the system and the complexities of interactions between these components that lead to development outcomes. In addition, for the purposes of an initiative or project strategies need to be translated into practical and operational considerations.

The combination of the Choice Framework (CF) of Kleine (2010) which was developed with the intent of evaluating ICTs' contribution to development, with the sustainable development strategy described by Chigona *et al*. (2009), which is based on human scale development (HSD) principles, may be a useful approach to analysing ICT4D in systems. The human scale sustainable development strategy relies on the alignment of community or group interests that are enabled by the building of social resources (relationship networks that become a resource, also called social capital, see Farr, 2004), which is one of the ten resources listed by Kleine.

This research has as its primary focus the role of social capital within the systemic perspective of the CF combined with HSD sustainable development strategy. This was due to four reasons: social capital is one of the local resources that can be used for development; social capital had also gained prominence in development policy due to the research of the World Bank (Woolcock & Narayan, 2000); the self-reliant human scale sustainable development approach relies on building networks of relationships; and the linkages between this sustainable development approach and the Choice Framework is at the foundational level of social resources as well as in the interaction between agency and structure. This interaction was described by Grunfeld, Pin & Hak (2011:152) as "a virtuous spiral dynamic between the use of ICT and the building and strengthening of capabilities, empowerment, and sustainability" (see Section 2.6.3.2).

The research problem is how to enable the continued viability of an ICT4D project by developing pathways to sustainability that include all possible local resources and external resources. The argument is that a framework to guide the development of pathways to sustainability requires a systems approach, of which a key aspect is the building of social resources to align the many internal and external interests.

1.2.3 A project scope

The context of this research was an ICT4D project that follows an enterprise-led development strategy to provide broadband internet connectivity in rural areas in South Africa. The Broadband for All (BB4All) initiative that was driven by the CSIR Meraka Institute was based on an entrepreneurial model for the development of local Internet Service Providers (ISPs), recruited from local unemployed young people, which provide on-site technical support to connected facilities (main schools) as well as internet access and ICT-enabled services at their own offices (CSIR, 2014).

The scope of the general problem statement was narrowed down to the sustainability of enterprise-led development and the influence of social capital to support sustainable development. The problem statement that this research addressed was: Investigating how the use of social capital in an entrepreneurial model for locally based support in a rural context can improve the value and the sustainability of providing access to, and stimulating, the increased adoption of internet-based services.

1.3 Research questions

In the BB4All project the entrepreneurial model was called the Village Operator model. The main research question was to investigate, in particular, what the social capital of Village Operators (VOs) was and how this resource could be used in ICT4D initiatives to improve the probability of sustained development outcomes for participants.

The derived research questions are:

- What was the social capital of Village Operators (VOs)?
- How did the use of social capital play a role in growing VO entrepreneurs?
- How can an understanding of the role of social capital be used to improve the conceptualisation, design, implementation and transfer of ICT4D initiatives for long-term benefit to participants?

1.4   Research objectives

The objective of this research was to make the role of social capital in enterprise development visible as evidenced in the development of VOs as part of the BB4All initiative.

The research aimed to discover and map the networks of relationships of the VOs and to analyse the value that is unlocked via these relationships to better understand the importance of building social capital and how it is built in practice. This would inform the conceptualisation, planning, execution and transfer of initiatives where the development of small enterprises is the goal, by clarifying the role of social capital and providing guidance as to how the development and use of social capital may be supported.

1.5   Delineations and limitations

The research scope is one research project of finite duration that delivered internet access to schools in a rural area in South Africa that aimed to test ICT technology and a local technical support model based on entrepreneurial principles, the VO model. The project focused on the adoption of the model and the transfer of the people (VOs) and the project infrastructure to a main customer. The project itself did not address the adoption and use of ICT by schools and individual community members. This important aspect was largely left to the individual actions of the VOs. The research focus was the implementation of the project in one area where the VO model was used.

The research is qualitative in nature and is primarily based on interviews that elicited the first-person subjective view of the entrepreneur. To triangulate the research findings based on the interviews, various types of customers and individuals in VO relationship networks would have had to be interviewed. This would have expanded the scope and duration of the search tremendously. Instead, interviews with selected BB4All project members were conducted to obtain a different perspective on the VOs, the project and the context. The main customer, the Mpumalanga Provincial Department of Education was not interviewed, but notes were made of its views in a meeting. The transfer strategy meetings were attended by the researcher and notes were made of these meetings.

1.6   Significance

Projects bring in resources and when projects ends, the flow of new external resources end and the participants and existing internal and external resource providers have the dilemma of trying to sustain the benefit brought about by the project. Projects generally create a dependency on temporary external resources and hence should be planned to use and catalyse the use of local and external resources, even in resource-constrained environments, to foster long-term sustainable development.

A systems approach is required to encompass and use local and external actors and interactions. The human scale sustainable development strategy relies on gaining access to local and external resources via the alignment of the diversity of internal and external interests, which is supported by building relationships (i.e. the development of social capital).

This research used self-reliant human scale development as conceptualised by Max-Neef and collaborators (Max-Neef, Elizalde, & Hopenhayn, 1991) which was used by Chigona *et al.* (2009) to define sustainable development and outline a bottom-up strategy in which relationship networks (social capital) play a significant role. The strategy also outlines how the disjunction between top-down and bottom-up development priorities and values may be overcome. This research also accepted the invitation of Dorothea Kleine for ICT-based development initiatives to use the Choice Framework (which includes social resources) to map out development processes, in this case with a specific focus on the role of social capital.

These theoretical frames for the role of social capital in development and in sustainable development, was applied, in the analysis of the nature and scope of the influence of social capital in the lives of entrepreneurs in an ICT4D initiative. The project and stakeholder level influences were also explored.

In summary, this research makes a contribution to improve the understanding and use of social capital as a resource in enterprise-led ICT4D development initiatives to improve the probability of long-term sustained benefit to participants after such an initiative has ended. The research is conducted in a project context and the understanding of the pervasive influence of social capital is used to develop considerations for the conceptualisation, planning, execution and exit or transfer of initiatives, especially where the development of entrepreneurs or small enterprises is involved.

1.7   Chapter overviews

The thesis consists of eleven chapters in all. A map of the flow of the thesis is depicted in Figure 1.
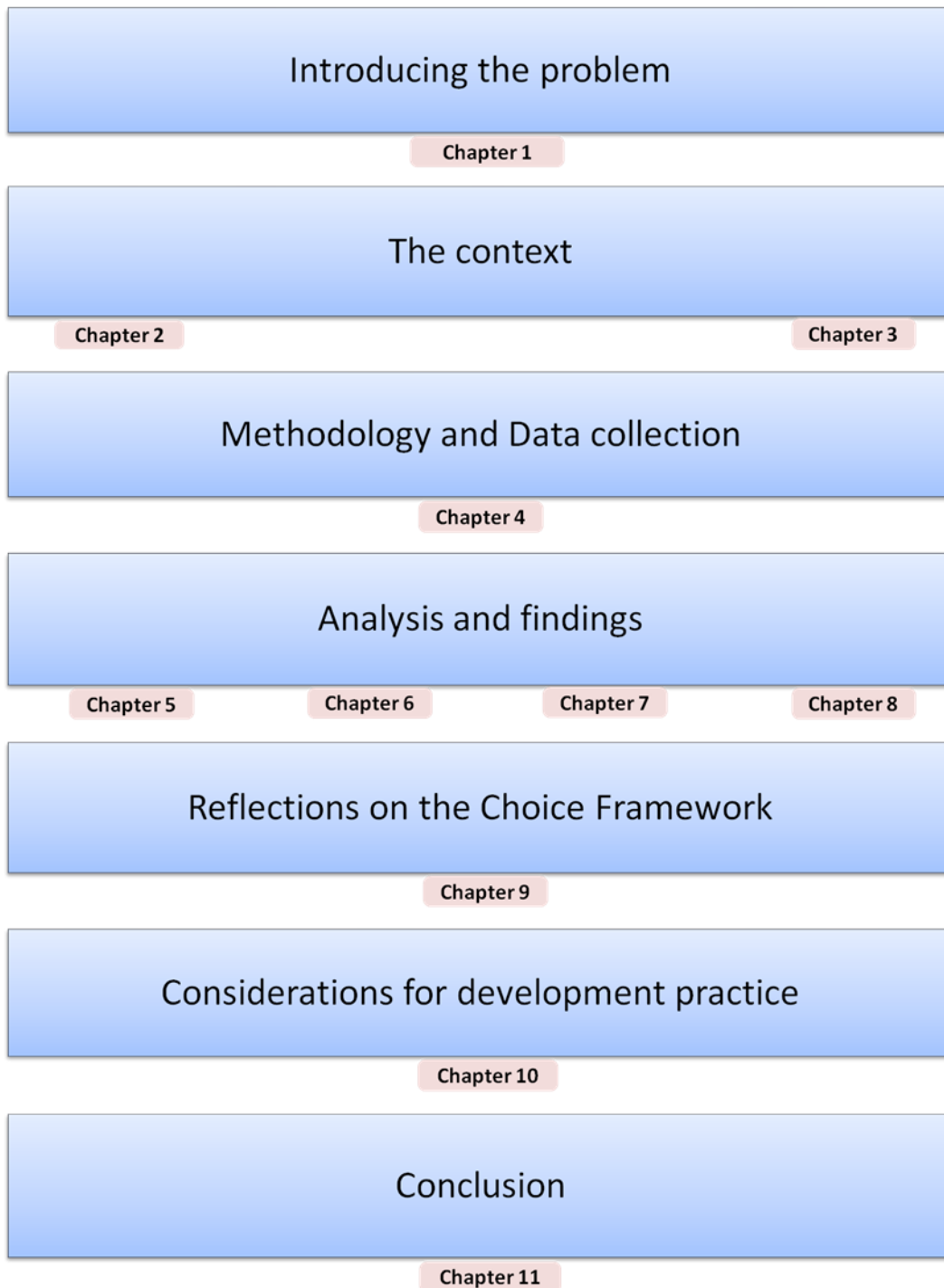
Figure 1 A map of the thesis flow with the chapters

The research context is introduced in Chapters 2 and 3, covering both the development context and the particular developmental project that is the focus of this study.

Chapter 2, the Literature Review, starts with a brief overview of the historical development of the concepts of development, followed by the introduction of asset-based and sustainable livelihoods development approaches. The rapid rise of the concept of sustainable development is outlined next, and a sustainable development approach is selected together with an appropriate definition.

The rest of the chapter focuses mainly on ICT in development, namely the use of ICT for Development (ICT4D's) role in sustainable development, frameworks for ICT4D (e.g. the Choice Framework), and suitable frameworks for analysing ICT4D's role in sustainable development.

The chapter ends with the discussion of the role of social capital in supporting ICT4D to achieve sustainable development and an overview of existing research on the influence of social capital in ICT4D. The approach of Halpern (2005) to social capital as a multi-level concept was used, with the micro level as the networks formed at the family level, the meso level being networks with people in the neighbourhood, and the macro level referring to large scale networks at national, regional, and community levels.

In Chapter 3 the development context of this research, namely the enterprise-led ICT4D initiative BB4All, is introduced. The problems that it addressed and the rationale for selecting a micro-enterprise development model, the VO model, are discussed. The areas in which the BB4All project was implemented is presented with a discussion of the geographical factors as well as the relevant educational contexts. Technology aspects and challenges are also addressed. The evolution of the VO model during the project and the associated sustainability issues are explored.

The research methodology and the data collection are described in Chapter 4. Qualitative research was selected to elicit the individual lived experiences of the VOs. The interpretivist research paradigm was chosen since the aim is to understand social capital, which is embedded in human and social interaction, and required engagement in the social setting investigated. The main source of information was in-depth interviews with VOs who investigated their relationship networks and the influence of these networks on them as entrepreneurs, both at a personal level and at a business level. The process of obtaining ethical clearance and the ethical conduct of interviews are described. The data collection process itself is described in detail, especially the use of the Net-Mapping approach during the interview process. Examples of the maps that were drawn are presented.

The analysis and findings are covered in four chapters. In Chapter 5 the analysis of the interviews and an overview of the findings are discussed. The analysis was guided by two theoretical departure points, namely the Choice Framework and a sustainable development strategy based on human scale development (HSD) principles. Social capital is an important component in both of these approaches. The VOs are entrepreneurs and therefore basic business issues were used with the two theoretical departure points to develop a set of codes via a deductive process. During the coding process new codes emerged as well (an inductive process). Analysis of the combined set of codes resulted in the development of three main themes: the development and use of social capital, the combination of community service with social and commercial entrepreneurship, and the role of VOs in innovation processes.

In Chapter 6, the findings regarding the use of social capital are covered in detail and the variations in social capital amongst the VOs are identified at the micro, meso and macro levels. The richest detail was found at the micro level where family relationships had the most influence on VOs. Meso level capital was important to connect VOs to additional resources and extend the business possibilities. Macro level capital was mainly a project level concern and few VOs were active at this level.

In Chapter 7, the positive and negative aspects of social capital with respect to business aspects are discussed. VOs are from the community and this created expectations from fellow members of the community regarding free services. The discourse of community service that VOs had developed is discussed and the spectrum of choices that VOs made regarding the balance between community service, social entrepreneurship and profit maximising entrepreneurship, is presented.

The important role of VOs in the adoption of innovation and the development of new innovations are covered in Chapter 8, Networks of Innovation. The variety of the influences of social capital in innovation processes is analysed and possibilities for increased use of social capital to catalyse innovation are pointed out.

In Chapter 9, Reflections on the Choice Framework, the findings are mapped to the elements of the Choice Framework to illustrate the pervasive influence of social capital. The other major resource that was present in the VOs' lives, namely psychological resources, is also discussed.

The focus of Chapter 10, Considerations for development practice and project design, is to apply what has been learnt about the influence of social capital on long-term sustainability, to develop considerations for the conceptualisation, design, implementation, and exit or transfer of ICT4D initiatives. The importance of building meso- and macro- capital in partnership with VOs and communities was emphasised and recommendations for structured approaches to engage early with macro-level role players were developed.

Finally, in Chapter 11, the Conclusion, the research findings are summarised and linked back to the research questions. This research adopted the sustainable development theory of Escobar (1992) which acknowledged the role of social capital in the alignment of interest to support bottom-up-driven development. The degree of influence that social capital at all levels, from bottom to top (micro to macro level) had in the lives of participants in an ICT4D project and the influence on the customer base of the project is shown. The importance of ongoing macro level capital development by a project in collaboration with participants in order to achieve support via complementary top-down development inputs was shown via an analysis of the BB4All project activities.

In the next section a summary is presented.

1.8   Summary

The sustainability of ICT4D interventions in poorly resourced areas is the main concern that informs this research. The reasons for failure lie inside the scope of the project, within the community itself, and outside the community in the larger socio-economic system. A systems approach with respect to the analysis of the sustainability (or lack thereof) of development initiatives is therefore required.

The systems approach used is based on the combination of the human scale development approach and the Choice Framework, both of which includes the use social capital.

The context of this research was an ICT4D project that followed an enterprise-led development strategy to provide broadband internet connectivity in rural areas in South Africa. The general problem statement was narrowed down to the sustainability of enterprise-led development and the influence of social capital to support sustainable development.

The main research question was to investigate, in particular, what the social capital of Village Operators (VOs) was and how this resource could be used in ICT4D initiatives to improve the probability of sustained development outcomes for participants.

A methodological contribution is the use of the Net-Mapping approach during the interview process to obtain a rich picture of the types and relationships of VOs.

The social capital of VOs was found to be mainly at the micro and meso levels. The micro level capital (family relationships) proved to be the major source of support for the VOs. The social capital of VOs varied widely, mainly due to differences in family relationships. The meso level capital played an important role to enable VOs to gain access to additional resources beyond the family circle and to extend business possibilities. Macro level capital was mainly a project level concern and few VOs were active at this level.

The positive and negative aspects of social capital with respect to VOs as entrepreneurs arose due to VOs being fellow community members and VOs made different choices about the balance between community service, social entrepreneurship and profit maximising entrepreneurship.

The close relationships of VOs with customers were one of the major influences on the adoption and creation of innovative services with customers. The possibilities for the increased use of social capital to catalyse innovation are pointed out.

In terms of the Choice Framework, the pervasive influence of social capital was mapped to the elements of the CF and evidence was also found of the important role of psychological resources, which is also part of the CF.

The development of social capital was shown to enable bottom-up driven development via the growth of relationships that drive alignment of interests and a sense of mutual interdependence. Project design and development practice should plan for encouraging the building of micro-, meso- and macro-capital in partnership with participants and communities. Structured approaches to engage early with macro-level role players are recommended. The development of social capital at micro and meso levels occurred due to the development of strong relationships with customers and the benefits of VOs having relationships with community structures (e.g. churches).

The development of customers and relationships at the meso level should be encouraged as this enhances the development of linkages to the macro level which fosters alignment of interests that are grounded in local realities, and may support development of bottom-up aligned strategies rather than top-down strategies.

This research makes a contribution to the limited theory base on sustainability in the field of ICT4D by investigating the sustainable development theory of Escobar which focuses on the alignment of interests, as supported by the use of social capital, to achieve complementary top-down development inputs in response to bottom-up-driven development. This research describes the degree of influence that social capital at all levels, from bottom to top (micro to macro level) had in the sustainability of the entrepreneur participants in an ICT4D project and the limited influence on top-down development efforts which may due to an insufficient focus on building macro level social capital.

2   Literature review

The context and content of Chapter 2 are shown in the thesis map.
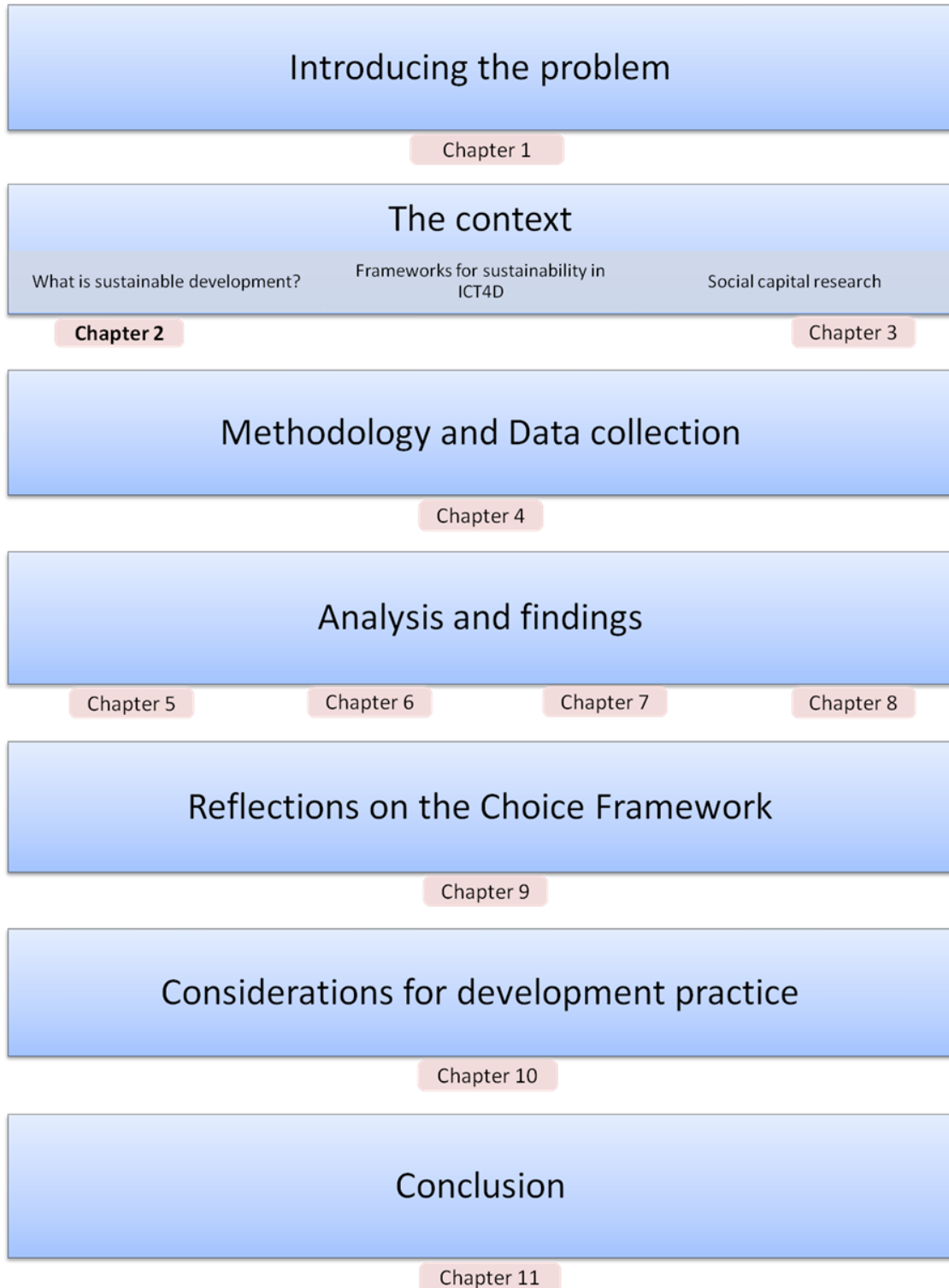
2.1 Introduction

2.1.1 Overview

This chapter provides a context for the research by beginning with the fundamental question of what development is, followed by a discussion of the concept of sustainable development. The next question is what is meant by ICT for Development (ICT4D), followed by considering ICT4D in the context of sustainable development, and therefore asking what the role of ICT4D is, or can be, in supporting sustainable development. Frameworks have been developed for better understanding of the role of ICT in development. The frameworks discussed are those that engage with the accumulated knowledge of the complexities of development as expressed in development theories. Engagement with development theories is considered by Heeks (2010) to be scarce in the ICT4D literature, a situation which has changed recently. Finally, due to the specific focus on social capital in this research, some of the existing research on the social capital in ICT4D is discussed.

The in-depth engagement with the relevant research literature occurs in the chapters where the findings are discussed and therefore this chapter serves mainly as a high-level overview, without going into too much detail. To lay a foundation, the selected development theories are covered in greater detail, as well as the particular approach to sustainable development that was adopted.

This brief overview is expanded in the next section to situate the particular choices made in the literature review.

2.1.2 The journey from development theory to social capital for sustainable ICT4D

The development theories that were considered appropriate for informing this thesis critique classic 'Western' development theories that equate development with economic growth, and mostly adopt a top-down approach to development. Bottom-up development theories starting at an individual level and the decoupling of development from increased wealth were considered to be more appropriate. Post-development theory is therefore discussed in some detail to illustrate alternative, non-Western views. Amartya Sen's definition of development was selected due to its focus on the individual and freedom of choice, which creates a natural tension with any top-down development decision-making approach.

The context of the research is micro-enterprise development in ICT4D, and therefore the general problem statement is how to improve the sustainability of enterprise-led development through the use of social capital. As previously indicated the notion of social capital is core to this thesis and is discussed in detail later in this chapter. The assumption is that the use of local resources available to everybody (e.g. social capital) reduces dependency on external sources, which should foster long-term bottom-up driven sustainable development. Taking sustainability seriously raises the question of how to achieve it, and pathways to sustainability need to be developed that will be dependent on many actors at different levels of society. The state will always play a role in development, be it positive or negative. From a bottom-up perspective, the question becomes how to establish fruitful interactions between development actors at both levels to achieve the best-possible alignment of strategies and resource use. In other words, how to align top-down development to support bottom-up driven sustainable development.

The development theories and approaches that were considered to be particularly relevant are sustainable development in general, human development (including Sen's capability approach), human scale development and sustainable livelihoods approaches which consider capabilities, assets and activities. These development theories and approaches were judged to be supportive of bottom-up driven sustainable development. The sustainable livelihoods approach adopted by DFID was developed into a

framework, the Sustainable Livelihoods Framework (SLF), and applied widely by large development funders and researchers. The SLF includes capitals, of which social capital is one, hence the particular relevance for this research. In addition, Kleine's Choice Framework, which is discussed later on, uses the SLF as a major component (Kleine, 2010).

In the following sections sustainable development is viewed from a global perspective to provide a context for this study. The imperative to act to enable sustainable development is fairly clear, but the selection of the appropriate strategies is influenced by different agendas and therefore the processes leading to the adoption of the Sustainable Development Goals (SDGs) as a resolution by the UN in 2015 are described.

Thereafter, the sustainable development approach as selected and constructed in this research from the theories and approaches mentioned previously is described.

The role of enterprise-led development in human scale development and in the SDGs is discussed briefly, while the complex concept of social capital is unpacked and the relevance to sustainable development is explored.

To describe ICT4D's role in sustainable development, the evolution of ICT4D is illustrated first. The overview then moves to the level of implementation, and frameworks for ICT4D are discussed that are based on the selection of the capability approach (CA) as the development philosophy. The discussion of the SLF is expanded and the capability approach is discussed in detail to uncover the complexities of 'operationalisation'. Various attempts were found in the research literature, but Kleine's Choice Framework was selected since it was the most comprehensive attempt at 'operationalisation' of the CA, uses aspects of the SLF, and was developed with the intent of evaluating ICTs' contribution to development.

The chapter ends by focusing on the existing research on social capital in ICT4D. To fit the context and roles of Village Operators (VOs) who offer internet-based services, the research on the sustainability of telecentres is covered, with the aim of identifying the important factors influencing telecentres, of which social capital is but one.

2.2   What is development?

2.2.1   Overview

The history of theories of development can be summarised briefly by starting with classical theories of development such as the liberal economic theory and historical materialism of the eighteenth and nineteenth centuries, followed by the 'catch-up' theories of development after the great wave of industrialisation in Western Europe (Payne & Phillips, 2010:8). Industrialisation was followed by the post-World War II era boom in development theories which led to the current 'alternative theories' that were derived from critiques of all forms of development theory from human development, gendered, environmental and postmodern viewpoints (ibid.).

The critiques that can be considered influential dealt with the inherent fault lines in capitalist development (dependency, inequality and the creation of dependencies – Kay, 1989), the option of bottom-up development that adds social and ecological goals to economic goals (Chambers, 1983), and the comprehensive and radical critique developed by post-development theorists (Escobar, 1992). The alternative that has garnered wide support in the UN and development circles is the capability approach

developed by Amartya Sen in which development revolves around the freedom of choice of individuals to live their lives according to their values.

2.2.2 Post-development theory

Escobar, a leading proponent of post-development critique, showed how Third World scholars have critiqued "the discourse of 'development' as a hegemonic form of representation of the Third World", in contrast to the First, or 'developed' world (Escobar, 1992:411). Escobar has emphasised that Development (spelled with a capital D) is a discourse that has "functioned as a mechanism for the production and management of the Third World in the post-war period" (ibid.:413). According to Sachs (2010), the term 'Third World' was coined by the French in the 1950s to describe the battle between the USA (joined by other Western powers) and the Soviet Union for the rest of the world.

Post-development critics such as Escobar, Esteva, Sachs, Rist and others defined the start date of the 'age of development' as a historical period, as 20 January 1949, when Harry S. Truman, in his inaugural speech as president of the United States of America, for the first time declared that the Southern Hemisphere countries were 'underdeveloped areas' (Sachs, 2010; Rist, 2014). This label and the 'Third World' label that was particularly popular in the 1960s and 1970s have remained in use (Sachs, 2010; Dirlik, 2007). The popular term currently used is the 'Global South' that originated from the 'Third World' label (Dirlik, 2007).

The issue of the definition of development is a complex one fraught with conceptual difficulties. Esteva (2010) referred to a process of conceptual inflation as the Truman simplification of development as economic growth was questioned, and social development was introduced alongside economic development. The search for a balance between these two types of development led to referring to development as growth plus change, where change included social, cultural and economic change leading to improved quality of life (ibid.). The fundamental critique is that the word 'development' carries the baggage of a favourable change, determined by a universal law, towards something defined as a desirable goal. The underlying assumptions include that all societies are homogenous, that development is linear and that a particular society (Western) is the point of reference. This particular society, a sub-system of the whole, can be seen as the 'reality', and can be disconnected from the interconnectedness of the processes that "make up the world's reality" (ibid.:8). An African perspective is provided by Nyamnjoh (2011), who, drawing on the work of (Chinweizu, 1987) and Mafeje (1998), deplored the lack of questioning by African researchers of the "assumption that Africa societies should reproduce Western ideals and institutions" and summarised the situation as "The tendency has been to conform to a *world conceived in the image of the West with the rest*" (Nyamnjoh, 2011:152, author's italics).

Some development theorists chose to step away from false representations of the complex realities of the world that are embedded in the concept of development and the theorisation about it and to simply consider what is practiced rather than what is preached. Rist (2014) developed a definition of development to "describe the ubiquitous mechanisms of the contemporary world that determine social change in accordance with a special structure-creating logic" (:12). This definition shows the difference in social change that is the distinguishing factor of 'developmental change' in modern societies compared to all previous societies:

> *'Development' consists of a set of practices, sometimes appearing to conflict with one another, which require – for the reproduction of society – the general transformation and destruction of the natural environment and of social relations. Its aim is to increase the production of commodities (goods and services) geared, by way of exchange, to effective demand* (Rist, 2014:12).

The 'practices' referred to are the economic, social, political and cultural practices that actually happen. The reproduction of society refers to the reality that "these practices enable the world system to reproduce itself by expanding the area within its grasp, so that it assures the existence of societies (or social classes) included within the system, and washes its hands of those excluded from it" (ibid.:13).

2.2.3 The selected development perspective

This research focuses on sustainable development anchored in broad-based bottom-up development enabled by the access to, adoption and use of technology-based (ICT4D) enterprise-led development as sustained by local resources such as social capital. A particular challenge is to reduce the hegemony of top-down development approaches driven by the powerful (e.g. government), and enhance the relevance, effectiveness and of top-down development approaches by creating synergy with bottom-up approaches rooted in the needs and assets and capabilities of the participants.

The development approaches that are particularly relevant are sustainable development in general, human development (including Sen's capability approach), and livelihoods approaches, and, of course, the various ICT4D strategies that have been used to support development strategies. Sustainable development is discussed in section 2.3, while the rest of the development approaches are discussed here.

The development approaches that are discussed in detail are illustrated in Figure 2.
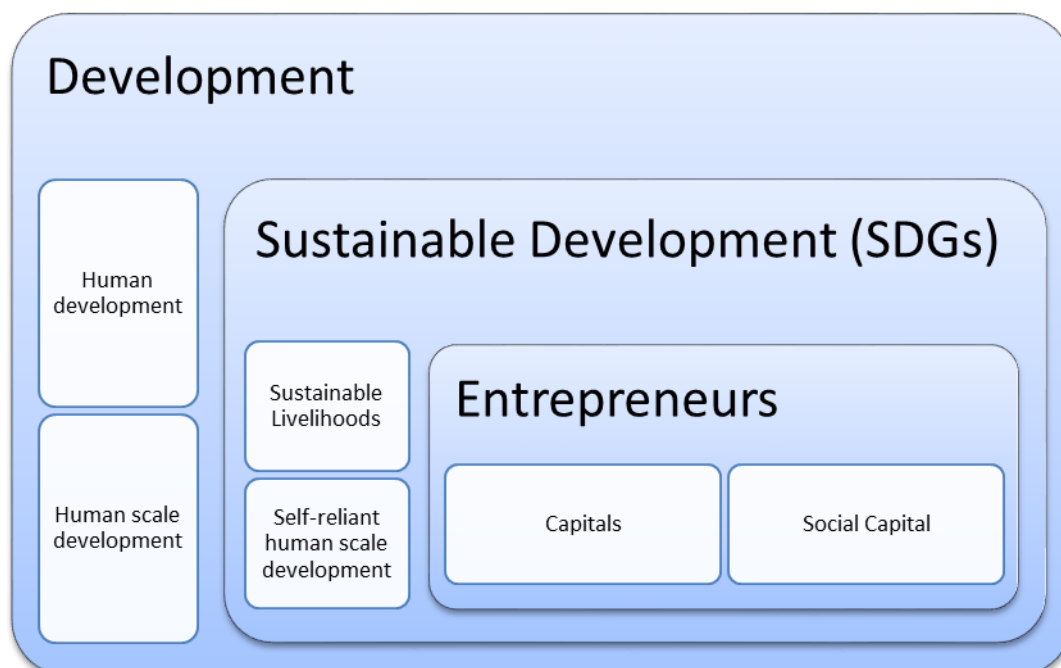
Figure 2 The development approaches investigated in detail

2.2.4 The human development approach

The human development approach to the evaluation and definition of development had a major resurgence after 1990. Two figures have been very influential, namely Mahbub ul Haq "an independent-minded Pakistani economist" and Amartya Sen, a Nobel laureate economist (Sen, 2000:17).

Mahbub ul Haq's brainchild, the *Human Development Report*, published under the auspices of the United Nations Development Programme (UNDP), received wide acclaim in less than a decade, and brought to the

fore "the idea of 'human development' as an illuminating concept that serves to integrate a variety of concerns about the lives of people and their well-being and freedom" (ibid.:18). The approach of human development accounting abandons a single measure of economic progress (e.g. Gross Domestic Product per capita) and instead adopts a pluralist conception of progress that involves the systematic examination of information about how people live in each society with the associated diversity in the nature of deprivations. The 25th anniversary of the report was in 2015 and the premise of the first report, that "People are the real wealth of a nation and human development is all about enlarging their choices" and the human development approach itself were declared as still being relevant in guiding "policies and actions to improve people's well-being by ensuring an equitable, sustainable and stable world" (Jahan, 2015).

Ul Haq's approach was not to build on theory, but to build on an agreement that "may emerge pragmatically, on quite diverse grounds, after a general recognition that many things are important" (Sen, 2000:22). Inclusion in the broad framework of the report or the indices followed a practical process of: tell us what it is, explain why it must be used, and be sure that we will listen to you. This was done to encourage different kinds of argument within a "framework of reasoned social evaluation" (Sen, 2000:22). The report contains the Human Development Index (HDI), which is the brainchild of Sen, as well as other indices such as the Human Poverty Index (ibid.).

Sen's major contribution to human development is his role as a theorist. Sen (1999) sketched a paradox: The world had become a better place in the twentieth century, with models such as democratic and participatory government, concepts of human rights and the freedom of politics, people who live longer, and an interconnected world at the economic, communication and idea exchange levels. The world is, however, also characterised by "deprivation, destitution and oppression", persistent poverty, hunger, lack of political freedom, neglect of women's agency and interests, threats to the environment and the sustainability of our social and economic lives (ibid.:xi). Development is argued to be to dealing with these problems, deprivations, and afflictions, by countering them with freedoms of different kinds exercised via the agency of individuals. Unfortunately, the freedom of individual agency is constrained by the available social, political and economic opportunities. So, while the freedom of the individual to act is central, its scope and nature is influenced by social influences, and there is a fundamental complementarity between the individual agency and the social structure in which the individual lives. Given this departure point, a social commitment to individual freedom is required to grow the freedom of the individual to act. This is Sen's basic approach. The essence of development is the growth in the freedom of the individual to act as the "primary end and the principal means of development" (ibid.:xii), and the removal of the many types of 'unfreedoms' that limit the choice and opportunity to act in a reasoned manner. The other important factor is the leverage caused by the interactions of certain types of freedoms to increase other kinds of freedoms, e.g. the public freedom to provide health care and education to individuals, is complementary to political and economic freedom, in assisting individuals (as active agents of change) to improve their own plans and actions to overcome their particular deprivations.

Development is therefore argued to be "a process of expanding the real freedoms that people enjoy" (ibid.:3). Sen focused on the end (expanded real freedom) rather than all the different means, such as economic growth, technological advances, political rights, and social and economic support arrangements. The expansion of human freedom (with the increased complementarity between kinds of freedoms) is the principal end and the primary means of achieving development, and the central role is played by people viewed as the primary agents of their own development rather than passive recipients of assistance.

To summarise, in his book published in 1999, Sen defined development as "a process of expanding the real freedoms that people enjoy" (:3) to "lead the lives they have reason to value" (:293).

Sen developed his own definitions of terms. The real freedoms referred to in the definition above were described by him as the person's capabilities. The 'capability' of a person refers to the various things a person may value doing or being (called 'functionings') that are feasible for that person to achieve, such as being healthy, being able to read, and being able to participate in community life. Kleine (2010) summarised the logic as follows: functionings are the outcomes for the person, while capabilities are the freedoms referred to in this approach. Zheng stated that the major difference between the CA and other economic approaches is that it distinguishes between "means to achieve" (what one values), "freedom to achieve," and "actual achievement" (Sen, as quoted in Zheng, 2009:.69).

We have now presented two very different perspectives on development, namely the critical and somewhat cynical definition of Rist (2014) that 'development' is a set of practices (economic, social, political and cultural) that reproduces a society which aim is to increase the production of commodities geared to effective demand. The capitalist machine to grow production, consumption and profit is unstoppable and individuals can either opt in to the society/system or opt out and lose out. Sen does not deny the realities of the social structures to limit or enhance the freedom of the individual to act in a reasoned manner, but has faith in the ability of individuals to free themselves from the unfreedoms, and that it is worthwhile to put effort into the development project of expanding individual freedom and removing the unfreedoms that limit the choice and opportunity for the individual to act.

Embracing plurality, openness to public reasoning and a dose of pragmatism is a hallmark of the work of Ul Haq and Sen.

2.2.5 Human scale development

2.2.5.1 Origin and context
Human scale development (HSD) is another development approach that emphasises the role of participants as the creators of their own future.

The search of the Dag Hammarskjöld Foundation for alternatives to the dominant option of neo-liberalism and other top-down development strategies, led to the 1975 report, "What now: Another Development", and the subsequent testing of the Another Development principles of "need-oriented, self-reliant, endogenous, ecologically sound and based on structural transformations" in fields such as rural development, education, information and communication, and participation (Max-Neef *et al.*, 1991:vii). A joint project on Human Scale Development was defined in 1984-1985 between the Chilean-based Development Alternatives Centre (headed by Manfred Max-Neef) and the Dag Hammarskjöld Foundation to place the ideas of the 1975 report in the Latin American context and to research concepts and problems such as "human needs, scale and efficiency, unemployment and local development financing", that had not been examined in depth in the report (:vii). A transdisciplinary team did research in Latin America that was subsequently published in a journal in Spanish (1986) and English (1988) and as part I of the 1991 book "Human Scale Development: Conception, Application and Further Reflections" (Max-Neef *et al.*, 1991).

The major issue in Latin America was the inability of the prevailing neo-liberal monetarism and the more interventionist state-centred developmentalism, to address the needs of the people, coupled with the lack of a deep-rooted democratic culture, and the marginalisation of a huge proportion of the population (Max-Neef *et al.*, 1991). Human Scale Development with its strong focus on the role of human creativity in development provided an alternative way that was eagerly embraced by civil society and adopted by some

governments in Latin America. Human Scale Development covered development philosophy, policy, and development praxis. The strong principle that "the purpose of the economy is to serve the people, and not the people to serve the economy" (:viii) and the sophisticated analysis of human needs challenged development philosophy, while recommendations for development practice driven by human actors, challenged top-down development praxis.

The purpose of this alternative way was to create the conditions in which a new development praxis based on HSD could occur. The objectives or pillars of HSD are based on "the satisfaction of fundamental human needs, on the generation of growing levels of self-reliance, and on the construction of organic articulations of people with nature and technology, of global processes with local activity, of the personal with the social, of planning with autonomy, and of civil society with the state" (:8). An important aspect of this research is that "'articulation' is taken to mean the construction of coherent and consistent relations of balanced interdependence among given elements" (:8). According to this approach the foundation for these pillars must be the enablement of conditions in which, as stated above, people play an active role in development praxis and therefore "both the diversity as well as the autonomy of the space in which they act must be respected" (: 8).

2.2.5.2   *Possible influence of social capital*

Social capital may play a particularly influential role in supporting a pillar of HSD, namely the 'relations of balanced interdependence' between the 'personal with the social' and of 'civil society with the state'. Social capital may also enable the 'the satisfaction of fundamental human needs' and the 'generation of growing levels of self-reliance'. The concept of a human scale is vital. The diagnosis of Max-Neef and colleagues was that participants need to be transformed from "an object person into a subject-person in the process of development" (ibid.:8) and that one of the fundamental problems is the issue of scale which is created in large hierarchically organised systems (e.g. government) that make it very difficult for an individual to engage with and influence the normal top-down decision-making processes. Therefore, forms of collaboration and organisation between individuals are required to be able to have meaningful relations with larger organisations in the first place. To progress to 'balanced interdependence', top-down political democracy supporting bottom-up social participation is required (ibid.). Social participation may take the form of collective action as enabled via the growth of social capital. The variety and efficacy of social capital will be discussed further in the section on social capital in this chapter and illustrated in Chapter 6.

2.2.5.3   *The challenge of heterogeneity*

A diverse society challenges both the state and civil society to enable conditions in which the needs of all people are met and all people are encouraged to play an active role in development praxis, and therefore:

> *development must nurture local spaces, facilitate micro-organizations and support the multiplicity of cultural matrixes comprising civil society. This type of development must rediscover, consolidate and integrate the diverse collective identities that make up the social body* (Max-Neef *et al*., 1991:10)*.

Therefore, new institutional ways of fostering participation and heterogeneity, rather than artificial homogenisation by the state, have to be established by both state and civil society. The challenge to civil society is to prevent "the increasing atomization of social movements, cultural identities and communities" (ibid.:11) which requires people to realise that there are indeed 'relations of balanced interdependence' at the local or horizontal level, and that HSD development requires the realisation of the potential role of individuals, social participation and communities. In fact, HSD advocates the necessity of new thinking and new ways of practicing politics.

In summary, as described briefly in Chapter 1, in HSD the development activities commence at the local level, building relationships of self-reliance that stimulate similar behaviour at higher levels. To achieve complementary top-down development support, the bottom-up driven development of networks of relationships around aligned interests between the different levels is required (Chigona *et al*.,2009).

2.2.5.4   Human needs

As mentioned before, HSD development also considered new thinking about practicing politics to be necessary and Max-Neef developed a theory of human needs for development as the departure point for a "new political praxis" (Max-Neef *et al*., 1991:11). Max-Neef is probably best known for this theory of human needs that "distinguishes clearly between human needs (inherent to our common human evolutionary heritage) and satisfiers (the particular means by which different societies and cultures aim to realize their needs)" and was considered by him and his co-workers to be the cornerstone of HSD and "probably the most important asset to the development debate" (Cruz, Stahel & Max-Neef, 2009:2024).

2.2.5.5   Use of the HSD methodological framework

An example of the use of the methodological framework of HSD is outlined. Needs and satisfiers are dealt with in Section 2.3.

Human scale development research focused on participatory action research in many communities in Latin America (Max-Neef, 1992) and a methodological framework was developed that has been used by community organisations and researchers. A fairly recent example is the use of HSD by Guillen-Royo (2010) to "underpin bottom-up strategies for wellbeing and sustainability" (:386). The HSD framework was chosen by Guillen-Royo since it engages individuals and groups in problem diagnosis and solution design and "provided a participatory tool for development practitioners that enables people to identify, through discussion groups, the hurdles that impede the satisfaction of human needs in their community" (:385).

2.2.5.6   HSD and sustainability

The HSD approach has been found to be especially useful to support sustainable development since "long-lasting sustainable initiatives develop from the bottom-up and include a wide array of interlocked transformations" (Guillen-Royo, 2010: 385) (see Section 2.3). To increase the scope of the application of the HSD approach, methodological extensions have been developed for use in the evaluation of development policies, strategies and new technologies (Cruz *et al*., 2009).

2.2.6   Sustainable Livelihoods

2.2.6.1   Introduction

The critical reaction to the rapid evolution of the thinking and execution of development initiatives in the 1970s and 1980s was summarised by Chambers and Conway (1992) as a reaction to disciplinary reduction. Development theory and practice required cross-linkages between economics, ecology and the social sciences in general to develop concepts that can be used to gain insights and be used in practice to support decision-making (ibid.).

An example of the cross-linkages required was the use by the World Commission on Environment and Development (WCED) of the integrative concept of 'sustainable livelihood security' to reflect the interplay between basic needs, secure resource ownership, and long-term resource productivity (WCED, 1987). In addition to Chambers & Conway (1992), researchers such as Bebbington (1999), Carney (1999) and Ashley (Ashley & Carney, 1999) were also working with livelihoods as a conceptual frame. Chambers & Conway (1992) stated that consensus had emerged that *capability* (Sen, 1984), *equity*, *sustainability* (e.g.

environmental concerns (WCED, 1987) and self-reliance) were the key concepts. The concepts can be used normatively or descriptively and can be used in an empirical fashion (e.g. observed or measured).

The consensus around sustainable livelihoods developed during the late 1990s into a portfolio of similar approaches used by intergovernmental organizations (e.g. UNDP), bilateral donors (e.g. DFID), non-governmental organizations (e.g. Oxfam), and research institutes (e.g. the Institute of Development Studies in Sussex and the Overseas Development Institute in London).

The widely adopted definition of sustainable livelihoods is:

> *A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.* (Chambers & Conway, 1992:6)

In this definition of a livelihood, the term capabilities as described by Sen (1984) is used as a broad definition, within which a subset of livelihood capabilities are defined that include the ability to find and make use of livelihoods, and, in general, being proactive to deal with adverse external conditions and seek new resources (Chambers & Conway, 1992).

2.2.6.2   Sustainable Livelihoods Framework (SLF)

The sustainable livelihoods definition was adopted and used by DFID (1999) in its Sustainable Livelihood Guidance Sheets. The reference to sustainable livelihoods is used in general as a set of guiding principles, consolidated best practices in development, and as a livelihoods analysis tool to understand the balances or imbalances between elements in systemic fashion and design interventions accordingly (see the comprehensive review of sustainable livelihoods in Brocklesby & Fisher (2003).

The core principles of the Sustainable Livelihoods approach as articulated by DFID (1999) are that development interventions should be: *people-centred*; *responsive and participatory* (participants as key actors in own development); *multi-level* (local-level activity informs policy and defines enabling environment, policies and institutions provide support for participants' development based on their unique strengths); *conducted in partnership* with public and private sector; *sustainable* (balance maintained between key dimensions of economic, institutional, social and environmental sustainability), and *dynamic* (flexible responses required to changes in participants situation).

The SLF as used by DFID (1999) is depicted in Figure 3.
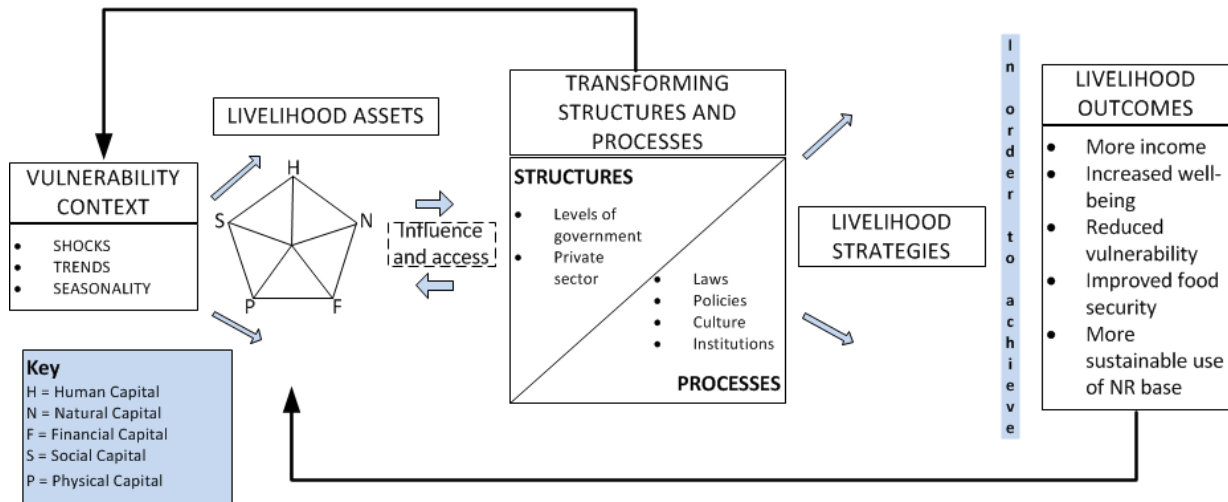
Figure 3 Sustainable Livelihoods Framework (DFID, 1999)

The main components of the SLF framework are the *vulnerability context* in which people live, the *livelihood assets* which are used to develop *livelihoods strategies* (choices and activities) to achieve the *livelihoods outcomes,* and the *transforming structures and processes* (e.g. policies, institutions, culture) (DFID, 1999). These structures and processes interact with the livelihood assets influencing people's access to livelihood assets, and may also influence the vulnerability context (e.g. by providing aid in a drought). These are the interactions between micro-level activities and the meso- or macro-level contexts of institutions and policies. In the case of DFID, the application of the sustainable livelihoods approach has mainly been in rural areas (Chambers & Conway, 1992).

The livelihood assets are described as capital assets: *social capital* (formal and informal relationships), *natural capital* (natural resources, e.g. land and clean air), *financial capital* (stocks such as savings and inflows such as income), *physical capital* (basic infrastructure and physical goods – transport, water and energy supply, communications) and *human capital* (skills, knowledge, capacity to work, and good health, amount and quality of labour available) (DFID, 1999). Researchers have modified the set of livelihoods assets, for example by sub-dividing social capital into socio-cultural and socio-political capitals to reflect the influence of the socio-political aspects of a society (Moore, Hulme & Shepherd, 2001) or adding cultural resources (Kleine, 2010). The motivation presented by Kleine for increasing the set of the livelihood assets (capitals) is discussed in Section 2.6.4 on the Choice Framework.

The SLF is important to this study since it introduces social capital as one of the livelihood assets. Culture (e.g. the norms and values that influence social capital) is recognised as a transforming structure that influences people's access to livelihood assets (e.g. human capital and financial capital), and culture may also influence the vulnerability context (e.g. via norms regarding mutual support in a community). The major critique of SLF by Kleine (2010) was that livelihood outcomes combine the goals of participants and DFID and that therefore the freedom of choice as advocated by Sen is compromised.

2.2.6.3   Sustainability
DFID acknowledged that sustainability has multiple dimensions, which were described using desirable characteristics of livelihoods and the four key overarching dimensions (DFID, 1999:Section 1.4). The general principle is that sustainable systems build rather than deplete their capital (assets) base over time and, in

the case of the livelihoods approach, the five capitals should increase to sustain the long-term improvement in livelihoods.

Livelihoods are considered sustainable by DFID when they "are resilient in the face of external shocks and stresses; are not dependent upon external support (or if they are, this support itself should be economically and institutionally sustainable); maintain the long-term productivity of natural resources; and, do not undermine the livelihoods of, or compromise the livelihood options open to, others" (ibid.).

In the context of this research on the role of social capital in the sustainability of a development initiative, the SLF includes social capital as a livelihood asset and social sustainability is included as a dimension in the core principle that development interventions should be *sustainable* via a balance between various dimensions (ibid.)*.* The HSD approach is instantiated in the SLF core principles of interventions being *people-centred* and *multi-level,* e.g. the recognition that local activity should inform policy, in accordance with a bottom-up driven development approach.

DFID described that "social sustainability is achieved when social exclusion is minimised and social equity maximised" (ibid.). Social capital's possible role could be the enabling of collaboration and resource sharing among all the different groups in a context, which may improve the resilience of livelihoods, reduce external dependencies, protect natural resources, and protect the livelihoods of every individual.

A key question is whether substitution between the five different types of capital can occur to increase the capitals' base. One problem is how to measure some of the capitals, but the major issue is the position adopted in 'strong sustainability' thinking that environmental sustainability is crucial to support livelihoods and that any loss in natural capital cannot be compensated for, e.g. through social or financial capital, or the use of technology (ibid.). DFID pointed out that the possibility of substitution between the capitals depends on the context in which people live.

2.2.6.4   *Summary*
The contribution of sustainable livelihoods approaches has been both conceptual and practical. These approaches enrich the understanding of community life beyond the narrow view provided by measures such as income per capital per day and employment (Brocklesby & Fisher, 2003) and include the social dimension and social capital as a livelihoods asset. The focus of development practice was shifted from general needs and resources to the individual's priorities and capacity to sustain developmental change (Brocklesby & Fisher, 2003; Kleine, 2010). From a CA perspective the principle of the freedom of choice of participants is compromised by the combination of participant and DFID goals to create livelihood outcomes (Kleine, 2010).

2.3   What is sustainable development?

2.3.1   Overview
The overview draws on work published by the researcher during the course of the PhD (Marais, 2010, 2011, 2015a). The roots of sustainable development lie in the critique of development from an environmental perspective and Payne and Phillips (2010:135) noted that this critique "gained ground in tandem with the basic needs, human development and gender critiques" and by "the end of the 1980s, environmental issues had also been incorporated squarely into the discourse of development practice, clothed in the concept of 'sustainable development'".

The frequently cited definition of sustainable development is from the 1987 Brundlandt report: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987:43). A fundamental critique of the Brundlandt report is that growth was not abandoned but seen as having to be made compatible with the achievement of other goals, which excluded the option of environmentally driven zero-growth goals (Payne & Phillips, 2010). Sustainable development as a multi-dimensional concept has been evolving continuously, with the economic dimension being augmented with social and ecological dimensions (sometimes shortened to people, planet and profit) (Fuchs, 2010). The work of the United Nations Commission on Sustainable Development to develop a set of sustainability indicators ultimately led to the recognition of the additional institutional dimension (UNDPCSD, 1996). Institutions arise from interpersonal processes, such as communication and co-operation, which result in the emergence of systems of rules that govern societal interactions. Institutional sustainability objectives include participatory political systems, non-discriminatory education and social security systems as well as gender equity (Spangenberg, 2002).

These four dimensions are not mutually independent. Griggs *et al*. (2013) argued in Nature that global environmental changes induced by human activities require every person in the world to make the transition to sustainable lifestyles, and that international coordination by the Sustainable Development Goals (SDGs) of the UN can mitigate risks if a nested concept is used. The 1987 Brundlandt report definition should therefore be redefined as: "development that meets the needs of the present *while safeguarding Earth's life support system, on which the welfare* of *current and future generations depends*" (ibid.:306, author's italics). The priorities of the SDGs should therefore be the protection of the Earth's life support system and poverty reduction (e.g. security of people and of planet).

Finally, it should be noted that sustainability is difficult to classify. Eishof (2003:170) referred to it as a "normative ethical principle" and comments as follows: "As a concept, sustainability spills over disciplinary borders, employing metaphors and insights from a number of relatively new scientific disciplines, including systems and ecological sciences. It resists simple definition." Eishof presented a process-based definition: "sustainable development can only be understood as an evolving process in which social and political institutions continuously adapt to changes in scientific knowledge, social values, and ethical concerns" (Harrison, quoted in Eishof, 2003:170). This definition is useful since it captures the realities of the global development arena, for example, the UN agencies in interaction with nation states in the SDGs process discussed below.

2.3.2   The Sustainable Development Goals (SDGs)

At the time of writing, 2015, the phrase, "the post-2015 moment" was apt, since it reflected the Zeitgeist of the year in which multiple efforts were made to develop a new vision for a better and different long-term future, to be followed post-2015, by a new global development trajectory (Gore, 2015:718).

The UN general assembly adopted a resolution on 25 September 2015 (UN, 2015b) to adopt the following outcome document of the United Nations summit for the adoption of the post-2015 development agenda: "Transforming our world: the 2030 Agenda for Sustainable Development" (UN, 2015a). The Agenda contains 17 Sustainable Development Goals and 169 targets which seek to build on and complete the Millennium Development Goals.

The goals are ambitious:

They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental. (UN, 2015b:1)

The issue of institutional sustainability has been removed, but the goals do retain the balance between prosperity (replacing profit), people and planet (ibid.). To these three P's, Peace (as a condition) and Partnership (as the means) was added to achieve sustainable development. Prosperity refers to prosperous lives and to social and technological progress 'in harmony' with nature, which is fairly vague. In the people dimension, poverty eradication is the "greatest global challenge and an indispensable requirement for sustainable development" (UN, 2015a:5).

The 17 goals are illustrated in Figure 4. Figure

Figure 4 The Sustainable Development Goals (UN, 2015b)

The agenda echoes human scale development by acknowledging the importance of regional and sub-regional frameworks to facilitate the "effective translation of sustainable development policies into concrete action at national level" (ibid.:10). Economic growth has to be sustained, inclusive and sustainable, and "people-centred" economies needs to be built (:11). Working with communities is mentioned in sustainable urban development, with community cohesion as one of the desired outcomes (:13). The dominant mode is top-down thinking, for example, statements that infer that governments will work closely on implementation with local authorities, sub-regional institutions and volunteer groups, but do not mention community structures (:15).

ICTs are mentioned in just four of the SDGs as abstracted in Table 1.

Table 1 References made to ICTs in the SDGs (UN, 2015a)

Sustainable Development Goals (ibid:18)	Reference to ICT
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	4.b Provision of scholarships in developing and least developed countries for training in ICT.
Goal 5. Achieve gender equality and empower all women and girls	"5.b. Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women" (ibid.:22).
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	"9.c. Significantly increase access to ICT and strive to provide universal and affordable access to the Internet in the least developed countries by 2020." (ibid.:25)
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	17.8 "enhance the use of enabling technology, in particular information and communications technology" (ibid.:31)

The Addis Ababa Action Agenda, adopted by the UN on 27 July 2015, focused on resources, capacity building and implementation, and is seen as an integral part of the 2030 Agenda for Sustainable Development. It foresees a Technology Facilitation Mechanism with an online platform to map information on science, technology and innovation initiatives and support the dissemination of open access scientific publications. A pervasive role for the use of ICT was not discussed.

There were quick responses from critics, for example Unwin's response on his blog:

> *The Sustainable Development Goals (SDGs) will do little to reduce poverty, will continue to propagate a world system based on inequality, and will continue primarily to serve the interests of those in the UN system and practitioners in the 'development industry'* (Unwin, 2015)

According to Unwin the many goals and targets will diffuse effort and focus and actually represent a compromise of all the different views on reducing poverty. The eight MDGs' target could not be reached in 15 years, and therefore the chances of achieving 17 goals and 169 targets in 15 years are not feasible (ibid). A major issue is that absolute rather than relative poverty is targeted and that the structural conditions that are biased towards economic growth remain unchanged, instead of dealing with the fundamentals of reducing social and economic inequalities.

2.3.3   Sustainable development approach

ICTs have been promoted (or over promoted) as being able to increase the efficiency and effectiveness of work, as key enablers of development in general, and as transforming society (Unwin, 2009). The scope of this research is an ICT-based development intervention that has demonstrated aspects of sustainability based on local dynamics and local adoption of ICT. It is an example of bottom-up driven development arising within a top-down developmental strategy that contributes experience and learning to inform the design of sustainable developmental strategies.

The prime concern is therefore development strategies and practices in the use of ICT. As argued in Chapter 1, a systems approach with respect to the analysis of the sustainability (or lack thereof) of development initiatives is required. As discussed in Section 2.2.5, the systems approach adopted in this research, is self-reliant human scale development, as conceptualised by Max-Neef *et al*. (1991) which has been used to develop a definition of sustainable development (Roode, 2002) and a sustainable development strategy

which can be applied in a bottom-up fashion to influence top-down development (Chigona *et al.*, 2009). The definition of sustainable development adopted is:

> *Sustainable development is achieved through self-reliant human scale development which flows from the individual level to the local, regional and national levels, and which is horizontally interdependent and vertically complementary.* (Chigona *et al.*, 2009:5).

The bottom-up driven development of networks of relationships around aligned interests between the different levels is required to achieve the necessary interdependence and complementarity (ibid.).

2.3.4   Focus on entrepreneurs and small businesses for sustained growth

Max-Neef *et al.*(1991:5) devoted special attention to the 'invisible sectors or the micro-organisations' since they are often ignored in the development literature, while they actually represent the reality of everyday life where productive practices link to collective survival strategies, and connections exist between social organisations, cultures and business. In addition, this formed part of the strategy of HSD to complement other bottom-up development strategies by making the invisible sectors relevant rather than marginalised.

In the section on ICT4D's role in Sustainable Development, an 'enterprise-led' development approach is discussed that illustrate the roles entrepreneurs can play in sustained growth (see Section 2.5.3).

Entrepreneurship is mentioned in two of the SDG goals:

❖ *Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.* (UN, 2015a:18)

  ➢ 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship (ibid.:21).

❖ *Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.* (ibid.:18)

  ➢ 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalisation and growth of micro-, small- and medium-sized enterprises, including through access to financial services (ibid.:23).

Goals 4 and 8 are important complementary strategies since education for entrepreneurship may grow a new generation of entrepreneurs that can be supported by development-oriented policies, e.g. access to financial services.

2.3.5   Role of social capital

2.3.5.1   Introduction

The overview draws on work published by the researcher during the course of the PhD research (Marais, 2012b). In this section a conceptual overview of social capital is provided. In Chapter 6, Social capital, the different types and dimensions of social capital are used to develop a comprehensive description of the social capital of VOs, the influences on the formation thereof, and the VOs' use of social capital.

As stated in Chapter 1, there were four reasons for the focus of this research on social capital: social capital is one of the local resources that can be used for development (see Section 2.2.6 on the sustainable

livelihoods framework of DFID); social capital had gained prominence in development policy due to the research of the World Bank (Woolcock & Narayan, 2000); the self-reliant human scale sustainable development approach relies on building networks of relationships (see Section 2.2.5), and the linkages between this sustainable development approach and the Choice Framework of Kleine (2010) is at the foundational level of social resources, but also in the interaction between agency and structure.

2.3.5.2   The fluidity of meaning of social capital

Social capital is a contested concept and has been used in widely different ways, and, as Farr (2004) summarised in a conceptual history of social capital, many articles on social capital start off by complaining about this fluidity of meaning. Woolcock (1998) referred to the many meanings and indiscriminate application of social capital, and, indeed, of other capitals (as referred to in the SLF) that resulted in weaknesses in theory and in empirical use.

Woolcock (1998) addressed these weaknesses by investigating the theory base and empirical work related to social capital. He described a chronology of the contemporary use of social capital which has been updated by the researcher. In 1920, Lyda Hanifan was an isolated example of its use, followed by Jane Jacobs (1961), Pierre Bourdieu & Jean-Claude Passeron (1970), and Glenn Loury (1977). The development of the concept has been comprehensively advanced by James Coleman (1988), Ronald Burt (1992, 2000), Robert Putnam (2000, 1995a, 1995b), and Alejandro Portes (1998) (Portes & Landolt, 2000; Portes & Sensenbrenner, 1993). Putnam's book, Bowling Alone: The Collapse and Revival of American Community (2000) introduced the concept to the public.

2.3.5.3   The theory base of social capital

Halpern (2005) considered the late 1980s as the crucial period when distinguished sociologists in Europe (Pierre Bourdieu) and the USA (James Coleman) drew attention to the concept and mainstream academic interest started to develop. Robert Putnam is viewed by Halpern to be the name associated with social capital in the academic world.

Bourdieu reacted to the dominance of the economist's worldview in policy and the social sciences, while this worldview ignored major aspects of social and economic life (Halpern, 2005). Cultural and social capital must be added to economic capital to explain the dynamics and structure of societies (Bourdieu & Wacquant, 1992). Cultural capital, or informational capital "exists in three forms, embodied, objectified, or institutionalized" (ibid.:119) and these forms can be converted to each other (ibid.). Ultimately, all forms of capital can be reduced to economic capital, which Bourdieu "defined as accumulated human labor" (Portes, 1998:3).

Portes (1998) illustrated the conversion of social capital as follows:

> *Hence, through social capital, actors can gain direct access to economic resources (subsidized loans, investment tips, protected markets); they can increase their cultural capital through contacts with experts or individuals of refinement (i.e. embodied cultural capital); or, alternatively, they can affiliate with institutions that confer valued credentials (i.e. institutionalized cultural capital).* (Portes, 1998:3)

Portes (1998) considered Pierre Bourdieu as the author of the first systematic contemporary analysis of social capital. Bourdieu defined the concept as:

> *the aggregate of the actual and potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and*

recognition—or in other words, to membership in a group—which provides each of its members with the backing of the collectivity-owned capital, a 'credential' which entitles them to credit, in the various senses of the word (Bourdieu, 1986: 249).

Social capital therefore has two elements, namely the relationships (membership) that allow access to resources of the group, and the sum of these actual and potential resources. The definition of membership of these groups can be related to family, friendship, shared ethnicity or class, or informal commonality ties such as playing or supporting a sport.

Bourdieu was against the prevailing "methodological monism of sociology that asserted the ontological priority of structure or agent, system or actor, the collective or the individual", leading to these dualistic alternatives that need to be replaced by the "primacy of relations" (Bourdieu and Wacquant, 1992:15). Sociology and social science therefore could be freed from having to choose between either action (agency) or structure since "the stuff of reality…lies in relations" (ibid.).

Giddens (1984) dealt with the same methodological monism of sociology by developing structuration theory to avoid the dualism of either human agency (the free will of people to act), or human action as constrained by social structures (e.g. religious institutions).

Giddens argued that dualism should "be reconceptualized as a duality – the duality of structure" (ibid.:xxi) and social practices are the locus of this duality, they are "at the root of the constitution of both subject and social object" (ibid.:xxii). To summarise, "The rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction… The constitution of agents and structures are not two independently given sets of phenomena, a dualism, but represent a duality" (ibid.:19, 25). In the processes of structuration, the dimensions of action and structure are simultaneously present (Turpin & Alexander, 2010). Social practices such as relations are therefore the foundation for understanding social systems for both Bourdieu and Giddens.

Finally, Nahapiet & Ghoshal (1998) argued that there are three dimensions of social capital, namely structural (the pattern of connections), relational (the sources and effects of social capital), and cognitive (shared representations and interpretations that constitute systems of meaning).

The broad scope of these discussions on the nature of social capital is narrowed down by considering empirical investigations as suggested by Woolcock (1998).

Research into social capital as a concept was based on the intuition that "the goodwill that others have toward us is a valuable resource" (Adler & Kwon (2002:18). This goodwill, as a resource, is embedded in and generated via the structure and content of an actor's social relations and can be used to support action (ibid.). Anderson & Jack (2002) referred to the puzzling nature of social capital as "both glue, which forms the structure of networks, and at the same time a lubricant that facilitates the operation of networks" (ibid,:193, see also Putnam, 2000) and concluded "that social capital is not a thing, but a process that creates a condition of social capital" (Anderson & Jack, 2002:193). The general consensus among researchers can be expressed as the fact that social relationships are central and that both an individual and the set of individuals that are all involved in relationships are enabled in some way to act individually or as a collective, thus leading to the categories of individual or collective social capital (Portes, 1998). The social relationships that form the collective system (i.e. an organisation or a form of group) are called internal social relationships, while external relationships are those between those inside a system and any other people. Internal relations are generally referred to as "bonding" (Adler & Kwon, 2002), while external

relations are "bridging" (Woolcock, 1998), leading to the reference to bonding and bridging types of social capital.

Social capital is therefore about relationship networks that enable or inhibit certain outcomes; bonding social capital refers to what binds individuals and groups and what occurs inside these collectives, while bridging social capital links disparate groups to form an extended network (Woolcock & Narayan, 2000, Grunfeld, 2011). The definition of social capital used in this research is that by Farr who, following Putnam (2000), combined the concepts of networks, norms and trust to define social capital as:

> *the network of associations, activities, or relations that bind people together as a community via certain norms and psychological capacities, notably trust, which are essential for civil society and productive of future collective action or goods, in the manner of other forms of capital*" Farr (2004:9)

Halpern (2005) identified the three basic components in any form of social capital as the existence of a network, a set of shared "norms, values and expectancies" (:10), and sanctions that assist in maintaining the norms and the network.

A third type of social capital is linking social capital, which was defined by Woolcock (1998) in the context of his definition of two levels – micro (the community level) and macro (the society and state level) – as linkages to those outside the community who can provide access to resources not available at community level.

The concept of linking capital has been used by other researchers in broadly the same way to refer to linkages among unlike people in dissimilar situations, such as those who are entirely outside the community and at different social strata in a hierarchy of power, social status and wealth (Field, 2003 in Thapa, Sein & Sæbø, 2012). Clark (2010) referred to the use of the concept of 'linking' social capital to "describe the ability of groups to engage vertically with external agencies to influence policy or access resources" (: 207). This concept articulates the "vertical alignment of interests" that Chigona *et al*. (2009) refer to as discussed in Chapter 2.

The difference between linking and bridging capital is that bridging capital refers to general external relationships with people and institutions that are functioning in the same geographical community, an example being the principal of a local school, while linking capital refers to relationships with people who function in larger scope, such as the manager of the schools in the many communities that constitute an educational district. Halpern (2005: 25) views linking capital as "a special form of bridging social capital that specifically concerns power – it is a vertical bridge across asymmetrical power and resources". Field (in Thapa, Sein, & Sæbø, 2012:8) preferred to define bridging social capital narrowly as something that "denotes ties among distant friends and associates, as well as between institutions such as religious organizations, and civil rights movements", in other words, between groups of approximately equal status. The definition of linking capital used in this research is that of Halpern, which affirmed the vertical aspect of links up and down the levels of power and resources in a society.

2.3.6   Levels of social capital

2.3.6.1   *Macro- versus micro-level social capital*

In the development context social capital has been identified as one of the possible conceptual frameworks to link a developmental initiative to the growth of collective action, via the building of networks and the associated embedded resources in these networks (Thapa, Sein, & Sæbø, 2012; Ostrom, 2000; Putnam,

2000). An individual perspective on development was provided by the access to additional resources that are enabled via social capital (Dıaz Andrade & Urquhart, 2009).

Halpern (2005) summarised the debate between social capital as a macro-level concept referring to large scale networks (national, regional, community level) and as a micro-level concept at the networks formed at the family level. He developed an approach that covered "both poles of the macro-micro division" and recognised the reality of interactions in society such as substitutions of social capital at the one level for that at the other level (ibid.:18). This approach was called social capital as a multi-level concept.

2.3.6.2 Social capital as a multi-level concept

Halpern (2005) created a conceptual map based on the multitude of arguments about the concepts of social capital, where each of these arguments was identified as describing a different dimension of social capital, all of which are largely independent of or perpendicular to each other.

Three major dimensions were identified:

1. *components – networks, norms, sanctions;*

2. *levels or domain of analysis – individual, group, community, nation, etc.;*

3. *character or function – bonding, bridging, linking.* (Halpern, 2005:26)

The assumption is that an interest in a person's social capital in context involves an understanding of the close relationships (bonding capital) that are mostly family networks, the norms of these relationships and the sanctions that occur when the norms are not obeyed (ibid.). Naturally, a person's networks extend to friends and other acquaintances and constitute links to people outside the ambit of the immediate network (bridging capital), followed by the key relationships with people who have varying degrees of power and resources to influence the person (linking capital).

If we stand back, the bigger picture includes the influences in the form of connections with networks of other people in the neighbourhood and community in which the person lives and works, and what is seen to be "normal" for this community. Do nuclear families live in isolation from each other, or is communal involvement the norm? This is the meso level. The next level up is the regional or national level and the nature of bonding, bridging, and linking networks, norms and sanctions at this level, the macro level.

The argument for dealing with this as a whole is that there are systemic relationships between the dimensions consisting of the components, character, and levels of analysis. The arguments for relationships between the components are more clearly defined, as networks are partly defined by group norms and, vice versa, group norms are formed via networks (Tajfel, 1970). The norms of groups are enforced via sanctions that can only be as effective as the degree of shared norms and the degree of closure of the networks (Coleman, 1988). Halpern argued that:

> *Similarly, it seems very likely that the micro-, meso- and macro- levels of social capital have some kind of empirical, causal relationship to one another. The case for describing the character of and trade-offs between the different functions of social capital – bonding, bridging and linking – also seems very strong. They are complementary functions per definition*. (Halpern, 2005:28)

The existence of causal relationships among these dimensions forms the argument for treating the components, functions or character of social capital, and levels of analysis, under the same umbrella term

of "social capital" (ibid.). The implication for research is to investigate how the whole is more than the sum of the parts. All three dimensions are shown in Figure 5.
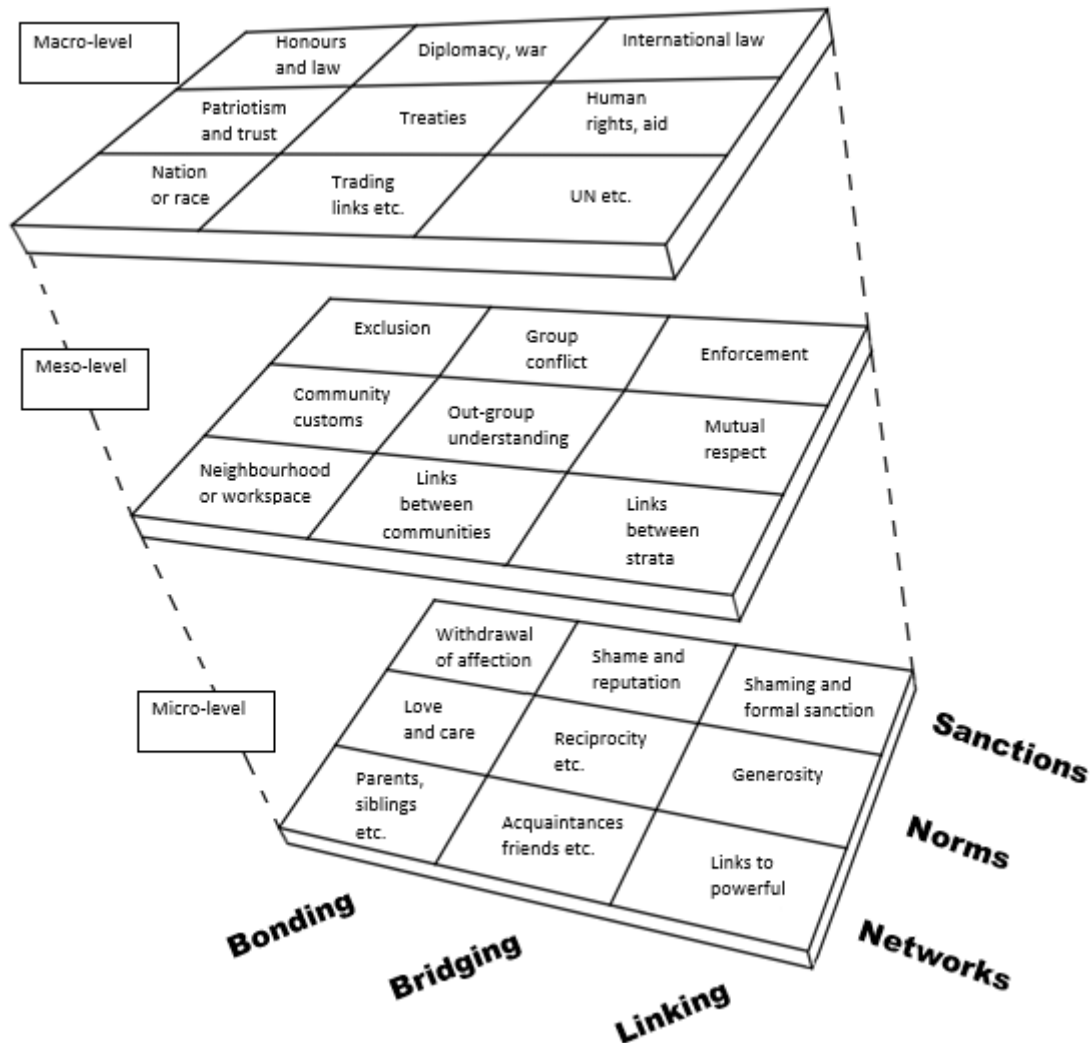
Figure 5 Social capital concepts (Halpern, 2005:27)

The other major argument for treating these dimensions as a whole is that, at least at the component level and to a lesser extent with respect to the character of social capital, a degree of functional equivalence exists – these dimensions can substitute or compensate for each other (Halpern, 2005; Coleman, 1988, 1990).

In a close-knit community explicit norms are not required for functioning – the unspoken rules are known (Katz, 2000). If the network is less closely connected, clearly defined norms and the application of sanctions may still enable it to function well (ibid.). Similarly, codes of conduct within a nation state may substitute for some of the functions of close-knit communities (Halpern, 2005).

The phenomenon of urban migration from close-knit rural communities may be seen as an example of individuals choosing to forgo the bonding capital of the rural community for the opportunities of developing bridging capital in the diverse urban context (ibid.). It may also be that the urban context

provides more opportunities for building linking capital via the closer proximity to the physical seat of the sources of power at regional and even national level.

2.3.6.3 The empirical base of social capital

Woolcock (1998) contended that significant empirical and theoretical advances occurred in "the late 1980s and 1990s from two distinct literatures within the so-called 'new sociology of economic development', namely ethnic entrepreneurship studies (at the micro level), and comparative institutionalist studies of state-society relations (at the macro)" (:161-162).

Woolcock (1998:162) presented a synthesis of these studies based on the fact that they shared as central concepts two complementary forms of social capital, called 'embeddedness' and 'autonomy'. Woolcock used the two levels (micro and macro) and the two types of social capital (embeddedness and autonomy) to create a broad canvas upon which the role of social capital in a society's development was sketched (Figure 6).
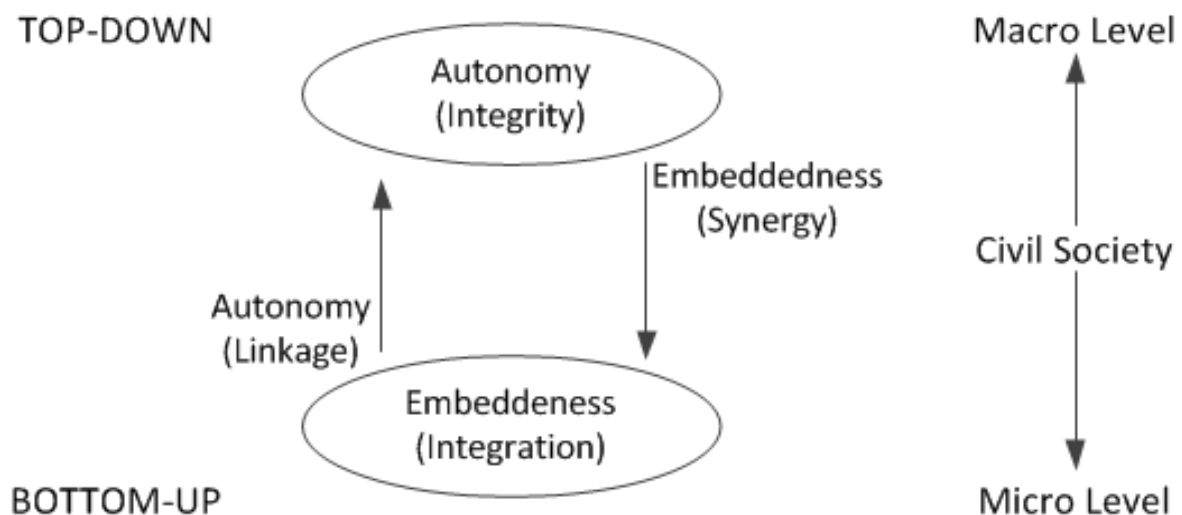
Figure 6 Top-down and bottom-up development and the forms of social capital (Woolcock, 1998:165)

Granovetter (1985) introduced the concept of embeddedness to sociologists and argued that "all economic action was inherently enmeshed in social relations of one configuration or another, and that development essentially brought about a change in the kind, not degree, of embeddedness" (Woolcock, 1998:162). Furthermore, embeddedness has different forms such as "social practices, social ties, cultural practices" (:163) and there are benefits and costs. There would be, for example, a cost associated with moving from local market exchanges in a village to becoming part of the exchanges of a bigger and more formal market system. A cost benefit analysis therefore has to include an analysis of the complementary set of interactions with those *outside* the close-knit group, what is called autonomous social ties. At the macro level these ties refer to, for example, the professional ethos which commits policy makers to pursue collective goals. Autonomy, just as embeddedness, is different at micro and macro level. To sum up, Woolcock states that:

> *embeddedness at the micro level refers to intra-community ties, whereas at the macro level it refers to state-society relations; autonomy at the micro level refers to extra-community networks, while at the macro level it refers to institutional capacity and credibility.* Woolcock (1998:164)

Embeddedness at the micro level is called *integration* (intra-community) and at the macro level it is called *synergy* (state-society relationships), while autonomy (extra-community networks) at the micro level is referred to as *linkage* and at the macro level (i.e. institutional capacity), as *organisational integrity* (ibid.) (Figure 6)

Using different combinations of these four dimensions of social capital, Woolcock (ibid.) explained a wide spectrum of development outcomes. In Woolcock's view social capital is a very necessary, but also very problematic resource for achieving developmental outcomes, and it can be used to explain so-called bottom-up (grassroots) and top-down dilemmas in development.

An example of a bottom-up developmental dilemma caused by a certain combination of social capital is that very tight community social ties (high integration) may be accompanied by a lack of trust of outsiders, hence very few relationships and exchanges with outsiders (low linkage), thus leading to limited value exchanges with the bigger world outside the community (ibid.). Woolcock's summary of relevant research is that, in successful bottom-up development programmes, "linkages to broader extra-community institutions are forged incrementally; a community's stock of social capital in the form of integration can be the basis for launching development initiatives, but it must be complemented over time by the construction of new forms of social capital, i.e. linkages to non-community members" (:175).

In the case of top-down development dilemmas, the mutual influence in state-society relationships to achieve a developmental state is very important. A case in point is India, where a fairly well organised civil service (a moderate level of organisational integrity) has weak ties to the private sector (low level of synergy), leading to a 'weak state' with high ideals that cannot, in practice, deliver services to the citizens and cannot support business development (ibid.). The ideal for top-down development is that "any institution with a developmental agenda must be at once engaged with the communities it seeks to serve and capable of maintaining its own credibility and effectiveness" (:178).

The solution to these dilemmas lies in recognising the need for social relations that connect "top-down resources and bottom-up capacity building" (:179). To achieve this, both top-down and bottom-up development need to participate in a dynamic interplay where, "in the case of bottom-up development, intensive extra-community ties (integration) must begin to coexist with more extensive albeit 'weaker' extra-community networks (linkage), while at the same time top-down combinations of state-society relations (synergy) must coexist with cohesive corporate ties (integrity)" (:180). This is an apt description of the principles and strategies of human scale development (see section 2.2.5).

To summarise, Woolcock (ibid.) saw social capital as a critical constituent of development since it can enhance or destroy other capitals such as physical or human capital, and mediates development outcomes through embedded and autonomous social relations that can resolve macro and micro level social dilemmas.

While Woolcock (ibid.) did recognise that power can also play a role in influencing development outcomes, he stressed that the principal mediation takes place through social relations. Critique of Woolcock's position has emerged: for example, Kleine (2007) argued that the concept of linking social capital (mostly linkage to those with more resources) accepts inequality and may even celebrate the entrenched structural dependencies. Urquhart, Liyanage & Kah (2008) referred to the possibility of negative social capital formation via gangs and corrupt relations. Schuurman was concerned that use of the concept of social capital may underplay inequalities in power and cited John Harriss' warning against usage of social capital since it is "consistent with the neo-liberal agenda of reducing the role of the state, partly in order to make possible large cuts in public expenditure" (Harriss, quoted in Schuurman, 2003:992).

2.3.7 Summary

The history of sustainable development as a development imperative has grown from environmentally driven concerns to a multi-dimensional concept that includes human rights and the means to achieve sustainable development. The SDGs are therefore summarised as people, planet, prosperity, peace and partnership. Climate change has shifted the focus to well-defined targets, and the means (global partnerships) to achieve them. A major critique of the SDGs is that the structural conditions that are biased towards economic growth remain unchanged, which means that social and economic inequalities are not being adequately addressed. The incorporation of ICTs in the SDGs was also considered inadequate given the potential influence they can have.

The sustainable development approach used in this research is based on self-reliant human scale development and a definition of sustainable development based on this approach was selected. Enterprise-led development is congruent with human scale development and is mentioned in the SDGs as well. The major part of this section consists of uncovering the many aspects of social capital, from both a theoretical perspective and empirical research. Social capital is about relationships that allow access to resources of the group, and the sum of these actual and potential resources. The concept of social capital leads to interactions between structure and agency. The theorists Bourdieu and Giddens agreed that dualistic views of structure or agency should be replaced. Giddens argued for duality, the duality of structure and agency.

Woolcock described two levels (micro and macro) and the two types of social capital (embeddedness and autonomy), which he used in different combinations to explain a wide spectrum of development outcomes. He viewed social capital as a necessary, but problematic resource that can be used to explain bottom-up and top-down dilemmas in development since it can enhance or destroy other capitals such as physical or human capital and mediates development outcomes.

In Chapter 6 the social capital of Village Operators is described and the benefits analysed.

2.4 What is ICT for Development (ICT4D)?

2.4.1 Overview

As discussed in Chapter 1, the definition of ICT4D is dependent on the person providing the definition as Tim Unwin (2009:360) remarked: "How we define ICT4D depends entirely on the development perspective that we adopt." Unwin (2009:1) distinguished between development perspectives that focus on economic growth and those that focus on participation and empowerment (i.e. more on human development), and proposes that "ICTs can have a key role to play in delivering both of these contrasting views of development." Based on an analysis of ICT4D initiatives, Unwin (2009:371) developed two broad classifications: market-led ICT4D with an emphasis on economic growth, and socially-led ICT4D that focuses on equality of access. These are recognised to be extreme positions, with most ICT4D initiatives fitting in between these positions. The main topics in this section is summarised in Figure 7.
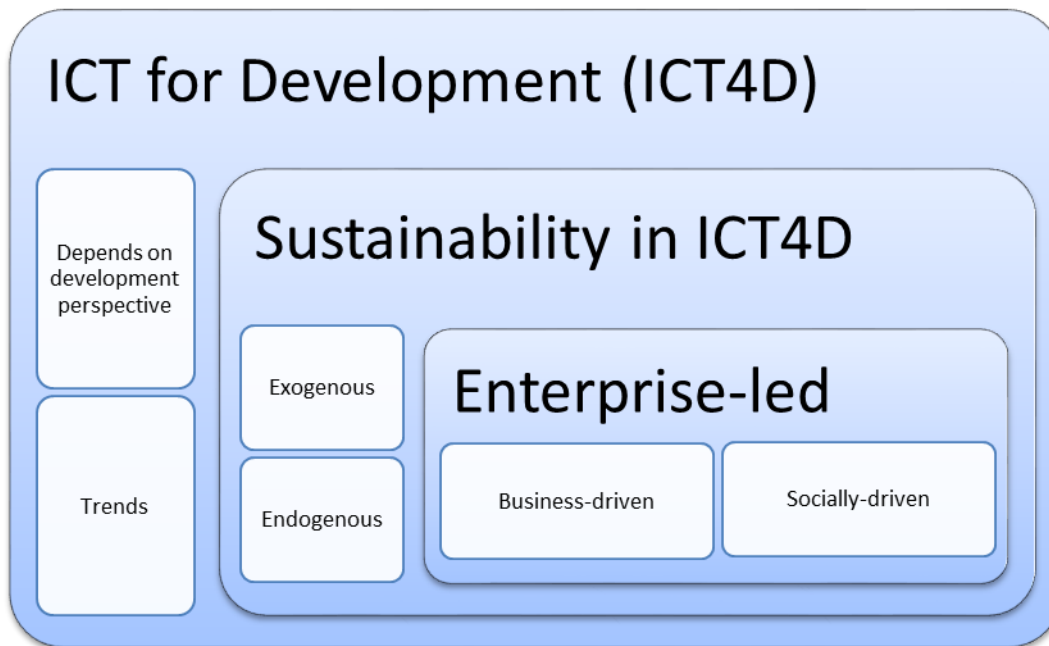
Figure 7 An overview of the ICT4D topics

2.4.2   Trends in ICT4D

This discussion draws on an overview developed by the researcher (Marais, 2011). Heeks (2008) described the evolution of ICT4D in three phases: ICT4D 0.0, 1.0 and 2.0. In the first phase, until about 1990, computers were used in government administration and by multinationals to foster economic growth. From the mid-1990s onwards, ICT4D 1.0 started as development actors such as the World Bank called for the adoption of ICTs as a tool for development – a call which was in response to the growth of the internet and the adoption of the Millennium Development Goals (MDGs). Due to the need for a rapid response to the plight of poor, rural communities, a popular choice was the deployment of telecentres to deliver information, communication and various services. The many failures that occurred in telecentre initiatives led to new 'watchwords', namely sustainability, scalability and evaluation (:27).

In reaction to these failures, many new approaches to ICT4D have been propagated. Heeks (2008) referred to ICT4D 2.0 as the next phase in using ICTs to achieve development aims, and stated that it differs from ICT4D 1.0 in viewing ICTs not just as a tool for development, a means to an end, but as "the platform for that development" (:33). ICT4D has transformative potential, and the focus is on the use of ICT as a productive tool. Heeks (2010) also referred to this as a new approach to development, "Development 2.0" that contains "new IT-enabled models that can transform the processes and structures of development" (:22).

Thompson (2008:825) also wrote about "Development 2.0", arguing that the increasing use of ICT by people in development contexts means that ICT has become not just an assemblage of hardware, software, and user behaviour, but an "architecture of participation". Thompson highlighted what he considered to be the considerable power of ICT-enabled social networks to transform the dynamics of group interaction, potentially driving increased calls for a much more plural and collaborative development.

Heeks (2008) stressed active participation and stated that new ICTs can be moulded by people themselves to fit their objectives and can be used to produce digital content and services to create income. There is a move from a passive diffusion view of technology and development (the market will deliver) to an active

innovation view (ICT4D2.0) where intervention is required via innovations to achieve development goals (Heeks, 2008). These innovations can be created in different ways: *pro-poor* (for the poor), *para-poor* (working with the poor) and *per-poor* (innovation by the poor in their communities). The new ICTs, which include social technologies and ubiquitous mobile communications, enable per-poor innovation that empowers people.

Spence & Smith (2010) identified five main stories in their assessment of trends in the use of ICT for poverty reduction between 2003 and 2009. The stories are the explosive growth in universal access via mobile phones that enabled new and expanded economic and social services, openness, human development with increased attention on capabilities and freedoms (inspired by Sen's work), and innovation.

An in-depth discussion of the role of ICT4D in innovation is presented in Chapter 8, Networks of innovation, section 8.2.1, to describe the shifts in ICT4D towards innovation.

2.5   ICT4D's role in sustainable development

2.5.1   Overview of discourses

Chigona *et al*. (2009:3) sub-divided human development approaches and referred to 'technocentric' and 'sociocentric' approaches. Technocentric approaches aim to provide ICT and access to it. Such approaches are mostly top-down, expect development to happen if access to technology is provided, and in practice disregard the actual needs of people. Sociocentric approaches put people and their developmental needs first and foremost and are an example of human scale development. They coined the phrase "socio-techno divide" to refer to the difference between these approaches (ibid.:3).

Leye (2009) adopted a similar position and stated that "the bulk of the ICT4D discourse does not question the assumption that ICTs necessarily stimulate economic growth and combat poverty", and critiques the assumption of ICT4D advocates that "technologies are autonomous forces or independent variables causing change in every domain of human life" (:30).

Mansell (2011, 2014) analysed key ICT4D discourses among major development agencies and found that an 'exogenous' model for development prevails. Exogenous refers to an external cause, i.e. using ICT as an intervention from the outside to fill knowledge and technology gaps in a developing country. These models are frequently accompanied by a "Western-centric and universalist model of economic growth and development" with a typically neoliberal emphasis on market-led development (Mansell, 2011:2). In contrast, 'endogenous' refers to internal causes, i.e. 'practice-based approaches' that work with local communities to define ICT intervention strategies (:4). This corresponds to Heeks' *per-poor innovation* model. These approaches include interpretivist socio-technical perspectives and acknowledge multiple knowledges and multiple models for development. Endogenous models have been dominated by exogenous models in ICT policy discourses due to the influence of neoliberal policy which emphasises market-led development where the interests of sellers of technology and content often prevail (Mansell, 2011). It is encouraging that Mansell did find some evidence of the endogenous model (for example in UNESCO reports), but, disappointingly, Mansell (2011:11) concluded that "the interpenetration of the exogenous and endogenous models has not resulted in a consistent distancing of the latter from the former in a way that encourages departures from advocacy of investment in technology as a solution."

The theme of the transformative potential of ICT use, as discussed in the previous section via the work of Heeks (2010, 2008) and Thompson (2008) was extended by Avgerou (2010). She researched the literature on Information Systems in Developing Countries and could discern *progressive* and *disruptive* perspectives on ICT-enabled developments. The progressive perspective sees ICT as enabling transformations in the multiple domains of human activities, but within the existing social order, while the disruptive perspective focuses on the politics and controversies surrounding development, and considers conflicts of interest and struggles of power as a necessary part of the innovations of ICT4D.

Some of the key aspects of a system that can be targeted by ICT4D in a transformative development strategy are: ICT as institutional enabler, as enabler for governance, accountability, and civil society (e.g. via increasing transparency), as enabler in service production and economic activities, and as enabler for access to global markets and resources (Thompson & Walsham, 2010).

2.5.1.1 The Sustainable Development Goals

As mentioned in section 2.3.2, the Sustainable Development Goals have disappointed ICT4D researchers due to the very limited attention paid to the possible transformative role of ICTs.

ICTs are mentioned in just four of the Goals: the need for training in ICT to support education and lifelong learning (Goal 4); enhance the use of enabling technology, in particular ICT, to promote the empowerment of women (Goal 5); the need for universal and affordable access to the internet to promote inclusive and sustainable industrialisation and foster innovation (Goal 9); and ICT as enabling technology for the implementation of sustainable development (Goal 17).

Unwin (2015) pointed out that the only focus on ICT *per se* is in Goal 9, regarding universal access, while in all the other goals ICTs are viewed as *enablers*. Unwin lamented the fact that the SDGs do not mention the significant difference that ICTs can make in the lives of people with disabilities, who constitute 10% of the world's population. The main thrust of his reaction is that the SDG agenda does not acknowledge and deal with the critical role of ICTs in shaping and indeed transforming contemporary development, which has led to great good, but has also created great inequalities (Unwin, 2014). The failure of the SDGs to deal with the deep structural issues, e.g. poverty and marginalisation, mean that ICTs will continue to contribute to greater global inequality (Unwin, 2015).

2.5.2 Sustainability in ICT4D initiatives

2.5.2.1 What is the development perspective adopted?

As discussed in Chapter 1 and in this chapter (Section 2.4.1), the very definition of ICT4D is dependent on the development perspective adopted by the person providing the definition, which can be summarised using the classifications of Unwin (2009): market-led ICT4D with an emphasis on economic growth and socially-led ICT4D that focuses on equality of access. The sustainability of an ICT4D initiative depends largely on the development perspective that is adopted and therefore the sustainability of market-led ICT4D will depend on market forces, e.g. are people willing to pay for the value delivered to them?

Socially-led ICT4D will depend on external funding and sustainability depends on whether donors and/or government are willing and able to pay for the value delivered in terms of cost-effective contribution to *their* developmental goals. Most ICT4D initiatives fit in between these positions (ibid.). Some development initiatives remain a government's responsibility and sustainability is then a matter of political will and implementation ability, in other words, institutional sustainability.

In all ICT4D initiatives, no matter what the development perspective is, a vital and practical question is "Whose interests prevail?" In practice, if an exogenous model is adopted, the interests of the sellers of technology and content often prevail (Mansell, 2011). In a truly endogenous model, internal causes driven by a diversity of community interests will prevail in "working with" practices to develop and implement ICT interventions such as per-poor innovation (Heeks, 2008).

The above discussion needs to be augmented with the difference between *progressive* and *disruptive* perspectives on ICT-enabled developments (Avgerou, 2010; Heeks, 2008; Thompson, 2008). In a progressive perspective concerning ICT-enabled transformations, the status quo is largely accepted and maintained, while a disruptive perspective adopts a critical stance and embraces the messiness of conflicts of interest and power struggles as part and parcel of ICT-enabled transformations and, therefore, runs the risk of becoming a victim of a power struggle.

The question can be broadened by asking if the strategy of the ICT4D initiative has taken into account that sustainable development is multi-dimensional with economic, social, ecological, and institutional dimensions (see Section 2.3.1.).

Having asked the strategic questions, we shift to the practical, on-the-ground design and implementation issues that will always be important.

2.5.2.2   What are the practical issues influencing sustainability?

Sustainability is only one of the many factors that influence success in ICT4D, for example, ICT4D practitioner insights have been summarised as eight interrelated principles for ICT4D success: a focus on needs, designing appropriate technology solutions, sustainability, vision and commitment, infrastructure, effective partnerships, monitoring and evaluation, and addressing issues of accessibility (Unwin 2009). These principles are echoed in common practitioner-based themes for success such as design (for local realities), governance and sustainability (socio-economic and political) (Heeks, 2010).

Research on rural ICT sustainability has added societal issues of a social, cultural and political nature (Armenta, Serrano, Mayer & Conte, 2012). Pade-Khene, Mallinson & Sewry (2011) developed two case studies of rural ICT projects, using social, institutional, economic/financial, political and technological categories to develop 19 critical success factors that need to be considered in the implementation and the management of rural ICT projects to further sustainability. Pade-Khene *et al*. (2011) called for a holistic view of a project in the "greater community context", rather than a narrowly technological focus, and identified the key issues as "economic (production, management, and use of resources in the rural community, etc.), technological (choice in technology), and rural society (social, cultural, and political) issues." (:191).

2.5.2.3   It is not about the technology

The fundamental rural ICT4D sustainability issues identified above have received support from Kentaro Toyama as part of his 'conversion' from a technically-based computer scientist view on ICT4D. His research and experiences have convinced him that the essence of the failure of ICT4D initiatives does not lie with any technology-related issues, since technology is only a multiplier of human intent and capacity, and cannot substitute for it (Toyama, 2015, 2011a, 2011b, 2010). The fundamental reality is that what is required is "a substrate of positive intent and high capacity among individuals and institutions – the exact substrate that is in stunted supply where social challenges persist" (Toyama, 2015:66).

The consequences of this approach are wide-ranging: since technology cannot substitute for the lack in institutional capacity and positive human intent, and technology tends to amplify inequalities, technology

projects are most successful when they amplify existing successful development initiatives or positive intent, rather than trying to fix or replace institutions (governmental or non-governmental) that are broken or absent (Toyama, 2010). This puts the human dimension of ICT4D in the foreground and clarifies the dependence of the impact of technology on the socio-political systems and positive or negative human intent. Technology use may exacerbate inequalities and divides of various kinds. The real development need is to address the power relationships which perpetuate these inequalities.

In summary, for ICT4D interventions to be sustainable, the role of technology is limited while the human dimension is paramount. In each of these summaries or perspectives on sustainability issues, the focus is wider than the individual project and includes the greater context within which the project is conceptualised and executed, and within which it ultimately has to become sustainable. Sustainability is the outcome of a combination of endogenous and exogenous factors. When project sustainability is being considered, the unit of analysis is always greater than the project itself and the actual scope and extent of the system that is relevant to sustainability needs to be considered, for example community level uptake of internet access combined with the economics and politics of national broadband access provision.

The human scale development or socially-led approaches can indeed start with one person. As soon as there is some human capacity that can be amplified by technology, and if there is positive intent, a positive feedback loop of change can be initiated. The champion or visionary leader role is required at many levels and vision and commitment is included as one of the eight interrelated principles for ICT4D success (Unwin, 2009). It has also been found that the single best predictor for the success of telecentres in India was the presence of a local, capable and motivated champion (an entrepreneur or a member of an NGO) that invested time and effort to keep a telecentre going (Toyama, 2011). The focus should not be on the identification of a champion to assist with quick achievement of the ICT4D project's goals, but the champion (or champions) can self-identify, emerge from community structures or be grown gradually with the assistance of the external resources. One of the key roles of the champion, in a human scale development approach, would be to play a role in building a network of aligned interests in communities and assist in growing networks between communities.

In research about the influence and roles of ICT4D champions, a networking role was prominent. Renken & Heeks (2013) analysed ICT4D literature to determine what constructs describe 'ICT4D project champions'. Three constructs emerged:

> *i) Champions are concerned with **Results** – …they have a strategic vision about successful project outcomes and even beyond; ii) Champions are concerned with **Relationships** – actively engaging with various project stakeholders with the purpose of promoting ideas, rallying support and building consensus; and, iii) Champions are concerned with **Resources** – actively identifying and mobilising needed resources – material and intangible – to advance the project.* (Renken & Heeks, 2013:2)

Social capital was found to be a useful construct since it describes how champions use *Relationships* to promote, build support and consensus as well as gain access to the required *Resources* (tangible and intangible) to grow the project.

In accordance with the human scale development principles, relationship networks between champions at different levels in the hierarchy of systems to the national level can serve to align interests to build additional networks to support the bottom-up flow of self-reliance and the top-down flow of support. Champions require support since it is a very demanding role. This support should, ideally, be both local and externally based and needs to be sustained since the development of such champions takes time. The

development of the social capital required by champions to exercise leadership that gets work done through others (Brass, 2001) also requires focused effort and time. Since the typical ICT4D project does not get funded for a long enough period to invest enough time and effort to grow and nurture champions, alternative sources of funding and expertise is mostly required to sustain the 'incubation' and on-going support of these champions (Van Rensburg, Smit & Veldsman, 2007).

2.5.3   A focus on entrepreneurs for sustained growth

This research considers an enterprise-led development strategy in the South African context. Enterprise-led development strategies that are informed by social values lie in-between market-led and socially-led ICT4D strategies (Unwin, 2009 - see Sections 2.4.1 and 2.5.2.1). From a sustainability perspective these strategies are interesting because of the different combinations of a purely commercial and a socio-political basis for sustainability, which leads to a balance between self-reliance and external support. These strategies could start from different ends of the two extremes and migrate over time towards the middle.

An example is the strategy suggested by Heeks (2008), who advocated the use of ICTs to produce goods and services that create jobs and income, possibly via the creation of ICT-enabled microenterprises. Telecentres doing 'social outsourcing' serve as an example: "the outsourcing of IT services to social enterprises based in poor communities" (ibid.:27).

Another example is provided by the Infopreneurs initiative which, driven by what is called a "development through enterprise" strategy, has been creating an "'ecosystem' of social (information-focused) entrepreneurs – Infopreneurs® – in rural South African contexts" (Van Rensburg, Cronje & Du Buisson, 2010:1). These entrepreneurs use ICTs as "enablers of a service extension network in under-serviced rural environments" (ibid.). Key to the sustainability of the network of these "community-level (village) change and service agents" is the institutionalisation of support and mentoring, and the improvement of the extent of the value proposition via the enhancement of the scope of the service offering (ibid.).

Kuriyan, Ray & Toyama (2008), in discussing "development-through-entrepreneurship", developed three broad types of entrepreneurs, namely socially driven, business-driven and balance-driven. Their study showed that tensions within the state and among entrepreneurs, as well as consumers' perceptions of public sector versus private enterprise, make it difficult to meet the goals of commercial profitability and social development simultaneously.

The research literature regarding the dynamics associated with different forms of social entrepreneurship and entrepreneurship in resource-poor communities are discussed in detail in Chapter 7: Community service and social entrepreneurship.

2.5.4   Summary

Technology plays a limited role in the sustainability of ICT4D interventions. The human dimension is paramount, as discussed in terms of human intent as an amplifier of technology, development via ICT-enabled microenterprises (with mentorship support structures), and ICT4D champions. In each of these approaches, the focus is wider than an individual project and includes the greater context within which the project is conceptualised and executed, and within which it ultimately has to become sustainable. Sustainability is the outcome of a combination of endogenous and exogenous factors.

2.6 Frameworks for ICT4D

2.6.1 Introduction

The evolution of ICT4D towards models that transform the processes and structures of development, use ICTs as productive tools, stimulate innovation by the participants (Heeks, 2010, 2008), and enable plural and collaborative approaches (Thompson, 2008), was discussed in section 2.4.2 "Trends in ICT4D". The shift from 'technocentric' (provide access to ICT) to 'sociocentric' approaches that put people and their developmental needs first was discussed as being aligned with sustainable development and human scale development. The development and the application of the human scale development have been discussed in Section 2.2.4, "The human development approach". In this overview the focus is therefore on sociocentric frameworks that foster sustainability.

In addition, the role of social capital within a framework is discussed. The frameworks or approaches considered here are the Sustainable Livelihoods Framework, the application of the capability approach, and Kleine's Choice Framework that combines the Sustainable Livelihoods Framework with the capability approach in an endeavour to operationalise the philosophical approach of the capability approach.

The choices made regarding the frameworks considered in this overview represent an engagement with development theories that are scarce in the ICT4D literature, as discussed by Heeks (2010) in an editorial deliberating the apparently simple question of what the contribution of ICTs to development has been. As suggested by Heeks (ibid.), the whole ICT4D value chain from inputs, outputs to outcomes and impacts needs to be considered and, if outcomes and impacts are to be understood, a rich conceptual understanding of development is required, and must be used to design and evaluate ICT4D initiatives. The ICT4D value chain is discussed in Chapter 8, Networks of innovation, within the context of outcomes realised via the VOs.

In a 2010 editorial, Heeks indicated that the relatively few research papers engaging with development theories used livelihoods and capabilities approaches, for example, Duncombe (2006) and Gigler (2008), and that Kleine's paper with the combination of Sen's capability approach with the sustainable livelihoods framework and empowerment was "especially welcome since it assesses the impact of ICTs from a development studies base", with a human development-oriented focus on, especially, empowerment of the individual (Heeks, 2010:634).

2.6.2 Sustainable Livelihoods Framework (DFID)

Duncombe (2006) developed a comprehensive and informative analysis of the usefulness of the SLF (as shown in Figure 3 in Section 2.2.6) to understand the influence of ICTs on poverty reduction. The research was summarised in a livelihoods-based model for analysing ICT applications for poverty reduction that was applied to the role of ICT in the development of micro-enterprises (Figure 8).
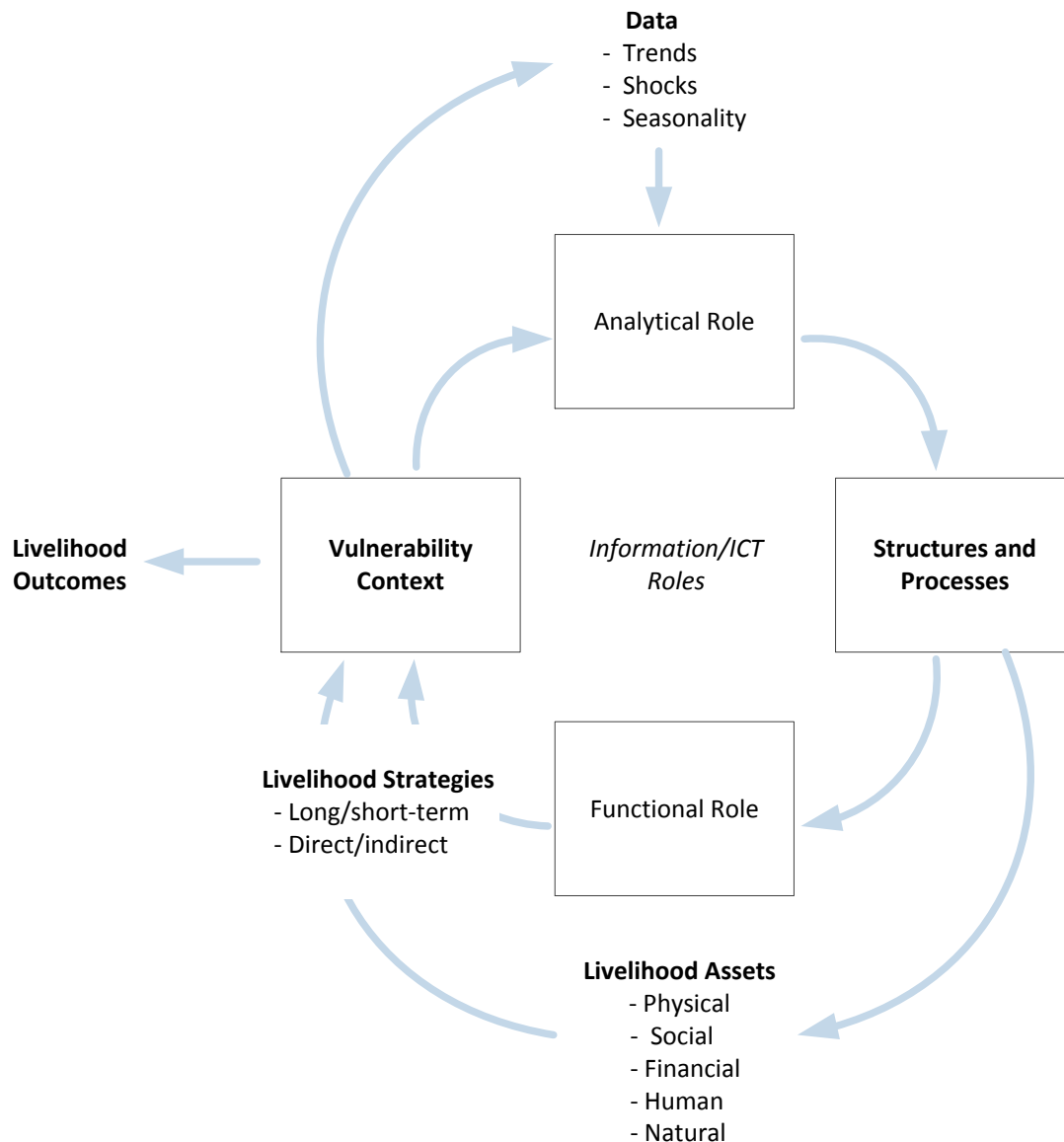
Figure 8 Model for understanding information and ICTs within a livelihoods framework (Duncombe, 2006:89)

The model spells out analytical and functional roles for information (and ICTs). The analytical role reflects how ICTs can be used in researching the SLF as instantiated in a context, i.e. by using local information in order to "assess vulnerability, identify and measure assets, and investigate structures and processes" (:88). The functional role shows how ICTs can be used "within livelihood strategies to create favorable outcomes" (:88).

2.6.2.1   Strengths of the SLF approach

One of the major strengths of the SLF analysis is that the scope of the system of interest can range from the local (individual) to the national or even global system(s). The investigation of livelihoods as such dictates that analysis has to start at the bottom, at the micro level of individuals and households, with their strengths and requirements (ibid.). The approach recognises and investigates the influence of the higher-level decision-making that takes place in organisational environments, from a local to a global level, and that shapes the livelihood strategies of individuals and groups. The research value of SLF is the reach and the ability to integrate the different levels of analysis (and action) and to show the flows (e.g. information) and the transfers of knowledge between levels (ibid.).

The SLF therefore provides a rich context (political, economic, social, environmental interactions) for the analysis that shows ICT as one asset among many assets, most of which are more important for development, e.g. human, social, financial, physical, and natural resource based assets that directly influence the capabilities and vulnerabilities of participants. The perspective of ICT as the "magic bullet" is therefore avoided – ICTs are necessary, but not sufficient.

The analysis and functional roles of SLF complement each other. The analysis starts by engaging with the rich diversity of the roles that information and communication play in people's lives, *before* moving on to ICT solutions. Therefore, the development of appropriate solutions that recognise the diversity of ICT requirements is supported.

The functional role of ICTs to improve information and communication to, for example, improve decision-making regarding and within livelihood strategies, is built by first understanding the strengths rather than the needs of participants, and therefore pre-existing information and communication practices are taken into account.

2.6.2.2   *Social capital, infomediaries and micro-entrepreneurs*

Social capital featured prominently in Duncombe's research. The possession and interaction of the various capitals are vital to support action. The apparently simple process of participants receiving data, requires that they have other resources such as physical, financial and social resources (ibid.). Social resources are used in the process of judging the relevance and credibility of the information. The use of the information to take action requires trust relationships with the source or purveyor of the information as well as a translation process of new information into the context of existing knowledge which may take place in a discussion (Heeks, 1999).

Duncombe (2006) pointed out the important role of infomediaries that arise from a livelihoods based analysis. Livelihoods structures are the organisations that perform functions (from policy functions to the delivery of services and products) that influence livelihoods. Livelihoods processes are mechanisms of all kinds such as socio-economic, political, etc. that govern the interactions between structures and individuals. Transforming structures and processes (see Figure 3 in this section) can influence the individuals' assets (capitals) directly or indirectly by institutions playing a mediating role for the participants. As discussed earlier, information may be used directly by participants (with resources) or mediation institutions may be involved, termed infomediaries (ibid.:87). Use of ICTs can enhance the direct and indirect routes. The use of ICTs can facilitate the expansion of social networks which create linkages to higher quality information sources that can grow socio-cultural and socio-political assets (Heeks & Duncombe 1999; Duncombe, 2006). The use of social media, for example, has the potential to build communication networks between community-level organisations and regional, national or global structures that directly serve the needs of the poor and other disadvantaged participants. The realities of ICTs being used in a socio-political context is demonstrated by the fact that ICT has also been hijacked by the powerful in communities and used to exclude the poor and powerless, e.g. in rural telecentres in Africa (Etta & Parvyn-Wamahiu, 2003).

The benefits of social capital to micro-entrepreneurs were clear and Duncombe referred to evidence that implied that micro-entrepreneurs had a greater need for trust and confidence that was built via local social networks, than new information sourced via ICTs. Communications systems (e.g. telephones) supported informal information systems and the social networks that compensated for non-existent market functions. Micro-entrepreneurs, also depended on trust relationships, usually based on personal contact with local

people, to assist with decision-making. These small networks could be expanded by ICT-based communications with non-local people.

In an analysis of a government initiative to contract out goods or services to social enterprises, i.e. social outsourcing, the empowerment due to expanding the set of livelihoods assets was clear and one of the major aspects was the growth in social capital (Heeks & Arun, 2010). The necessity of complementing SLF-based analysis with "psycho-social empowerment" such as "new attitudes, new confidence, new status, new roles and new identity" was demonstrated (ibid.:453).

2.6.2.3 *Weaknesses of the SLF approach*

The major weakness of the SLF approach identified by Duncombe (2006) was the treatment of information, communication and ICTs as separate physical capitals. "Information should be viewed as a cross-cutting resource and as a constituent part of each component of the livelihoods framework and not necessarily as an asset in its own right" (ibid.:97). The process of spreading information occurs via communication and hence both information and communication, and indeed use of ICTs, are integral to the functioning of the processes of the SLF, as indicated in Figure 8 by placing them in the centre of the diagram. In the original interpretation of the SLF, ICT infrastructure would be considered part of the physical capital (basic infrastructure and physical goods) and, especially in the case of ICTs, skills and knowledge development (the human capital), to derive value from ICT use, is very important. Kleine (2010) adopted a different view and included information as a resource in the Choice Framework as part of her use and critique of the SLF (as discussed in Section 2.6.2). Arun, Heeks & Morgan (2004) made the point that ICT is a complex technology compared to a simple technology (e.g. for use in making clothing), and therefore careful analysis is required to determine the appropriateness of ICTs for improving livelihoods and the capabilities.

2.6.2.4 *Summary*

As pointed out by Duncombe (2006), the SLF has a range of applications in especially ICT4D research, since it deals with the fundamentals of the influence of ICTs in people's lives and has the conceptual reach to influence ICT-enabled development strategies and policies to avoid the trap of being too technology-centric. The pervasive role of information and ICTs leads to interesting questions as to whether information is a resource and ICTs' enabling role in conjunction with other capitals. ICTs were found to be useful in enabling the growth of the social capital of entrepreneurs. The SLF should be used with other approaches to deal with the complexities of empowerment as a whole, for example, the psycho-social aspects.

2.6.3 The Capability Approach

2.6.3.1 *Introduction*

As described in Section 2.2.4, a major contribution of Sen (1999) is the recognition that, while the freedom of the individual to act is central, this freedom is influenced by social influences, and therefore a fundamental complementarity exists between the individual's agency and the social structure.

Sen (2005) acknowledged that "the capability approach allows considerable variations in application" (:157) and recognised the arguments made by his co-worker, Martha Nussbaum, (2003) for the merits of identifying a list of capabilities with associated priorities. As described in Section 2.2.4, capabilities are seen by Sen as alternative combinations of functionings (being and doings) that are feasible for individuals to achieve.

Sen (2005) has, however, provided multiple reasons for not participating in this search for capabilities. His position is that there may be important capabilities that have been identified, but there is no canonical list,

and in each context, ethical, political and social judgements regarding what capabilities are, should be made in open debate without privileging the voice of theorists.

Robeyns concluded that the value of the CA is in its usefulness as a "mode of thinking" about normative issues that can be used in evaluation (2005:96) and not as a recipe for development.

The application of the strongly normative CA has been investigated from a Development Informatics (Zheng, 2009) and a Community Informatics perspective (Stillman & Denison, 2014). Loh (2015) compared the validity of the capabilities approach and vulnerabilities approach to poverty for use in ICT4D as theory bases. The Community Informatics (CI) article is especially useful since it also provides an overview of the application of the CA in the design and evaluation of ICT4D projects (including the work of Zheng) and is discussed in more detail later on.

A major, enduring and evolving critique of the CA has been that it over-emphasises the individual while neglecting the development dynamics of groups or social structures (Zheng, 2009). The other theory bases used in this research, social capital and human scale development, both use concepts associated with groups, for example the possibility of collective action and therefore the issue of 'collectivity' in CA is discussed.

The section is structured as follows: A Community Informatics perspective on the use of CA in ICT4D is used to provide an overview, followed by a comparison between the capabilities approach and vulnerabilities approach, a summary of the use of the CA in ICT4D, is presented, and finally, the critique of the CA being too 'individualistic' is reviewed.

2.6.3.2   CA adapted and applied to ICT4D: a Community Informatics perspective

Stillman & Denison (2014) broadly defined CI as a domain of sociotechnical theory and practice that focuses on the improvement of the lives of people in need which "foregrounds social change and transformative action in emergent sociotechnical relationships, rather than prediction and control" (:201), and did not accept purely technical explanations of technology success that do not engage with the social.

Stillman & Denison (2014) identified eight approaches in ICT4D regarding the application of CA to the design and evaluation of projects, as reflected in Table 2.

Table 2 Adaptations of the CA for the study of ICTs (Stillman & Denison, 2014)

Authors	Conceptual adaptation of the Capability Approach
Gigler (2011)	Informational capabilities and informational capital
Grunfeld, Hak & Pin (2011)	Capabilities, empowerment and sustainability
Kleine (2010)	Choice framework
Johnstone (2007)	Theory of justice
Oosterlaken (2009); Oosterlaken (2008)	Capability sensitive design
Toboso (2011)	Functional diversity for disability
Vaughn (2011)	Indigenous communities on the margin
Zheng (2009);Zheng & Walsham (2008); Zheng & Heeks 2008	Capability exclusion in the e-society

The summaries of the most important adaptations are discussed, taking into consideration newer literature. Kleine's work will be discussed in the next section.

Gigler (2015, 2012, 2011) developed an impact chain method to evaluate the subtleties of the contributions (not attribution) of ICTs' direct and indirect effects on people's well-being in indigenous communities in Bolivia. His prime focus was information and, by using the impact chain method, the interaction between personal and community capabilities to make use of information was illustrated. This interaction was articulated by the concept of 'informational capabilities' which, using Sen's terminology are "a person's capability to transform his/her existing informational capital, such as people's level of access to ICTs (the entitlement) into human agency and real opportunities in society to achieve the things s/he values doing or being. In other words, informational capabilities refer to a person's positive freedom to use ICTs within the institutional and socio-economic setup of a society" (Gigler, 2011:8). Improving people's informational capabilities was found to be crucial in determining the impact of ICTs on their well-being. In addition, the roles of various intermediaries (infomediaries) in an individual's progression from access to use of ICTs were important (Gigler, 2015).

Grunfeld, Hak & Pin (2011) used a participatory methodology and considered micro, meso and macro levels in a longitudinal study of a Cambodian ICT4D project to test a framework for the evaluation of how such initiatives contribute to capabilities, empowerment and sustainability (CES). The levels covered geographical and conceptual aspects: micro level referred to the village, meso level to the district, and macro level to provincial and national structures and policies.

A general focus of research combining ICT and CA was found to be the capabilities of users to benefit from the technology in ways that will achieve desired functionings, as would be expected since, in the CA approach, access to ICTs is not an end in itself, but a commodity or means through which valued capabilities (e.g. computer literacy) and functionings can be achieved. External factors (the meso and macro levels) also influence the conversion of the ICT commodities to capabilities. The CA was found to be useful for both influencing the design of ICT interventions and in the evaluation thereof while taking into account the diverse interests and perspectives of individuals (see also Ashraf, Grunfeld & Quazi, 2015; Grunfeld, 2007; Grunfeld, 2011).

Grunfeld, Hak & Pin (2011) used a conceptual model that "assumes a virtuous spiral dynamic between the use of ICT and the building and strengthening of capabilities, empowerment, and sustainability (CES) in the sense that individuals and communities can use ICT to build CES, which in turn can improve their ICT infrastructure and skills" (:152). They concluded that many of the insights around the impacts of ICTs upon health, education, community development, and women empowerment were unlikely to have emerged if a participatory approach was not used that reflected the choices that individuals and communities made in determining capabilities.

Johnstone (2007) argued that the CA is ultimately concerned with justice, since what are valued are fundamental human freedoms, and proposed a theory of justice that is used to judge how ICTs are used in an ethical and moral way to achieve human well-being. From a strategy development perspective, she proposed that the CA be used to develop a broader and more socially responsive agenda to understand and promote the development opportunities offered by use of ICTs. The CA as a theory of Justice is extensively discussed in the September 2011 issue of Maitreyee (HDCA, 2011).

Oosterlaken (2009) discussed the common sense notion of the expansion of human capabilities by technology which is qualified in the emerging research field of 'value sensitive design' by the recognition that technologies are not value neutral, but are inevitably laden with the values of designers and society. She proposed that the CA should therefore be directly applied in "'capability sensitive design of technologies for developing countries" (ibid.:96) that use participatory design to consider the "personal and

social/environmental characteristics that influence the conversion from resources into capabilities and functionings" (:98, see also van den Hoven, 2012). ICT and ICT4D have been prominent in adopting CA principles in design and innovation which may be due to multiple uses of ICTs supporting expansion of a wide range of human capabilities, offering users choice regarding functionings (Oosterlaken & Van den Hoven, 2012; Kleine, 2011). The CA has also provided a human-centric perspective to criticise ICT4D initiatives which have narrowed down the potential impact to economic growth (Kleine, 2010), or just increased access (Madon, 2004), therefore not really getting to key issue of respect for individual agency (Zheng, 2009) and choice, and in general not engaging with the multiple factors involved in enabling outcomes of participants being empowered to choose to lead the lives they have reason to value.

Design to accommodate human diversity is a viewpoint that considers disabilities as originating from "society's limitations in taking the specific, functional requirements of those individuals into consideration" (Toboso, 2011:108). Designers should therefore design with "recognition of the capability set that allows a person to function as fully" as wished (Stillman & Dennison, 2014:206).

The CA was used by Vaughan (2011) to evaluate ICT4D programmes in indigenous communities in Australia by using "community defined, context specific concepts of well-being and constitutive valued functionings and the derivation from this of required capabilities" (:131) rather than any normative definitions. The conclusion was that evaluation using the CA can be used to improve culturally grounded policy and programme design for socially inclusive ICT-based development. The CA approach provided a strong framework to develop the Theory of Change linking means (ICT access) to ends (outcomes) and for evaluation of the strength of these linkages that influence community-driven sustainability of ICT4D programmes in the long-term. Ashraf, Grunfeld & Quazi (2015) found the CA useful to deal with the multi-dimensionality of the issues faced by indigenous communities in Bangladesh, thus avoiding a narrow focus on ICT adoption, use and diffusion.

As listed in Table 2, capability exclusion in the e-society is the topic of research done by Zheng, Heeks and Walsham considering other social priorities or the effects of ICTs (Zheng, 2009; Zheng & Heeks, 2008; Zheng & Walsham, 2008). As discussed in the previous paragraph, the issue is to not limit the influence of an ICT4D project to a small set of capabilities such as individual e-literacy, but to at least move to 'information literacy' as embedded in social structures and representative of societal diversity, thus developing a perspective of ICT that "emphasizes embedding ICT in the pursuit of human development (i.e., allowing individuals to achieve greater capabilities and to lead a life they value)" (Zheng & Walsham, 2008:79). As discussed earlier, the embedding of ICT in human development was described by Gigler (2011) as the development of 'informational capabilities' to transform informational capital (e.g. people's level of access to ICTs) into human agency and freedom to use ICTs to achieve the things they value doing or being.

Summary

Stillman and Denision (2014) emphasised linkages between CI and the CA as being a shared concern for the participative design of solutions by communities. CI embraces the complexity of social contexts and attempts to develop non-traditional models that fit social reality, rather than simply force fitting existing ICT solution models. The strong social theory foundations of the CA enable the development of well-thought through ICT projects that can show how ICTs influence different aspects of human well-being, as discussed in the adaptations of the CA in Table 2.

A key issue for this research is the broadening of the possible influence of ICT to the development of 'informational capabilities' to transform informational capital (e.g. access to ICTs) into a person's freedom to use ICTs (Gigler, 2011). The improvement of these capabilities was crucial in determining the impact of

ICTs on well-being (ibid.) and in this process infomediaries (e.g. Village Operators) played an important role (Gigler, 2015).

One of the key problems of CI is the evaluation of the outcomes of the complex and emergent interactions between people and ICT systems that cannot be predicted or designed in. Stillman & Denison (2014) saw the value of the CA as providing "a social-justice-oriented theoretical basis and a structure for conducting complex longitudinal evaluations of well-being from many different points of entry (Kleine) into socio-technical projects" (:209). This was illustrated in the variety of evaluation perspectives discussed, e.g. Gigler's use of an impact chain method.

2.6.3.3 Comparison between CA and the vulnerabilities approach

Loh (2015) conducted a literature survey to investigate the validity to ICT4D research of the capabilities approach (Sen, 1999; Nussbaum, 1988) and the very different vulnerabilities approach to poverty (Heijmans, 2001; Briguglio, 1997; Moser, 1996).

A generic definition of vulnerability is the "insecurity of the well-being of individuals, households or communities in the face into and out of poverty" (Moser, 1996:2), which highlights the dynamics of change rather than "mere static measures of poverty" (ibid.) The major vulnerabilities caused by local and global development, such as increased populations living in flood-prone areas and climate change leading to new flooding risks (Schipper & Pelling, 2006), has driven the sustainable human development agenda, leading to the goal of keeping global warming below 2°C (UNFCC, 2015).

The association between ICT and capabilities can be positive since the capability to use ICT can improve people's access to information, which can support democratic freedom (Grunfeld, 2007). Sen (2010) related how a mobile phone video of the whipping of a girl led to the ejection of the Taliban from a valley in Pakistan due to the public awareness that was created with associated political pressure (participative politics). The research of Ogan, Bashir, Camaj, Luo, Gaddie, Pennington, Rana & Salih (2009) revealed the role of ICT use in providing a voice for marginalised groups like women.

A direct linkage has been found between the use of ICTs and improved livelihoods. Examples include: the improvement of financial systems which led to increased incomes for milk farmers in India (UNDP, 2004); half of all Grameen village phone calls were used to foster livelihoods by obtaining information regarding selling prices; job availability and money transfers (Richardson, Ramirez & Haq, 2000; Cohen, 2001), and mobile phones were used by the fishers of Kerala in India to reduce information inefficiencies, thus integrating markets and reducing price fluctuations (Abraham, 2007).

These research papers provide examples of the need for in-depth field studies, as called for by Grunfeld (2007), to critically evaluate the effect of ICT on the individuals' abilities in a "systematic, forward looking, longitudinal manner through a participatory approach" (:5) rather than making vague statements about ICTs' influencing capabilities.

Loh (2015) concluded that the capabilities approach and the vulnerabilities approach to poverty both provide valid theoretical foundations for ICT4D, can complement each other in development, and can coexist within both academia and practice.

2.6.3.4 Summary of the use of the CA in ICT4D
Introduction

The use of the CA is summarised in this section by developing a project-based schema based on an analysis of the CA-related research in the previous section augmented with additional work on the application of the CA in ICT4D.

Focus areas in the use of CA in ICT4D

Heeks (2010) summarised the use of the CA in ICT4D by referring to research by Kleine (2010) on how an individual's choice was enabled through the use of ICTs, as an illustrative example of the general conclusion that capabilities and realised functionings were increased via the use of ICTs (Kivunike, 2015; Kivunike, Ekenberg, Danielson & Tusubira, 2009a, 2009b; Olatokun, 2009).

A selection of articles dealing with application of the CA in ICT4D is summarised below. The articles include publications in a special Issue of the journal Information Technology for Development which was devoted to the topic of the use of the CA in ICT4D research and practice (Andersson, Grönlund & Wicander, 2012).

The articles fall mainly into three major focus areas, namely, approach, design and evaluation:

Approach – A major strength of the CA is that it is a human-centric perspective that can be used to develop policy and strategy level recommendations to broaden the scope of ICT4D initiatives beyond economic growth. Provision of technology must be complemented by a capabilities development focus in which intermediaries (e.g. infomediaries) play a vital role to support individuals' ability to derive value from ICT use. A variety of linkages between ICT use and improved livelihoods have been found.

Design – Many researchers have explored the rich possibilities of enriching the design of ICT4D initiatives to respect freedom of choice and diversity in general, e.g. the marginalised and people with disabilities (as defined by societal limitations) as well as empowerment via increased democratic freedom, addressing corrupt power structures and direct participation in initiative design that is sensitive to the values embedded in technology.

Evaluation – A strong emphasis was placed on the CA's role to widen the scope of evaluation to include justice based on human freedoms, socially inclusive development, and the self-definition of capabilities. A systems perspective on the interactions between micro, meso, and macro levels to deal with diversity was developed, which included a model for the key dynamics as a virtuous spiral of interactions between capabilities, empowerment and sustainability.

In the next section critiques of the CA that are relevant to the focus of this research are addressed.

2.6.3.5   Critique of the CA as being 'individualistic'
Relevance of critique

In researching the role of social capital in the development of micro-entrepreneurs, the relationship-based emergence of support for individual and collective action is key, as shown by the empirical work of Woolcock (1998) (see Section 2.3.5 - Role of social capital). From a theoretical sociological viewpoint Woolcock referred to the position of Portes & Sensenbrenner (1993) that there are four different types of social capital corresponding to each of the major theoretical traditions, and, for example, social capital can be defined as "those expectations for action within a collectivity that affect the economic goals and goal-seeking behavior of its members, even if these expectations are not oriented toward the economic sphere" (Portes & Sensenbrenner, quoted in Woolcock, 1998:160). The definition of social capital by the influential sociological theorist, Bourdieu (1986), included group membership "which provides each of its members with the backing of the collectivity-owned capital" (:249). Bourdieu was also against the "methodological

monism of sociology that asserted the ontological priority of…the collective or the individual", leading to dualistic alternatives that need to be replaced by the "primacy of relations" (Bourdieu & Wacquant, 1992:15) (see Section 2.3.5.3 - The theory base of social capital).

Human scale development (Section 2.2.5) sees forms of collaboration and organisation between individuals as a requirement for the ability (a form of collective ability) to have meaningful relations with larger organisations so that progress towards top-down political democracy supporting bottom-up social participation can occur (Max-Neef *et al.*, 1991). This social participation may take the form of collective action, as enabled by social capital (ibid.).

The general discussion among researchers regarding the 'individualistic' focus of the CA and the contention that it "pays insufficient attention to groups and social structures" Zheng (2009:73), has been vigorous. In this discussion Evans (2002) introduced the term 'collectivity' into the CA discourse regarding the conceptual treatment of groups.

The concept of sustainable development and the expression thereof via the CA has been deemed problematic due to the lack of systematic incorporation of collectivities (Leßmann & Roche, 2013). Sen (2013) has responded to this critique by pointing out that sustainability is a problem of the whole of humanity, i.e. the largest possible human collectivity. Sustainability is also an individual problem, which can be expressed in the CA by defining individual sustainability goals in terms of substantive freedoms, but this does not deal with the conceptual differences between individuals and collectives (Leßmann & Roche, 2013).

Sen (1999) disagrees with theorists who adopt an artificial view of individuals as isolated from society, which is what 'methodological individualism' is (Sen, 2002:80). An individual's 'thinking, choosing, and doing' is deeply influenced by society, but that it is also an individual activity does not, *per se*, make any approach methodologically individualist, since one would have to add "the postulation that the individuals are separated and detached from each other" (ibid.:81).

Sen (2002:84) agreed with Evans that "gaining the freedom to do the things that we have reason to value is rarely something we can accomplish as individuals" Evans (2002:56). He disagreed regarding Evans' use of "collective capability" (ibid.:56), which is not just a nomenclature issue, but about seeing a human capability that depends on social interactions as "a collective rather than an individual capability" (Evans 2002: 56). Sen argued that the dependence on social interactions refers to a causal connection, and that one should therefore refer to "*socially dependent individual capabilities"* and that this is different from "genuinely 'collective capabilities'", such as the capability of a world nuclear power to kill the entire population of the world through nuclear bombing" (Sen, 2002:85). Sen saw collective capability as an ability that is not part of an individual's life, but as a capability that is *integrated as the capability of a group*, while acknowledging the interdependence of an individual's life on a social context. The sharing of interests, the satisfaction of social interaction, influences most individual capabilities, which are therefore socially dependent (ibid.).

The question of if and how the CA can deal with collectivities and their influence on the formation of capabilities, remains.

Conceptualisation of sustainable development using the CA

The use CA to conceptualise sustainable development, which involves choices made by individuals and collectives, is an issue if collectivities are not systematically incorporated in the CA.

Leßmann and Roche (2013) pointed out that approaches to collectivities in the CA can be classified in two ways: 1) internal and individual versus external points of view on collectivities, and 2) a focus on individual well-being versus agency aiming at goals beyond individual well-being (an example being sustainable development). Kleine's case study demonstrated that, *in practice, the distinction between well-being and agency, may well be moot,* since well-being and agency are thoroughly intertwined (Kleine, 2013).

Leßmann and Roche (2013) concluded that "there is no simple or unambiguous way to accommodate collectivities in the CA. The topic is inherently complex and the variety of approaches to it reflects this complexity" (:3).

Views on sustainability: a freedom or a responsibility?

Sen (2013) argued for a freedom-oriented view of sustainability: "human freedoms include the fulfilment of needs, but also the liberty to define and pursue our own goals… no matter how they link with our own particular needs. Human beings are reflective creatures and are able to reason about and decide what they would like to happen, rather than being compellingly led by their own needs—biological or social" (:.6). Sen considered the freedom to fulfil certain needs as being one of more important freedoms that a person has reason to value (Sen, 1992, 1985). He argued that sustainability as a concept has to be broadened to aim at sustaining human freedoms and capabilities, and not be limited to our abilities to meet felt needs.

Therefore, Sen's main argument remained that needs should be replaced by human freedoms and that the Brundlandt definition of sustainable development (WCED, 1987) should be modified to refer to "development that prompts the capabilities of present people without compromising capabilities of future generations" (Sen, 2013:11). In other words, the argument is that if the objective is "sustaining the freedom of future generations to live the way they like and to what they have reason to value (no matter whether this corresponds to their own conception of their 'needs', not to mention our conception of their 'needs'), then we should choose a freedom-based view of sustainable development" (: 9-10).

Individual agency, exercised in collaboration with others does not touch upon concepts of collective agency or collective capabilities.

Lessmann & Rauschmayer (2013) used the CA to model sustainable development. In their model it becomes clear that an individual's choices have little impact on sustainable development, but do have the full burden of moral responsibility in the CA. Ignoring the motivational challenges, just the cognitive burden of making rational decisions regarding the consequence of your decisions on the far future is excessive and therefore Lessmann & Rauschmayer agreed with the argument of Grunwald (2010) that implementing sustainable development is mainly a political task to be undertaken by collective entities.

In summary, the different views on the concept of collective agency and the freedom or responsibility views on the collective problem of sustainability provide new insights into the complexities of using the CA's individualistic foundation as a base for dealing with issues where the interdependence of individual freedoms emerge, and the first steps to formulate 'collectivity' based agency, action, intentions, capabilities has been taken, but a long journey awaits.

Proposals regarding the use of the CA in ICT4D

In the domain of ICT4D, Thapa, Sein & Sæbø (2012) remarked that even Sen's "critics concede that the CA is a powerful lens to study human development. It is termed as suitable, but insufficient (Ibrahim, 2006) and incomplete, but a good foundation to build upon" (Zheng, 2009). The good foundation was summarised by Zheng (2009), in referring to the work of Robeyns (2005), as "Sen explicitly takes into account social

environment, societal structures, and culture, first by the distinction between functionings and capability, and second by recognizing the conversion factors from commodities to functionings." (Zheng, 2009:73).

Dedicated efforts has been made to improve on the CA 'foundation', but definite unresolved problems remain in the improvement efforts which keeps the research debate going.

Thapa *et al*. (2012) suggested, as proposed by Evans (2002), that the

> *CA can be complemented by incorporating theoretical and conceptual premises that emphasize the collective and the society. Adding collective capabilities to individual capabilities gives us a sharper and more powerful analytical framework to examine how ICT can lead to human development.* (Thapa *et al.*, 2012:6).

As pointed out by Zheng (2009), the CA is incomplete and therefore the introduction of additional theories to augment the CA framework for different applications will be an ongoing process.

2.6.3.6   *Summary of the Capability Approach as framework for ICT4D*

The CA is essential in supporting the general shift from 'technocentric' to 'sociocentric' approaches in ICT4D since it provides the theoretical foundation for defining development that is about putting people and their choices first, as well as the shift to participant empowerment and participant-driven innovation, e.g. Heeks' per-poor innovation (Heeks, 2008). The CA also supports the vital shift from needs to agency and capabilities, which informs the difficult issues regarding sustainable development and human scale development. Engaging with the CA involves ICT4D researchers with fundamental social research issues, as was illustrated by the debates regarding 'individual' and 'collective capabilities'.

The practical use of the CA has been mainly focused on evaluation, but as shown in the analysis of the ICT4D articles, the use of the CA in the whole project life cycle of approach (conceptualisation), design and evaluation, has been initiated. Some of the value added by the CA approach has been: the systematic broadening of the *approach* to ICT4D initiatives beyond economic growth, to the consideration of societal dynamics from a human-centric perspective; the enrichment of the *design* of ICT4D initiatives by the focus on the diversity of society rather than a simplistic top-down design for the 'poor'; the need to have democratic freedom so that all voices are heard and broad-based participation is designed in; and, finally the widening of the scope of *evaluation* to include justice based on human freedoms, socially inclusive development, and the self-definition of capabilities.

The operationalisation of the CA has commenced, even if it is in the early stages, and the next section on Kleine's Choice Framework is firmly based on the CA, while incorporating aspects of the SLF that has been discussed in the previous section.

2.6.4   The Choice Framework

2.6.4.1   *Introduction*

The Choice Framework was introduced in Chapter 1 as a systemic approach that was selected to provide a development theory base for the research on the use of social capital in the development of entrepreneurs. The major building blocks of the Choice Framework, namely the Capability Approach and the Sustainable Livelihoods Framework have been discussed, and in this section the balance of the framework is introduced. The Choice Framework is applied in Chapter 9 to tell the story of an entrepreneur's use of social capital.

Kleine (2011) described the Choice Framework as a "conceptual tool" that assists in the operationalisation of the capability approach and "can be used to deconstruct embedded ideologies and analyse the appropriateness of development goals, to map development as a systemic process, and to plan interventions which can result in increased freedom of choice for people" (ibid.:119).

In the previous section on the use of the CA in ICT4D, three main research focus areas were described: project approach (a human-centric development philosophy), project design (freedom of choice and diversity) and project evaluation (broadening of evaluation scope to systemic self-defined socially inclusive development). Some of this research, e.g. Gigler (2015, 2011), Grunfeld (2011, 2007) and (Hatakka & De', 2011) operationalised the CA approach to a limited extent with specific focus areas, such as Grunfeld's evaluation framework, the focus of Hattaka and De' on the role for technology as well as evaluation, and Gigler's use of the SLF. Kleine (2011) mentioned the work of researchers such as Alkire (2002), Alsop & Heinsohn (2005), Clark (2002), Nussbaum (2000) and Robeyns (2003a) who have worked on CA operationalisation.

The development of the Choice Framework is described, followed by a critique of the framework.

2.6.4.2   The development of the Choice Framework
Introduction

The Choice Framework was developed during field work in Chile that initially used the CA as an ontological framework, with the Choice Framework emerging during systemic analysis and the mapping of relevant concepts in development (Kleine, 2010, 2009, 2007). The resultant framework used the CA and aspects of the SLF such as the concept of a portfolio of capitals, with the main foundation being the work of Alsop & Heinsohn (2005) on an analytic framework to structure the World Bank's analysis of empowerment and outcomes at intervention and country level.

Empowerment

Empowerment of the poor by investing in their assets formed part of the World Bank's two-pronged strategy to reduce poverty, the other aspect being improvement of the investment climate in developing countries (Narayan, 2005). Poor people are the vital partners for development and evidence indicates that empowerment plays a role in the improvement of development effectiveness at grassroots and societal levels (Narayan, 2002). Empowerment was perceived broadly as an increase in the poor's freedom of choice and improved ability to act to influence their own lives (ibid.).

Empowerment is crisply defined by Alsop & Heinsohn (2005) as "enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes" (:5). Empowerment describes both a process and an outcome. The degree of empowerment of a person is influenced by personal agency and opportunity structure as illustrated in Figure 9.
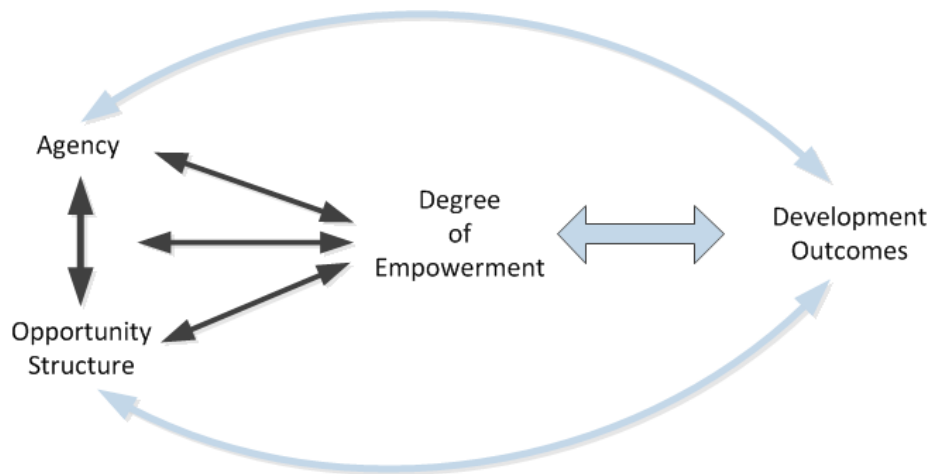
Figure 9 Influences on empowerment (Alsop & Heinshohn, 2005)

Personal agency is defined as the capacity of the person to make 'purposive choice' and the indicators of agency are the assets (e.g. resources or capitals) which include "psychological, informational, organizational, material, social, financial, or human" assets (ibid.:4).

Opportunity structure is seen as the social, political and institutional context in which the person or group makes choices and can be described and measured by "the presence and operation of formal and informal institutions, including the laws, regulatory frameworks, and norms governing behaviour" (ibid.). To summarise, the "empowerment of poor, excluded, or subordinate groups is a product of the interaction between the agency of these groups and the opportunity structure in which this agency is potentially exercised" (Petesch, Smulovitz & Walton, 2005:42). In-depth research regarding the measurement of empowerment was conducted by Smulovitz, Walton & Petesch (2003) and Narayan (2002).

Finally, the degrees of empowerment were measured by "the existence of choice, the use of choice, and the achievement of choice" (Alsop & Heinsohn, 2005:4).

The conceptual relationship between assets (resources or capital), agency, structure and choice, has parallels in the SLF where the analysis starts at the level of individuals and their assets and then takes into account the influence of structure via decision-making in organisations that shape the livelihoods strategies of individuals and groups (see Section 2.6.2.1.).

The Choice Framework

Kleine (2010) combined the strengths of the Alsop & Heinsohn (2005) framework with that of the SLF. Alsop & Heinsohn (2005) placed choice at the centre of their framework and reflected choice as a product of the interaction between agency and the opportunity structure in which this agency is potentially exercised, but did not spell out how this occurs. Kleine (2010) saw the SLF as being a systemic framework with more detail, such as the five livelihood assets, that did not elevate choice as a key element.

The Choice Framework is shown in Figure 10 and is followed by a discussion of each component.
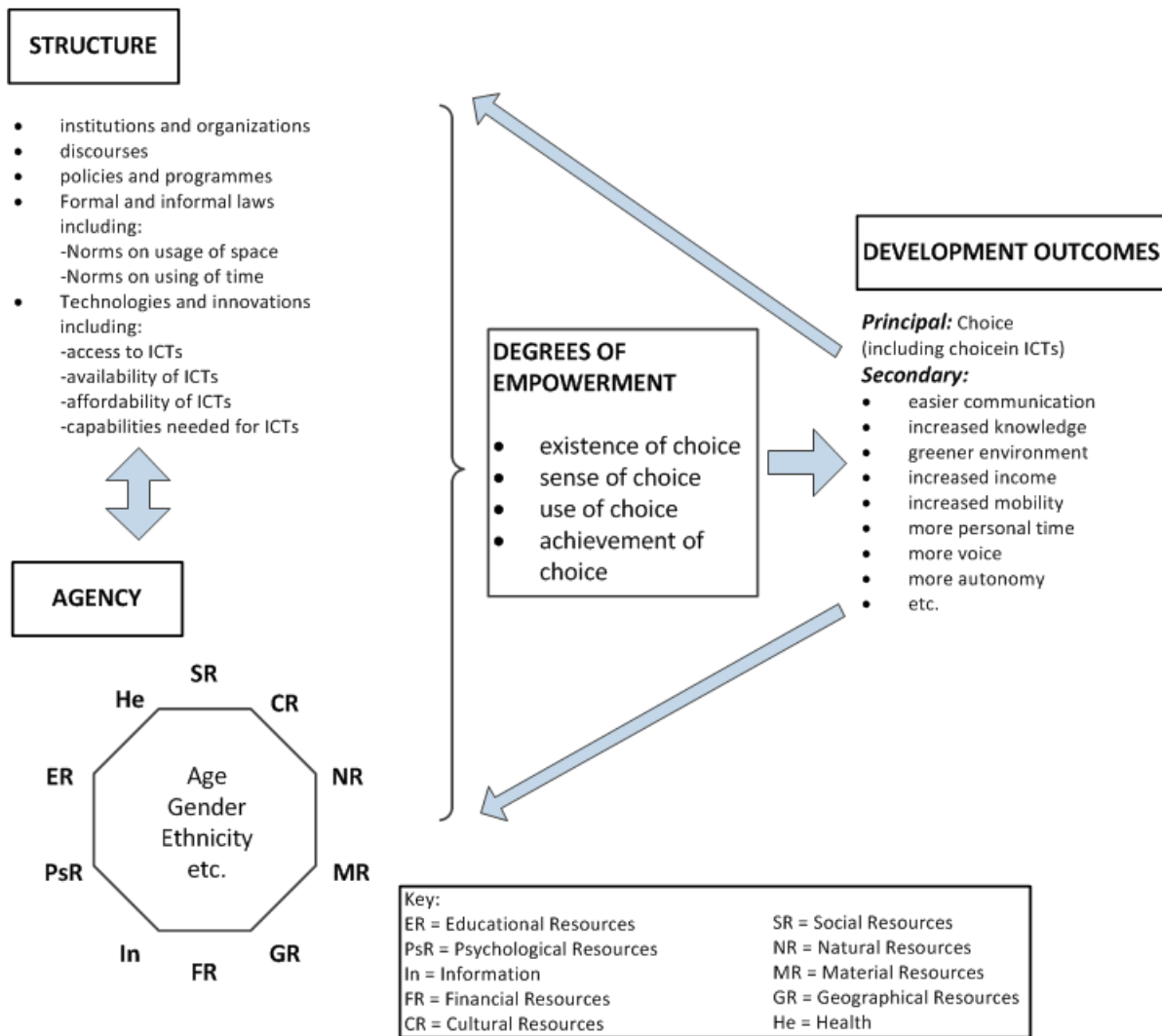
The description starts from the final outcomes at the right hand side of the diagram, followed by dimensions of choice, agency and the resources required to enable agency, ending with structure.

Development Outcomes

The primary development outcome is choice (Sen, 1999), for example choice in use of ICTs, while the secondary development outcomes would depend on the choices individuals make regarding the lives that they value. This is therefore diverse and the examples provided in Figure 10 are ones in which ICTs may play a role such as easier communication, increased knowledge, a greener environment, more personal time and income and so on.

Kleine (2010) acknowledged that the capabilities are not evaluated directly, but that the achieved functionings due to an individual's choice is used as a proxy (as is done in other work on operationalisation of the CA). The framework can be applied by describing the outcomes as achieved functionings (as chosen by the individual) and proceed "into the systemic relationships between agency, structure and choice, thus analysing how the outcomes were arrived at" (ibid.:679).

Dimensions of Choice

Kleine (ibid.) referred to Alsop and Heinsohn's 'degrees of empowerment' as dimensions of choice and added a 'sense of choice' to their three degrees of choice.

The first degree of choice is 'existence of choice' which describes a situation in which alternatives exist that can, in fact, be realised by an individual, given that all other factors are in place (e.g. resources and opportunity structure).

A 'sense of choice' option was developed because Kleine realised that individuals were only aware of some of the uses of technology due to the scope of their computer skills and the dominant use patterns experienced and communicated in Chile. Examples could be receiving faxes by email, or voice-over-IP, compared to email and online chat. Kleine argues that 'sense of choice' is important since whenever unfamiliar technology is introduced, an individual has to develop a feeling for what the use of the technology entails. As pointed out by Kleine, the choices diminish as the last two degrees of choice are considered. The 'use of choice' reflects whether a choice is made or not, and the 'achievement of choice' represents a successful outcome.

Agency and resources

Agency is based on the individual's resource set and Kleine (2010) augmented previous work on resources or assets. The SLF (Duncombe, 2006) referred to five assets (human, social, financial, physical, and natural resource based assets), while Alsop & Heinsohn (2005) added psychological, informational and organisational assets to the SLF set as indicators of agency. Kleine (2010) sub-divided human resources and added geographical and cultural resources to these sets, listing ten resources (or assets) in all as described below.

Kleine followed Sen (1984) in using the term 'resources' rather than capitals or assets to fit with the CA focus on resources as individual agency-based capability inputs, which, when combined with structure-based capability inputs, as described by (Robeyns, 2003b), could be converted into capabilities. The individual's resources depend on the characteristics of the individual (e.g. gender, sexual orientation, age and ethnicity) as well as the influence of limiting or exclusionary constructs in the social context.

Kleine (2010:681) described the 'resource portfolio' as follows:

- *Material resources:* Material objects that include those essential to production (e.g. machinery and computer hardware).

- *Financial resources*: Financial capital. Kleine illustrated the interplay between structure and resources by referring to the ability to obtain credit as "a combination of the structural character of the banking rules and individual collateral" (ibid.:681).

- *Natural resources*: The full spectrum of the natural environment of a place, e.g. geomorphology, soil, climate, and rainfall.

- *Geographical resources*: This a resource added by Kleine to highlight the influence of location and distance (logistics and communications infrastructure) as well as intangible qualities such as local know-how (e.g. in a geographical trading cluster (Marshall, 1961)) or local dynamics (e.g. personal contact in local markets (Storper & Venables, 2004)). The intangibles have been referred to by Helbrecht (2005) as 'geographical capital'.

- *Human resources*: As shown in Figure 10, this resource is split into health and educational resources (education and skills – formal and informal), due to the fundamental differences in attaining and maintaining these resources.

- *Psychological resources*: Kleine (2010) included self-confidence, tenacity, optimism, creativity and resilience. The dynamic between spirituality and psychological resources is seen as complex since her view is that spiritual resources could strengthen or weaken an individual's psychological resources (ibid.:681). The significant roles of churches as support structures are discussed in Chapter 6 (Social capital), churches as customers in Chapter 8 (Networks of innovation) and faith and psychological resources in Chapter 9 (Reflections on the Choice Framework).

- *Information:* This resource has been viewed as a key resource for development since the path to knowledge starts with information acquisition (Alsop & Heinsohn, 2005; Gigler, 2004; Heeks, 1999).

- *Cultural resources*: The approach of Bourdieu (1986) is followed in which 'Cultural capital' occurs in three states: "an embodied state (the habitus a particular person lives in); an objectified state (objects like paintings, instruments and monuments which only the initiated can use or appreciate) and an institutionalised state (prestige attached to, for example, academic titles) (Kleine, 2010:681; see also Section 2.3.5.3 -The theory base of social capital).

- *Social resources*: The concept of 'social capital' has developed from many different viewpoints and the significance, fluidity and evolution of the concept were discussed in Section 2.3.5 (Role of social capital). Kleine adopted Bourdieu's definition of social capital (refer to Section 2.3.5.3).

The focus of this research study is mainly on just one aspect of the resources, namely the role played by social resources, but information, educational, financial, material and geographical resources emerge as important resources as well. The last aspect of the CF is the structure that shapes and is, in turn, shaped by individual agency.

Structure

The 'duality' of agency and structure as described by Giddens was outlined in Section 2.3.5.3 (The theory base of social capital) and was described in the SLF and Alsop & Heinsohn (2005) frameworks. The SLF includes structural aspects such as institutions and processes, laws, policies, institutions and processes, informal norms on the use of time and space, and culture, which corresponds to Alsop and Heinsohn's list.

Kleine (2010) referred to elements of structure that limit ICT choices as 'dimensions of access', e.g. the availability, affordability and the skills required for ICT use. These dimensions are very local and are also coupled to other structural elements. The roles of discourses are considered by Kleine to be a vital part of the CF structure since processes, norms, laws and policies are formed in a context influenced by dominant discourses such as 'development as growth' or 'human rights based' equality of ICT access.

In the CF the interactions between individual agency as enabled by resources and the opportunity structure are complex and therefore Kleine (2010:682) stated: "Structural constraints need to be recognised as being at least as important an element as individual agency", or to make a stronger statement we can use the theory and terminology of Giddens (1984), and refer to the 'duality' of agency and structure as actually being two aspects of a single element.

Applying the Choice Framework

In terms of the application of the CF, Kleine referred to actual use in analysis of the effect of ICT policies on local livelihoods in her PhD (Kleine, 2007), and the possible use in development work in general as a tool for

planning and assessment, as well as for analysis of development initiatives. Grunfeld (2011) identified the main contribution of the CF as a robust ICT4D evaluation framework that operationalised CA. The caveat is that complex development processes can be analysed, but that only a subset of well-targeted activities may be amenable to planning and assessment (Kleine, 2010).

Implications for researching and planning ICT4D

The CF is based on Sen's capability approach and hence the major implication is that the outcomes of an ICT4D project must be defined according to the individual development priorities of the participants, rather than any other agenda, e.g. a technology-driven development strategy (ibid.). In practice that requires acquiring the relevant information from participants to execute the planning, implementation, monitoring and evaluation of the project accordingly.

The development benefits should exceed the burden of the complexity of participative development priorities. Kleine argued that six major benefits are possible of which the first is the general moral argument that people should be involved in decisions about their lives. Secondly, the relevance and appropriateness of the defined outcomes should improve the probability of success (Chambers, 1983). Thirdly, the sustainability of institutions created via a participatory process should be higher (Oakley, 1991). Fourthly, by engaging with a diversity of development priorities, the scope of the development should extend beyond economic matters to social, environmental and other priorities. Fifthly, the potential of the use of ICTs to contribute to a diversity of functionings or 'being and doings' (Sen, 1999) may be enhanced due to the participative process which also encourages a sense of citizenship as a basis for "potential subversive uses of technology which can sometimes create social change for the disadvantaged in a more effective way than mainstream uses" (Kleine, 2010:683-684).

Kleine (ibid.) suggested that ICT4D initiatives could use the CF as a kind of map, as a template for planning and evaluation through which the contribution of ICTs to targeted process elements can be shown in the personal and systemic context described in the CF. Perhaps the main benefit of the use of the CF is that "the 'impact of ICT' is not conceptualised in a cause-and-effect chain; instead effects are carefully disaggregated and their systemic interrelatedness and co-causality is demonstrated" (ibid.:687).

2.6.4.3   *Limitations of the Choice Framework*
The benefits and limitations of the application of the CF are closely related and also deeply embedded in the philosophy of development adopted. Kleine (2010) engaged with the limitations and makes the general comment that development initiatives with "specific, a priori defined desired outcomes designed for a large number of people" might be in contradiction to the Choice Framework (:689). She pointed out that these types of initiatives could be done with a focus on individual choice if the development practitioner shifts perspective accordingly.

Three limitations are described by Kleine (ibid.). The first limitation is that there is an inevitable trade-off of *comprehensiveness* that encompasses the complex relationships between outcomes, empowerment, structure, agency, and resources, with respect to the *level of theorisation* that can be achieved. Value can be added to each element of the CF, for example, by exploring the existing theoretical work and developing syntheses for new research.

The third limitation is covered before the second one, which entails a major and ongoing debate. The third limitation deals with the reality that funders as a whole prefer impacts that are clear, measurable and predefined (Kleine, 2010). The challenge is that the CF exposes the systemic and pervasive nature of

impacts, which makes measurement difficult, and requires the participation of the people involved in defining outcomes, which requires flexibility regarding predefined outcomes.

Kleine's second limitation concerned how to make the leap from qualitative use at the level of the individual (who makes a personal choice) to dealing with groups of individuals. Kleine (2010:688) referred to the reality of "a complex relationship between individual and collective choice which will have to be conceptualised carefully" to enable the empirical application of the Choice Framework at higher levels of aggregation of groups and social structures.

The critique of the CA as being 'individualistic' has been carefully considered in Section 2.6.3.5 in which the case study of Kleine (2013, 2007) regarding collective action in public procurement in Peru was mentioned. Kleine (2010) referred to an analysis of online public procurement practice as an expression of collective choice, which was related to individual views as to how "their tax money should be used to meet create the community they wanted to live in" (ibid.:688).

Amendments to the CF were developed by Attwood & May (2015) who applied the CF to the findings from a rural ICT intervention in resource-poor communities, the CLIQ (Community-based Learning, ICTs and Quality-of-life) project. The project's aims were to support participants to improve their Quality-of-life (QoL), to research the impact of ICT training and use on QoL, and to build the capacity of telecentres. The use of the CF assisted in the tracing of the variety of causal paths found in the participants' stories regarding outcomes. Via in-depth analysis of the research process, the actions of participants and the development outcomes, recommendations were developed on how the CF could be amended to represent the complexity of the project findings.

The most important amendment relates to the pervasive influence of psychological resources in local development (as mental health) and in human agency (via inner empowerment). Attwood & May (2015) adopted the constructivist paradigm of multiple realities, and therefore contended that "some resources only exist or become visible with a minimal level of psychological health" (:2). Negative and positive effects of psychological resources were evident among project participants. Negative effects included reduced engagement in learning activities and limited pursuit of entrepreneurial opportunities, while positive effects such as finding solutions to ICT access problems and the creation of new businesses were encountered.

The proposal is therefore made that:

> a minimum set of positive psychological resources are needed in order to recognise and use other personal resources or take up structural opportunities. Psychological resources can thus be viewed as a conduit through which individuals access and employ their resources to engage with the structures of society in pursuit of their goals. (Attwood & May, 2015:3)

Formulated differently, personal characteristics should be embedded in psychological resources, to reflect the importance of their influence on all other resources, rather than just listed as one of the resources. Attwood & May (2015) argued that this approach is aligned with Kleine's view regarding the importance of psychological resources: "we should be asking what structural conditions are most likely to support people's mental health and psychological resources, putting them in a stronger position to make individual and collective choices towards the lives they have reason to value" (Kleine quoted in Attwood & May, 2015:4). All of the resources are important, and the same argument could be made for most of them, for example, physical health, which is seen by Sen as a key factor influencing individual ability to choose (Kleine, 2010), and therefore this amendment should not be endorsed.

Stillman (2015), in his review of Kleine's book (Kleine, 2013) praised the work for deep theoretical and empirical findings. The only major critique was that the dynamics of the CF, with complexities of the many different dimensions (e.g. 10 types of resources) had not been illustrated well in the key diagram Figure 10, in the previous section). Stillman called for the development of a 'practical toolkit' which would help the reader to not get lost in the multidirectional agenda of the use of the CF as an evaluation tool, as a mapping tool, or as a policy tool, and support wider application (ibid.).

2.6.4.4 Summary

The development of the Choice Framework as a vehicle to operationalise the capability approach in a holistic and systemic way has been outlined. The combination of the building blocks of the empowerment framework and the SLF's portfolio of capital has been motivated in terms of explaining choice as the result of the interaction between agency (based on the individual's capitals) and the opportunity structure (e.g. norms, laws, customs). The equal importance of agency and opportunity structure and the contextual nature thereof was highlighted.

The broad arena for the application of the CF was outlined as analysis of policy, a planning and assessment tool, and the evaluation of initiative outcomes, with the caveat that only a subset of well-targeted activities may be amenable to planning and assessment.

The implications of the CF for researching and planning of ICT4D include definition of the outcomes according to the individual development priorities of the participants, which requires participative processes. The benefits are argued to be worth the participative effort, since relevant and appropriate outcomes should improve the probability of success, sustainability of institutions created via a participatory process should be higher, and the increased diversity in development priorities leads to a natural extension of the scope of the development to cover a balanced set of high-level developmental priorities. The use of the CF avoids the conceptualisation of impact in a cause-and-effect chain and shifts the focus to disaggregation of effects and systemic interrelatedness and co-causality.

The limitations of the CF consist of an inevitable trade-off of *comprehensiveness* versus the *level of theorisation* that can be achieved, the problem of applying the Choice Framework to groups and social structures, and the challenge of selling to funders impacts and outcomes that are not clear, measurable and predefined, but are dependent on participants' preferences and contextual systems dynamics.

To foster the adoption of the CF by a wider audience, the simplification of the representation of the framework was advised to accommodate the many possible uses of the CF (e.g. planning and evaluation). The CF is applied in Chapter 9 to show its use to map out development processes.

2.7 Overview of existing research on social capital in ICT4D

2.7.1 Introduction

An overview of the history of the development of the concept of social capital and its relevance and use in development theory and practice was presented in Section 2.3.5. The importance of social issues and human dimensions was raised in Section 2.5.2 which dealt with Sustainability in ICT4D initiatives and in which ICT4D champions' use of social capital to enhance sustainability was mentioned. In Section 2.6 (Frameworks for ICT4D) sociocentric frameworks that foster sustainability was covered including the role of social capital within the SLF, the application of the CA, and Kleine's Choice Framework.

In Chapter 6 (Social capital), the different types and dimensions of social capital are used to develop a comprehensive description of the social capital of VOs, the influences on the formation thereof, and the VOs' use of social capital. Social capital is the golden thread in Chapters 7 and 8 as well.

Given this comprehensive coverage of social capital in these chapters, this section presents a highly focused and condensed overview of selected research regarding social capital in ICT4D.

2.7.2 Social capital in ICT4D research

2.7.2.1 Introduction
Social capital and development

An individual perspective on development was researched by Díaz Andrade & Urquhart (2009) who used a framework with ICT, human capital, social capital, and institutions as components to take into account "the underlying and intricate cultural elements interacting with each other during any ICT intervention" (:111). Social capital has also been identified as one of the possible conceptual frameworks to link a developmental initiative to the growth of collective action, via the building of networks and the associated embedded resources in these networks (Thapa, Sein & Sæbø, 2012; Ostrom, 2000, Putnam, 2000).

Woolcock (1998:162) used two complementary forms of social capital, called 'embeddedness' (relationships inside a group) and 'autonomy' (relationships with those outside a group). According to the concept of embeddedness, the spectrum from social practices to societal economic activity is seen as "inherently enmeshed in social relations" and therefore development changes the kind of embeddedness (:162) (see Section 2.3.5.4).

Views on relationship between ICT and Social capital

The relationship between ICT and social capital has elicited extreme positive and negative views. One extreme view is that the benefit of the internet for relationship-building may be more essential than information provision, while the other extreme sees the increasing use of ICT leading to localities becoming "globally connected and locally disconnected, physically and socially" (Castells quoted in Grunfeld, 2011:49). Grunfeld (2011) referred to empirical studies that show that the negative extreme has not been confirmed, but do refer to the phenomenon of thinking about ICT in a decontextualised manner that is not grounded in how ICT is implemented in a context. She contended, based on her research in communities, that positive social capital has a higher probability of emerging in community contexts. The facilitating role of ICT in the building of social capital via enhancing information flows and connecting individuals was highlighted in previous research (Adam & Urquhart, 2009). Examples of research regarding the influence of ICT4D in rural areas are the work of Díaz Andrade & Urquhart (2009, 2010) and Yang, Lee & Kurnia (2009).

The conceptual model of Grunfeld, Pin & Hak (2011:152) regarding "a virtuous spiral dynamic between the use of ICT and the building and strengthening of capabilities, empowerment, and sustainability" (see Section 2.6.3.2) has also been used to reflect on the interaction between social capital's and community engagement as "a virtuous spiral dynamic". Social capital triggers and sustains ICT projects in communities, while ICT projects trigger community engagement that strengthen the communities (Grunfeld, 2011). Onyx & Bullen (1997) summarised this general dynamic as social capital both contributing to and resulting from community development processes.

In ICT4D research a major role of ICT use is in enabling communications that strengthen relationships of different kinds thus building social networks, therefore, in Woolcock's framework, ICT4D influences embeddedness at community level, called *integration* (intra-community linkages), and at societal level, *synergy* (state-society relationships). ICT4D influences autonomy at community level, called *linkage* (extra-community linkages), and at societal level the influence is on the ICT4D initiative via *organisational integrity* (i.e. institutional capacity, norms). The mutual influences between an ICT4D intervention and social structures at various levels are central to success and sustainability.

An information systems perspective on social capital was developed by Urquhart, Liyanage & Kah (2008) and Simpson (2005). Urquhart *et al*. (2008) used knowledge management theories to develop a framework that covers four phases: the process of ICT development, the ICT intervention, the evaluation of the impact of the ICT intervention and the process of poverty reduction. Simpson (2005; Simpson, Wood, Daws & Seinen, 2001) found a social capital perspective useful in the development of a framework for understanding the complexities of implementing and sustaining community informatics initiatives and recommended that project design for significant and long-term impact should include support via the building of social capital as one of the key factors.

The balance of this discussion is structured around the evolution of ICT4D which brought social aspects to the fore. As examples, telecentre projects and research on the use of mobile communications by refugees are discussed and analysed using Woolcock's framework.

2.7.2.2   Social capital in the evolution of ICT4D
In Section 2.4.2, the overview of Trends in ICT4D, the evolution of ICT4D in three phases: ICT4D 0.0, 1.0 and 2.0, as developed by Heeks (2008) was used. In ICT4D 1.0 the deployment of telecentres was a popular response to rapidly meet the need for information and communication services in especially poor rural communities. The failure of many telecentre initiatives resulted in a focus on sustainability, scalability and evaluation (ibid). Research showed that social aspects including social capital elements play important roles in the effective delivery of services and sustainability of telecentres (Masiero, 2011).

In ICT4D 2.0, ICTs are viewed as an end in themselves, which has transformative potential, and this phase was also described as "Development 2.0" with "new IT-enabled models that can transform the processes and structures of development" (Heeks, 2010:22). Thompson (2008:825) also referred to "Development 2.0", arguing that ICT use has become more than an assemblage of hardware, software, and user behaviour, but an "architecture of participation". The considerable power of ICT-enabled social networks (i.e. social capital enabled via ICT use) to transform the dynamics of group interaction, increased the potential for more plural and collaborative development.

What have we learnt from Telecentres?

Telecentres have remained a feature of ICT4D and the BB4All project can be considered to be a variant thereof, with the VOs offering internet access at the offices as well as additional services. The basics remain the provision of affordable access, the bridging of the digital divide, with frequent calls to move on from traditional top down 'technocentric' approaches, to 'sociocentric' approaches that put people and their developmental needs first (Section 2.5.1 - Chigona *et al*., 2009).

Ricardo Gomez and co-workers have published articles on Public Access Centres (PACs) which include telecentres, libraries, and cybercafes, in locations all over the world (Gomez, Ambikar & Coward, 2009). A study of public access to computers in Colombia analysed the "most salient benefit to users, namely more information for stronger relationships with friends and family" (Baron & Gomez, 2013:271) and determined

that the sense of belonging and connectedness to both community and the larger world enabled by usage often led to "feelings of empowerment and development of social capital, two intangible factors that are critical for community development" (ibid.). A different perspective on the role of social capital was developed by Díaz Andrade & Urquhart (2010) in their research of an ICT4D project providing internet access via information centres in rural Peru. Some villagers sought information, but also distributed it to other villagers and were termed 'social connectors' with reference to the usage by Gladwell (2002) of the terms connectors, mavens and mavericks to describe the behaviour of people in the diffusion of trends. It was found that some individuals were seeking information on behalf of others (e.g. farmers) and that the information was shared with the social group the individual was connected to, i.e. social capital in action. Information was communicated via networks of contacts and understood due to shared sets of meaning. This social connectivity behaviour was deemed to be supported by the cultural norm of reciprocity. Díaz Andrade & Urquhart (2010) concluded that a combined framework of information seeking behaviour, as described by the actor-defined purposes framework of Dervin (1989), and social capital, is useful to understand the roles adopted by some individuals to search for and spread information.

Research into the sustainability of telecentre initiatives has led to an increased focus on balanced approaches, as advocated by Masiero (2011), who found that the well-known financial and social dimensions to sustainability should not be defined as an either-or choice, but that, in practice, mutual reinforcement occurs. Social sustainability, defined as the "the capacity of being coherent with the needs and characteristics of the local population in a given context" (:1) is capable of increasing the financial viability of telecentres, and in the case study conducted on the Akshaya Telecentre Project in Kerala, southern India, the social sustainability factors which increased the financial viability of telecentres were identified as: "trust-building behavior, the provision of context-based services, and the proactive involvement of civil society in the telecentre experience" (ibid.).

Masiero (2011) developed a new definition of social sustainability based on the above findings. Firstly, locally relevant content must be provided to the users so that enough users' needs are met, and secondly, an outcome of a high and sustained level of community participation is required. Masiero (2011:4) therefore refined the definition of social sustainability of telecentres to "the capacity of providing locally relevant content to prospective users, *aimed at fostering local participation* to the project" (author's italics).

Vital questions centre on the model used to run the telecentre and the attitude of the person responsible for the telecentre. The Akshaya Telecentre Project used a franchising model in which a network of telecentres was set up by an external public entity, but after the start-up phase, the telecentre entrepreneurs had to sustain themselves financially, to encourage them to focus on local people's needs, i.e. their source of income. This project has been thoroughly researched, especially by Madon who has done longitudinal analyses (Madon, 2007, 2005, 2004).

The design of the project model required that the telecentre entrepreneurs perceive and function as the human link between the introduction and the use of ICTs by the community, a pro-active function that has been called an 'intelligent intermediary' (Gopakumar, 2007:22), 'infomediary' (Mukerji, 2008:2) or 'social connector' (Díaz Andrade & Urquhart, 2010) (see Section 2.6.2.2). In this role good relationships with customers are vital and therefore the building of various types of social capital is required. Masiero (2011:13) described telecentre entrepreneurs as being more than change agents as referred to in the diffusion of innovation work of Rogers (2003), since they guide a customer from the first innovation decision (e.g. going to a telecentre) to an ongoing process of adapting and adopting ICTs to derive value. This role is described in more detail in Chapters 7 and 8.

As mentioned previously, social sustainability factors, which increased the financial viability of telecentres, were identified as three mechanisms of interaction between social and financial aspects: "trust-building behavior, the provision of context-based services, and the proactive involvement of civil society in the telecentre experience" (Masiero, 2011:1).

Trust is the basis of social capital, and trust was built via various actions such as ensuring that telecentres were perceived to be safe environments by the community and that the range of services provided were coherent with the socially-oriented ethos of Akshaya, rather than providing private services (Masiero, 2011). In addition, applicants were screened for their familiarity with the local context, which improved the probability of being able to build social capital (e.g. knowledge of local norms and customs). The synergies between the project and context (Kerala province) were researched as 'coherence' between the project and the political features of its environment, e.g. the trust that citizens have acquired in Kerala e-governance initiatives, and Akshaya has been used as a paradigmatic case to argue for tailoring telecentres to local culture and political patterns (Antin, 2005). The trust in the local government was social capital that entrepreneurs could build upon or destroy. This research is highly relevant to the BB4All project.

Regarding the delivery of context based services, Masiero (2011:15) argued that the provision of these "services attracts new clients and retains the existent ones, which increases the financial sustainability of telecentres." This requires a free and open exchange of information and knowledge on an ongoing basis to keep up with the evolution of needs, as enabled by ongoing social capital development.

Masiero (2011) considered that, in general, but especially in a context with a strong civil society, social sustainability is enhanced via civil society involvement which can attract new funding and new clients, leading to increased financial sustainability.

Civil society interaction with telecentres was conceptualised by Madon (2007) using the work of Sen (2001), as telecentres being "shared public spaces" (Madon, as quoted in Masiero, 2011:16) that are interaction spaces for collective use, for example Akshaya telecentres that were used for meetings of local cultural associations.

Masiero (2011) summarised her findings as (ibid.:18): "trust-building is key to customer retention; context-based service provision is important both for attracting new users and for retaining existent ones; civil society involvement is able to provide e-centres with new sources of funding and new users."

In Woolcock's social capital terms, development of trust by community members in the telecentre entrepreneurs increased *linkage* (extra-community linkages) and the trust in the local government developed important *synergy* (state-society relationships) – referred to as coherence earlier. The use of telecentres by groups of community members increased *integration* (in the community itself and of telecentres in the community). The development of context-based services (enhancing social sustainability) by entrepreneurs also relied on the development and use of *integration* by the entrepreneurs.

The important support of civil society for the telecentres increased *linkage* as well as *organisational integrity,* which supported the attraction of new funding for the project. The Kerala government's track record had developed their *organisational integrity*, which fostered the ability to attract funding and support, as well as faith in the government by the community, which led to community support of the ICT project.

2.7.2.3   Mobile communications

The other recent revolution is the growth of mobile telephony all over the world which has enabled people from even the poorest and most remote rural areas to communicate via voice and instant messaging and use the many services available via the internet. A South African example was selected from the extensive research corpus to show some of the benefits. Bacishoga, Hooper & Johnston (2016) used a social capital lens to study mobile phones as possible tools to assist in refugee integration. Bridging social capital, e.g. weak links among individual members of a heterogeneous network (Williams & Durrance, 2008), were formed between refugees and South Africans via connections made, for example, at work and via shared accommodation, but the major source of bridging relation was meeting people with similar interests at, for example, work, school and churches (Bacishoga *et al.*, 2016). Use of mobile phones assisted in keeping these relationships alive and resulted in improved bridging social networks, which has been shown (Granovetter, 1973) to be very important in increasing the probability of a person getting a job due to the increase in the diversity of information sources. Jobs were found via these networks in this study (Bacishoga *et al.*, 2016). Refugees with small businesses used mobile phones to recruit and retain customers by staying in touch, and to find suppliers. The vital role of mobile communication for the creation of economic opportunities such as income generation and achieving savings in cost and time has been well-researched (Diminescu, Renault & Gangloff, 2009; Bhavnani, Chiu, Janakiram & Silarszky, 2008).

Mobile communication also enabled the maintenance and strengthening of bonding social capital, the strong ties that connect family members, who were a source of mutual emotional support and important information. These social networks were mostly homogeneous in contrast to the heterogeneous nature of bridging networks and were found to contribute to social isolation and hinder social and economic integration. As might be expected, the role played by trust and common language affected the development of the various types of social capital. Bacishoga, *et al.* concluded that the major contribution of mobile phones was in growing bridging social capital, especially as used to assist economic integration. The development of bonding social capital was also enhanced by mobile communications, but negative effects also occurred due to increased social isolation. This showed the importance of building trust and the major influence of sharing or not sharing a common language.

In Woolcock's social capital terms, ICT enabled development of bonding capital (high *integration*) with family back home and among local refugees, which increased emotional support, but also increased social isolation and led to a low level of relationships and exchanges with outsiders (low *linkage*). On the other hand, the use of mobile phones assisted in building the linkage of refugees from a zero base, and rapid building of linkage was essential for small businesses, job seekers and economic integration.

2.7.2.4   Summary of social capital in ICT4D research

In both of the case studies presented, the mutual interactions between ICT adoption and social dynamics from individual to societal levels, as expressed in social capital terms, were very clear. The major contribution to sustainability, as interaction between financial and social sustainability, by the development and maintenance of social capital was made evident in the analysis of telecentres.

2.8   Summary of the literature review

2.8.1   Development theories and sustainable development

The literature review was designed to find and analyse research dealing with the problem of how to improve the sustainability of enterprise-led development in ICT4D through the use of social capital.

Development initiatives have to embrace the full complexity of a person's life in context and the inherent sustainability issues created by externally driven development. A key dynamic in this context is the interaction between top-down development and bottom-up driven development.

Sustainable development theories illustrate the many dimensions of sustainable development, for example, the SDGs include people, planet, prosperity, peace and participation. Human development theories have also developed that focus on individuals and bottom up approaches to implement sustainable development. The theories considered were therefore sustainable development, human development, human scale development and sustainable livelihoods approaches which consider individuals' capabilities, assets and activities.

Amartya Sen developed the important argument that development should be dealing with the problems and deprivations of people by countering them with freedoms of different kinds exercised via the agency of individuals. This agency is, however, constrained by the available social, political and economic opportunities and hence there is a fundamental complementarity between the individual agency and the social structure in which the individual lives. This showed the fundamental link to relationships which form part of the social structures, and therefore provides a context for the focus of this research, namely the role of social capital in development.

The value of Human scale development (HSD) approaches (Max-Neef *et al.*, 1991) lie in the way in which the sustainability dilemmas created by both top down or bottom up development is addressed. The pillars of HSD include "the generation of growing levels of self-reliance" (ibid.:8) and the construction of coherent and consistent relations of balanced interdependence of, for example, the personal with the social and of civil society with the state. Balanced interdependence depends on individuals collaborating and organising (i.e. developing and using social capital) to be able to establish meaningful relations with large organisations and influence top-down decision-making processes. Top-down political democracy supporting bottom-up social participation is required, in other words, both vertical relationships and horizontal relationships of social organisation are needed. The definition used for sustainable development was therefore based on HSD principles:

> Sustainable development is achieved through self-reliant human scale development which flows from the individual level to the local, regional and national levels, and which is horizontally interdependent and vertically complementary. (Chigona *et al.* 2009:5)

Social capital has a definite role in sustainable development and an overview of this elusive concept was done to clarify the choices made in this research.

2.8.2   Role of social capital

Both theoretical and empirical bases for social capital were discussed. Bourdieu, a sociologist, argued that cultural and social capital must be added to economic capital to explain the dynamics and structure of societies (Bourdieu & Wacquant, 1992). Through social capital, individuals can gain direct access to economic resources, e.g. a loan from a friend.

The empirical base of social capital was developed by Woolcock (1998) who defined two complementary forms of social capital, called 'embeddedness' and 'autonomy' (:164). Embeddedness at the micro level refers to intra-community ties and at the macro level to state-society relations, while autonomy at the micro level refers to extra-community networks and at the macro level it refers to institutional capacity and credibility (ibid.).

Woolcock used the two levels (micro and macro) and the two types of social capital (embeddedness and autonomy) to create four dimensions of social capital which he used in different combinations to explain a wide spectrum of development outcomes. He viewed social capital as a necessary, but problematic resource that can be used to explain bottom-up and top-down dilemmas in development since it can enhance or destroy other capitals such as physical or human capital and mediates development outcomes.

2.8.3   ICT4D and sustainability

In the evolution of ICT4D, Heeks (2008) contends that the many failures of ICT as a tool for development led to the recognition of sustainability as one of the major issues. To decrease failure rates, active participation by communities rather than passive diffusion of technology is required, specifically an active process of innovation, ideally by poor communities, in order to achieve development goals (Heeks, 2008).

Unwin (2009) pointed out that the sustainability of an ICT4D initiative depends largely on the development perspective that is adopted, e.g. market-led ICT4D with an emphasis on economic growth and socially-led ICT4D that focuses on equality of access. The sustainability of market-led ICT4D will depend on market forces, while socially-led ICT4D will depend on external funding which requires value to be delivered in terms of cost-effective contribution to *their* (external) developmental goals.

The relationship between sustainability and technology was powerfully articulated by Toyama (2010) as technology being only a multiplier of human intent and capacity, and not a substitute for it. Engagement with human dimensions in ICT4D was illustrated with enterprise-led development strategies and research on the role of ICT4D champions. In the latter case, social capital was found to be a useful construct since it describes how champions use relationships to promote, build support and consensus as well as gain access to the required resources (tangible and intangible) to grow the project.

2.8.4   Frameworks for ICT4D

In alignment with the research focus, sociocentric (people first) frameworks that foster sustainability were discussed: the Sustainable Livelihoods Framework (SLF); the application of the capability approach (CA); and Kleine's Choice Framework that combines elements such as the capitals of the SLF with the CA to operationalise the CA.

A major strength of the SLF is that the scope of the system of interest can range from the local (individual) to global system(s), while at the same time the livelihoods analysis has to start at the micro level of individuals and households, with their strengths and requirements (Duncombe, 2006). The important role of infomediaries (e.g. Village Operators) mediating information use emerged as well as the use of ICTs to enable social networks that mediate linkages to higher quality information sources. The SLF contextualises ICT as one asset among many assets (human, social), most of which are more important for development.

The CA is essential in supporting the general shift from 'technocentric' to 'sociocentric' approaches in ICT4D since it provides the theoretical foundation for defining development that is about putting people and their choices first, as well as the shift to participant empowerment and participant-driven innovation. The CA also supports the vital shift from needs to agency and capabilities, which supports new approaches to sustainable development and human scale development.

The use of the CA in a whole project life cycle of approach (conceptualisation), design and evaluation was evident in an analysis of ICT4D articles. The use of the CA has added a human-centric perspective to ICT4D initiatives that broaden the scope beyond economic growth. The design of ICT4D initiatives was enriched to respect freedom of choice and diversity in general, empowerment via increased democratic freedom, and direct participation in initiative design that is sensitive to the values embedded in technology.

Critique of the CA that is relevant to social capital was addressed. The concept of sustainable development and the expression thereof via the CA have been problematic due to the lack of systematic incorporation of collective capabilities (Leßmann & Roche, 2013). As pointed out by Zheng (2009), the CA is incomplete and therefore the introduction of additional theories to augment the CA framework for different applications will be an ongoing process.

The Choice Framework (Kleine, 2011, 2010,) is the most ambitious attempt to operationalise the capability approach in a holistic manner. Kleine (2011) described the Choice Framework as a 'conceptual tool' that assists in the operationalisation of the capability approach and "can be used to deconstruct embedded ideologies and analyse the appropriateness of development goals, to map development as a systemic process, and to plan interventions which can result in increased freedom of choice for people" (ibid.:119). The CF combines the strengths of the Alsop & Heinsohn (2005) framework with those of the SLF. Choice is at the centre of the Alsop & Heinsohn framework, and choice is described as the product of the interaction between agency and the opportunity structure (e.g. norms, laws, customs) in which this agency is potentially exercised. The focus in this research on social relationships created the opportunity to surface aspects of the opportunity structure such as communal norms.

The SLF is a systemic framework with more detail, such as the five livelihood assets (capitals) that enable agency (Kleine, 2010). The CF explains choice as the result of the interaction between agency (based on the individual's capitals) and the opportunity structure (e.g. norms, laws, customs). The equal importance of agency and opportunity structure and the contextual nature thereof was highlighted.

The implications of the CF for researching and planning of ICT4D include definition of the outcomes according to the individual development priorities of the participants which requires participative processes. These processes should define relevant and appropriate outcomes which should improve the probability of success, increase the sustainability of the institutions created, and increased diversity in development priorities should deliver a balanced set of high-level developmental priorities.

In this research the human scale development approach and the CF are seen as complementary. The CF keeps the focus on the individuals and their choices as the heart of the development endeavour. At the same time, as Kleine (2010) acknowledged, the application of the framework to groupings of individuals, where the issue of collective choice rather than individual choice arises, is not self-evident. The HSD strategy with the element of alignment of community or group interests shifts the focus to the group level. The CF provides a means of identifying what needs to be done to achieve this alignment, namely the building of social resources, and reminds us that group alignment is in itself a resource that affects agency. The CF provides an overarching systems view on which the HSD strategy can be mapped out. The emphasis on self-reliance in HSD creates a productive interplay between the two approaches – the choices individuals make contribute to a self-reliant community.

2.8.5 Overview of existing research on social capital in ICT4D

ICT4D and social capital interactions in mobile communications and sustainability of telecentres were discussed and in both of these case studies the mutual interactions between ICT adoption and social dynamics at individual and societal levels, as expressed in social capital terms, were very influential. The analysis of telecentres showed the major contribution of social capital to sustainability due to interactions between financial and social sustainability.

Gigler (2011) reflected on the broadening of the possible influence of ICT to the development of 'informational capabilities' to transform informational capital (e.g. access to ICTs) into a person's freedom

to use ICTs). The improvement of these capabilities was crucial in determining the impact of ICTs on well-being (ibid.) and in this process infomediaries (e.g. Village Operators) played an important role (Gigler, 2015).

Finally, the research on the Akshaya Telecentre Project, which shared important commonalities with the BB4All project, such as the development of the telecentre entrepreneurs as an infomediary, showed that the functions of the entrepreneurs were enhanced via the development of social capital (Madon, 2007, 2005, 2004 and Masiero, 2011).

3 Research context: The "Broadband for All" project

The context and content of Chapter 3 are shown in the thesis map.
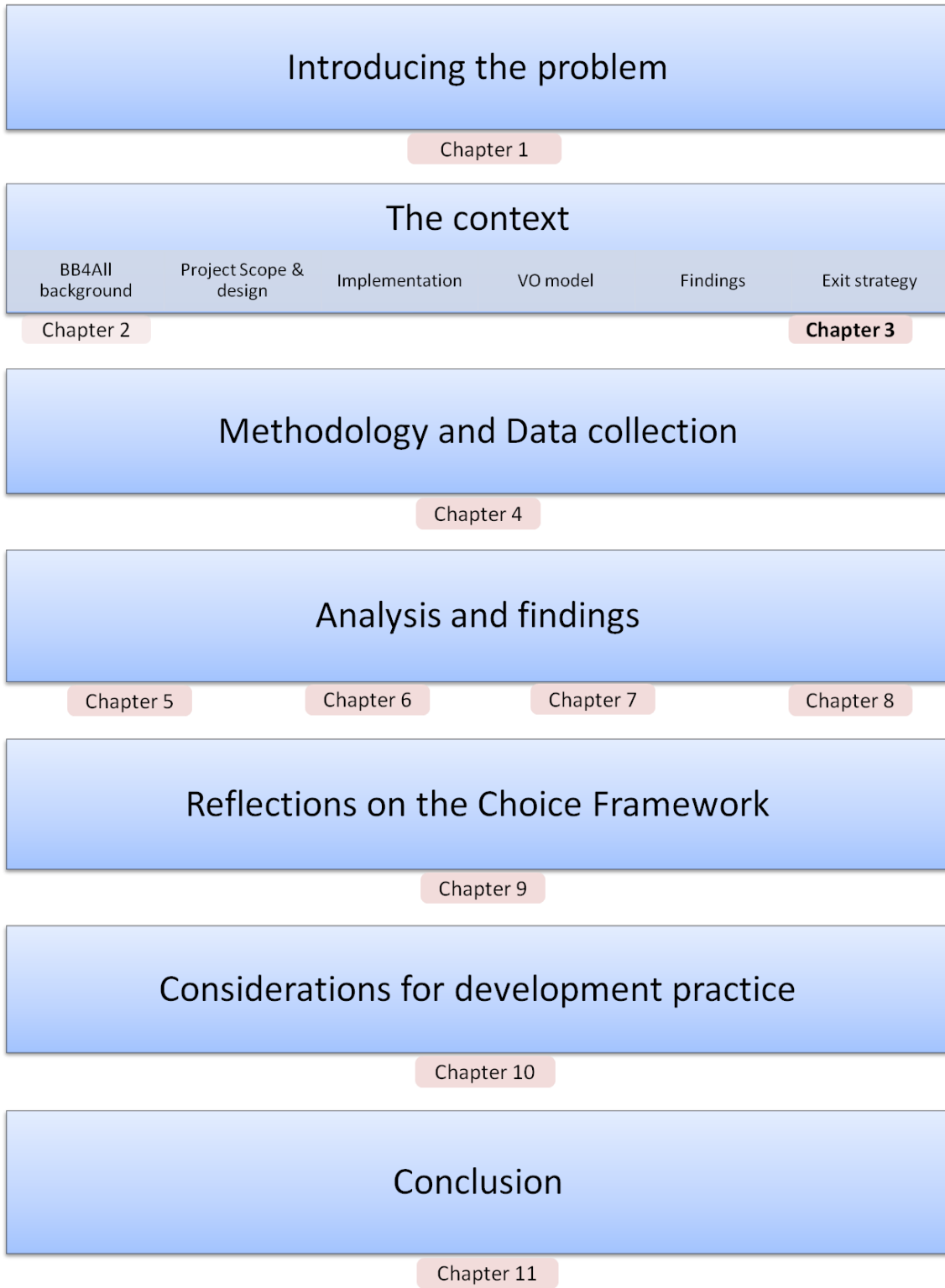
3.1   Introduction

The CSIR Meraka Institute and its partners initiated the Broadband-for-All project (BB4All) with the goal of providing affordable broadband connectivity to the rural under-served areas of South Africa through wireless mesh technology.

The BB4All initiative aimed to test a community-centric model as a basis, as opposed to the typical centralised models used by national telecommunications companies. The community-centric model was designed to empower local ICT service providers (known as Village Operators) to implement broadband infrastructure using wireless mesh network technology to connect schools and other government facilities to the Internet.

Two key project focus areas were:

- Provision of a large-scale demonstrator of a wireless mesh network (WMN) as a broadband solution for rural areas (a technology demonstrator). The majority of the project budget was allocated to the technology demonstrator.

- The establishment of a Village Operator (VO) model to support access and increased use of technology in selected rural areas.

The main emphasis of the BB4All project was to conduct research in cooperation with a range of partners, to find innovative solutions to connectivity problems in deep rural settings, to document these and to disseminate the results so that other practitioners could benefit from the lessons learnt. Initial deployment was in the Nkangala District Municipality (DM) of Mpumalanga province and the Sekhukhune DM of Limpopo province of South Africa. The technology was also established in the Northern Cape province as part of this project.

The two major areas that are discussed are the BB4All project as a whole and the Village Operator model. The researcher was directly involved in the development of business models for the VO model, and hence developed insight at the overview level during the project in addition to the detailed information collected in the VO interviews in this research. The description of the project is based on the BB4All end-of-project report that described the project journey from inception in 2009 until April 2014, business modelling project reports written by the researcher, meeting notes, and PhD research information collected from 2012 to 2015.

The background to the problems the BB4All project was addressing is introduced, followed by the response in the form of the Project Scope and design. An overview of the project implementation from 2009 to 2014 is presented before a detailed discussion of the establishment of Village Operators. The end-of-project findings and recommendations are summarised, and then the interesting experiences of the exit strategy and commercialisation during and after the official end date of the project are discussed in detail in order to provide an example of the sustainability challenges in ICT4D.

3.2   The background to the BB4All project

3.2.1   The problem: Rural schools lack connectivity

There are an estimated 17 000 public schools in remote areas of South Africa with a total of 26 500 in the country having limited or no access to digital communication facilities such as the Internet, landlines,

cellphones or fax machines (CSIR, 2014; Roux & Marais, 2011). Many schools and provincial departments of education (DoEs) still use couriers or drive themselves to deliver or collect official messages and documents (CSIR, 2014). Rural areas typically face serious backlogs in the provision of services. This includes telecommunications, as this kind of infrastructure is difficult to establish, support and maintain in rural areas due to their remoteness, dispersed settlement pattern, limited disposable income and various historical reasons such as the homeland development policy of the South African government (ibid.).

3.2.2 Commercial viability of broadband connectivity in rural South Africa

Traditionally, telecommunications infrastructure could only be established by a select few national or large regional telecommunications operators with the financial means and access to expertise and licenses. As a result of technological advances in the field of wireless (Wi-Fi), it has become possible for anyone with some technical know-how to create wireless connections directly between devices such as computers.

Major telecommunications operators have limited interest in developing broadband telecommunications data infrastructure in rural areas since their view is that this investment would be unlikely to provide sufficient return on investment. It has been mostly the mobile operators that have rolled out some infrastructure, mostly focused on voice coverage, in the rural areas. 3G coverage, though widely available, is expensive and does not allow full broadband access. As a result, the only means of communication that is available to households, particularly in rural areas, is the mobile phone (or cellphone - the term used in SA). Given the fact that the majority of households in rural areas have lower income levels than the average household in the rest of the country, these households cannot always afford value-added services provided by mobile networks, such as access to the internet or e-mail, due to the high cost of mobile data access, e.g. R79 for 1GByte of data (Vodacom, 2016). Hence many schools, clinics, businesses and inhabitants in rural areas cannot access broadband internet.

3.2.3 Broadband connectivity contributes to economic growth in rural areas

Some of the challenges faced by rural and marginalised areas regarding information and telecommunications include (CSIR, 2014):

- Limited opportunities for sustainable businesses.

- Lack of access to ICTs (which can spur economic development).

- Sub-optimal government services because government offices are not linked to their systems or do not even have phones.

- Lack of sustained support and maintenance of (ICT) infrastructure.

It has been established that broadband infrastructure, along with a strengthened skills base, can contribute to economic growth in rural areas (ibid.). Access to information is one of the key prerequisites for the stimulation of economic development, improvement of education levels and skills development. This in turn means that access to Internet and telecommunication services can satisfy the need for information and create opportunities for business development and other socio-economic benefits. Broadband has been identified as a factor contributing to the provision of better access to healthcare, education, other government services and job opportunities (ibid.).

The lack of affordable broadband infrastructure in rural areas and recent developments in technology have created the opportunity for an innovative approach to establishing broadband infrastructure.

An overview of the South African telecommunications, broadband and information society policy and regulatory environment policy context coupled with implementation case studies (which included BB4All) came to the conclusion that the key problem was that underserviced communities were unable to utilise technology effectively to access government and other services (Mshiywa, 2014). This indicated the need for the roles that infomediaries such as Village Operators play in assisting community members (See Chapter 2).

3.2.4 Government's support for BB4All

Government recognised that a broadband infrastructure could be a significant contributor to economic growth. Its establishment in rural areas in particular can have a significant positive impact on the development of local communities. As a result, government initiated the *Broadband Community Wireless Mesh Network project* with the aim of bridging the market gap in rural areas and using new advances in wireless mesh technology so that rural communities can be provided with access to wireless internet, with schools as the prime area of focus.

Funding for the project was provided to test, prove, document and enhance a model that ensures rural communities have affordable access to broadband connectivity. The research hypothesis was stated as follows (CSIR, 2014:1):

The BB4All project aims to provide a cost-effective way of enabling reliable broadband connectivity in rural areas that will provide social benefits and grow rural economies.

The BB4All project sought to change the face of rural connectivity by providing backbone infrastructure across under-served areas, creating points of access in a mesh configuration in these regions and placing competent and equipped VOs at these access points to provide a range of affordable ICT services to rural communities. The long-term permanent change created by the BB4All project starts with bridging the digital divide for rural communities in Africa, bringing the social and economic benefits offered by broadband connectivity to these communities, assisting the development of a new generation of ICT users, creating an enabling environment for people to change their lives and ensuring long-term community ownership of the ICT resources.

The impact of the BB4All project as described in the 2009 project agreement was aimed at:

- Stimulating sustainable rural economic development through strengthening local entrepreneurship (enterprise development) in broadband infrastructure and services using community wireless mesh networks and free and open source software.

- Communication access provided to communities. Connectivity costs will be saved at the local level and new revenues will flow into the community as a result of services offered.

- Improved service delivery by connecting government facilities through ICT infrastructure.

- Direct social impact in terms of local capacity creation (training, mentor network, etc.), improved government service delivery (connected offices and officers) and broad public access to ICTs.

At the policy level BB4All was designed to make an impact on South Africa's telecommunications policy through providing valuable technological and policy lessons as inputs to the ICT infrastructure roll-out strategy development of the Department of Communications (DoC) and its implementing agencies.

3.3   Project scope and design

3.3.1   Project scope

The Broadband Community Wireless Mesh Network project (hereafter referred to as the BB4All project) was conceptualised in 2008 and started on 30 March 2009 as a three year project. In order to address shortcomings and to focus on operationalising the project to provide commercial credibility the project was extended to March 2013. The project was finally extended to March 2014 to enable the implementing the wireless mesh at 55 facilities in the Northern Cape and to set up an industry best practice operational environment for the BB4All project to improve customer service.

The BB4All project provides broadband connectivity to areas that were not previously connected, utilising low-cost, locally owned and supported infrastructure to create socio-economic and commercial opportunities (Roux & Marais, 2011).

To ensure the sustainability of this initiative, the local community, and in particular an adequately skilled and trained local entrepreneur (also known as a Village Operator), was responsible for operating, promoting and supporting the BB4All offering in their respective communities. The inhabitants of rural communities, mainly teachers and learners in schools in selected areas, were the primary participants targeted by this initiative. In addition, the following parties could derive direct or indirect benefits from the initiative:

- Traditionally unconnected rural communities and individuals living in these communities.
- Village Operators who were responsible for providing the service.
- The greater South African society (government, civil and private sector) by bridging the digital divide, reducing poverty and creating opportunities for job creation, new business development, as well as community wealth generation.

With the basic infrastructure in place, a rural community can grow a local wireless mesh network in an ad hoc manner, based on antennas connected to buildings, therefore removing the need for large capital investment in towers.

Affordability, sustainability and innovation were the key drivers to establish locally owned, community-driven and self-supported broadband access that could allow people even in the most remote rural villages to leverage a national innovation system for broadband access. This access in turn would stimulate local economic development, open innovation and create a bottom-up value system for the provision of a communications infrastructure for government offices and the people in under-served areas.

The project ensured capacity development of selected VOs through the provision of training in computer literacy, business skills and network security, as well as technical training in maintaining the network and safety training. These small businesses were supported so that they could provide specific ICT and related services in their communities by maintaining the wireless mesh network and providing internet access.

The project was launched in three DMs over its lifespan, namely the Sekhukhune DM in Limpopo, the Nkangala DM in Mpumalanga and the John Taolo Gaetsewe (shortened hereafter as JT Gaetsewe) DM in the Northern Cape (Figure 11).
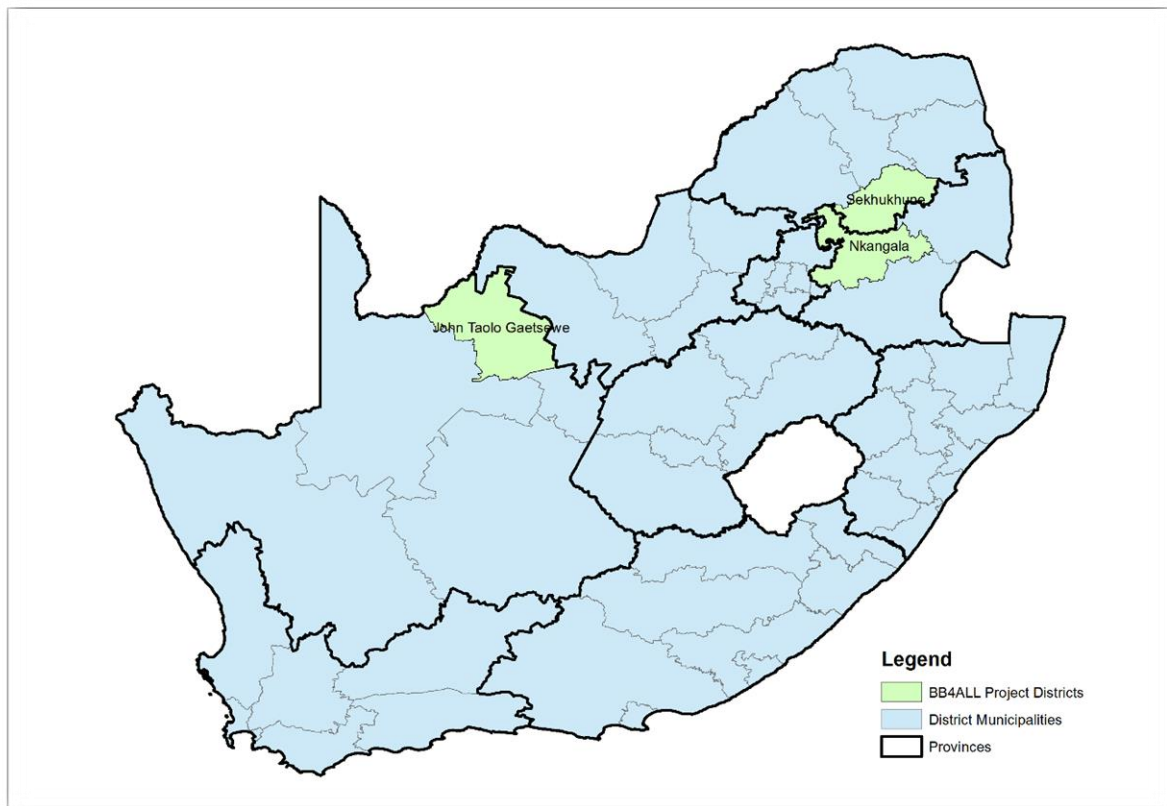
Figure 11 The Sekhukhune DM (Limpopo), Nkangala DM (Mpumalanga) and the JT Gaetsewe DM (Northern Cape)

The Village Operator model was not implemented in the JT Gaetsewe DM and hence the next map zooms in to show the context of their deployment in the Sekhukhune DM and the Nkangala DM, which are relatively close to the City of Tshwane Metro which contains Pretoria where the CSIR's main campus is located. The furthest VO is located approximately 150km from the CSIR.
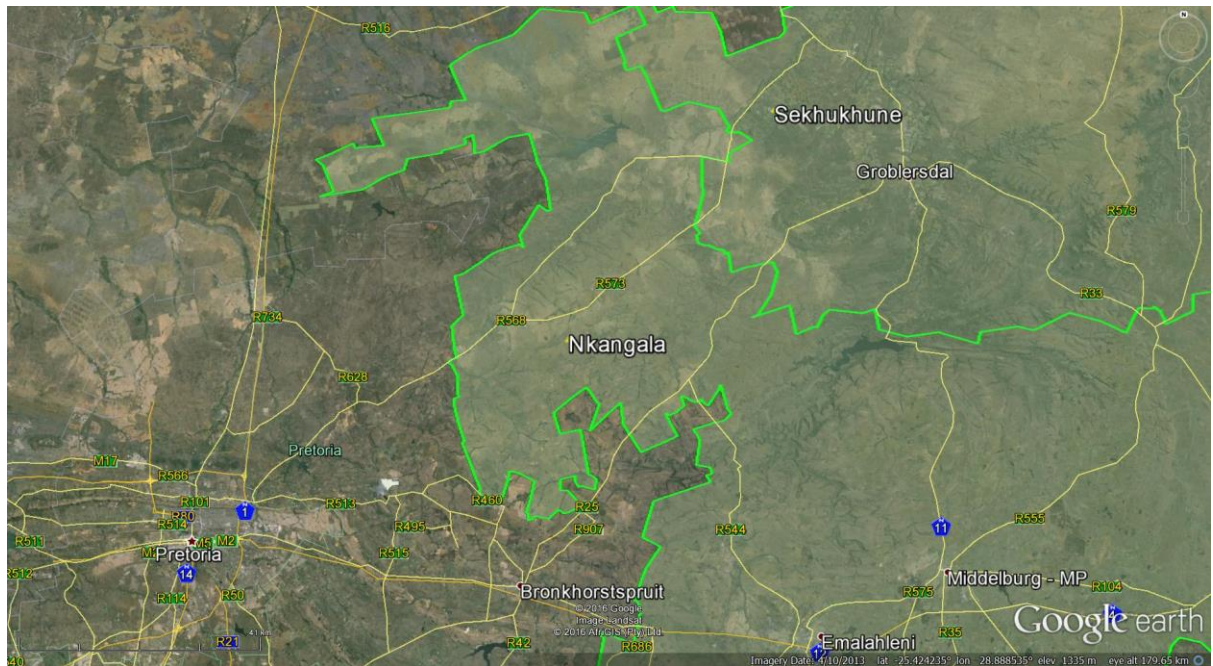
Figure 12 The Sekhukhune DM (Limpopo) and the Nkangala DM (Mpumalanga)

The Wireless Mesh Network (WMN) was ultimately installed at 209 facilities in Nkangala, Sekhukhune and Ekangala (an adjoining municipality of the Mpumalanga province) and 55 facilities in the Northern Cape.

The 209 facilities consisted of 184 schools, 13 VO offices, 7 DOE Circuit offices, 1 Further Education and Training (FET) college, 4 Nutritional centres, and 1 radio station. The number of schools connected changed over time as schools were closed. Two of the schools and the radio station were in Ekangala. Connectivity was provided to 103 000+ learners and 3 200+ educators at 184 schools (CSIR, 2014:62).

In the JT Gaetsewe DM in the Northern Cape, connectivity was provided to approximately 27 400 learners and 770 educators at 49 schools (ibid.:73).

3.3.2   Project design

The BB4All project was broadly defined by four phases:
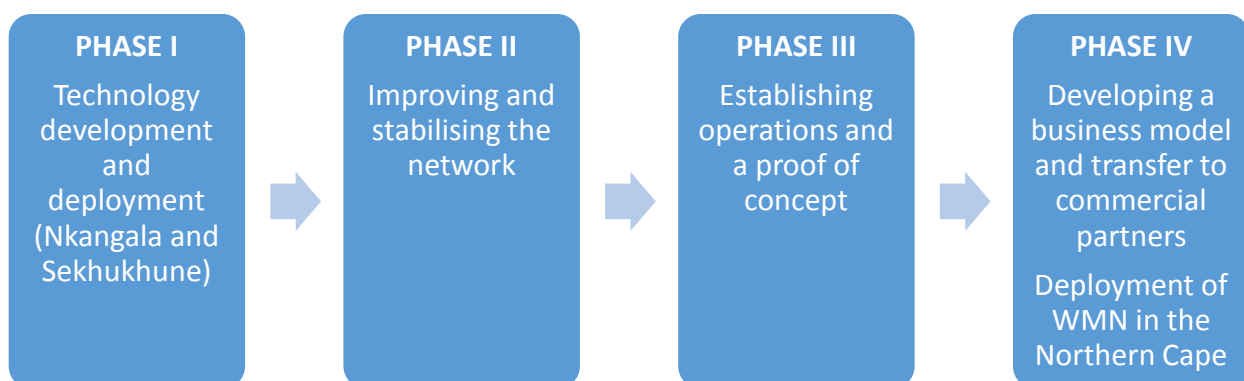
Figure 13 The phases of the BB4All project (CSIR, 2014:vi)

In the *first phase*, the first two-and-a-half years, the major focus of BB4All was the technology development and planning, design and rollout of the backbone and WMN deployment in the Nkangala and Sekhukhune DMs. The *second phase* focused on improving the stability and quality of the network. The *third phase*, involved operationalising the project in the Nkangala/ Sekhukhune network, as well as measuring and evaluating how well the implementation met the goal of providing a proof of concept. This included the basic connectivity technology, the business approach, and the model acceptance and meeting of user needs. In the *fourth phase* of the project the business model was developed, network operations and the VO model were transferred to commercial partners to take the concepts and learning forward. The *last phase* of BB4All comprised the establishment of the WMN in the Northern Cape, which did not follow the VO model and used a different technical approach, largely due to the large distances between schools in the sparsely populated JT Gaetsewe DM that made it difficult for individuals to offer support at the different sites.

The first and second phases were unavoidably redefined and extended due to the withdrawal of the government agency that was supposed to provide the backbone. The BB4All team had to buy an existing commercial experimental network that was in place in order to cover some of the backbone requirements. This network equipment soon proved to be unsuitable for a rural backbone network with long distance links between nodes and the harsh environment of the high site locations. Components of the network equipment had to be redesigned, and additional monitoring systems were installed. New high sites had to be found to add the additional nodes required and space for radios and antennas on the existing towers at these sites had to be leased from owners - a protracted process. Due to this situation, the installation of the backbone was delayed till 2011 and the backbone went through various iterations before the required performance and stability were achieved. The commissioning of the WMNs that had been installed at the clusters was therefore delayed until 2011, which prevented the VOs from becoming fully operational businesses as soon as they were deployed.

3.3.3   Project structure
The project was structured according to the following project streams:
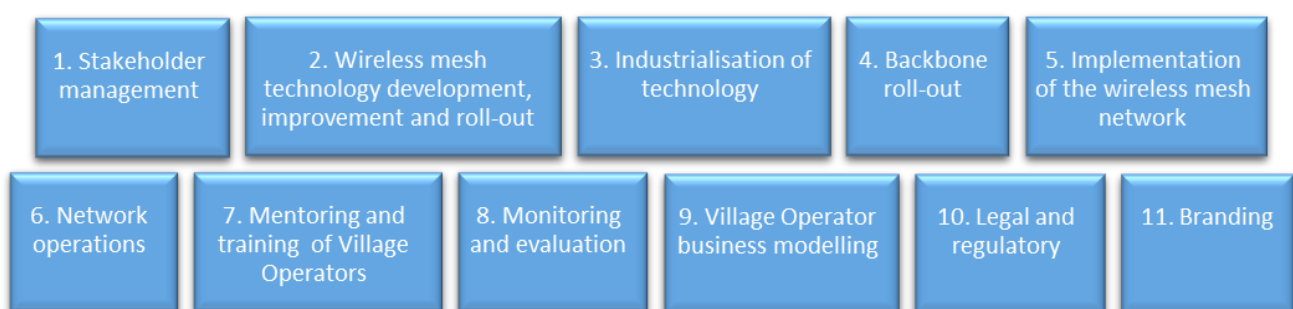
Figure 14 BB4All project streams (CSIR, 2014:10)

In this overview the emphasis is on streams 2, 4, 5, 6, 7 and 9, with special attention on illuminating VO related aspects. In the next two sections selected aspects of the implementation are discussed via an overview followed by a more detailed description of the path followed by the Village Operators from selection to establishment.

3.4 Overview of the implementation (2009-2014)

The technology and network architecture of the BB4All as a technology demonstrated is unpacked first, followed by the Nkangala/Sekhukhune implementation overview. This period is covered by the end-of-project report and this summary draws on that report (CSIR, 2014).

3.4.1 A large-scale technology demonstrator

The description consists of the fundamentals of wireless mesh networks technology, the overall network architecture and the new technology components that were developed. The choice to use wireless mesh networks technology and the choice for a VO model are closely linked.

3.4.1.1 Wireless mesh network technology

WMNs provide a technology base to deal with many rural connectivity problems in rural Africa and elsewhere. CSIR had built up experience with a previous implementation in South Africa (CSIR, 2014; Johnson & Roux, 2008; Johnson, 2007) and research in collaboration with the Linknet wireless network in Zambia (ibid. ; Johnson, Belding, Almeroth & Van Stam, 2010).

Incremental connectivity expansion can be achieved through adding wireless mesh nodes to the existing networks' coverage, which then relay the signal to extend the coverage. Traditional communication networks use point-to-multi-point communication, whereas a mesh network uses peer-to-peer communication that enable multiple connection paths for the individual nodes and self-healing of the network should one of the nodes go down (Olwal, Masonta, Mekuria & Roux, 2012; Makitla, Makan & Roux, 2010).

A WMN network can be expanded by the community. Community members can also share communication and data traffic within the community using servers connected to the WMN without the need to have access to the internet or the main network infrastructure (or backbone) as required in traditional network topologies. Only once communication with the world "outside" the community is required, is the need for access to the primary network or the internet required. This can lead to tremendous cost savings and sharing of local data. The key to making this model work from a business and sustainability point of view is the "Village Operator", a local entrepreneur who is trained and supported to operate and maintain the village-level network infrastructure. In this context, "local" is defined as a geographical area small enough to be serviced by an individual Village Operator – typically between 5 and 15 km in diameter.

3.4.1.2 Network architecture

An illustration of the network architecture below provides an overview.
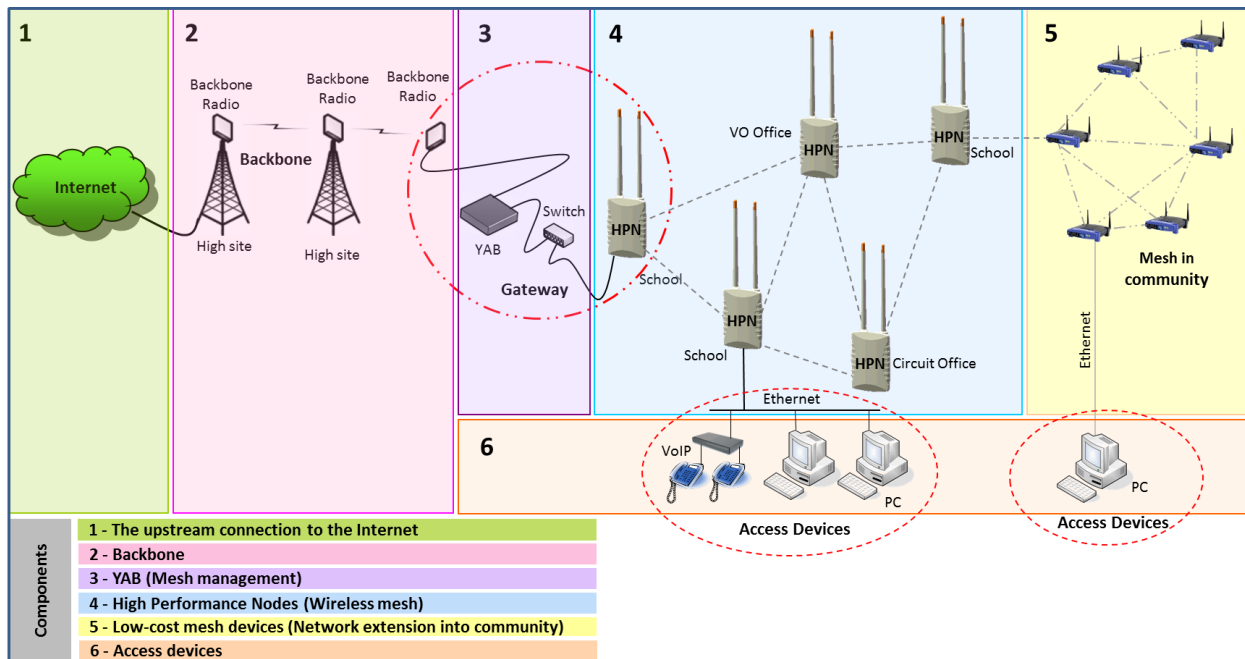
Figure 15 The BB4All network architecture.

The elements in the diagram above are summarised in   Table 3 below.

Table 3 Network architecture elements (CSIR, 2014)

Network architecture element	Description
Element 1 – Back-office and Internet connectivity	The back-office is located in the Meraka building on the CSIR campus in Pretoria where the connection to the Internet Service Provider (ISP) is also made.
Element 2 – Backbone	Broadband connectivity to national systems and to the Internet via radios on towers on high sites to provide long distance links – up to about 20 km.
Element 3 – Mesh network management	Equipment situated at the site, called the gateway that connects to the Backbone and ultimately the back office and the internet. The gateway site has a radio (to connect to the backbone radio and mesh network management equipment as well as a High Performance Node (HPN) that forms part of the backhaul mesh.
Element 4 – Backhaul mesh	HPNs that connect to each other as the nodes of the local WMN, commonly referred to as a cluster. One of these nodes is the gateway HPN. A VO is typically assigned to one or two clusters. Each HPN provides Ethernet cable access and Wi-Fi access for use by a wired Local Area Network (LAN) or Wi-Fi LAN that serves the site where it is installed (e.g. a school, an Department of Education Circuit Office, or a VO office).
Element 5 – Community mesh	Off-the-shelf 2.4 GHz wireless access points that have been re-configured to form a mesh network.
Element 6 – Access devices	Off-the-shelf wireless access points to which any device that has Wi-Fi can connect (e.g. laptops, tablets, mobile phones).

Elements 2, 5 and 6 are summarised briefly while Elements 3 and 4 are described separately.

Element 2, the backbone provides broadband connectivity to national systems and to the Internet. Partnership models included partnering with local community radio stations for access to towers on high sites in exchange for free internet access, as well as partnering with a national high-bandwidth research and education network for internet access. Element 2 can be a hybrid of satellite, microwave, fibre or other solutions.

The red dotted circle extending over Elements 2, 3 and 4 represents the gateway between the internet and the wireless mesh network. The gateway consists of a backbone radio, a mesh controller (called a YAB - Yet Another Box) that runs mesh network management software and an HPN.

CSIR Meraka Institute has contributed to advancement of efforts on Element 5, "community mesh" (Johnson and Roux, 2008). The BB4All project did not work directly on the "community mesh" extension elements or on Element 6, but focused on building broadband infrastructure (an internet model). Wi-Fi access could be provided by adding off-the-shelf Wi-Fi access points (Element 6).

The fact that the scope of the BB4All project ended at Element 4, i.e. connecting a school to the internet via the backbone via the gateway, was important for the development or lack of development of relationships between the VOs and the project team with the schools. The VOs team was not responsible for technical support of any equipment at the school such as existing PCs or LANs or Wi-Fi access points. This did open up entrepreneurial opportunities for VOs such as extending the reach of the internet access at the school from one point at the HPN to the whole school by adding a Wi-Fi network in the school and offering PC and LAN technical support services. As discussed in Chapter 8 (Discourse of community service) and Chapter 9 (Networks of innovation) some VOs did derive income from these types of services.

3.4.2 Deployment of the backbone and WMNs in Nkangala and Sekhukhune

The main backbone was deployed in three stages. Clusters of facilities (mainly schools) were selected between Nkangala and Sekhukhune for implementation of the wireless mesh network. Each of these clusters had to be connected to the internet via a gateway facility. The backbone network was designed and redesigned and cluster changes were made over the first year-and-a-half of the project (April 2009 to September 2010). The final stage, stage 3, involved the last four clusters. It was designed in September 2010 and by June 2011 three of the four clusters were connected. The final cluster was connected and commissioned in September 2011. Installation problems (non-robust backbone equipment, incorrect installations) resulted in a re-commissioning effort (replacement of some backbone equipment, re-doing installations) that meant that phase 3 only ended in September 2013. All 14 clusters therefore had unstable internet connectivity for more two years.

The map in Figure 16 shows the fourteen (14) clusters that were ultimately selected and implemented.
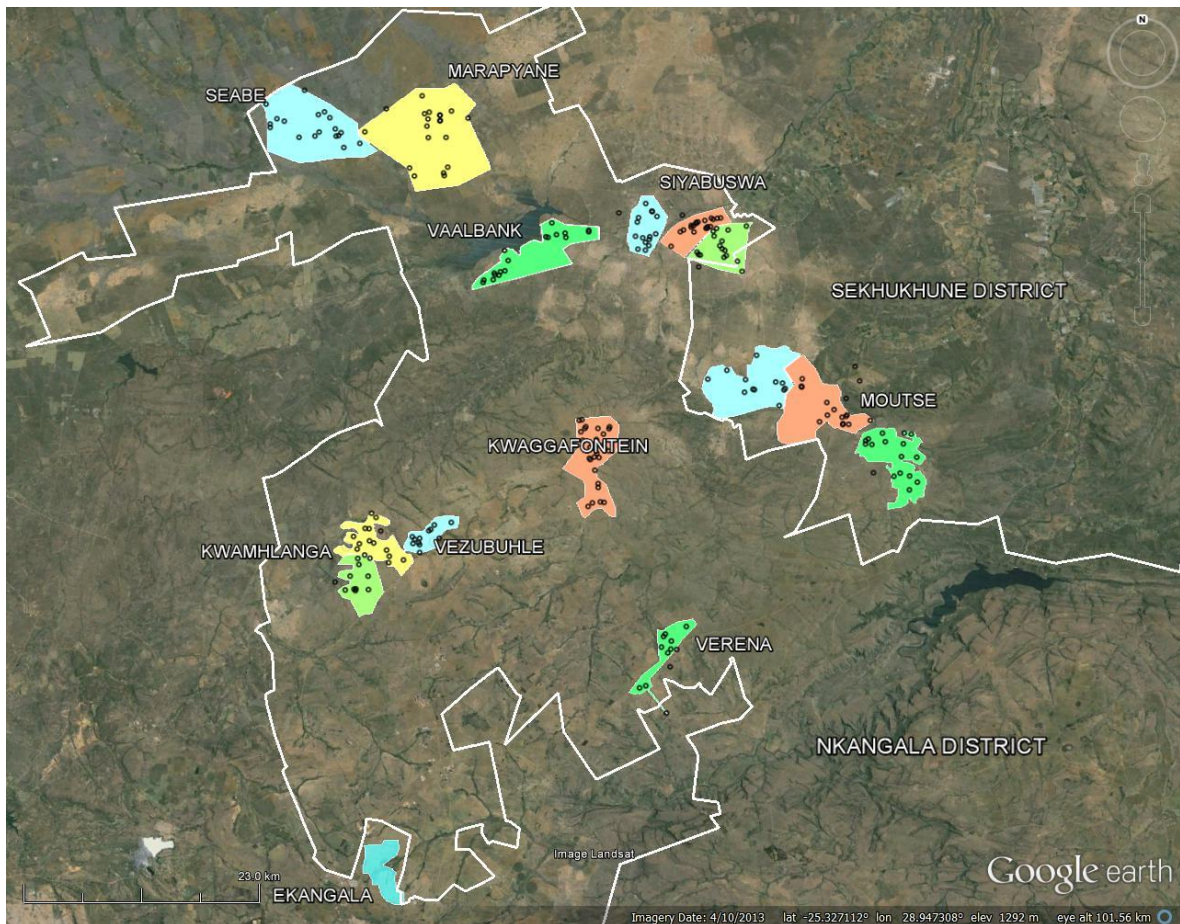
Figure 16 The 14 clusters of the Nkangala and Sekhukhune network (CSIR, 2014:32)

The 14 selected clusters as shown on the map include: eleven in the Nkangala DM of Mpumalanga province and three in the Sekhukhune DM of Limpopo, namely, Moutse 1, Moutse 2, and Moutse Central, as shown in the top right of Figure 16.

The final backbone configuration as at March 2014 is shown in Figure 17 (CSIR, 2014:43). Nineteen microwave links connect fifteen clusters (14 BB4All clusters and one DOE school in Ekangala, Mpumalanga) to the internet via a tower on the CSIR campus. The final configuration was influenced by the behaviour of the VO in Moutse Central, who attempted to restore connectivity by frequent rebooting of the backbone and mesh, resulting in equipment failure and forcing the movement of the gateway site away from the VO office to a school in stage 3, September 2013 (ibid.:42).
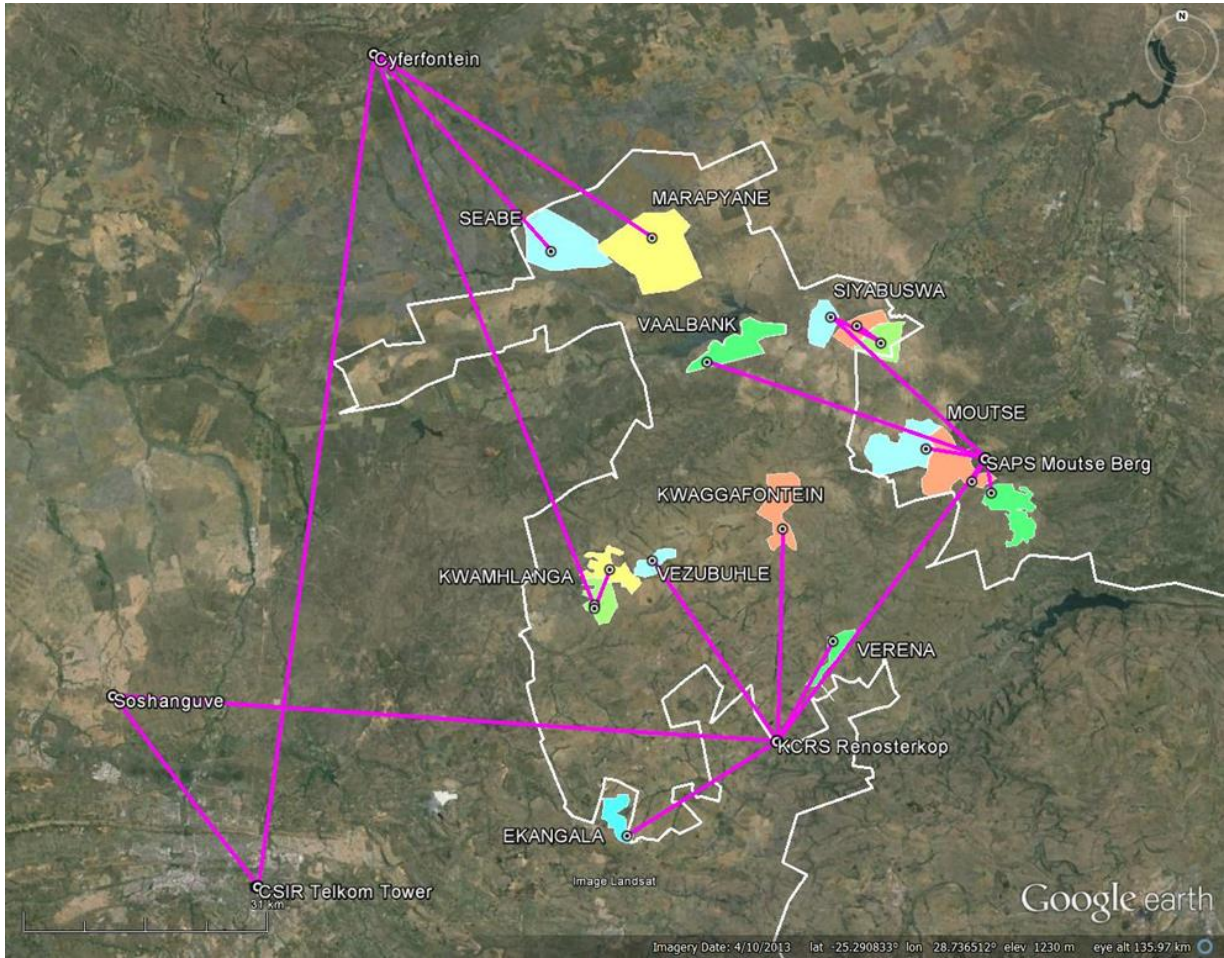
Figure 17 Wireless (microwave) backbone linking clusters (CSIR, 2014:43)

The microwave link from a high site on the backbone to a gateway site is illustrated below in Figure 18 by a thick blue line at top right.
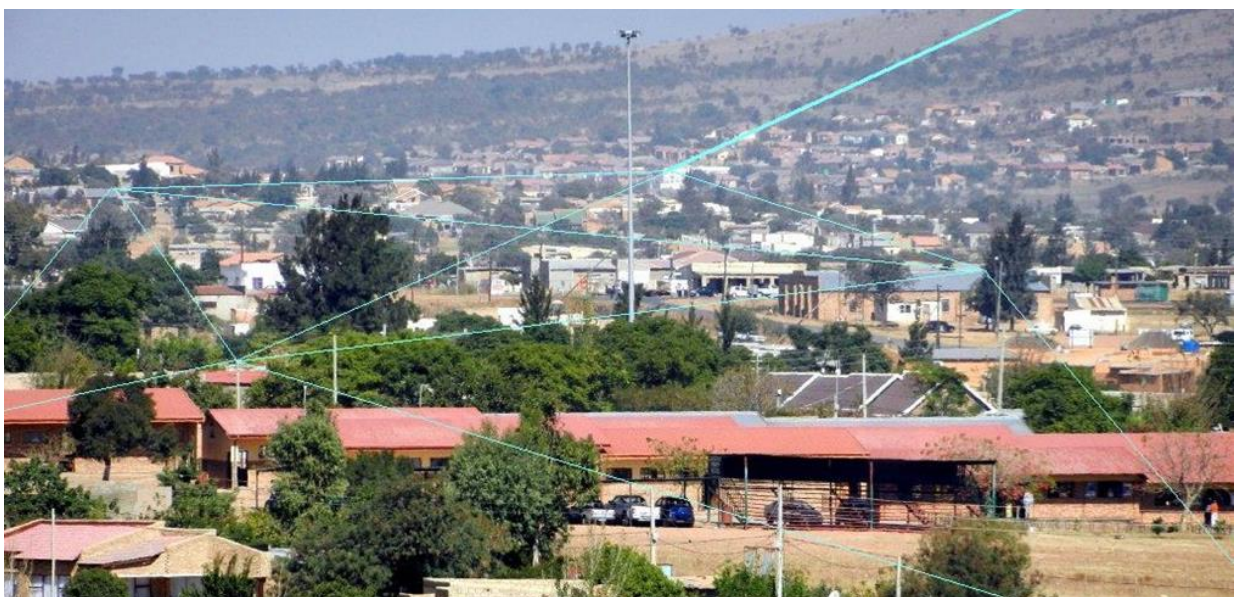
Figure 18 A backbone link to a WMN (in KwaMhlanga) (CSIR, 2014:xvi)

The light blue lines show the linkages between the nodes of a typical WMN cluster which consists of schools and the VO office. In the final configuration all the gateway sites were at schools.

As mentioned earlier the final stage, stage 3, involved the last four clusters. It was designed in September 2010, procurement started in 2011, three of the four clusters were connected by June 2011, and the final cluster was connected and commissioned in September 2011. Installation problems (non-robust backbone equipment, incorrect installations) resulted in a re-commissioning effort (replacement of some backbone equipment, re-doing installations) that meant that the phase 3 only ended in September 2013. All 14 clusters therefore had unstable internet connectivity for more than two years.

Successes, challenges and lessons learnt

A wireless mesh network is dependent on a stable backbone: A key learning was that deployment and commissioning of the WMNs should only start once a reliable and stable backbone is available.

Control electricity access to backbone supply to ensure that behavioural aspects do not cause downtime.

Develop personal relationships with key stakeholders: To obtain access to schools to install equipment sufficient time is required (up to six months) for school staff to buy into the concept and understand the value that connectivity will provide, so that they ensure reliable power supply.

3.5   The establishment of a Village Operator (VO) model

3.5.1   Introduction

This section provides an overview of the four project streams that are highly relevant to VOs and summarises the VO model: Mentoring and Training of VOs, VO Business Modelling, Branding, and Legal and Regulatory. For each stream the discussion ends with project feedback on successes, challenges and lessons learnt.

3.5.2   Mentoring and training

The training was designed to provide the VOs with the necessary theoretical and practical knowledge to successfully start up and run a business that provided technical support to the schools in their cluster. The mentoring aspect was intended to provide the VOs with the necessary guidance in the field to assess how well they were doing in their businesses and to help them to develop better business operations.

3.5.2.1   Selection of VOs

Selection of suitable VO candidates took place in mid-2009. A suite of tests was used to determine potential candidates' literacy, numeracy and computer literacy competencies, as well as their entrepreneurial aptitude.

One hundred and twenty potential candidates that had completed secondary school successfully, but were mostly unemployed, were nominated by their former schools that were part of the proposed clusters. This strategy was followed to ensure that a relationship between the VOs and at least one or more of the schools in their cluster existed. In the end, 60 candidates were selected to attend interviews held near the closest proposed cluster of schools (WMN) where they resided, out of which 30 proceeded to complete a week of initial training. 20 candidates were confirmed as VOs after the training since they were judged to be able to take responsibility for growing and maintaining a business, as well as providing technical assistance to their customers in their assigned cluster. The VOs were paid a monthly stipend. A

complement of 20 allowed for one VO per cluster of schools, as well as five extra VOs to allow for possible attrition. VO clusters (as shown in Figure in Section 3.3.2 on Project design) were planned as follows (CSIR, 2014:90-91):

- A group of facilities that were in line of sight of each other to enable mesh network communication.

- A cluster diameter of less than 10 km in order to make it possible for the VO to travel easily to the facilities as they did not have any means of transport and would need to walk or travel by taxi to attend to any problems in their cluster's network.

- Between 10 and 20 facilities within a cluster to make it financially viable for a VO, while at the same time not being too great a number to support.

This guiding principle of the VO model was that VOs should live as close as possible to their school sites so that they could afford transport, with the important motivation that they should be "local" in other words, a member of the community and know the local schools, businesses and the community in general. One VO therefore had to leave due to a reconfiguration of clusters and this left the project with 19 VOs and 14 clusters which later grew to 15 clusters that were ultimately consolidated to 14. In 2009, when all the VOs had been selected, official VO training could not commence because the backbone was still not up and running. This created a hiatus in the training of the VOs.

3.5.2.2   Training

At the onset of BB4All the roles of a VO were sketched, but not clearly defined, and therefore the nature of required training was uncertain. To fulfil the technical support role VOs were provided with basic office equipment such as a combination scanner/copier/printer, an A4 binding machine and a laptop. As a means to gain extra income VOs were provided with a video camera to film events such as weddings.

The following training areas were evidently required: managerial and entrepreneurial skills to run a business, computer skills training, health and safety training and practical on-the-job training to function successfully as VOs. The training therefore evolved over time.

Training started near the end of 2009 and continued in 2010. A specialised university business school programme was selected as suitable entrepreneurial skills training material. The VOs' need for additional computer literacy training was addressed via a six week formal IT end user computer training programme that included Microsoft Office software training. Both of these programmes were conducted at a local school.

Technical WMN training consisted of two components. An installation team was contracted to install and commission all the clusters, and VOs were allocated to work with them to get first-hand experience of installing the equipment. In addition, one week of formal technical installation training was done that covered the installation of the WMN equipment and health and safety requirements. The initial plan was that the VOs would be responsible, or at least involved with, the installation of equipment; however, experience showed that it would take substantial time to develop the required skills (ibid.:63) and, combined with the rapid changes in the project technology, each of which would require time-consuming additional training, this plan became impractical. At a personal level, some VOs were unwilling to climb onto high structures (school roofs) for installations, which excluded them from installations. The VOs' exposure to the installation of equipment was considered useful nonetheless, because they developed an

understanding of how the technology operated and how it should be installed, enabling a quality control role.

Ongoing VO training was conducted as the need for it developed from VOs' experiences. Computer viruses on customers' USB flash drives were a constant threat in the daily operations of the VOs during the first two-and-a-half years and therefore, in 2011, VOs attended a two-day Cyber Security Awareness training course customised for first time computer users.

In 2012, the issues faced by VOs in their everyday practices was shared and discussed in an informal three-day needs workshop to determine what assistance they required from the project team and how they believed they could perform better in future. At another meeting VOs engaged with one another with regard to the business models (services offered) each of them had developed, where they learnt from one another and shared ideas about how they could improve their respective businesses.

In 2012, the VOs attended an Introduction to Network Essentials course offered by a university at a location near a cluster. The purpose was to move beyond computer literacy to basic networking concepts, develop an understanding of the purpose of common networking equipment (network cables, connectors, antennas) and networking protocols, as well as how to do preventive maintenance of networks, including securing and protecting network cabling.

As the operations of BB4All became more mature, the technical support role of the VOs was clearly defined via an industry standard IT service management (ITSM) framework, namely, the IT Infrastructure Library (ITIL®) which prescribes a multi-tiered model (AXELOS, 2011). The tiers are described in Figure 19.
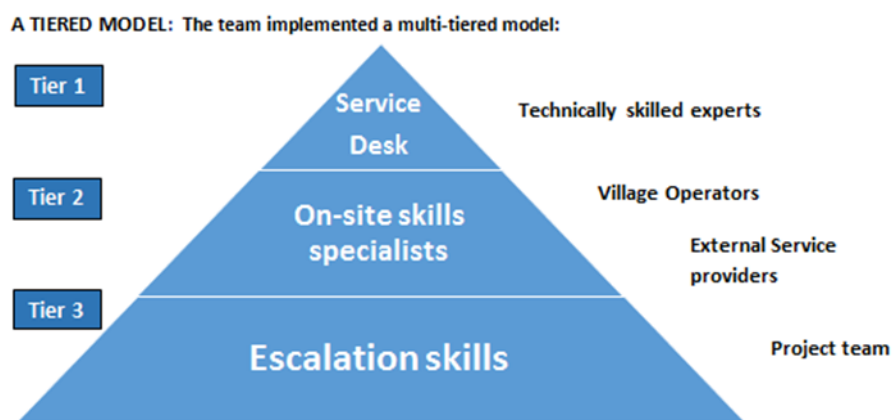
Figure 19 Tiered support system (CSIR, 2014:81)

The Service Desk (or helpdesk) that customers call for IT support constitutes 1st Level Support (Tier 1), whose function is to register and classify received incidents and try to restore a failed IT service as quickly as possible. If they fail to do this, they transfer the incident to expert technical support groups, the 2nd Level Support (Tier 2), who try to restore the IT service, either remotely, or at the customer's premises. If no solution can be found, the 2nd Level Support passes on the incident to 3rd Level Support (Tier 3) experts which are typically located at hardware or software manufacturers (third-party suppliers).

In BB4All, 1st Level Support was done by a BB4All Service Desk established at CSIR Meraka staffed by two service agents. 2nd Level Support was done by the VOs and a contracted service provider. If the VOs could not resolve an incident it was referred by the Service Desk to the contracted service provider. If they failed,

the incident/problem was transferred to 3rd Level Support, i.e. the CSIR Meraka technical team or suppliers. In 2013, the VOs received individual training at their offices on the ITSM application by the agents of the BB4All Service Desk. VOs played a vital role in logging incidents as did the administration clerks at schools.

3.5.2.3 Mentoring

Mentoring was intended to assist the VOs in their day-to-day business operations and required a business mentor on a full-time basis that also had good knowledge of the area and the requirements of the project including the VO model. The services of a qualified individual, well versed in small business development, who lived in one of the clusters was contracted to serve as mentor with the title of field support coordinator (FSC). He mentored VOs based on what their needs were, evaluated how well their businesses were faring and assisted them in developing their business operations. An experienced trainer was contracted as field support manager (FSM) to coordinate training and mentoring as well as providing additional mentoring support to VOs. If the FSC and FSM were unable to assist VOs in terms of developing technical knowledge and skills, the assistance of a trainer would be called in, or if necessary the broader technical team would be called upon.

Figure 20 The full-time mentor (FSC) assisting four VOs (CSIR, 2014:94)

3.5.2.4 Successes, challenges and lessons learnt

The significant successes, challenges and lessons learnt as reflected in the end-of-project report are summarised. The rich detail regarding VOs' lives and businesses as collected during this research is presented in Chapters 6 to 9.

Establishing small businesses: Many of the VOs had no prior experience or resources at the start, but by the end of the project, they each had a business that was running and generating an income that enabled them to contribute to the support of their families. Business success also gave them feelings of self-worth.

Provision of services to save rural communities money and time and to increase local spend: The VOs provided services to the community that included printing, photocopies, sending faxes, making business cards, setting up e-mail accounts and charging customers for internet access. Many VOs were able to purchase additional computers and photocopiers/printers.

Some VOs added sophisticated services such as doing e-filing of tax returns for customers, registering businesses online, and assisting with online grant applications and online banking. These services contributed meaningfully to the communities because customers did not have to spend money to go to urban areas for these services.

Increased value for schools: An important positive outcome was the change in the perception of schools with regard to the internet. After gaining access accompanied by assistance from VOs they started seeing how useful it could be. Positive outcomes included: schools communicating more effectively with other schools and the education department; use of e-mail to receive tests and exam papers rather than driving to pick up the papers; use of previous exam papers to prepare students better; and finding additional material for more comprehensive teaching. Some schools increased the wireless coverage area via VOs adding Wi-Fi access points as a business service.

Establishing of informal VO support networks: Some VOs supported one another by communicating regularly and exchanging advice and support.

Challenges and lessons learnt were regarding the relevance of timing of VO appointment, formal training, skills development, performance management and conflicting roles of VOs.

Wait till the technology is ready: The VOs should only have been selected and contracted after the technology was in place since this would have avoided training delays and VO frustrations regarding hamstrung daily operations.

Relevance of the training content was low: The training would have been more successful if the content had been tailored specifically towards the future needs of the VOs and therefore it is recommended that future programmes provide training based on current needs identified by VOs/SMMEs as well as focused mentoring of VOs to assist them to translate theory learnt into good business practices.

Spend more resources on skills development: Increased support services for skills development and skills transfer was required in order for VOs to be able to adequately support customers to understand the value of internet access and start using VO services. A focus on marketing and change management is required. The value of the VO services was experienced by the community, but future projects should allocate sufficient budget to support adoption so that customers derive full value from internet use.

Performance agreements: The VOs received a modest (minimum wage level) monthly stipend as well as a rental allowance for the VO office, regardless of their performance. Performance management was required and good practice would be to establish performance-based agreements with the VOs at the start.

Conflict between the VOs' entrepreneurial and social roles: VOs' main role was to provide a free network support service to the schools in their cluster. They were also selected for entrepreneurial attitude and provided some office equipment to offer additional services to other customers and hence also operated their VO business for profit. VOs would often give preference to paying customers, rather than doing the network support required to keep schools connected. VO focus could be determined via their use of the ITSM system. VOs were instructed to log in at least once a day. Some VOs would be proactive and access the system a few times a day to ensure rapid response to issues in the network, while other VOs only accessed the system a few times a month, presumably due to being mainly focused on entrepreneurial activities.

3.5.3 Village Operator Business Modelling

3.5.3.1 Introduction

The purpose of business modelling was to clarify the essence of the value-add provided through the VO model via a business model that could be used in the commercialisation phase to attract a commercial entity to test/refine the model and commercialise operations which would allow CSIR Meraka Institute to exit. The researcher was responsible for managing this stream in BB4All. The exit strategy is covered in Section 3.6.

The scope testing, piloting and validating of VO services was limited due the major focus technology demonstration goal and the resource drain caused by the unplanned backbone provision. The VO component was not a full-blown commercial pilot, but did demonstrate its potential on a mini scale. The project report commented that (CSIR, 2014:111): "in hindsight it was idealistic to try to develop the VO model simultaneously. Nevertheless, the project team's aim was to provide successful technical support services through VOs."

3.5.3.2 Influences on business modelling

Sustainability of the established WMN network depended on commercialising it since the BB4All brief did not include managing of ongoing operations. Different scenarios were identified for positioning components of the BB4All initiative for investment (buy-in) or alternatively for a complete take-over (buy-out). Market studies showed that the provision of WMNs to schools only is not a viable financial model from a pure connectivity point of view and that even providing connectivity to all possible customers in the footprint of the Nkangala/Sekhukhune WMN would not be profitable. The development of local entrepreneurial capacity (e.g. VOs) on top of the connectivity that could deliver services to schools and the community (as discussed in the previous section) which are at the same level as those in urban areas could get, was considered a viable business model to be developed because of its potential contribution towards growing rural economies and job creation. This strategy would also receive SA Government support via ICT specific programmes for job creation in rural areas (CSIR, 2014:110).

3.5.3.3 Village Operator business model development

A VO feasibility framework was developed and tested as well as a financial modelling framework which included a financial model of the operations of BB4All, covering the costs of products, training, deployment, support, infrastructure, monitoring services, and outlining SME business models.

The value proposition of the VO model has two components (Figure).
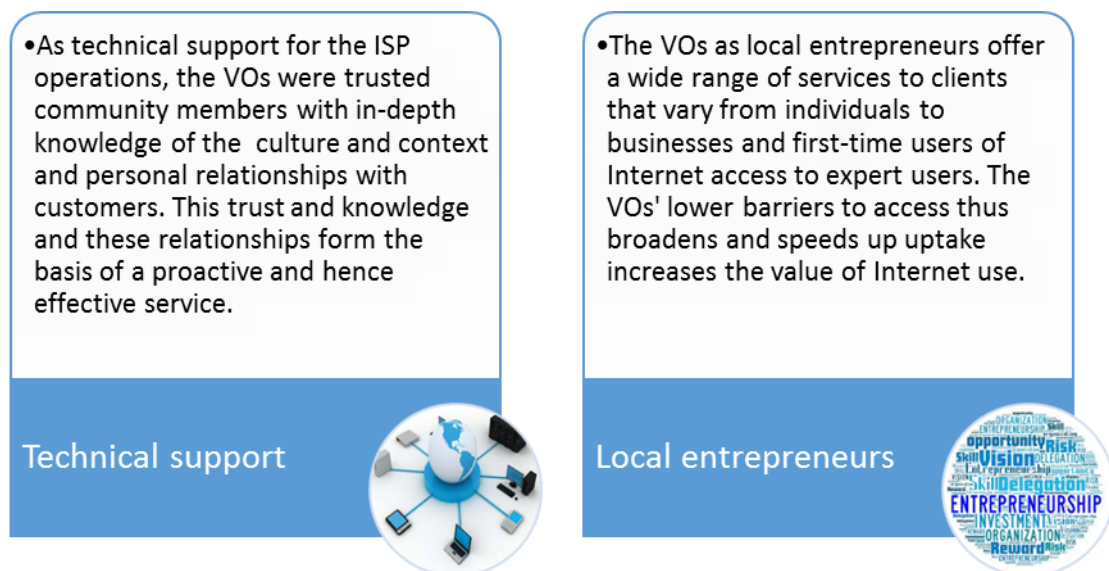
Figure 21 The value proposition of the VO model

The close proximity of the VOs as a component of 2nd Level Support to customer sites reduces costs due to the reduction in transport costs and improves effectiveness due to a decrease in response time. Avoiding incidents and reducing the load on the service desk through onsite user education should also be possible due to improved communication (a shared language) and the building of personal relationships that enable changing the user behaviour patterns that lead to calls to the service desk in the first place. Any reduction in call-outs of 2nd level technical support based at the nearest town reduces costs.

A key objective is to keep income local to support local economic development. The combination of entrepreneurial attitude and technical aptitude required by VOs was acknowledged to be rare and in practice VOs augmented each other's skills or appointed employees (as discussed in Chapters 6, 7 and 8). The need for substantial training and mentoring was identified to develop the skills that could increase the viability of the VO model.

The VO business model must be judged by balancing the financial viability with the social benefits derived from empowering the local community via increased benefit and cost savings from internet based services.

3.5.3.4 *Different users require different services*

The users of VO services can be divided into two groups: institutional users (schools and other government facilities) and private users (with different computer literacy and internet usage levels). The private users need individual hands-on assistance to develop skills which was termed social services. Government funding for some of these services may be available. The viability study of the VO business model included the client base for both social services and business services. The types of clients, the services that could be offered and the value proposition are summarised below (Table 4).

Table 4 Client base for social and business services (CSIR, 2014:112)

	Social Services	Business Services
Client base	Group 0 to 3: People who need assistance to use and adopt the Internet.	Group 4: Existing computer and Internet users
Definition of client base	Group 0: People who do not see the benefits of Internet use and do not think "It is for them". Group 1: People who want the benefits of Internet use, but do not want to use computers or the Internet, for example elderly people who do not want to learn how to use computers or the principal who says, "Come and do my e-mail for me in my office". Group 2: People who experience skills and resource barriers, for example those who cannot afford computers or smartphones (lack of resources), or those who want to learn but are scared of computers and do not have access to computers at home or work (lack of resources, no lack of willingness). Group 3: People in organisations who are "forced" to use computers and the Internet, for example schools, some employees who need "training" (which mostly includes handholding for a while and not just once-off courses)	Group 4: Existing users of computers and the Internet who want more bandwidth at affordable costs but may not have a laptop and do make use of expensive Internet access on a cell phone.
Services	Provide facilities with personalised services and just-in-time training in the workplace.	Provide Internet access and occasional technical support.
Value proposition	Reduce barriers to Internet use and adoption (resource and skills barriers). Bridge the digital divide for **all** citizens. Increase uptake and grow a client base for business services. Feeder service for commercial Internet use.	Affordable broadband access and technical support. Lower ICT adoption barrier of small businesses. Local technical and business support provided to NGOs, CBOs and commercial players.

Personalised services and training are vital to increase internet adoption and usage levels among Groups 0 to 3. Customised service offerings based on local knowledge should be developed for all client groups. If the provinces could allocate a budget to provide internet access to schools along with the provision for social services to education personnel, the VO model would be more viable.

Key results of the business modelling activities are summarised in the following sections.

3.5.3.5   *Business modelling assumptions regarding potential service offerings of VOs*
The initial business plan for the VOs included the following revenue sources:

- Connectivity revenues from an average of twelve regular customers (schools) and a substantial number of prepaid customers.

- Technical support services to the majority of the regular connectivity customers.

- Internet support services such as Voice Over Internet Protocol (such as Skype), website web design, domain name registration, and hosting (which may be for intra-WMN access only).

- In-store transactions such as photocopies, faxes, typing, binding, and Internet café services.

- Media services such as desktop publishing, video production and assisted searches.

3.5.3.6   *Business cases*
A family of business cases (scenarios), backed by a financial model, were developed and presented in 2013. Some of the key issues that emerged were:

- It is possible to get to a zero Net Present Value (NPV) in the Limpopo/Mpumalanga deployment with the "current reality scenario" which was based on current infrastructure and the current VO model if schools pay R2 500 per month.

- VOs as stand-alone businesses, without income from the project for technical support services, are mostly not financially viable.

- The model showed the negative impact of new capital investment for refurbishment of the wireless broadband backbone, the high central costs of "head office" and high VO costs.

- Economies of scale are therefore required, i.e. growth in customer numbers.

  o In addition, more revenue per customer is required. For example, one could engage with the Provincial DoEs as anchor clients in order to deliver additional services beyond connectivity.

  o Rationalisation of the current network to align the services delivered with the stated market demand is required.

The key success factors for a sustainable commercial model with schools as the major clients was summarised by a consulting company on 25 September 2013 as shown in Figure 22.

Broad Outline of Commercial Strategy

Village operators have the opportunity to become a key element in ensuring sustainability of the deployed infrastructure provided that they can deliver a good quality service
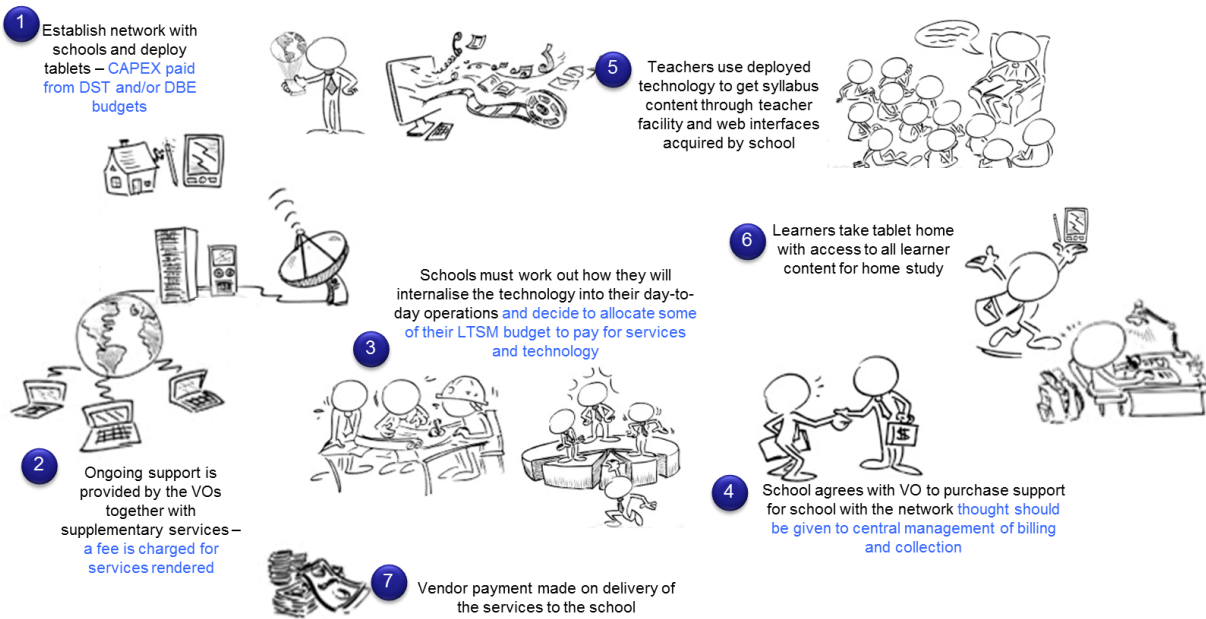
Figure 22 Key success factors for a model with schools as the main clients (CSIR, 2014:114)

A major assumption is the willingness of the DBE, provincial DoEs and schools to support this model.

3.5.3.7   Protecting the B4All ethos

Due to the entrepreneurial nature of some of the VOs the diagram below was presented to VOs to stimulate debate about what services would fit the BB4All ethos and protect the brand.
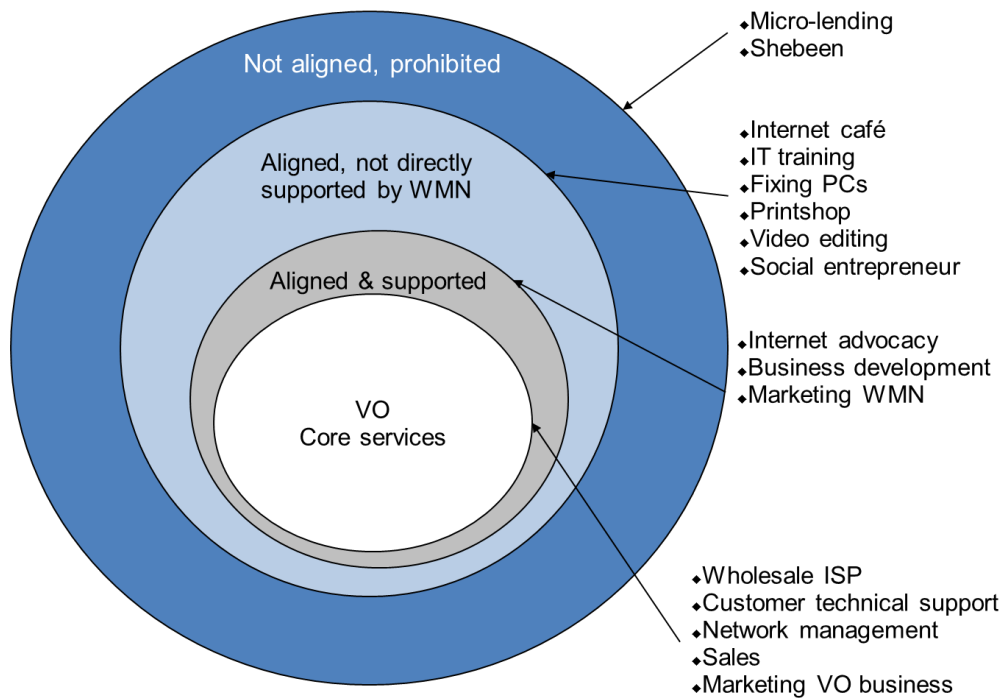
Figure 23 Diagram used to stimulate debate about BB4All ethos and brand

3.5.3.8   Challenges and recommendations identified via business modelling

Local demand for services: With the commissioning of the clusters completed and all the VOs connected in 2012, increased feedback was received from the schools regarding the use of the internet, and other schools in the clusters were beginning to ask for internet access since they were "*tired of travelling to the government complex to deliver reports*" (ibid.:115).

Profitability of the VO model not driven in BB4All: The project was a research project that investigated the VO model without a mandate to drive the profitability of the VO model. A commercial focus would have resulted in a partner being brought on board sooner to test the most suitable VO model.

The difficulties of building a sustainable commercial model: In the project context, the VO model cannot be deemed as sustainable since there is too much reliance on project funds in the form of the stipend and rental allowance, and the management of the VOs is aligned to research outcomes and operations rather than profitability. A sustainable commercial model in rural areas where the major sources of income come from government grants (e.g. old age pensions) is difficult and requires substantial support from government, for example as the major client, by aggregating the connectivity demands of all government departments (police, social services, health and education).

The following *lessons were learnt*:

> *The VOs focused their attention more on a cash-business, offering office-type services. Firstly, they were provided with an office that obstructed their ability to be in the field to support customers. Secondly, they were contracted as independent natural persons and were guaranteed some income and rental allowance without any regard to performance. Thirdly, the customer support provided by the VOs was somewhat haphazard, limiting their ability to charge for services.* (CSIR, 2014:116)

Recommendations to the commercial partner included (ibid.:116 -117)

- Test the most-needed and profitable service offerings in the community.
- Obtain auditable financial information. The income from the services currently delivered by the VO is unknown since financial records were not kept.
- Improve management and reporting by the VOs so that they become business ventures rather than informal sole traders.
- The social impact of VO services is diverse and can have a large impact on rural development that can attract development funding (e.g. ICT4D funding) and government contracts for connectivity, ICT-enabled service delivery and broadband uptake development.

3.5.4   Branding

In order to support the development of VO businesses and the exit to commercialisation branding was important to gain acceptance for the initiative within the community but also to be recognised by the community, the education stakeholders and potential commercial partners.

A brand was developed that represented the values of the BB4All project. The brand was rejected by the DST, alternative brand names were proposed to the DST, but the DST selection of the brand name was never finalised. The project team adopted the name *Broadband-for-All/ BB4All* in the interim. *Internet for All* was the name adopted by the VOs, corresponding to the slogan that was selected for the original brand, and "Internet for All" boards were placed at the VO Offices.

3.5.4.1 Successes, challenges and lessons learnt

The VOs made use of the slogan "Internet for All" to advertise their facilities and services, which assisted to a certain extent in establishing their identity. Some VOs even painted the "Internet for All" slogan on their office walls.

Despite a lack of official branding, the VOs were able to create a general awareness of the work they did through word-of-mouth and by producing their own advertisements. The VOs became known for each of their unique services.

The "Internet for All" slogan created confusion among their customers since the slogan was associated with an internet café facility.

Figure 24 A VO Office with "Internet for all" slogans (CSIR, 2014: 120)

3.5.5 Legal and Regulatory

During the BB4All project, CSIR Meraka operated the Nkangala network under a research exemption in order to pilot the HPN mesh equipment.

The project team received support from the Universal Service and Access Agency of South Africa (USAASA) regarding licensing of VOs.

Successes, challenges and lessons learnt

Influence on ICT technology policy: The Department of Communications (DoC) amended their ICT technology policy by using BB4All as a case study of how broadband can be provided in rural areas. The CSIR's Meraka Institute was brought on board to design a plan for rural broadband roll-out and the BB4All project was recognised as a workable solution.

National broadband policy for schools: The CSIR received invitations to join policy influence structures, including the National Schools Connectivity Committee and contribute to the National Schools Connectivity Plan.

Provincial support: Relationship development with the Northern Cape province led to a commitment to fund bandwidth provision to schools.

Equipment licensing: The company manufacturing the HPN received a licence from the Independent Communications Authority of South Africa (ICASA) to commercialise the HPN.

The major challenge was that, in order for VOs to run their businesses as telco operators on a commercial level, they would have to obtain their licences from ICASA, and as soon as their businesses are operating on a commercial level, they are required to publish their rates. Since the VOs were not paid by the schools for their services, they were not considered as telco operators. Being licensed as a telco operator comes with certain responsibilities and liabilities, which persuaded the project team rather to make use of the CSIR's licence exemption for research.

3.6 BB4All end-of-project findings and recommendations

3.6.1 Introduction
In the previous section an overview of the four project streams that are highly relevant to VOs and the VO model was summarised: Mentoring and Training of VOs, VO Business Modelling, Branding, and Legal and Regulatory issues. In each stream the discussion ended with successes, challenges and lessons learnt.

In this section a condensed overview of the project achievements relative to the objectives set for the contracted project duration (end March 2014) is combined with recommendations. In the next section the project exit strategy (2014 to 2015) is presented.

3.6.2 General overview
Based on monitoring and evaluation outcomes**,** the indicators, targets and objectives set for the BB4All project that are relevant to the VO model were met as follows (CSIR, 2014:122-123):

- In terms of social imperatives, VOs were developed as SMMEs. Most of them felt that they were successful in what they were doing, but reported that they had reached an income ceiling and that their profit was not enough for them to survive on their own and be self-sustainable. By 2013 all the VOs were making their own pricing decisions.

- In terms of job creation, employment by VOs who created jobs for employees in their businesses.

- With regard to access to local affordable broadband, the VO offices have been providing the resources and facilitation for a range of users to gain experience in ICT use for incorporation into community life.

- With regard to assisting schools, a stable, operational and sustainable WMN has been created in the schools. Growth was seen in the active use of educational sites. Schools indicated that ICT resources had a positive impact on learning and teaching. Administrative use: most of the school clerical staff stated that communication with government departments was improved, especially useful was online submission of documents to the DBE.

- In terms of technology commercialisation, a mature operational business was established, a VO business model was developed and a commercial company was selected to take the VO model forward.

3.6.3 Recommendations
The key recommendations for future implementation are mentioned that have not been covered in Section 3.5 (ibid.).

Stakeholder management

It takes time to obtain buy-in, but the effort is necessary as lack of buy-in can derail a project.

The key lesson learnt from deployment in Mpumalanga was that it is crucial to have financial support and commitment from the province prior to project commencement to increase the likelihood of sustainability. The initial assumption was that the schools would be responsible for the VOs' stipend, but the majority of the schools did not have the budget for it. Furthermore, a price was never established for the VOs' services prior to project initiation and the VOs were eventually paid by the project.

Financial support was achieved in the Northern Cape, even though it took much greater effort than anticipated.

Readiness of participants

Skill levels and computer equipment at schools should be investigated. Participants should be ready to capitalise on an ICT4D initiative. Many of the schools had a computer in the principal's or secretary's office only, which meant that the school could not use their internet access for the benefit of the children. The schools with no computer laboratories could not use the internet to its full potential and were less interested than the ones that had computer laboratories.

Projects targeting schools in rural areas should consider whether school staff is computer literate and their level of internet experience. Computer literacy training should be considered. VOs looked after the network and ensured that it was well maintained. They also provided an introduction to the internet, set up e-mails for schools and showed staff how to use search engines. However, in most cases they only provided paid for computer literacy training as part of their business services.

Wireless mesh network development, improvement and roll-out

Future projects should implement a pilot and learn about the technology, the business model and participant behaviours before rolling out. A pilot also provides a proof of concept that stakeholders can be referred to for buy-in purposes.

Sufficient time was needed to properly implement the project in schools. Projects should consider that there is no access to schools after closing time, during the holidays or during exam time.

Network operations

The project team did not realise that they would eventually have to run the project operationally to develop the business model. Had the team known this, they would have designed the technology differently from the start.

Nurturing customer relationships

Regular communication between VOs and the schools over time played a role in establishing a relationship of trust.

The difference with the BB4All model was that there were VOs on the ground who could provide technical support. Once the project team had demonstrated the technology and provided access to connectivity, access to the schools became much easier. This was also due to the trust relationships built between the schools and the project team as well as the VOs.

Commercialisation

All the technology (in the case of the BB4All project, the YAB) should have been developed with commercialisation in mind.

A paying customer is key to commercialisation. Similar projects should secure financial buy-in from government and other stakeholders so that connectivity services are either fully or partially subsidised or compensated for in rural areas. Commercialisation is covered in depth in the next section.

3.7 Exit strategy (2014-2015)

3.7.1 Introduction
The fourth and final phase of the project was the development of an exit strategy and a business model and handing over operational aspects of the technology and the VO model to commercial partners who will take the concepts and learning forward (see Section 3.3.2 – Project design).

As a state-owned entity, the CSIR is generally discouraged from setting up new companies (CSIR, 2014). This effectively excluded the CSIR from any direct commercialisation of the VO model and therefore a licensing strategy was adopted. A black-owned company, e-Mbizo that owned a WMN in a low income urban context, was selected via an open Expression of Interest (EOI) process. A Memorandum of Understanding (MOU) was signed between CSIR and e-Mbizo in December 2013 that outlined a process. The process consisted of a due diligence process from December 2013 to February 2014 for the sharing of experience, learning and information from the BB4All project so that e-Mbizo developed a proper understanding of the project and expectations, to enable them to develop a business case to be presented to CSIR by March 2014 (Marais, 2014b). A separate licencing agreement would follow if the CSIR accepted the business case. After extensive discussion the technology Licence Agreement was signed on 14 October 2014 for e-Mbizo to run the network (14 VO cluster implementations in Nkangala and Sekhukhune DMs connecting more than 200 schools) and make it commercially available to local communities.

The processes and the human dynamics that emerged in 2014 and 2015 are presented below.

3.7.2 The challenges of taking over
The company was faced with infrastructural, operational and people challenges. The capital and operational costs of the current operations were disclosed fully to e-Mbizo after the MOU and before the licence agreement was signed, for example, the 2013 operational cost estimate was estimated by CSIR to be R5.5M and the cost breakdown was communicated (Marais, 2013c).

The backbone and the WMNs required updated technology. Due to the high yearly cost of a particular high site, a new site had to be found and a new backbone link commissioned. On the operations side the operational costs of the service desk, ITSM software, and the technical support team including VO stipends and office leases was high.

The major challenge that unfolded was the conflicts of interest, unmet expectations, and resultant deterioration of the relationships between the VOs and e-Mbizo, as well as between the VOs and CSIR.

3.7.3 Engagement between VOs, CSIR and e-Mbizo regarding project exit and commercialisation

3.7.3.1 Process flow
Prior to the EOI an information session was organised by CSIR to assist the VOs in understanding that the project funding ended at March 2014; thus ending CSIR's commitment to VOs; that CSIR did not have funding for operations and therefore needed a commercial partner with money to operate and expand the network.

After the MOU the CEO of e-Mbizo was introduced to the VOs at a workshop on 17 January 2014 that was attended by the CSIR team as well. The CEO shared their vision for the BB4All future and VOs asked for clarification of the business model and raised concerns about their future (Marais, 2014a). The NVC learnership provided the VO stipend after the end of BB4All project funding in March 2014, but it ended in

2014. VOs' office leases also ended in 2014. The CEO stated that VOs are seen as partners of e-Mbizo, that a retail component will be introduced with a commission on sales and that the stipend will come to end at some time, with hopefully enough commission income and revenue sharing with VOs to replace it (ibid.). After the licensing agreement was signed (14 October 2014) operations were transferred to e-Mbizo.

After VO disenchantment grew due to the BB4All network not being fully operational due to e-Mbizo re-configuring and upgrading the backbone, complaints regarding poor communication by e-Mbizo, and refusal of many VOs to sign an agent agreement with e-Mbizo, CSIR decided to contract The Institute for Transdisciplinary Development (ITD) to facilitate constructive engagement between VOs and e-Mbizo and CSIR. ITD arranged workshops that culminated in a final exit strategy meeting on 16 October 2015 between VOs, CSIR, DST and the e-Mbizo CEO.

3.7.3.2   *Facilitated workshops*
The workshops held by ITD were aimed at reaching the following objectives:

- *Facilitate the readiness of the CSIR team to hand over responsibility for the implementation and continuation of the benefits to the commercialisation partner*

- *Facilitate an understanding with the beneficiaries (primarily Village Operators) of the change in project responsibilities and change in project ownership to a business run by a commercial entity*

- *Facilitate with e-Mbizo a review of the responsibilities that is required for realisation of benefits of this project, and facilitate a renewed interaction between e-Mbizo and the Village Operators*

- *Develop learning about the readiness of the various partners for project handover, for use in the development of future planning of ICT4D projects* (ITD, 2015:2)

The outcomes of the workshops were that CSIR stated their position on finalisation and handover of the project, and VOs could take stock of their achievements, learning, as well as the assets that they developed over the course of the project, which included: technical and business skills, how to introduce a new service into the community, and social capital. This value was judged by ITD to place VOs in a good position to undertake future business activities, with or without access to technology (ibid.)

From a workshop between CSIR and VOs on 10 March 2015, facilitated by ITD, the researcher noted the following key issued raised by VOs that showed entrepreneurial pride, their sense of ownership and responsibility to their cluster and their clients (Marais, 2015b). VOs reported that they were embarrassed to meet their customers since they could not tell them when the connectivity would be restored due to a lack of communication from e-Mbizo (ibid.). The inability to deliver a service that they had successfully delivered for a long period, was highly frustrating and damaged their customer relationships. VOs did not feel that they were treated as partners by e-Mbizo. Instead of being 50/50 partners in a business, all they were offered was reseller agreements they would only get 2 to 3% commission (ibid.). They know they have value to the community since they have been in the business for five years, yet they felt that e-Mbizo treated them as if they had no value. CSIR did not inform them of the call for an EOI and hence they did not have an opportunity to express their interest in acquiring a license, which was not the way to treat a partner. They were treated as partners in the project by CSIR and had acted as partners by investing their lives in the project, and had expected to be part of it in future, and at least wanted to be part of the negotiations with the new partner.

In order to harness their business value, and to facilitate future business activities as a whole, ITD facilitated the process of establishment of cooperatives. These would enable the VOs to negotiate with e-Mbizo and other businesses as a collective, rather than as individuals.

3.7.3.3   Way forward
At the time of the final workshop a formal business arrangement with the Village Operators had not been reached. A number of VOs did sign agreements to act as resellers for e-Mbizo, but these have not been finalized for the group as a whole.

The major decisions regarding the way forward were: engagements between DST and the Mpumalanga province to ensure greater buy-in of BB4All, and that e-Mbizo and VOs (who will engage as cooperatives) will engage with the Village Operators in order to finalise a business agreement.

3.7.4   Successes, challenges and lessons learnt
In general, as discussed in the Literature review, the sustainability of ICT4D projects is problematic and the source of sustainability often lies outside the scope of a project. BB4All illustrated this dilemma well, especially the difficulties of handing over to a commercial partner.

ITD developed a summary of the lessons learnt during the BB4All exit phase regarding handover strategies that can be used to avoid the destruction of value that has been created by a project. Some important aspects from a project process and change management perspective were (ITD, 2015:6-8): Pro-active management of change, participatory design of handover and the development of handover processes and structures.

3.7.4.1   Pro-active management of change
This requires the development of a handover strategy that takes into account both individual and organisational transitional processes. Participants need opportunities to take stock of learning and asset development, to voice expectations, and to highlight expectations. Planning for handover processes needs to allow for delays in organisational tender and legal processes.

The design and implementation of a strategy to communicate change should be done to improve effectiveness of communication, e.g. by agreement on appropriate mechanisms of communication for participants.

Continuous monitoring of change readiness and sense-making by participants, project team, and key stakeholders, as well as response to outputs is required to create feedback to adjust the communication and the handover process to deal with where people are.

3.7.4.2   Participatory design of handover
Early involvement of all role players in the definition of a desirable end-state for the project will enable buy-in and engagement. The definition of the end-state can be guided by the clear definition of project objectives and the expected benefits for all role players and well as the extent to which it is required to be sustained. In BB4All, therefore, definition of VOs expectations and roles during and after the project and the anticipated benefit for the community could have been done in an iterative manner.

The co-design of a handover strategy by all role players will enable a comprehensive and holistic project handover plan to be developed.

Participant involvement in the engagement of new role players (e.g. e-Mbizo) will facilitate easier adoption, as well as the realistic definition of roles. VOs could have participated in the scoping of the EOI.

3.7.4.3   *Development of handover processes and structures*

The definition of a handover strategy should include the definition of temporary structures that are required to facilitate the handover of critical functions and management of processes. An example is the development of cooperative structures to facilitate collective action in negotiation of business agreements for participants.

3.8   Summary

The BB4All project had ambitious goals. To test technology with a large implementation in a rural areas and at the same time to test an entrepreneurial model for managing and growing this network and provide customer support is a large and complex undertaking.

The technical problems caused by the unavoidable delay to deploy a telecommunications backbone that was supposed to be provided by another entity, had knock-on effects on the process of developing and supporting Village Operators. For the first few years, management attention was largely focused on technical problems that had to be solved as soon as possible and hence there were not enough time and energy left to provide enough guidance and management for the VOs.

The development of relationships with the major prospective customer, the Mpumalanga Department of Education, at all levels, from school, up to provincial level, did not receive ongoing attention.

One of the lessons learnt by the project was that the phasing of the project should have been different. VOs were selected, trained and deployed before the backbone and the WMN clusters were fully operational and stable. This left a vacuum in terms of them not being able to focus on providing technical support services to the schools in their clusters, since the problems were mainly upstream, in the backbone, and therefore outside their control. VOs were selected for their entrepreneurial attitude and were encouraged to offer "office" type services such as typing of CVs, making copies and binding of documents. These services provided extra income to them and hence their focus shifted to these office type services and other entrepreneurial activities, some of which did not fall in the ambit of the project at all.

This situation created opportunities for the VOs to develop their entrepreneurial skills in a loosely managed environment and, as discussed later in Chapters 8 to 9, did lead to the development of innovative services that may have never happened if a strictly defined, circumscribed and tightly managed franchise-like model had been in place. The other reality was that the VO office equipment that was provided by the project was primarily aimed at supporting their role as local technical support and was not aimed at supporting the operations of business services such as large volume photocopying, or an internet café. In order to scale up office type services or provide new services, they had to find resources on their own. This search for resources involved the use of social capital to gain access to resources. The various ways in which VOs used social capital in supporting their entrepreneurial endeavours is analysed in Chapters 7 to 9.

Many lessons were learned during the exit/handover/commercialisation phase. Pro-active management and engagement are vital. Perhaps the most important recommendation developed by the project is early involvement of prospective commercial partners and the establishment of a participative change management stream to focus on the many technical, operational and human aspects of the major transition from project to business.

4 Methodology and Data collection

The context and content of Chapter 4 are shown in the thesis map.
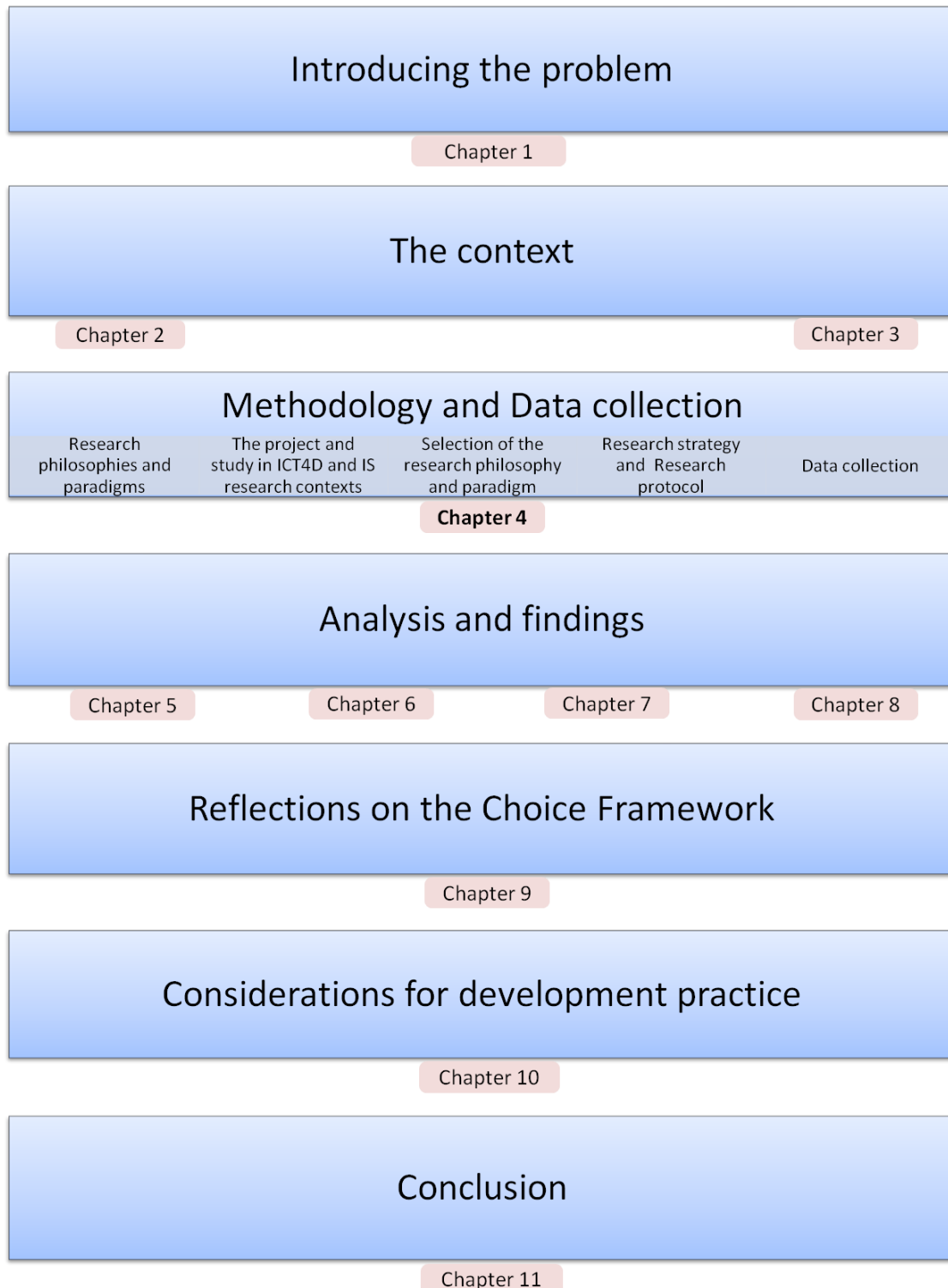
4.1 Introduction

The purpose of this chapter is to discuss the research methodology which explains the theory of how this research is carried out. It includes the theoretical and philosophical assumptions on which the research is based and the methods adopted (Saunders, Lewis & Thornhill, 2012). The major methodology elements discussed are: the research philosophy, research approach, and methods for data collection and analysis. The decisions regarding these elements have to consider the context of the project (an ICT4D project in the development domain), the particular design of the project, the theoretical development frameworks selected for the study, and the particular focus of the study on social capital. The researcher's context of being an ICT4D practitioner and Information Systems (IS) researcher also influences the decisions.

The forms of inquiry that inform research in the social sciences, the different world views in social research and IS research is discussed first. The research paradigms that have emerged are discussed using the work of Orlikowski & Baroudi (1991) as a departure point. The nature of the Broadband for All (BB4All) project in the context of ICT4D discourses and the particular aspect of social capital researched is described as motivation for the selection of the research philosophy and research paradigm. Finally, the research strategy, the research protocol, the data collection via interviews and reflections on the interview process, are discussed.

4.2 Research philosophies

4.2.1 Introduction

Some of the important extreme positions in forms of inquiry in the social sciences are discussed. The recurring theme of a gradual shift to a continuum of choices, consisting of combinations rather than 'either or' choices, is introduced.

4.2.2 Forms of inquiry

4.2.2.1 *Qualitative and quantitative*

Qualitative and quantitative methodologies are the two most frequently used and popular forms of inquiry that inform the work of much research in the social sciences (Sarantakos, 2005).

The simplest distinction is that qualitative data are nonnumeric data, e.g. words, and that quantitative data are numeric data (Schwandt, 2007). Qualitative inquiry has the broad meaning that it aims to understand the meaning of human action and it is used by researchers for forms of social inquiry that rely mainly on qualitative data, including case study research and ethnography (ibid.) In terms of collecting data, qualitative methods (methodologies) include open-ended interviews and participant observation that generate qualitative data, while quantitative data is collected via, for example, structured questionnaires or psychometric measures. Quantitative data can, however, also be generated from interview data using statistical methods (ibid.).

Creswell (2003) described the choice between quantitative versus qualitative as becoming less important since the view has developed that "research practices lie somewhere on a continuum between these two" (ibid.:4). This reality has been described as mixed methods research.

4.2.2.2   *Mixed methods research*

Mixed methods research regards quantitative and qualitative approaches as compatible, and that value can be created by combining their use in different ways (Teddlie & Tashakkori, 2011). Feilzer (2010) describes mixed methods research as "a response to the long-lasting, circular, and remarkably unproductive debates discussing the advantages and disadvantages of quantitative versus qualitative research as a result of the paradigm 'wars'" (: 6).

4.2.2.3   *Objectivism and subjectivism*

If one accepts that 'the scientific method' is the means of developing true knowledge about how the world works, then social sciences, including sociology, should follow the scientific method and develop a science of society (an objectivistic research approach) (Letherby, Scott, & Williams, 2013). If, however, one argues that society is closer to the humanities than to science, then the subjectivity of the individual researcher is central to, and entangled with, the knowledge developed (a subjectivistic approach) (ibid.). The essence here is ontological choices as to whether phenomena exist independently of humans (objectivism) or not (subjectivism) (see Section 4.3.1).

For the purpose of this study a qualitative form of inquiry was applied.

4.3   Research paradigms

4.3.1   The development of paradigms

4.3.1.1   *Social sciences*

Creswell (2003) developed a general framework for the design of research, in order for researchers to understand three different approaches to research: quantitative, qualitative, and mixed methods approaches. The framework elements are (:3): "philosophical assumptions about what constitutes knowledge claims; general procedures of research called strategies of inquiry, and detailed procedures of data collection, analysis, and writing, called methods".

Creswell uses the term scenarios to describe how the qualitative, quantitative, and mixed methods research approaches adopt different views in each of these three elements. The first element, assumptions about what a knowledge claim is, spells out the assumptions about how and what will be learnt. Knowledge claims may also be called research paradigms. Creswell (quoted in Cresswell, 2003:6) states that in these paradigms "researchers make claims about what is knowledge (ontology), how we know it (epistemology), what values go into it (axiology), how we write about it (rhetoric), and the processes for studying it (methodology)". In this section, we based the detailed description of the research paradigms on the research done in the IS, and to a lesser extent, the ICT4D research domains.

4.3.1.2   *The engagement with paradigms in IS*

In IS research, the work of Orlikowski & Baroudi published in 1991 is one of the first systematic explorations of the many possible paradigms. The sociological paradigms developed by Burrell & Morgan was published in 1979 and is frequently referred to in IS research, an example being Landry & Banville (1992), but this work introduced complexities (Turpin, 2012) that have led researchers to adopt smaller sets of assumptions to represent the paradigms that have had broad adoption.

Orlikowski & Baroudi (1991), based on a survey, found that the dominant research perspective in IS research was positivistic, which is rooted in the natural sciences. The dominance of positivism was considered to limit the 'what' (the diversity of aspects of phenomena in IS) as well as the 'how' of IS research. The variety in research perspectives used by social science researchers was classified by Chua (as quoted in Orlikowski & Baroudi, 1991:7) as sets of beliefs that "delineate a way of seeing and researching the world". These are a) beliefs about the phenomenon or 'object' of study, b) beliefs about the notion of knowledge, and c) beliefs about the relationship between knowledge and the empirical world (ibid.). Various stances on these sets of beliefs, constitute the different world views of social science researchers, as shown in Table 5.

Table 5 Beliefs underlying the conduct of research (Orlikowski & Baroudi, 1991:8)

Beliefs about	Explanation
Physical and Social Reality:	
Ontology	Whether social and physical worlds are objective and exist independently of humans, or subjective and exist only through human action
Human Rationality	The intentionality ascribed to human action
Social Relations	Whether social relations are intrinsically stable and orderly, or essentially dynamic and conflictive
Knowledge:	
Epistemology	Criteria for constructing and evaluating knowledge
Methodology	Which research methods are appropriate for generating valid evidence
The Relationship between Theory and Practice:	
	The purpose of knowledge in practice

Physical and social reality: The ontological beliefs about reality involve making a fundamental choice about phenomena not being created by humans, having an independent existence that is free of human bias and hence can be studied objectively, or choosing to believe that phenomena are created by humans; and hence subjectivity, human bias will be involved in the study (ibid.). Researchers also make assumptions regarding the intentions of the humans they study, in other words the nature of rationality attributed. An example is the theory of 'bounded rationality' developed by Herbert Simon (1991) to describe economic decision-making as limited by access to all the information required and the cognitive limits of humans in processing information. The beliefs about how humans interact in groups may be that stability and order prevail in general, or that interactions are dynamic and conflict prevails (Orlikowski & Baroudi, 1991). Burrell & Morgan (1979) saw order and conflict as part and parcel of any society and considered alternative beliefs that order (the status quo) should be established via regulation, or that societal structures of domination require emancipatory action via radical change.

Knowledge: Epistemological assumptions are about the criteria by which valid knowledge about a phenomenon may be constructed and assessed (Chua, 1986). To use the positivist world as an example, a theory is true only if it is repeatedly not falsified by empirical events, i.e. the theory that there are no black swans is immediately proved false if one is observed.

Methodological assumptions indicate which research methods and techniques are considered appropriate for the gathering of evidence. This depends on how the truth of a theory is established. In the case of positivist research, controlled, well-designed laboratory experiments and sample

surveys designed by the application of statistical principles are used to control data collection and analysis.

The relationship between theory and practice: These beliefs are individual and depend on the values and intentions of researchers. Some researchers intend for their research to have practical value in providing technical solutions, while other may be interested in social or organisational socio-technical systems, with, for example, an emancipatory objective.

Orlikowski & Baroudi (1991) used these three sets of beliefs to describe the underlying assumptions of the positivist, interpretive and critical research paradigms. Their work has been combined with that of other researchers to develop the following description of these paradigms in the context of ICT4D and IS research.

4.3.2 Discussion of research paradigms in an ICT4D and IS context

4.3.2.1 ICT4D viewed through the positivist lens

The ontological assumption of positivism is that an objective reality exists that is independent of human observers, and that this reality can be investigated rationally using empirical methods, which will uncover causal relationships that hold both for physical entities and human behaviour (Shanks & Parr, 2003; Orlikowski & Baroudi, 1991). The assumption is that human behaviour is intentional and rational and on the whole ordered and stable (Orlikowski & Baroudi, 1991). Guba & Lincoln (in Shanks & Parr, 2003) refer to this ontological position as naïve realism.

The epistemological assumption of positivism is rooted in Logical Positivism with its verification principle: the only meaningful statements are synthetic statements about empirical facts (Allen & Springsted, 2007). Theories need to be able to be verified. Karl Popper, a critic of logical positivism, introduced the idea of falsifiability: we can only test if a theory is false, we cannot prove that it is true, and, most importantly, argued that all observations are selective and theory-laden (Thornton, 2015). The researcher has to be aware that "pure" and "objective" statements of observations or measurements of, for example the quantity of ICT use in ICT4D, do not exist, as theory is explicitly or implicitly invoked by the researcher in the observation process and the observations are a function of both objective reality and subjective factors such as the researcher' interests (in this case, social capital).

4.3.2.2 ICT4D viewed through the interpretivist lens

Toyama (2009) asked what one would emphasise first – problems or values – when doing ICT4D research. A problem-solving-first approach focuses on whether an intervention shows "measurable improvements" (e.g. what is the impact on economic welfare), whereas a values-first approach emphasises the process of joint construction of a "shared perspective between researchers and the communities they research" (ibid.:90) (e.g. what are the VOs' perspectives on changes to their wellbeing). Ontologically, the interpretivist perspective does not focus on (so-called) objective reality, but rather on the way in which people perceive the world and act accordingly (working from an idealist rather than a realist foundation) (ibid.). Reality is a social product and cannot be understood independently of the people (and the researchers) who construct it (social constructionism) and try to make sense of it, hence the aim of interpretive research is to understand how people "enact their realities and endow them with meaning, and to show how these meanings,

beliefs and intentions...help to constitute their social action" (Orlikowski & Baroudi, 1991:13). Developing knowledge is all about trying to understand from the person's perspective, developing a shared understanding as the researcher inductively constructs interpretations (constructs) in an iterative approach, cycling between the particular and the whole – the hermeneutic circle (Orlikowski & Baroudi, 1991; Trauth & Jessup, 2000).

4.3.2.3   ICT4D viewed through the critical lens

Whereas the interpretivist paradigm focused on understanding the social construction of reality, the critical research paradigm asks the researcher to step back and ask why and how the current social reality has been created over time? The researcher is challenged to question the way of life in which the researched and the researcher are embedded. This focus is what differentiates progressive and disruptive perspectives in Information Systems in Developing Countries (ISDC) research (Avgerou, 2010). The progressive perspective assumes the existing status quo of the social order while the disruptive perspective recognises the influence of power struggles on the social order.

Critical research is related to what Burrell & Morgan (1979) called a radical humanist paradigm since interpretivist epistemological assumptions are used, but a radical change in society is advocated rather than simply accepting the status quo. Critical research moves beyond understanding to questioning and seeks to inform action that will emancipate (Trauth & Howcroft, 2006). The discussion on discourses mentioned ICT4D 2.0, which looks at ICTs as an end in itself that have transformative potential. The power ascribed to ICTs makes it even more important to identify what forces and social practices shape ICT4D. From a critical perspective, the question as to who drives innovation needs to be asked and Heeks' (2008) distinction between pro-poor, para-poor and per-poor innovation then becomes a useful guide. The emancipatory potential of "Development 2.0" in giving citizens a voice and platform for coordinated action against power structures is another example of critical research (Thompson, 2008).

Information systems researchers, such as Lyytinen & Hirschheim (1988) have promoted the need to shift from a perspective on IS as just technical artefacts, to a "social action perspective" in which "IS-use is seen as a manifestation of social action which is always socially determined and conditioned" and hence "differences in IS-use need to be explained not only in terms of technical aspects...but also in terms of social aspects, and thus requires an appropriate theory (or theories) of social action" (ibid.:19-20), for which Habermas' theory of social action was chosen (see also Myers & Young, 1997).

Trauth & Howcroft (2006) used a critical research perspective to be aware of the "less explicit ideological and structural forces" (ibid.:274) and used the framework on power developed by Lukes (1974) to surface both covert and overt use of power. Covert power use relates to how power is used to shape perceptions so that people accept rather than reject the way things are. They discovered an instance of covert power in action at a workplace in the construction of a social network that is built on predominantly masculine activities. Social capital, therefore, needs a critical research perspective as well.

In the next section the use of the different research paradigms in the ICT4D literature is summarised.

4.3.3 Survey of the research paradigms used in ICT4D

A content analysis of 948 papers from selected peer-reviewed journals and conferences published between 2000 and 2010 on ICT4D was used by Gomez and co-workers to show the preferred research paradigms (Gomez, 2013). Interpretivist, positivist and pragmatic paradigms were preferred. The dominant research questions were descriptive in nature, or measurement and improvement oriented, or focused on social change. Qualitative, mixed methods and quantitative research methods were preferred. The majority of approaches to ICT4D were technological, rather than social and unsurprisingly, recommendations were mostly about ICT infrastructure. Gomez (2013) used the typology of research paradigms developed by Guba (1990), as presented in Table 6.

Table 6 Paradigmatic stances in research (Gomez, 2013)

	Positivism	Post-Positivism	Critical Theory	Interpretivism (Constructivism)
Ontology (nature of reality)	Realist	Critical realist	Critical Realist	Relativist
Epistemology (nature of relationship between knower and known)	Dualist / Objectivist	Modified objectivist	Subjectivist	Subjectivist
Methodology (How to go about finding out knowledge)	Experimental / Manipulative	Modified experimental / manipulative	Dialogic / transformative	Hermeneutic, dialectic

The choice of the research method was closely related to the research paradigm and it was found that qualitative studies were mostly interpretivist, quantitative methods were predominantly positivist, while mixed methods were evenly distributed among the interpretivist, positivist and pragmatic paradigms.

Other types of relationships exist as well, for example the inductive approach is closely associated with interpretivism (Creswell, 2009; Knox, 2004). When applying induction one applies a process of developing a general principle on the basis of many observations gathered from experience (Thomas, 2010) consequently inductive reasoning goes hand in hand with qualitative studies (Creswell, 2009). As mentioned in Section 4.3.2.1, observations are selective and theory-laden (Thornton, 2015).

Gomez (2013) commented that the predominance of interpretivist paradigms in the literature from 2000-2010 is consistent with the study of the 2000-2004 literature by Walsham & Sahay (2006). Interpretivist studies were declining towards 2010, but were still predominant, followed by positivist, then pragmatic approaches. Oates (2006) and Myers (2009, 1997) referred to positivism, interpretivism and critical research as the three dominant paradigms in IS research.

The IS research literature before 2000 was dominated by positivism as described by Chen and Hirschheim (2004) who referred to research by Orlikowski & Baroudi (1991) and Goles & Hirschheim (2000). Interpretivism was a growing alternative (Trauth & Jessup, 2000; Nandhakumar & Jones, 1997; Walsham, 1995a, 1995b), while critical theory had just a few adherents (Orlikowski & Baroudi,

1991) (ibid.). The balance between the use of positivism and interpretivism had therefore changed rapidly in the 1990s.

4.3.4   Summary

The history of the development of the major research paradigms has demonstrated the diversity in worldviews, which has grown over time. The growth in the 1990s in IS of the use of interpretivism to replace the dominant role of positivism, has been followed by a decline in interpretivist studies towards 2010 in ICT4D research, and the increased presence of pragmatic approaches in ICT4D as well as critical research in IS. The choice of the research method in ICT4D was found to be closely related to the research paradigm selected, thus qualitative studies (such as this study) were mostly interpretivist.

4.4   The project and the study in ICT4D and IS research contexts

4.4.1   The theory base of the study

The focus on VOs translates to a focus on the endogenous development model in BB4All, which relates to internal causes and dynamics inside a community. According to Mansell (2011, 2014), this kind of approach involves interpretivist socio-technical perspectives and multiple knowledges and multiple models for development. The research question is about the relationships of VOs and how these relationships (social capital) influence their growth as entrepreneurs. In doing research on the VOs in BB4All, social research is being conducted, and since we are dealing with individual and group interactions, the research falls partly in the domain of sociology, in conversation with the work of researchers such as Pierre Bourdieu regarding cultural and social capital (as discussed in Chapter 2).

Social capital was described in Chapter 2 as having a structural dimension (the network of relationship has a certain structure) and a relational dimension, which includes gaining access to resources such as economic or cultural resources. These relationships are built on perceptions of trust, norms and social values, which are developed by an individual in the context of a culture in a society.

The measurement of social capital therefore involves two broad classes: those aspects that are easy to measure in a quantitative manner (the structural characteristics of a network of relationships), and qualitative aspects that may be quantified and measured to some degree, but need to be combined with qualitative approaches for full understanding, e.g. the cultural aspects that influence social values.

Adi (2004) in reaction to the mostly functionalist definitions of social capital that use the outcomes such as collaboration and collective action to define it, constructed a three-dimensional representation of social capital in terms of (:1):

> a) what constitutes it (its *essence*),
> b) the qualities or attributes that it essentially generates, and
> c) the structures or institutions that are engendered by (a) and (b).

The essence of social capital is argued to be "dictums that command belief or obedience thereby shaping individual agents' attitude towards others" (ibid.), which are norms and values that

are used as the basis for explaining behaviours. Trust is an example of a cognitive quality that is generated by believing in certain norms and values. Groups, networks and associations are instantiated social capital that is extrinsic and observable (Uphoff, 2000).

In summary Adi (2004:4) defines social capital as "the effectiveness of believe [sic] in, and compliance with mutually held norms and values in engendering trust, solidarity, reciprocity among a group of people that makes mutually beneficial cooperative action possible".

Direct measurement of norms and values are not possible, but surveys can be done to determine how many people believe in culturally determined norms and values, by asking them to rank their adherence to these norms (e.g. trust) according to attitudinal scales, for example, the General Social Surveys (University of Michigan, 2016). Building on the work of Woolcock (1998) and Putnam *et al.* (1993), the creation of a stock of social capital (cultural capital) requires the existence of institutions that nurture and support the norms and values of a society. This can conceptually be measured quantitatively to a certain degree, by investigating the enforcement influence of these institutions. As discussed in detail in Chapter 2, Woolcock's work used two complementary forms of social capital, called "embeddedness" (intra-community social practices) and "autonomy" (extra-community linkages) and two levels (community and state) to create a broad canvas upon which the role of social capital in a society's development can be described. This is another approach of which some aspects may be quantified.

In this section an argument was developed for the possible combination of quantitative and qualitative approaches to measure and understand aspects of social capital, but the complexity is significant. The structural dimension of social capital, as a network structure, can be easily measured via quantitative techniques, but does not present the whole picture of why the different network configurations develop.

4.4.2   The positioning of the BB4All project in ICT4D discourses

There is a combination of approaches and assumptions regarding development in the BB4All project and hence, before embarking on selection of a research philosophy, we first examine what development approaches are present in the design of this project.

The BB4All project approach combined 'endogenous' and 'exogenous' models for development as described in the analysis by Robin Mansell (2011) of key ICT4D discourses (see Section 2.5.1).

Endogenous models refer to internal causes and play out as approaches that work with local communities to define ICT intervention strategies (ibid.) and include what Heeks (2008) calls 'per-poor innovation' models in the 2.0 phase of ICT4D. Exogenous models refer to external causes, for example, using ICT as an intervention from the outside to provide technology and knowledge, and a neoliberal emphasis on market-led development is typically adopted (ibid.).

Human scale development is also about applying the development principles of self-reliant and endogenous fields such as rural development (Max-Neef *et al.*, 1991) (see Section 2.2.5).

If BB4All was only about providing the infrastructure for providing internet access to the schools, then it would have been a purely exogenous approach. BB4All did not consult local communities regarding the choice of schools since the technical requirement for line-of-sight links defined the gateway school and the rest of the schools in a cluster. Permission to execute the project was

obtained via the top-down route from the provincial Department of Education head office, then via District and Circuit managers who informed the school principals (FSM, 2013a). Negotiations regarding access to the school premises did take place and a modicum of stakeholder management was done, i.e. via a project launch in the Nkangala area by the Minister of the Department of Science and Technology (CSIR, 2014). In general, a participatory approach was not used.

The addition of the VO model added an endogenous approach that started with the selection of VOs based upon recommendations from the local school principals. The introduction of an entrepreneurial element to the model, with VOs developing businesses that develop their own services in response to customer needs is the fundamental endogenous element that led to a variety of services as each VO interpreted what it meant to be a VO business. The VO business services emerged via interactions between VOs and customers and VO-to-VO interactions. The VOs also had interactions with groups of people such as the faith community they belonged to. In these interactions existing relationships were involved and new relationships developed.

BB4All therefore includes exogenous and endogenous models for development.

4.5 The selection of the research philosophy and research paradigm

4.5.1 Which paradigm is appropriate to this research in ICT4D?

BB4All is partly a type of ICT4D which focuses on state level development initiatives, in this case, access to broadband connectivity for all citizens. Therefore, it needed a foundation of empirical, positivist-based evidence to respond to the drive towards 'evidence-based' policy for government and justify investment in ICT infrastructure. As Avgerou (2010:1) stated: "ICT4D research...remains weak in forming convincing arguments about IT-enabled socioeconomic development." At the community and household level deeper understanding of ICTs' developmental role as "seen from the inside" by participants/partners is required to guide the design and implementation of a rich diversity of ICT initiatives, moving away from the dominant technologist perspective. In BB4All the VO model provided this opportunity for a participant view that was explored in this research. At both state and community/citizen levels critical research is required to avoid entrenching existing power structures and biases (e.g. the technology bias) and enabling ICTs' developmental transformation potential to be realised into emancipatory action by a range of role players – large and small.

Development is itself a contested notion and critical social theory can be used to critique the hidden assumptions and to ask whose idea of development is being implemented. In the case of this research a development theory-based framework is used, namely the Choice Framework, that translated Sen's capability approach at conceptual and practical levels into a systemic framework while also drawing on empowerment and sustainable livelihoods approaches (Kleine, 2010). This is combined with the theory base of social capital. These two theoretical approaches were used together with the entrepreneurial aspects of the VO model when considering the research philosophy and methodology and methods to be used.

At an ICT4D and project level there is a clear need for a combination of positivist and interpretivist and critical research, if the transformatory potential of ICT as a platform for emancipatory

development is to be understood, and if the evidence for IT-enabled socioeconomic development is to be collected and interpreted.

While the context and the focus of the study were important considerations, the social capital of VOs remained the dominant factor in selecting a research philosophy.

4.5.2 The choice of research philosophy and methodology

Qualitative research was selected to elicit the individual experiences of the VOs during the course of the BB4All project with all of its complexity and multiple influences. Research was conducted via the interactive engagement of the researcher with the VOs and ICT4D practitioners (the project team members) by means of face-to-face, in-depth interviews. The research paradigm chosen is interpretivist since the aim is to understand social capital, which is embedded in human and social interaction, and required that the researcher engage in the social setting investigated (the VO offices and school clusters) to learn about interactions from the participants' perspective (Orlikowski & Baroudi, 1991).

As will become clear in the research protocol, quantitative approaches for researching the structural aspects of the social capital of VOs were considered. The choice of the tool used in interviews was informed by considering both structural (quantitative) and relational (qualitative) aspects.

4.5.3 Summary

The need for quantitative and qualitative research in development, ICT4D and in research on social capital was acknowledged and engaged with. The difficulty of combining quantitative and qualitative approaches was shown. The relevance of positivist, interpretivist and critical research in development and ICT4D was argued. The adoption of a dominantly qualitative research approach and the use of the interpretivist research paradigm were motivated by examining the nature of social capital, and recognising the importance of learning about relationships as seen by VOs.

4.6 Research strategy

A research strategy can be defined as a plan of how the researcher will go about answering the research questions (Saunders *et al.*, 2012) and popular research strategies include experiment, survey, case study, grounded theory, ethnography and action research. This research is qualitative in nature and primarily applied a single case study as a strategy.

4.6.1 Case study

A case study gives the opportunity to study an individual, event or program in detail for a distinct period of time (Creswell, 2009; Leedy & Ormrod, 2010). "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident" (Yin, 2003:13), as is characteristic of social capital. The case study strategy is useful to investigate a situation which is poorly understood or to investigate changes in individuals or programs over time (Leedy & Ormrod, 2005). It is particularly relevant when the researcher is interested in the real-life context of the research (Saunders *et al.*, 2012. The focus can be on a single case or on multiple cases depending on the aim of the research (Leedy & Ormrod, 2005; Saunders et al., 2012; Yin, 2003). Four types of case studies exist according to Yin (2003): holistic single case; embedded single case; holistic multiple

case and embedded multiple case. A holistic case has a single unit of analysis whereas an embedded case has multiple units of analysis (ibid.) A holistic case study is formed by a comprehensive qualitative approach that depend on phenomenological and narrative portrayals (Scholz & Tietje, 2002). Themes are important, but not as important as developing an understanding of the case. In embedded case studies the initial and completion points are the understanding of the case as a whole in its real-life context (ibid.).

A single case study with embedded units of analysis was selected for this study. The multiple units of analysis were the 15 VOs interviewed. The strengths of case study research are high construct validity, in-depth insights and provide the opportunity to the researcher to establish rapport with participants. Remedies to ensure construct validity (Yin, 2003) include multiple sources of evidence which was ensured by making use of data collection instruments (interviews, observations, the use of a mapping interview technique, geographical maps). Evidence was collected by taking notes and making audio recordings that were transcribed.

In addition to interviews that elicited the first person, subjective view of the VOs, interviews with selected BB4All project members were conducted to obtain a different perspective on the VOs, the project and the context. The details of the strategy are spelled out in the research protocol.

4.7   Research protocol

4.7.1   Introduction
The overall aim of the research is to discover and map the networks of relationships of the VOs that are relevant to their successes as entrepreneurs and to understand the value that is unlocked via these relationships to better understand the importance of building social capital and how it is built and used in practice. This overall aim guides the design of the research protocol and the researcher's approach to the interactions with the research participants. This was a longitudinal study as the particular phenomenon (social capital) was studied over a significant period of time (2012 to 2015) as part of the BB4All project. Longitudinal studies have the ability to study change and development as it occurs over an extended period of time, which is appropriate for case studies Saunders *et al*., 2012).

The research protocol elements, the motivations for the selection of research instruments, and ethical clearance are described below, while the execution of the data collection processes is described in the next section.

4.7.2   Description of the research protocol
The research protocol will discuss the sampling technique as well as the data collection instruments that were applied in this study.

4.7.2.1   *Sampling*
Sampling is the process of selecting the specific entities for the study. In order to collect data, it is important to identify an appropriate sample from which to obtain data (Leedy & Ormrod, 2005). The goal of sampling is to purposefully select the individuals for the study (Creswell, 2009). Miles & Huberman (quoted in Creswell, 2009:178) consider the following four aspects necessary when discussing the participants: "the setting (where the research will take place), the actors (who will be observed or interviewed), the events (what the actors will be observed or interviewed doing), and

the process (the evolving nature of events undertaken by the actors within the setting)". The focus on the social capital of VOs led to the use of purposive sampling (i.e. intentionally non-random selection) which meant that the 15 VOs and key project members were selected and interviewed at their places of work (Creswell, 2009; Leedy & Ormrod, 2005).

4.7.2.2 Data collection instruments

The data collection instruments included primary data collected via interviews (using an influence mapping technique) and observation, as well as secondary data.

Secondary data

Project documents were used as secondary data (Saunders *et al*., 2012) to obtain a project perspective. The researcher had access to all project documentation. The comprehensive BB4All Project-End Report issued in 2014 provided a valuable overview of the project and project and VO interactions (CSIR, 2014). The business modelling documents also provided valuable insights into the dynamics of VO businesses, such as the nature of the services and customer base. Quarterly project reports, minutes, and notes of meetings were used to gain insight regarding stakeholder perspectives. Maps produced by the project were used to depict the location of VO offices.

Observation

Observation during the interviews with VOs in their offices were made. Of particular interest were the slogans on the walls, the equipment used, and interactions with customers and fellow entrepreneurs. The researcher attended BB4All project meetings, meetings with the VOs, a meeting with the Mpumalanga DoE and meetings during the commercialisation process and made notes.

Interviews

The interviews were semi-structured (Saunders *et al*., 2012), and, in the case of VO interviews, the structure was provided by the Net-Map technique as discussed below.

4.7.3 The selection of Net-Map

Social capital is a relational construct and therefore the techniques used during the interview process had to be able to explore the relationship networks that VOs have and the meaning of these relationships to VOs at different levels, such as personal support, knowledge exchange and business dealings. The exploration of all these levels was bound to be a lengthy process and therefore the interview method had to really engage the VO and keep participation, focus and interest levels high.

The decision was therefore made to use a method that would create something that is visual, co-constructed and of value to the interviewee. It was decided to use participatory influence network mapping (Schiffer & Waale, 2008) to explore the relationships with various kinds of actors that influence the success of the VOs as entrepreneurs. The tool that was developed for the mapping is called Net-Map (ibid.).

The processes and Net-Map tool were developed in the context of the creation of multi-stakeholder water governance bodies that function on local; national; and cross-border, international levels. These integrative bodies were designed to improve the governance of the shared water resources,

which is a complex undertaking that is difficult to execute. Also recognised was the need to support the analyses of these complex governance systems via appropriate research tools.

The tool was developed during research by the International Food Policy Research Institute (IFPRI), an agricultural research centre, as part of a larger project called "Integrating Governance and Modeling", funded under the Challenge Program for Water and Food by the Consultative Group on International Agricultural Research (CGIAR) (ibid.:v-vi). The Net-Map tool supported analysis of multi-stakeholder governance by "gathering in-depth information about governance networks, goals of actors, and their power and influence" and was designed for use by both researchers and implementers to "collect qualitative and quantitative information in a structured and comparable way" (:vi). The tool combines aspects of both social network analysis and a power mapping tool and is used in a participatory manner where interviewees and interviewers together draw a network map of the actors involved, characterise the different kinds of links between the actors, and indicate the influence of actors (Schiffer & Waale, 2008). The process steps are as follows:

a) *Who is involved in this multi-stakeholder process? Actor names are written on actor cards and distributed on a blank sheet of paper.*
b) *How are they linked? Arrows of different colours are drawn between those actors that interact in terms of information, advice, funding and command relationships.*
c) *How influential are they in this multi-stakeholder process? 'Influence towers' consisting of checkers pieces are put next to each actor name to indicate the influence of actors.*
d) *Participants have a qualitative discussion about how and why.* (Schiffer, Hartwich & Monge, 2010:8)

In terms of the latter, the qualitative discussion can include deliberating the orientation of actors towards a major relevant issue and the development of a strategy for the future by adding links to be established or strengthened in the future (Schiffer & Waale, 2008). This step assists the development of a strategic plan that deals with positives and negatives, i.e. alliances and conflict management.

A case study illustrates the application of this research method. The case study concerns the development of a multi-stakeholder water governance body for the White Volta River Basin, a watershed in northern Ghana. To clearly define the area of analysis and develop a concrete idea of the question to be answered, pre-work (i.e. interviews) was required before the mapping process. The board of the newly established entity was asked "Who can influence whether and how the Basin Board achieves its goals?" (ibid.:5).

An example of a Net-Map drawn by one of the board members during an individual interview is shown in

Figure 25.
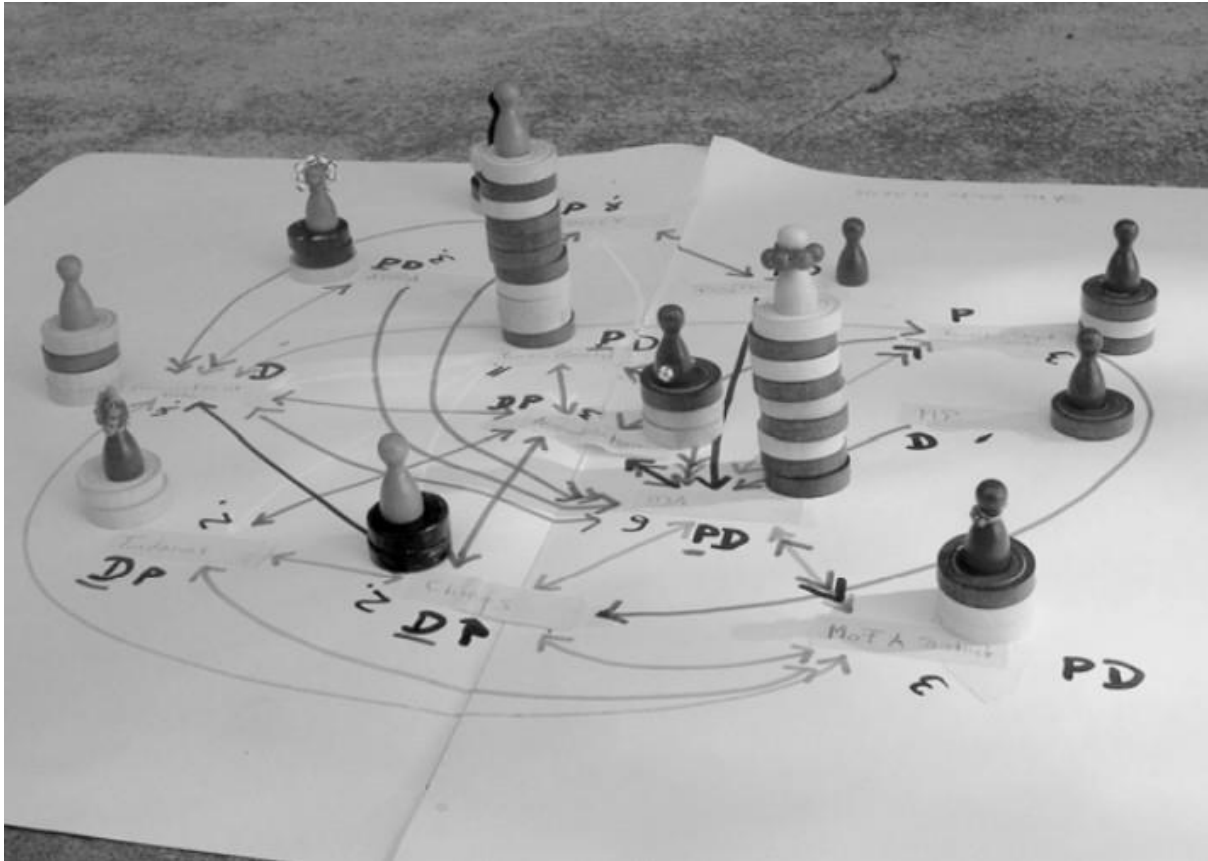
Figure 25 Net-Map drawn by a member of the White Volta Basin Board (Schiffer& Waale, 2008:8)

The relevant links were defined as: flows of funds, formal lines of command, support, advice, direction given, flow of information, and future links (to be established or strengthened) (Schiffer & Waale, 2008:6). The 'influence towers' are used to represent abstract concepts of power and influence as a physical variable (height). The goal orientation of the different actors, for example a developmental versus an environmental goal, is depicted on the map as P for protection, D for development, PD for both goals, <u>PD</u> for both goals but a stronger protection focus, <u>DP</u> for both goals but a stronger development focus (:9). Actors pursue different orientations or goals and this information is very useful in strategic influence network planning for the future, i.e. to identify potential conflicts of interest and possible alliances (ibid.).

In the case study, individual network maps were created with all board members, followed by two networks created with smaller subgroups, and finally a common influence network map was drawn with the whole group that was used as a basis for strategic planning (Schiffer & Hauck, 2010:240).

The benefits of using Net-Map

The creation of network maps provides data that can be analysed quantitatively, for example using Social Network Analysis (SNA) algorithms to analyse the structural features of the network as a whole and of the actors in the network. The structural analysis of a network also provides more exact definitions of social capital terms such as bonding capital and bridging capital. Bonding capital corresponds roughly to the kinds of social capital arising from connections within a tightly-knit group

(where everybody knows each other), while bridging capital arises from connections between such groups (Easley & Kleinberg, 2010:69).

'Betweenness' is a measure of the total amount of flow that a node (e.g. an actor) in a network carries. A higher flow suggests that the node (the actor) is an interface between tightly-knit groups and occupies a critical role in the network (ibid.:75-76), for example controlling the flow of information or money. Betweenness is one example of a centrality measure that tries to find the central points in a network (:342).

These structural measures can be compared with the additional information provided by the different kinds of links (e.g. flow of information, advice or money) and the degree of influence assigned to actors. The SNA algorithms can determine the different centrality measures of actors in the different networks, comparing them to different kinds of links, for example, are the same actors central in the money and the command networks? Structural measures can be correlated with the influence of actors as shown by the influence towers, e.g. does high betweenness in the advice network (the ability to control flows of advice) make actors influential? The analysis of the goals of actors can help to understand whether certain goals are shared by influential network members.

Many insights can be developed via the use of the SNA, but in this study, the network was small, with only 15 VOs and therefore the use of the SNA was tested, but not analysed in detail.

The real value of the Net-Map tool for this study was that the case study demonstrated that the mapping process enabled structured and in-depth discussions and learning. Implicit understanding was visualised and made explicit in the process. This helped the group to understand areas of agreement and difference. In individual interviews a major attraction of this method was the finding that "interviewees were excited about their own learning processes throughout the interview" (Schiffer & Waale, 2008:iv). The use of Net-Map in the case study also proved that the method could be applied in different cultures and that it was easy to apply and adapt.

4.7.4   Ethical clearance

The research protocol that was developed was submitted for ethical clearance. All research conducted by CSIR staff members that involve people must be approved by the CSIR Research Ethics Committee. An application was submitted to the committee who decided that the application need not be subjected to a full ethics review and that primary ethics clearance should be granted by the University of Pretoria. An application was made to the UP and ethics clearance was granted. Permission to interview CSIR Meraka employees and to use project documentation was obtained from the Executive Director of the CSIR Meraka Institute.

4.8   Data collection

4.8.1   Types of interviews

The source of most of the data and information was the interviews with 15 VOs. Interviews with selected BB4All project members were conducted to obtain a different perspective on the VOs, the project and the context. The main customer, the Mpumalanga Provincial DoE, was not interviewed, but notes were made at a meeting with the DoE that the researcher attended, project

documentation (minutes of meetings with the department) and the interviews with the project manager (PM) and the field support manager were used to obtain information.

The exit and commercialisation meetings were attended by the researcher and documentation of the meetings was used. The role of the researcher during the data collection for this project was that of a participant observer as well as an interviewer.

4.8.2 The VO interview process

4.8.2.1 The process flow

The process followed was that the researcher phoned VOs and other participants to inform them about the purpose and method of the research and asked if they would participate. An interview date was arranged to suit the interviewee and interviews were held at the VO's office. The information document explaining the purpose and scope of the research and the interview process as well as the consent form were emailed to the VO before the interview. Paper copies were provided at the interview and the information document, the interview procedure with the use of the Net-Map technique, and the consent form were explained to the interviewee and questions were answered. Two consent forms were signed, of which one was kept by the interviewee.

 A summary of the interview process and the subsequent data collection processing is provided below:

- The interviews were recorded using a LiveScribe pen that recorded the conversation as interview notes were made on a special paper that allowed play back from the time when the words were written.
- Interviews generally took about four to five hours (from 9h to 14h), with a 30-minute break after two hours. Refreshments, such as sandwiches, water and juices or cool drinks were taken along for interviewer and interviewee. The preferred brand or type of cool drink or juice was determined beforehand.
- Photos were taken of the VO office surroundings and the VO office interior.
- A summary of the interview based on the interview notes was made by the researcher on the day after the interview or as soon as possible. Pictures of the influence network map that was created were emailed to the interviewees as immediate feedback.
- The voice recordings were sent for transcription and the transcripts and the interview summaries were loaded into a qualitative data analysis tool (QDA Miner), as cases to be used in coding.
- Finally, a summary of each VO interview was made that collated all the information and captured the topics of interest. The summaries were the start of the analysis process and were used together with the coding in the analyses process (See Chapter 5 for an example of a summary).

Interview dates

Of the 15 VOs who were members of the project at November 2012, 14 could be interviewed of whom four are female. One VO resigned before he could be interviewed.

Twelve VO interviews were conducted from November 2012 to 8 March 2013. The final two interviews were done in September and November 2013. At the time of the interviews, the network status was that all 14 clusters had been commissioned since September 2011 (13 by June 2011 and the final one in September 2011), but re-commissioning started soon after and was only completed by September 2013 (See section 3.4.2 in Chapter 3). At the time of the interviews all 14 clusters and, therefore, all but one VO had unstable internet connectivity.

4.8.2.2   The use of Net-Map in VO interviews

Social capital and small business perspectives were used to select the actors, and the types of relationships (links) that were considered. Six types of links were used initially, namely the flow of information, advice, money, commands, business referrals and competition. After a few interviews, an additional link type was added: the command link was split into two – who has the power to command you or be commanded by you; and who demands services, and who are you demanding services from.

It was decided to use commonly available material so that VOs could use this mapping technique for themselves as well. Therefore, flipchart, paper, 3M Post-its, permanent markers, a pencil and stickers were used.

An interview outline was developed that consisted of an introduction and the eight steps summarised as follows:

Introduction: Explain the basic ideas of a Net-Map

Explain to the VO that this tool helps to explore those relationships that shape and affect her/his work as a VO and their VO business but are not necessarily shown in formal reporting hierarchies.

Give practical examples that relate to the experience of the VOs. There is a field service coordinator in the BB4All project, but you probably also have friends or family or fellow business owners that influence you? Maybe by giving you information or advice?

Definitions: Check which word works best to describe influence. Do we use "influence" or "whose word has weight" or "who do you have to listen to"?

Step 1: Who are the people or organisations that influence?

Place a flipchart-sized sheet of paper before the interviewee and ask her/him to think of all the people, groups or organisations that can have an impact on them. For example, "Who are the people that influence a Village Operator in becoming a successful business?"

The people can be local, or regional or national and may or may not be officially linked to the BB4All project. The VO and the BB4All project are added by the interviewer.

The interviewer writes down the names mentioned by the VO on Post-Its and sticks them onto the flipchart. The VO and the interviewer arrange these so that those that probably share links are close to each other.

People and links are added as they arise in the interview. Read the names already listed to encourage recall and provide time, but do not prompt or push or probe.

<u>Step 2: How do they influence? Define different links and draw network.</u>

The purpose is to collect data about how these people or organisations are linked. Links are illustrated by drawing arrows of different colours between the Post-Its to represent the different types of links.

A legend is drawn in a corner of the map to show the mapping of colours to types of links.

The types of links chosen were:

- Giving advice – Green

- Giving and receiving services – Pencil

- Paying money – Red

- Bringing new clients – Blue (business referrals)

- Information flow – Dotted Green

- Giving commands – Black

- Competing with – Yellow (fluorescent marker)

- The future: relationships to be strengthened or weakened – Orange.

The links are arranged in the usual order in which they were drawn and discussed.

The next step is to explain how the links will be created. The arrows show that something (money or advice) is flowing from one person to another. Two-headed arrows show that there is flow in both directions. Start with the uncommon links so that the map does not get too full early on. Guide the VO to complete one link type before going to the next. Links about the future are added at the end of the interview as a start to "strategic network planning".

<u>Step 3: Determine degree of influence</u>

Influence or power needs to be defined early (see Introduction of interview outline). Sources of influence or power can vary widely from 'official' decision-making and commands to people giving advice.

The key issue is the ability to influence this specific issue – in this case the VO becoming a successful business. It is not about the general level of influence that somebody has on things happening in the VO's context or business environment.

When the VO has understood what is meant by influence, he or she is asked to think about who has the most influence on this particular issue: VO businesses.

The question asked is: "How strongly can these people or organisations influence a VO in becoming a successful business?"

Rules:

- The more influence the more stickers are placed on a person or organisation's Post-It.
- As many stickers as you want can be placed on a Post-It.
- Two persons can have the same number of stickers.
- If there is no influence at all, do not add a sticker.

After the stickers have been added, the interviewer talks about what is seen on the map, starting with the Post-It with the most stickers. Questions are asked to test the interviewers' understanding and to get a conversation going where VOs re-think some of the links/relationships.

Ask the VOs to make adjustments till they are content. Then write down the number of stickers next to the Post-Its to record the degree of influence.

Step 4: A qualitative discussion.

The map is now used to structure a qualitative discussion about the influences on the VO's business.

Start with the most influential person or organisation and ask about the sources and effect of influence.

Questions to ask:

- Why is this person or organisation the most influential? Where does his/her influence come from? How would somebody like me that do not know them see their influence?
- You show that these two have the same amount/level of influence. What happens if they disagree? Do they influence in the same way? Is their influence based on the same grounds? Does it have the same range (does their influence vary from little to large in the same way?)
- Is there any conflict between people? I have heard that there is conflict between these (two or three) people. Please explain to me what that is about?
- This person has been linked to many other people, but he/she has little influence according to you. Why is that so?

Note: Make sure you discuss all the people/organisations on the map.

Step 5: Add the orientation of the people/organisations.

People have different goals/agendas or orientations. This is important for strategic influence planning for the future. Examples: People might have a strong internet and IT orientation (IT) or a strong entrepreneurial orientation (E) or a developmental orientation (Dev), i.e. they want to help you.

Mark these persons' Post-Its with an IT, E or Dev.

Step 6: Add links to be established or strengthened in future

Ask questions about the future:

- In order to achieve your VO business goals, which links (relationships) would you want to establish or strengthen in the future?
- Are there any new people or organisations that you would want to establish relationships with or strengthen in the future?
- What kind of alliance would you form with these people/relationships to achieve your VO goals?
- Which relationships should weakened or cut? Why?

Add future links in just one colour (orange was used) and use the information to encourage further thinking about the future and to gather more qualitative data.

Step 7: Insight and value to the VO?

Looking at the map that we drew together, what do you think you have learned through this process?

Step 8: Feedback on the interview process

How was the interview process for you? What was good or bad for you about the process of drawing the map and discussing it?

A pilot interview was conducted to refine the interview guidelines and gain experience regarding the factors to consider for a meaningful interview.

An example of an influence map follows in Figure 26.
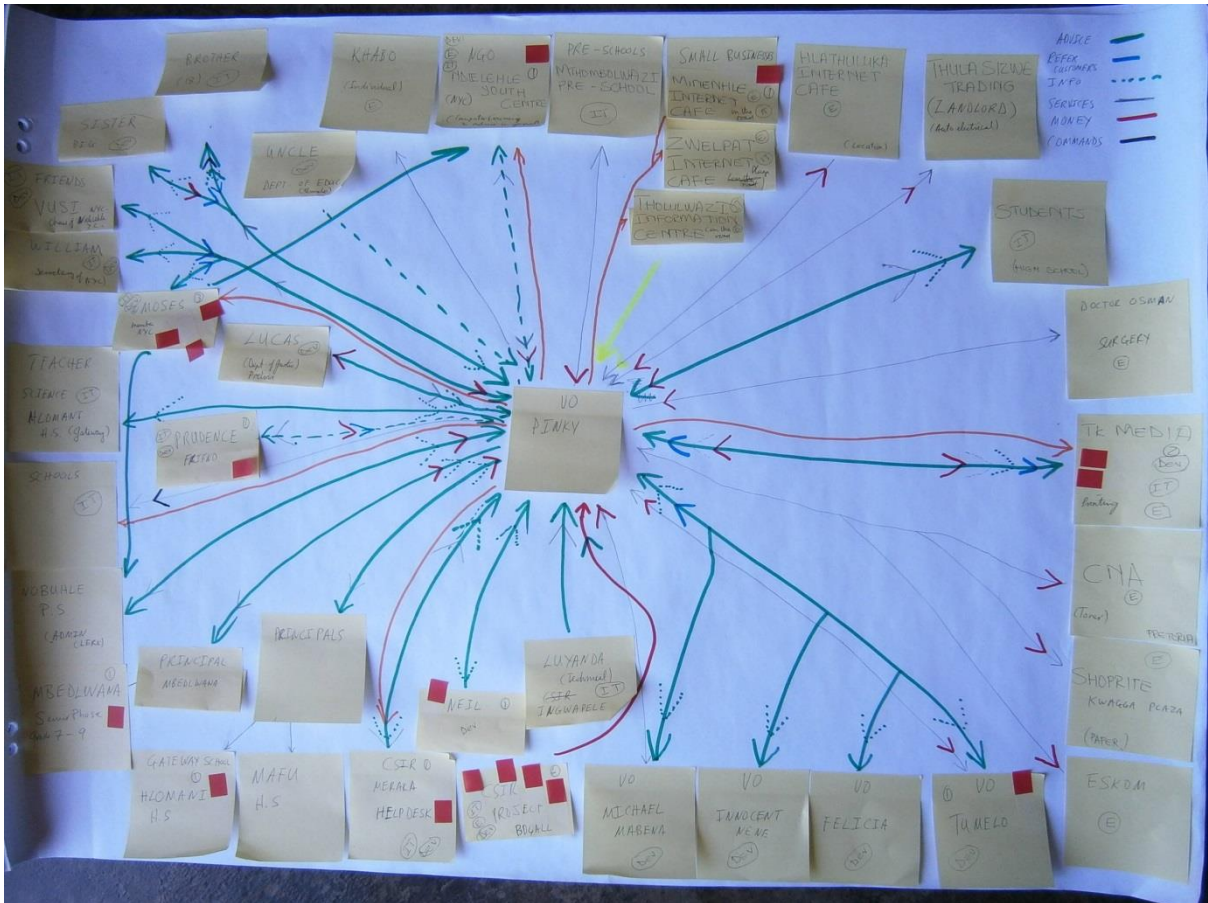
Figure 26 An influence map drawn by a VO

The money flows in red are easily seen and has proved to be very useful in discovering relationships. The red stickers indicate the degree of influence to the actors as assigned by the VO. In the next diagram, Figure 27, the interactions between the VO and a media company that does various types of printing (flyers, posters and larger banners) are shown.
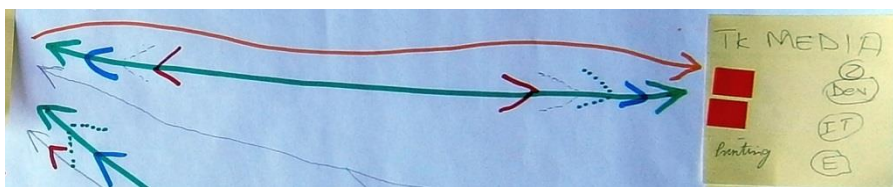
Figure 27 Links between a VO and a media company

The mutual exchange of money (red), services (pencil), advice (green), business referral (blue) and information (dotted green line) is shown. The level of influence is two, and the orientation of the company is to help the VO business develop (Dev), a technical orientation to increase IT and internet use (IT), and a business orientation (E).

4.8.3 Project member interviews

The two project members that had the most regular contact with the VOs were the field service manager (FSM) and the project manager (PM). The FSM had direct personal contact on a regular basis with all VOs at their offices and the PM was the first person VOs phoned if they had major problems that needed to be resolved.

The FSM and the PM interviews were conducted on 24 July 2013 and 5 August 2015, respectively. The questions asked during the interviews were mostly open-ended to encourage a free discussion where any topic could be raised:

- What do you think about the VO model?
- What distinguishes the VO model?
    - What are the key aspects that make the VO model different?
    - What was the downside of being from the local community in terms of the VO model being successful?

- Which VOs do you think are successful and which are less successful? (Please provide reasons).
- What relationships do they have?
    - Relationships with what kinds of different groups?
    - How do their relationships differ from each other?

- What do you think about the key relationships some of these VOs have?
    - The types of relationships that you think are important to success?
    - The different ways these types of relationships influence success or failure?

- Who are the most connected/disconnected VOs?
- Which project team members do you think are the most connected with the VOs?

The interviews were conducted at the CSIR and took between two to three hours. The FSM interview was transcribed but not the PM interview. In each case the interview was recorded and notes were made during the interview and after the interview.

4.8.4 Researcher and VO reflections on the interview process

4.8.4.1 *Responses of VOs to the overall interview process*

Positive responses were received from all the VOs. In response to the question, *Was the process boring?*, comments included:

"Not boring, actually kind of fun…it was good." (VO11, 2013b).

In response to the question, *Did you enjoy it? Was it fun?*:

"Enjoy it? Yes, did not even know it was so late already. Did not even want to have food." (VO5, 2013a).

A VO stated that he felt that a previous interview with a project member wasted his time and that there was nothing in it for him, and, as a result, when an interview was requested via a phone call,

he thought it was the same project member, and therefore was reluctant to be interviewed (VO16, 2013a). He apologised for rejecting the first attempt at organising a meeting and said that this interview was different (ibid.).

4.8.4.2   The process of mapping

The question was asked: *How was the process of doing the mapping? What was bad and good about it?*

One VO expressed the value of building a map very well: "Now I can see things that are apart, and not just everything as a stream of questions, running together" (VO15, 2012a). VO9 (2013b) alluded to seeing something grow: "Started small when you came in here, we are not just pasting." This was interpreted to mean that there is a structure to the process that leads to a result that was meaningful to the VO.

VOs did make suggestions on how to improve the process. VO15 (2012a) suggested that such a map can be done more often to help one track progress, maybe every three months or six months. VO10 (2013a) remarked: "If we could have more time!" VO6 (2013a) suggested: "Make it a big chart! Increase the size of the paper. To list all the customers."

Some did not think that the process required improvement: "It talks to me…I think this is the right model." (VO5, 2013a).

4.8.4.3   Some of the major outcomes as seen by VOs
An awareness of "Not being alone"

"It is good. It makes you realise who is around and supporting you." (VO9, 2013b:27). VO11 (2013a) remarked that he could see that some people want to develop his business and that "they have hope on [sic] me. Will give me a push." VO12 (2013a) remarked that it was "good to see that I have a few reliable people". VO10 (2013a) stated that "relationships are important."

Seeing new things, developing new perspectives

When asked *How does this process help?* VOs replied that they see something now and that something had changed. "How big is my business! How many customers I have. So many loyal customers, so many teachers (as students). Special customers. Who pay and not pay" (VO6, 2013a).

"Benefited from it – things I don't think of, like referrals, motivate them to send me more people". (VO10, 2013a).

"Competitors – I visit them when they are working. Started to realise what they are doing (to compete with me)." (VO9, 2013a). "Did not realise there is [sic] relationships." (ibid.)

"Notice certain things not noticed before, opportunities, open my eyes, gave me perspective". (VO12, 2013a).

"Open my mind"; "Make me see these things in a different way. Schools now more important." (VO2, 2013a).

"It helps to see where you are and to see which things are important." (VO15, 2012a).

VO1, who had participated in the pilot interview, had used the previous influence map to ask customers what it is that they wanted from her (VO1, 2013a). Her main point was that she found the interview process useful to discover needs (ibid.).

Encourages self-reflection

"Observing yourself. Forces you to observe yourself." (VO12, 2013a).

Researcher suggestions for improvements

The concept of the orientation of an actor was difficult to explain. The clearest orientation was Development: who is developing me and my business, are we growing businesses together? VOs ascribed a business orientation (E) to almost all actors.

4.9   Summary

An investigation of the forms of inquiry has shown that combinations of approaches, i.e. mixed methods, are growing, presumably to deal with the increasing complexity of the phenomena that is being researched. The research paradigm war has also shown signs of resolving itself as the influence of natural science methodologies has been combined with critical approaches that question a wide range of assumptions. The nature of the phenomena studied in this research was examined as well as the research context of technology plus people plus development (ICT4D). In this context there is scope for at least positivist, interpretivist and critical research. The phenomenon of social capital has structural aspects (the properties of networks or graphs in mathematical terms) that can be studied in the positivist paradigm, and aspects that emerge from human relationships and culturally influenced norms and values. Due to the limited scope of this study, the choice was made to focus on the subjective experience of relationships by VOs, and hence a predominantly qualitative and interpretivist research approach was selected.

The research instrument, Net-Map, was chosen since participatory development (drawing) of influence maps has been proven to increase the degree and quality of participation and this was found to be true in the four-hour long interviews with VOs in which a considerable amount of information was collected and presented in the maps. The creation of a map was also found to be a creative process that actually created something tangible that could be explored and discussed by interviewee and interviewer alike, thus developing shared understanding and new insight in the life of a VO.

5   Analysis and findings: Introduction and overview

Introducing the problem

Chapter 1

The context

Chapter 2   Chapter 3

Methodology and Data collection

Chapter 4

Analysis and findings

Coding framework	Analysis of coding results	Development outcomes	The three themes
Chapter 5	Chapter 6	Chapter 7	Chapter 8

Reflections on the Choice Framework

Chapter 9

Considerations for development practice

Chapter 10

Conclusion

Chapter 11

5.1 Introduction

The data analysis was guided by two theoretical departure points of this research. The Choice Framework brings together several theories, i.e. empowerment and sustainable livelihoods approaches, to support the aim of translating Sen's capability approach at conceptual and practical levels into a systemic framework (Kleine, 2010).

In Sen's capability approach to development (Sen, 1999) a person needs resources (e.g. clean water and social resources) in order to exercise their capabilities. The sustainable livelihoods approach includes livelihood assets, described as capital assets (e.g. social capital and financial capital) which are used to develop livelihoods strategies (DFID, 1999). The concept of resources or assets are present in both approaches.

The other theoretical departure point is the sustainable development strategy described by Chigona e*t al.* (2009), based on human scale development (HSD) principles, which relies on the bottom-up driven development of networks of relationships (social capital) around aligned interests between the different levels in society to achieve complementary top-down development support.

These two theoretical departure points were used together with the entrepreneurial aspects of the VO model to develop an initial coding framework via a deductive process. During the coding process new codes emerged as the researcher's notes from the interviews were analysed (an inductive process).

The chapter describes the coding framework in more detail and then discusses the analysis of the coding outputs from all the VO interviews to show the prevalence of codes and the emerging of new constructs, followed by a high-level overview of the major trends that emerged.

The focus then shifts to the key development outcomes related to the choices made by the VOs as entrepreneurs in a community and ICT4D project context, and the role of social capital in enabling or hindering these outcomes. In order to develop a rich contextual description of the VOs as entrepreneurs, a summary was developed for each VO that described the personal and business relationships and the business outcomes in terms of services and the development of relationships.

These summaries constituted the embedded multiple units of analysis of the overall case study, or what could be called a set of "mini case studies" of each VO. An example "mini case study" (or unit of analysis) is provided in this chapter. The full set of 15 consists of 80 pages and is available as a supplementary document.

The topics that emerged from these 15 summaries were clustered, and the major findings (themes) that were identified are outlined in this chapter and then discussed in detail in the three following chapters (6 to 8). The themes are Social capital (Chapter 6), the Discourse of community service and social entrepreneurship (Chapter 7), and Networks of innovation (Chapter 8). The mapping of the findings to the Choice Framework is discussed in Chapter 10.

5.2 The coding framework

5.2.1 Introduction

The principal development outcome of freedom of choice for VOs can be described as the freedom to choose to be an entrepreneur who is building a business, to choose to be an employee of the

project, or indeed to make any other choice, such as to leave the project. In addition, a VO can also decide which type of entrepreneur to be: a social entrepreneur whose prime aim is to deliver transformative social benefits to a disadvantaged community (Martin & Osberg, 2007), a commercially oriented entrepreneur whose prime aim is to maximise profit, or one of a number of varying mixtures of these two orientations.

A question that arises is how to think about the possible distinction between a VO as an individual who happens to be in a context created by the project where he or she is encouraged to be an entrepreneur, and the business that is being conducted by the VO, called the VO business. This issue is discussed further in Chapter 6 on Social capital, where it is argued that a useful distinction can be made between the support provided to a VO as a person and support that is focused more on business aspects.

The data was analysed through Entrepreneurial, Human Scale Development and Choice Framework lenses or perspectives as shown in Figure 28.
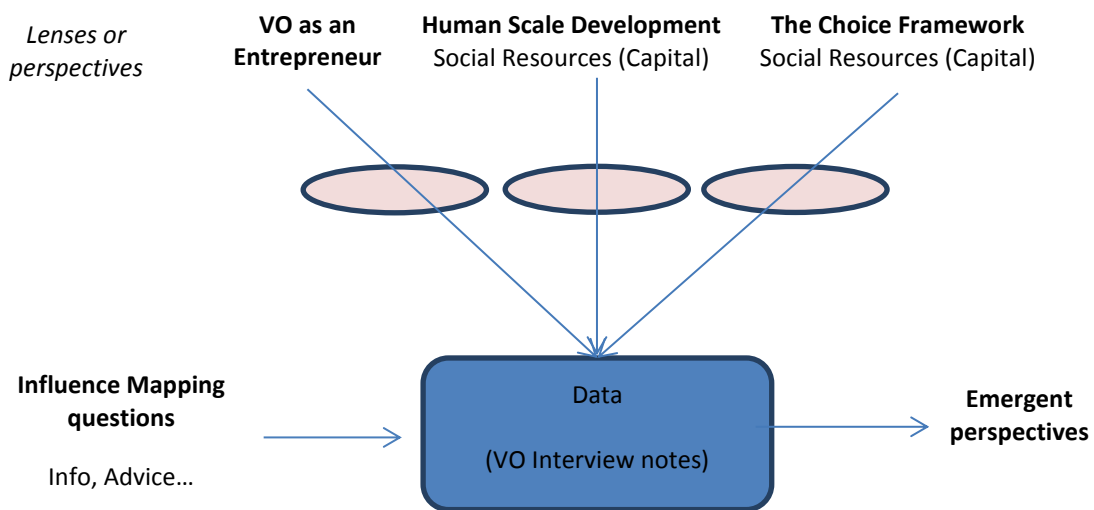
Figure 28 Perspectives on the VO interview notes

As shown in the diagram, the focus was primarily on the Social Resources (Social capital) component of both the HSD approach and the Choice Framework. The coding process was shaped by these perspectives. The Computer-Assisted Qualitative Data Analysis Software used was QDA Miner (2013).

The Choice Framework diagram, which was included in Chapter 2, is repeated here for convenience.
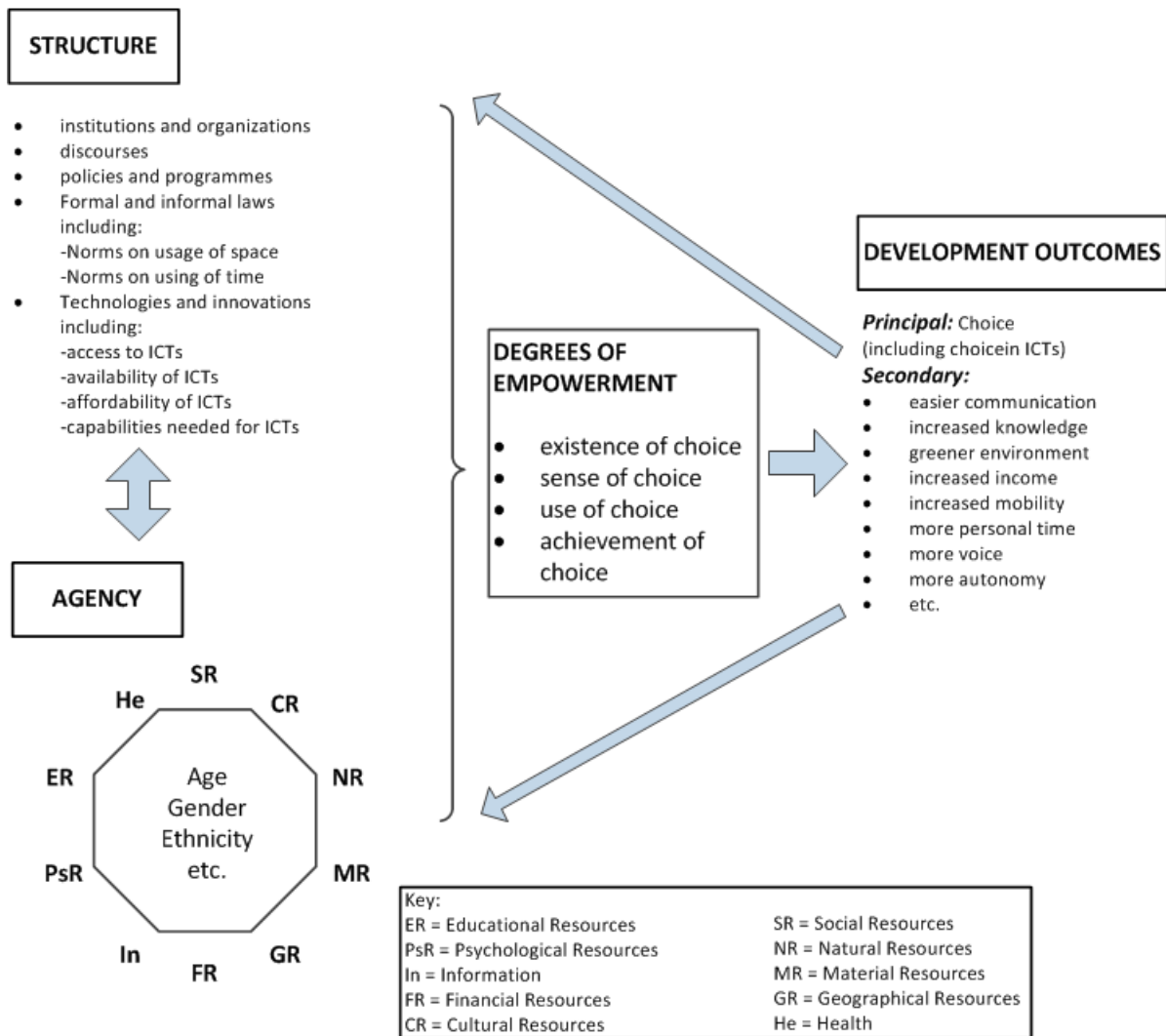
Figure 29 The Choice Framework (Kleine, 2010)

The Choice Framework has the following structure:

- Development Outcomes
  - Principal (Existence of Choice, including choice in ICTs)
  - Secondary
- Degrees of Empowerment
- Structure (structure and agency describe capabilities)
- Agency
- Resources (Capitals)
  - Educational, Psychological, Information, Financial, Cultural, Social, Natural, Material, Geographical and Health.

This structure was used as in the coding process.

The development of VOs as entrepreneurs was seen as the major secondary development outcome in the CF.

The HSD based sustainable development strategy focuses on networks of relationships, i.e. social capital, which is already represented in the CF structure.

The entrepreneurial aspects of VOs were represented by an initial code structure with these major components:

- Entrepreneurial Attitude (active or passive) including Customer Orientation (weak or strong)
- Business Strategy
  - Basic business requirements
  - Services
  - Value addition to customers
  - Ways to grow VO business
- Marketing strategy
- Interactions with competitors
- Knowledge of customers

The concepts of coding and the details of the coding process are discussed in the next sections.

5.2.2   The coding process: definitions

Coding was used a means to engage with the data, in order to reflect on the interview data to try and understand what it means (decoding) and when a code was chosen or created to label a passage, the encoding process occurred - coding is decoding and encoding (Saldaña, 2012:5).

Saldaña (2012:8) refers to coding as a heuristic which is "an exploratory problem-solving technique without specific formulas or algorithms to follow" that is the first step towards more rigorous analysis and interpretation. Coding consists of two phases, the First Cycle and the Second Cycle, each with its own characteristic processes or coding methods. The First Cycle is the initial coding of the data, while in the Second Cycle analytical skills such as "classifying, prioritizing, integrating, synthesizing, abstracting, conceptualizing, and theory building" (ibid.) are used.

The basic flow of the coding process can be illustrated as the application of *codes* to the data (e.g. text), the development of *categories* (to describe at a conceptual level the sorts of things represented in the codes), the development of *concepts/ themes* (as higher-level abstractions), followed by a process of systematically interrelating the themes and concepts on the journey towards the development of *assertions* and ultimately *theory* (Saldaña, 2012). This flow is the movement from the real and particular to the abstract and general.

<div align="center">

Codes →Categories→Theme/Concepts→Assertions/Theory.

</div>

The coding process is not linear, but cyclical: "comparing data to data, data to code, code to code, code to category, category to category, category back to data" (ibid.:58).

In this research the coding process was informed and indeed driven by existing theories such as the collection of theories in The Choice Framework (e.g. development theory, social capital), entrepreneurship development, and the many theories and approaches used in ICT4D. The aim was

not to complete the coding process to develop theory, but as stated above, use coding as the first step towards further analysis and interpretation that may develop themes and maybe assertions regarding VOs use of social capital and the use of social capital in ICT4D initiatives.

A few key definitions that are based on the versions used in Saldaña (2012):

Code

> *A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/ or evocative attribute for a portion of language-based or visual data* (Saldaña, 2012:3)

A code is applied to "Slices of social life recorded in the data – participant activities, perceptions, and the tangible documents and artifacts produced by them. Your own reflective data in the form of analytic memos …and observer's comments in field notes" (ibid.:17).

Some of the codes used in this study: *Advertising, BusinessAdvice, Flexibility, Adapting to the customer's needs, ITAdvice, LearnerSupport, NewBusIdeas, OutsourcedOffice*

Category

A category is a somewhat fuzzy concept. Saldaña refers to the search for:

> *patterns in coded data to categorize them…sometimes you group things together not just because they are exactly alike or very much alike, but because they might also have something in common – even if, paradoxically, that commonality consists of differences…* (Saldaña, 2012:6-7)

> *Acknowledge that a confounding property of category construction in qualitative inquiry is that data cannot always be precisely and discretely bounded; they are within "fuzzy" boundaries at best* (Tesch in Saldaña (2012:7)

Rossmand & Rallis (in Saldaña, 2012:14) stated: "think of a category as a word or phrase describing some segment of your data that is explicit".

Saldaña (2012:8) described the connection between code and categories as: "qualitative codes are essence-capturing and essential elements of the research story that, when clustered together according to similarity and regularity (a pattern), they actively facilitate the development of categories and thus analysis of their connections."

An example from this study:

Category: *Value added by the VO*:

- Codes: *Advertising, BusinessAdvice, Flexibility, Adapting to the customer's needs, ITAdvice, LearnerSupport, NewBusIdeas, OutsourcedOffice*

Theme

> *A theme is an outcome of coding, categorization, or analytic reflection, not something that is, in itself, coded* (Saldaña, 2012: 14-15)

Rossmand & Rallis (quoted in Saldaña, 2012:14) explained the difference between categories and themes: "think of a category as a word or phrase describing some segment of your data that is explicit, whereas a theme is a phrase or sentence describing more subtle and tacit processes".

An example from this study:

Theme: *Development outcome*

- *Secondary development outcome* (sub-theme)
  - *Value added by the VO* (category)

Analytic memos

Analytic memos are a place to record the thoughts that arise when the researcher engages in a critical and reflexive manner with the data and the codes (Saldaña, 2012). The writing of these memos is used to document and reflect on the coding process including: "code choices; how the process of inquiry is taking shape; and the emergent patterns, categories and subcategories, themes, and concepts in your data" (ibid., 2012:41). The process of analytic memo writing is a means to generate and refine codes and categories. Coding and analytic memo writing happen in parallel.

An example from the VO12 interview note:

> **Reflections:** *World of a VO can be small - what can I do with and in this office? School teachers not seen as market or source of business, learners yes. Not very strong relationships with all the schools - only those he went to plus one other? And then he only gets a pat on the back - after walking to Khomane High in the hot sun! Not very specific about plans (gaming was mentioned and talent agency). Why would talent agency use his space? Is it about the Internet access? VO office (or Internet access hot spot as nucleus of businesses) - Sharing of premises.* (VO12, 2013a)

5.2.3   Outline of the coding process

The data used in the First Cycle coding consisted of the notes handwritten during the interview, the Net-Map, photos and the interview notes.

The interviews were semi-structured and in the structure the quest for the influence of social capital began. The questions were mainly focused on relationships and business dynamics. An open mind was kept and questions were asked regarding those things that were surprising to the researcher.

During an interview notes were handwritten to capture phrases and words verbatim and also to jot down ideas. The day after the interview (or as soon as possible) the interview was reflected upon and two kinds of notes were written as sections in an interview note. The first step was to summarise what was said and to structure the notes in related paragraphs. The second step was to write an analytical memo by reflecting on the raw handwritten notes, the photos, and the write-up

done in the first step. Observations were included, for example, what was seen and not seen in the VO office, the interactions between VO and customers, and the general demeanour of the VO. The questions that came to mind was noted and reflected upon. Patterns that emerged were noted as potential categories.

The First Cycle coding was done using a structured code book that was generated using the Choice Framework with all of its embedded theories, such as Sen's definition of development with the focus on choice and the resources-based approach and the interaction between resources, agency and structure.

Striking comments in the interview notes were carried through to the analytical memos and then followed up in the transcripts. This enriched the codes and led to quotes that described a particular code or category and, in some, cases, even a theme.

A category called *FreeCoding* was created for all the codes that did not fit into the pre-defined categories. As the coding continued these codes were clustered into categories and some were used to create subcategories within the pre-defined categories.

After the First Cycle coding was done for all the VOs, which overlapped with the Second Cycle of reflection, it was realised that the coding results should be used, but not on their own. What was required to capture the rich context of a VOs life was a write-up that placed a VO at the centre. Thus a form of a case study was written about a VO that followed a structure that emerged due to the business perspective on customers and services and due to the codes and categories that had developed during the First Cycle coding for that VO.

The objective of a VO write-up was to describe the striking and unique features of this particular VO's story about being a VO. This tended to be at the category level. At the end of each VO case a summary phrase was written to try to capture what this VO made this VO unique. This led to the identification of patterns of VO life, i.e. a form of categorisation of the different ways of being a VO.

An example (refer to Chapter 6 for the full "mini-case"):

> **In summary: a business built on relationships and service innovation**
>
> *VO1's business was providing personalised and flexible services to a variety of customers that is based upon relationships that she has built through her own efforts. VO1 benefited from the supportive relationships from her husband and her father that added skills and business referrals.* (VO1, 2013a)

In the end some of these "summary phrases" was clustered into a theme, for example "helping the community" and tensions between that and being an entrepreneur that has to make a living. This ended up as one of the three themes "Discourse of community service and social entrepreneurship" (Chapter 7).

Further analysis consisted of statistical analysis of the code frequency and the distribution of codes across interviews (Section 5.3) and comparing the 15 VO "mini cases" with each other to pick up patterns across the interviews and also to look at the nuances in the codes that were used and alter codes, split codes, create categories and themes (Section 5.4.2).

5.3 Analysis of the coding results

5.3.1 Introduction
An overview of the prevalence of codes in the interview notes is presented first, then the relationships between the dominant codes are outlined, and, finally, the emergence of new coding constructs is presented and discussed.

5.3.2 Prevalence of codes
Codes were allocated to text from the different perspectives mentioned above. The statistical analysis of the code frequency and the distribution of codes across interviews showed interesting patterns regarding which types of codes dominate.

One way of viewing the interviews is through the lens of "what are the most popular codes"? (Figure 30).
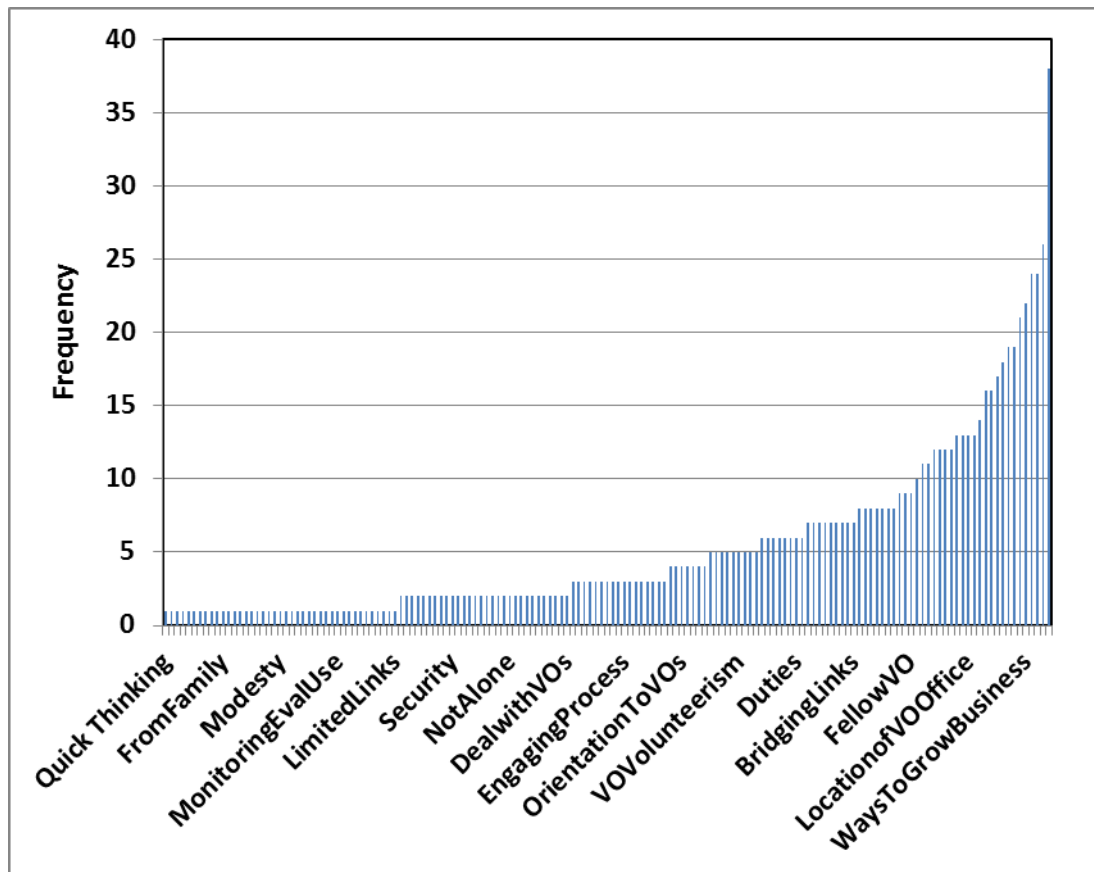
Figure 30 The frequency distribution of codes (keywords) across all interviews

The distribution of codes (keywords) as used in the corpus of interview notes shows a power law type of distribution, with only a few codes being frequently used and a long tail of codes that were assigned only once or twice. Because the large number of codes had been pre-structured to reflect the Choice Framework, the human scale development principles and Entrepreneurial perspectives,

there were codes that were only assigned once or twice and some that were not used at all. A total of 155 codes were used once or more and the "Favours" code was used the most (38 times).

The codes assigned twelve times or more are shown in Figure 31.
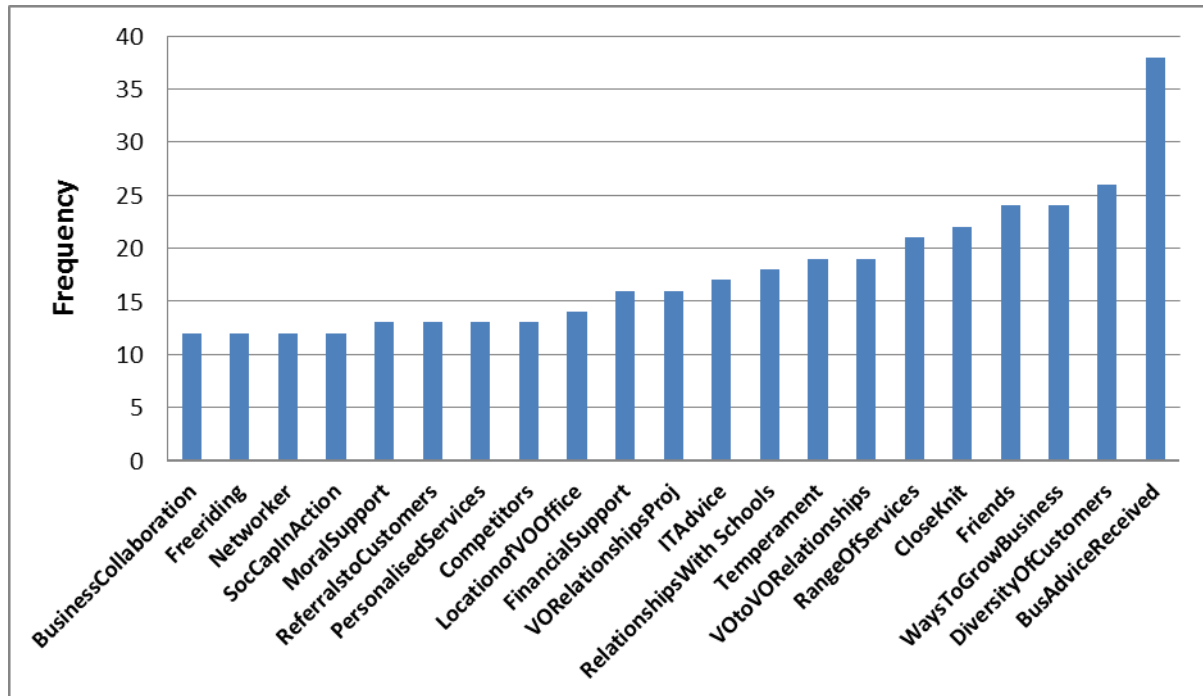
Figure 31 Keywords (codes) used twelve times or more

There are 38 occurrences of Favours that represent 4.6% of the total number of code occurrences, while CloseKnit and RangeOfServices occurred 19 times indicating the large difference between.

Relationship-related codes were evenly balanced with business related codes.

Nine out of the 21 codes with a frequency of 12 or higher were relational or indicated support received via relationships, while eight were business related. This probably the reflects interview structure and a social capital and business bias of the researcher in making notes of relationship and business aspects in particular, and in the assignment of codes to the notes.

An important question is: What are the codes that were assigned to more than one VO interview note? Figure 32 shows all the codes that appear in four or more VO interviews.
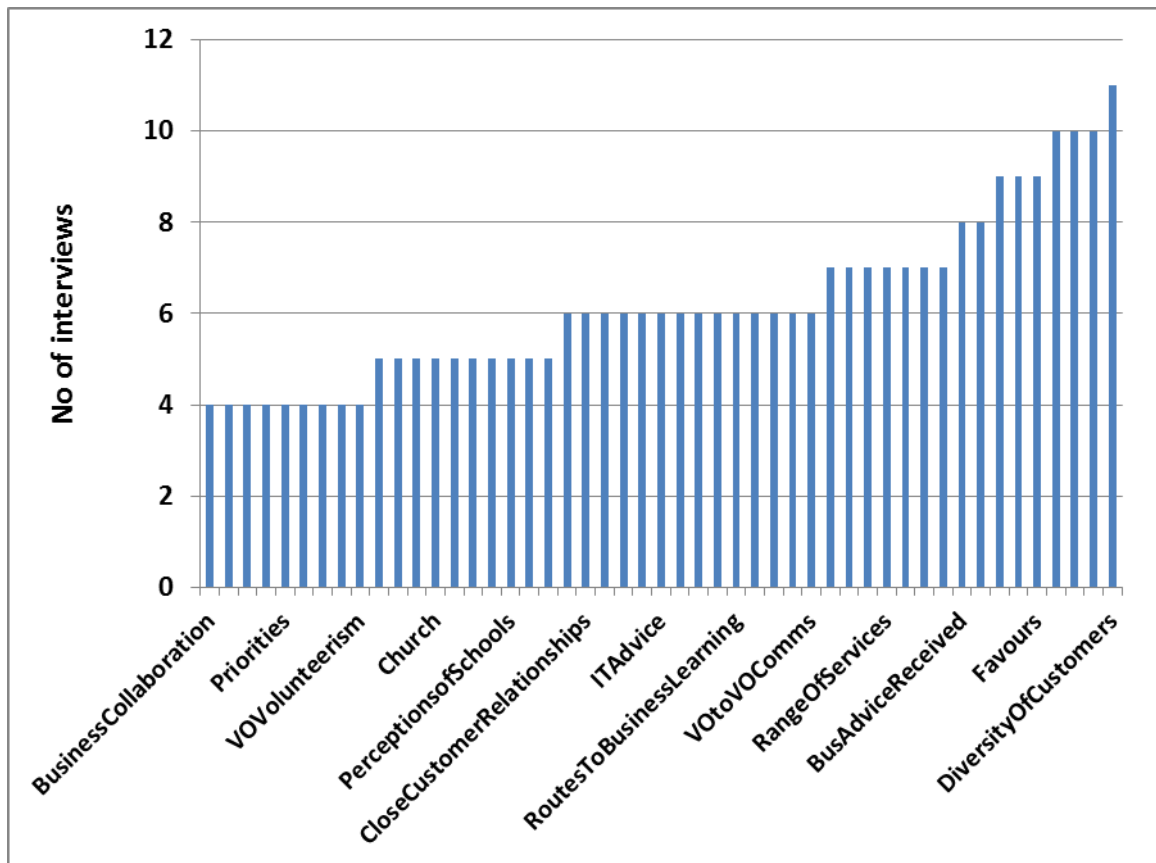
Figure 32 All codes that appear in four or more VO interviews (cases)

The top five ranked codes that occurred in 7 or more of the 15 interview notes are shown in row 3 of Table 7. The DiversityOfCustomers code was the top ranked code and was used no less than 24 times in 11 interviews and Friends was used 21 times in 10 interviews. The top six ranked codes in terms of frequency are also shown in the table.

Table 7 The codes in VO interview notes

Distribution type	Most prevalent code	The top ranked codes
Frequency of codes in the corpus of interview notes	Favours	**The top 6:** 1. **Favours** 2. **Family** 3. **BusAdviceReceived**, **DiversityOfCustomers** 4. **WaysToGrowBusiness** 5. **Friends** 6. **CloseKnit** and **RangeOfService**s.
Frequence of occurrence of codes in separate interview notes	DiversityOfCustomers	The top 5: 1. **DiversityOfCustomers** 2. Temperament, LocationofVOOffice, **Friends** 3. **Favours**, **Family**, **CloseKnit**. 4. Freeriding, **BusAdviceReceived**, **WaysToGrowBusiness**, VOtoVORelationships, SocCapInAction, **RangeOfServices**, PersonalisedServices, NewBusIdeas, FinancialSupport

In the table the top ranked codes Favours, DiversityOfCustomers, Friends, Family, CloseKnit, BusAdviceReceived, RangeOfServices and WaysToGrowBusiness were common to both types of distribution.

This indicated a significant presence of social capital and business concepts:

Favours, Friends, Family and *CloseKnit* - Favours reflect exchanges of value that are possible due to the existence of relationships. The relationships that occur often are the close-knit relationships to be expected between Family and Friends.

DiversityOfCustomers, RangeOfServices, BusAdviceReceived, RangeOfServices and *WaysToGrowBusiness* -   VOs referred to an interesting variety of customers. The researcher assumed that a VO would be more sustainable with a diverse customer base and hence questioned the VOs thoroughly about their customers, which probably also contributed to the prevalence of this code. One may surmise that a wide variety of customers encouraged the development of a wide range of services. VOs reported many instances of business advice and a prevalent topic was how to grow your business. All of these high-level observations will be discussed in detail in the next chapter, based on an in-depth analysis of the interviews.

The social capital and business concepts that were highly-ranked in both types of distribution were clustered as depicted in Figure 33.
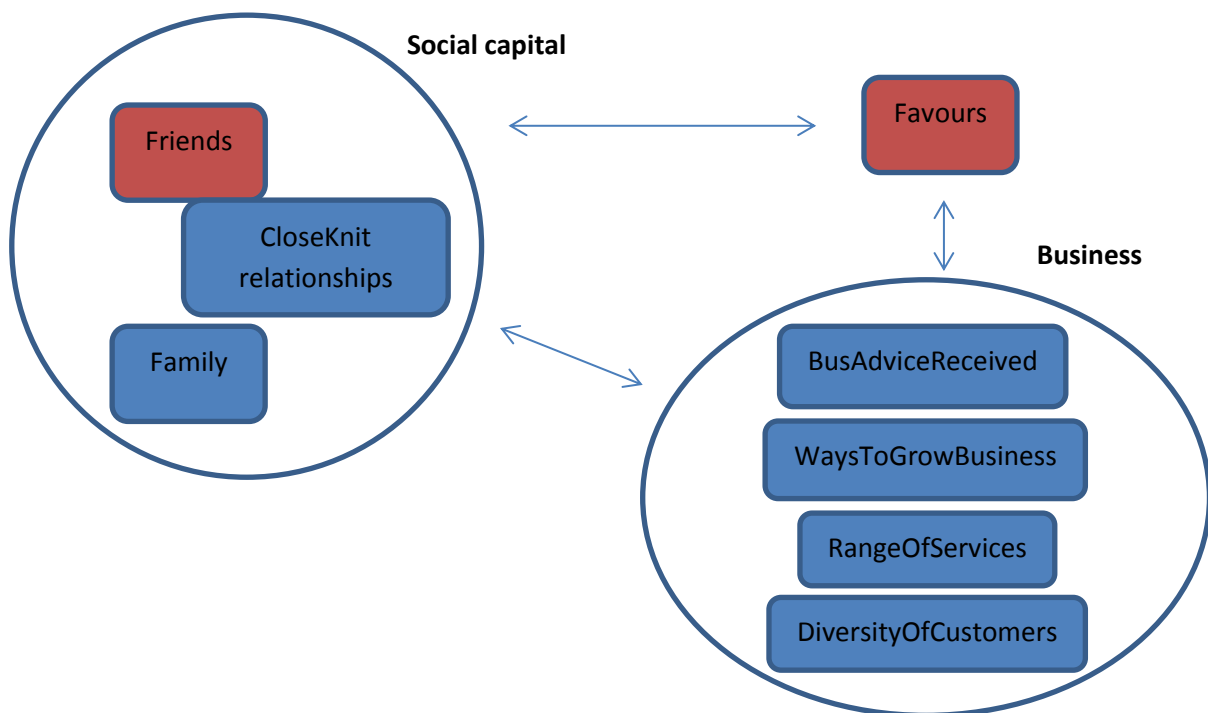
Figure 33 Clustering of the most prevalent codes

The possible dynamics associated with the interactions between the concepts are also depicted. An example of the dynamics is that favours were exchanged between a VO and family and friends and between VOs and customers as well. Family and friends were major sources of business advice.

5.3.3 New coding constructs

The major new categories of codes that were added included two types of resources (Psychological and Geographical), VO personal values, interview process related categories (VO reflections on the mapping process, VO reflections on the interview process, and researcher reflections on the interviews).

Psychological and Geographical resources were among the resources listed in the Choice Framework, but the coding process started off with only Social resources. It soon became clear that a Geographical resource such as the location of the VO office was an important factor in the lives of VOs. In Chapter 6 (6.4.1) the influence of the proximity of VO offices to each other and the proximity of schools to a VO office is discussed. The importance of Psychological resources, such as the support given to VOs by people such as family members, friends and pastors, as well as their self-esteem and recognition by others as business people, became evident early on in the interview process.

The values of VOs in terms of their orientation towards their customers were coded as being either business- or community-oriented, and this reflected the balancing act between assisting the community and ensuring the long-term viability of a business. This emerged as one of the major themes, as discussed in the following sections.

The VO and researcher reflections on the interviews centred on a recognition of the importance of relationships in the VOs' lives as entrepreneurs, an example being the realisation of VOs that they are not on their own but are part of an extended network of relationships. Various aspects of the influence of the relationships are explored in detail in the subsequent chapters.

5.4 Development outcomes: Social capital in action

5.4.1 Introduction

The key development outcomes related to the choices made by the VOs as entrepreneurs in a community and ICT4D project context and the role of social capital in enabling or hindering these outcomes are discussed. In order to develop a rich contextual description of the VOs as entrepreneurs, a summary was developed for each VO that described the personal and business relationships and the business outcomes in terms of services and the development of new relationships. These summaries constituted, in effect, a set of "mini case studies" (or units of analysis of the case study of the VOs of BB4All) of each VO and have been collected in a supplementary document. The researcher's interview notes and the interview transcripts were the main data sources used in this process.

The topics that emerged from each VO summary were clustered and analysed. The major themes that emerged are outlined here and are discussed in detail in the following chapters (6 to 9).

5.4.2   An example of a VO summary

5.4.2.1   Introduction

VO summaries focused on three aspects, namely the customers and services, a short description of the VO business, and a discussion of the important or unique topics that emerged.

The types of customers and the main services provided to them were summarised in a table. The comments column was used to describe interesting aspects of either the VO – customer relationship or the nature of the service. The VO1 summary is in Table 8, followed by a discussion of the important topics that emerged.

Table 8 VO1 Customers and Services

Customers	Services	Comments
Large businesses: Automotive company, service suppliers to the mines and a printing business	Typing Email Creation of email addresses Designing logos Personalised services	Produced invoices for the automotive company and emailed the invoices to their customers. Logos were designed for the printing company.
Small businesses: Furniture design, furniture stores, grocery store, liquor store, construction, automotive repairs, funeral parlours, attorneys	Typing and printing Doing tenders and quotations Email Internet access Anti-virus software updates Company registrations	Used accounting skills to compile tenders.
Landlord	Internet searches	
Schools (10)	Internet access	Did business with three of the ten schools.
Secondary school principals	Internet searches, emails (for administrative use)	Showed principals in their offices how to use internet and do email.
Administration clerk at primary schools	Emails Job applications Technical support	Set up email accounts for school and for clerk. Taught them how to use email and read their email if their internet was down. Applied for jobs online. VO visited school on her way to the VO office to provide technical support.
Teachers: Mainly High School	Internet assistance	A science teacher at a high school is an enthusiastic user. She had shown him how to apply to get a site open for access.
Learners: High School	Printing Internet research	Helped them with their assignments. Provided information about bursaries. Taught them how to search on the internet.
Learners: Primary School	Printing Internet research	For assignments
Pre-school centres	Printing, typing, binding	Reports for government
NGOs	Applications for CSI grants	Preparation of a business plan and a business profile for the application
Individuals (unemployed youth, middle-aged people and pensioners)	Training Photocopies, printing, typing Internet searches	Computer, Internet and email training
Family - Brother	Internet access Design and printing of logos	VO1's brother assisted in the office on a part-time basis.

Customers	Services	Comments
- Father		Printing on fabrics
Friends	Internet searches Emails	Friends did pay for printing and emails.

VO1 had developed many value-added services such as assistance with preparing tax returns, registering companies, preparing Corporate Social Investment (CSI) applications for NGOs which involved creating a business plan and a business profile (VO1, 2013b).

VO1 did business mainly with three schools out of her cluster of ten schools. She mentioned that when she visited the primary schools to provide computer assistance to the administration clerks, "They want[ed] me to stay there the whole day" (VO1, 2013b:3).

The researcher observed evidence of investment in the business in the VO office. There were two printers and a PC for customer use (VO1, 2013a).

VO1's office was located well in a small complex of shops next to the main road to the north. A printing shop owned by her father had opened up recently in the same complex. This was one of several printing shops owned by him.

5.4.2.2   Topics that emerged
Support from her husband as an "extra VO"

VO1's husband is a building contractor and had a registered company. She used his company's name when placing orders with suppliers. At night he sometimes slept in the VO office as security guard. During the interview he was repairing printer toner cartridges. According to the FSM, VO1's husband went out to VO1's schools, while she ran the office (FSM, 2013b).

VO1's husband added a skill that enabled VO1to offer value-added services. According to her, he is good at accounting, and that was why businesses come to her for support with doing tenders and quotations (VO1, 2013a).

VO1 offered her husband's electrical and buiding skills to her customers too, so his business also benefited (VO1, 2013b). This showed a mutual exchange of value between the two businesses.

Support from her father

VO1's father owned a printing business and she referred to it as a large business: "Yes, they are quite big, as they design the printing and signage for the signage boards" (VO1, 2013b:3). VO1 created designs for his business and he referred businesses to her (ibid.).

Hands-on assistance from her brother

VO1's brother had a job at a soft drink company, but did help her part-time in the office (VO1, 2013a). She did not pay him. She semi-jokingly remarked that the real reason he volunteered was to meet young ladies at the office to get dates with them! In this case, VO1 indirectly benefited from her brother's efforts to build a network of relationships to achieve his personal goals.

Empowering businesses to use the internet

VO1 had created an email address for a business so that they could reply to the invoices she mailed to customers on their behalf. This saved them the effort of coming to her office to reply to customer emails (VO1, 2013a). She had offered to teach the wife of a businessman how to use email in order to reduce his reliance on his partner to handle the business's email (ibid.).

Personalised and flexible services at all hours

VO1 had provided her cell phone number to a group of middle-aged individuals and as a result had the following to relate: "You know these people, most of them they are the ones that give me a wake-up call in the morning and ask me where are you, we need you now." (VO1, 2013b:4). These requests were normally about a fax that they wanted to receive.

In the case of a transport business that did school tours, she made bookings for their business with accommodation providers via the internet (VO1, 2013a). She also provided email assistance over the phone to the owners of the transport business (ibid.). They also fetched her after hours to go and assist them at their premises. When they required updates of anti-virus software they brought their PC to her office and paid her for her services (ibid.).

VO1 stated that business customers would wait for her in her office when they wanted to compile a quotation and if it got late they would take her home (ibid.).

Taxi owners would come to her with piles of accounts for doing tax returns and in addition to payment for her service she received free transport from them in exchange for her help (ibid.).

Good support provided by the project team

The technical manager of the BB4All project had told her that she could call him anytime (VO1, 2013a). He logged calls for VO1 with the Service Desk on her behalf (and then the Service Desk reacted very quickly). This was a good example of personal relationships having an impact on business efficiency.

The FSM advised her to register a business (a computer school) and that the first step was to devise a plan that showed what she had and did not have (ibid.).

In summary: a business built on relationships and service innovation

VO1's business was providing personalised and flexible services to a variety of customers, based on relationships that she had built through her own efforts. VO1 benefited from the supportive relationships with her husband and her father that added skills and business referrals.

5.4.3   The themes that emerged

The themes that emerged from the 14 "mini case" studies covered a wide range of personal, business and contextual elements. Prominent themes present in nearly every interview were VO values, business strategies and the enabling and disabling factors in the VO environment.

VOs' values were a surprising result and originated from a particular dilemma that they faced. VOs identified with and responded to the community and their lack of resources by providing assistance

such as free services while at the same time having to adopt entrepreneurial and business-like approaches to developing sources of income in order to stay in business in the long-term. VOs showed a particular sensitivity to providing cost-effective services to students, e.g. by optimising the use of photocopy paper for printing student ID cards (VO8, 2012a). These dynamics between the VOs and their communities was identified as a high-level theme and termed "Discourse of community service".

The VO business strategies were summarised in these groupings: Business growth, Building networks, Innovation, Expanding business beyond the ICT base and the Advantages and disadvantages of being local.

An important aspect of the entrepreneurial behaviour of the VOs was the development of innovative business strategies, and a good example is provided by VO1 who developed personal and flexible services to suit the different needs of customers. The flexibility of VOs in delivering services that suited their diversity of customers was an important business advantage and led to highly innovative services. Many customers had no prior exposure to the use of the internet or computers, and VOs had to support and facilitate the adoption by customers of these technologies and services. These VO entrepreneurial behaviour patterns, developed in interaction with their customers, led to the selection of innovation and especially the diffusion of innovation as a high-level theme called "Networks of innovation".

An important business strategy that supported other business strategies was the use of relationship networks to achieve various business and personal outcomes. As illustrated in the previous section, the relationships that VO1 had with her husband, her brother, her father and project team members led to a range of benefits. The strategies that VOs used to build relationships were very diverse and interesting. An example of a very effective strategy was gaining access to groups of customers via a person that the customers trusted. The VO thus had the advantage of a recommendation by a trusted person. These relationship-based strategies highlighted the importance of social capital in support of business strategies, and "Social capital" was therefore selected as a high-level theme.

Due to the focus of this research on the sustainability of VO entrepreneurs, the enabling factors in the environment of the VOs that supported and sustained their businesses were very important. The focus of this research is relationships and how relationships allow access to sources of support, and VOs did refer to many sources of support, types of support and types of relationships, as mentioned above. The disabling factors in the environment included aspects that might be expected, such as the lack of financial resources and skills, but the research also highlighted the positive and negative effects of VOs' being from the local communities. Examples include VOs having a deep understanding of the circumstances of people and VOs, as alumni from a local school, being expected to provide free services to the school. This is another facet of the influence of social capital and was therefore included under the high-level social capital theme.

The three high-level themes that were distilled from the VO interviews are therefore Social capital, Networks of innovation and the Discourse of community service. Each of these themes is discussed in the following three chapters.

5.5 Summary

Sen's capability approach, the operationalisation thereof in the Choice Framework, and the entrepreneurial aspects of the VO model were used to develop an initial coding framework that was extended as the importance of Psychological and Geographical resources in addition to Social resources emerged. The reality of VOs facing the complexity of creating a balance between a business and a community development orientation was discussed as a matter of values.

Analyses were conducted of the frequency of assignment of codes in the complete corpus of interview notes as well as the number of interviews in which a code was used. The codes that were highly represented in both types of analysis dealt with relationships, exchange of favours in relationships, business aspects and personality traits.

A rich contextual description of the personal and business relationships, the business outcomes in terms of services and the development of new relationships was developed for each VO. The prominent themes present in nearly every one of the 15 "mini case studies" (or embedded units of analysis) were VO values, business strategies and the enabling and disabling factors in the VO environment. The three high-level themes that were distilled from the VO interviews are therefore Discourse of community service (dealing with VO values), Networks of innovation (innovation via relationships as a key business strategy) and Social capital (a relational basis for describing the enabling and disabling factors in each VO's environment). In the next three chapters these high-level themes are explored, starting with social capital as a means of describing the variety of enabling and disabling influences on VOs in their contexts.

6   Social capital

The context and content of Chapter 6 are shown in the thesis map.
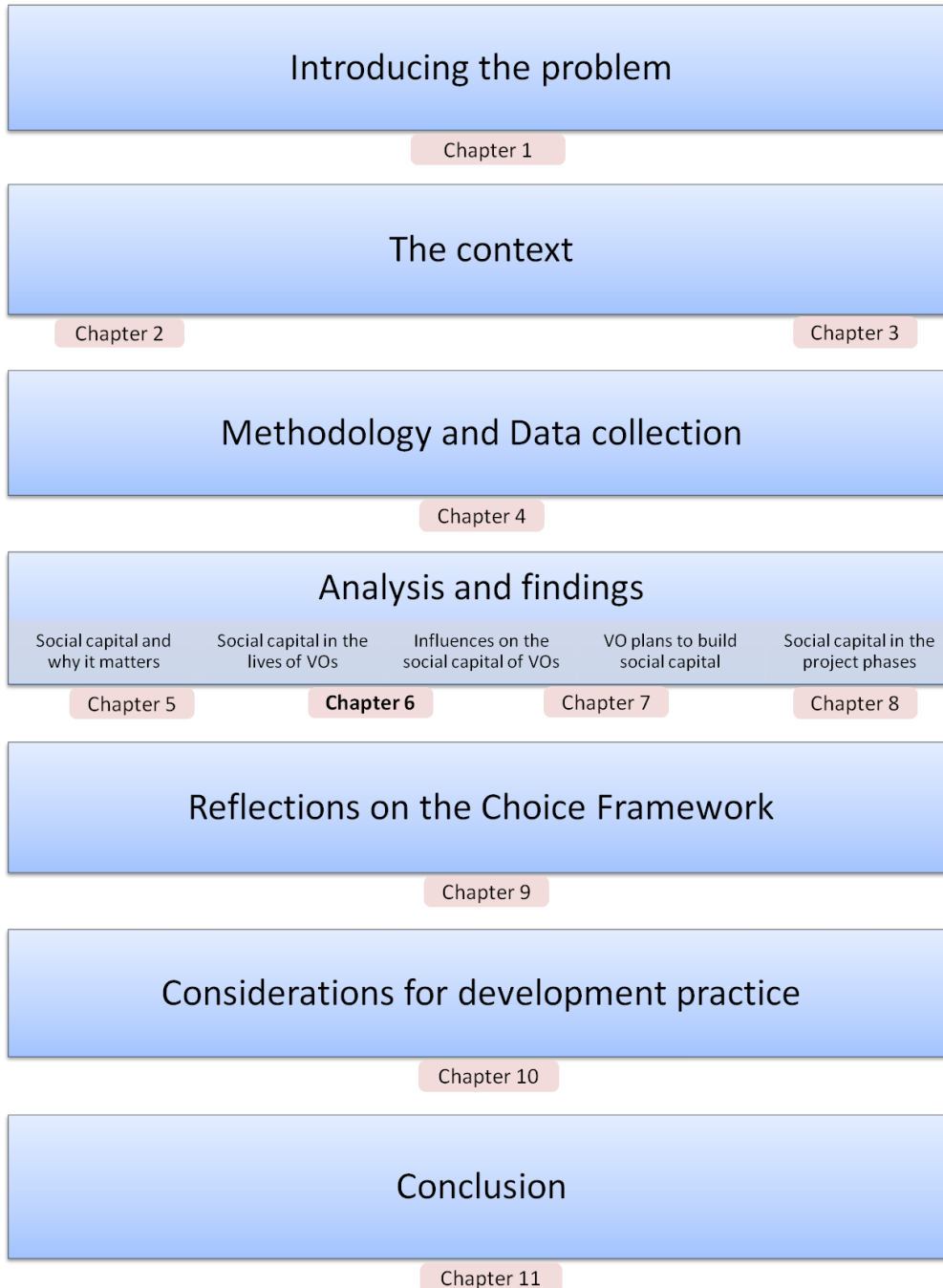
6.1 Introduction

The social capital theme is discussed first, since the construct of social capital or social resources is at the heart of the main research question of what the social capital of VOs is and how it can be used in ICT4D initiatives to improve development outcomes for "participants"; it forms the conceptual departure point from which other themes are understood in this research.

In this chapter the social capital of VOs is analysed using Halpern's multi-level concept of micro, meso, and macro levels of social capital as discussed in Chapter 2 (Halpern, 2005). At each level the different forms of social capital, namely bonding, bridging and linking capital, are investigated as well. The research regarding the social capital of VOs is therefore mapped to three levels, each with three forms of social capital. The diversity and commonalities in the relationships of the VOs are described and discussed. Three important influences on the social capital formation of the VOs were found and are described in a separate section. The chapter is concluded by a shift to the practical implications of social capital in development at VO level and at project level. An overview of the practical use of social capital as a concept is provided via extracts from the plans of VOs to build social capital in support of business growth. The chapter ends with a project-level reflection on the ways in which the role of social capital was evident during the course of the project.

6.2 Social capital in the lives of VOs

The detailed analysis of the micro- level social capital of the VOs according to Halpern's framework is presented in the Appendix. The meso- and macro-level analyses are shorter and are located in the text as tables. References to the relevant sources such as interview notes or interview transcripts are provided in the tables and therefore references are not provided in the text. The purpose of the summaries is to describe the relevant dimensions of social capital, emphasise the significant aspects that emerge and then ask whether there are any surprising aspects that are absent, as seen from the perspective of the researcher as informed by the theory base. One of the significant aspects discussed is the many different ways in which the value of belonging to a network manifested itself.

For the purpose of this research, informal or very small businesses (e.g. one-person businesses) and VOs are considered to be equals and hence relationships with them were considered to be bridging social capital. Larger, well-established formal businesses are considered to be "powerful" relative to the VOs even if they are owned by members of the community, and hence relationships with these entities were considered to be linking capital.

At the individual level it is a question of how to think about VOs. VOs are individuals who are entrepreneurs and have their respective businesses. It is difficult to separate the person from the business or, in other words, to distinguish between the entrepreneur as a person and the entrepreneur's business. Nevertheless, a distinction will be attempted between support provided by people to the VO as a person who happens to be an entrepreneur and support that is more focused on business aspects, on the VO business as a small business.

The micro level was defined as VOs in their personal relationships where they are located, their relationships with contact persons at the clusters of schools assigned to them, and the business relationships with entrepreneurs and customers either at the location of the VO office or at the customer's premises. The relationships with other VOs were also included. Interactions with the

individual project team members that dealt mainly with the VOs as entrepreneurs in their local context were also included.

The meso level was defined as the influence of the communities within which VOs lived and worked as defined geographically by the footprint of their own clusters and as defined by their membership of a cultural group (Ndebele). The VO interactions with the various forms of organisation (church, NGO, traditional leadership structures, businesses and government) active in and across VO communities were included. VO interactions with the project team also played a role since the VOs formed part of the community formed by the project team and the VOs, with its own networks of relationships, norms and sanctions.

The macro level was defined by the interactions with the education department (at provincial level) and other provincial and national government departments. The macro-level influence on VOs of interactions either directly or indirectly via the project team's involvement with national entities such as the Department of Science and Technology was also considered.

6.2.1   Micro-level social capital

6.2.1.1   *Bonding social capital*
A. Networks

The personal networks of VOs contained partners, parents, siblings, uncles, aunts, a nephew and a mother-in-law. There are two VOs who are married, one female and one male, but it is only the husband of VO1 who played a significant role in a VO business. VO1's husband had a registered company and there was mutual exchange of value between the two businesses. The FSM said that the other VOs referred to him as the "extra VO". VO4's wife repairs cell phones and had also repaired his phone. The girlfriend of VO5 was a source of support to him.

The mothers of at least four VOs played an active role by assisting in buying equipment, lending equipment, providing loans, buying services and referring customers. The mothers that do provide support are either employed or have their own businesses. It is interesting that only two fathers were mentioned. VO1's father owned a large printing business and VO1 did business with him and they referred businesses to each other (VO1, 2013a). VO4's father used to own two tuck shops (spaza shops); VO4 used to work at these shops after school instead of playing and credited this experience with developing his entrepreneurial skills.

Siblings provided both free and paid assistance in the VO office and in one case provided technical computer support as well. VO13's brother was a vital link in one of his business processes by bringing customers' photos from Pretoria. The benefits to the siblings were clear in two instances. VO4's plan was that his two sisters would work for him until they had gained enough skills and experience. This worked out well in that one sister got employment and the other sister started her own business. VO8 provided advice to his younger brother who is preparing to start a business.

VO1 is the one VO that had very active involvement with and support from her close family, i.e. her husband, father and brother.

The extended family of VOs also played a supporting role; three VOs mentioned uncles, one of whom provided job information, one owned a large business and was a customer too, while another

provided an example of a business plan. VO11 and his younger brother lived with his aunt and he provided her with financial support. An example of a close relationship was that of VO12 and his nephew, a small business owner. They have discussed how to merge to their mutual benefit.

VO4 was involved in a business venture with his mother-in-law, a Zimbabwean, who bought goods in Johannesburg and sold them in Zimbabwe. He also used her laser printer.

The overall picture that emerged was that many of the families did not have financial resources to support VOs, but that those who could assist did so when they could and to the degree that they could afford. Family members who were in business themselves could provide more direct business support.

VOs lived with family and received access to resources such as staff for their businesses, small loans, office equipment and referrals to customers. In general, information and advice was also provided. The VOs in turn provided support via free services, advice, on-the-job training and financial support.

It is somewhat surprising that only three VOs directly mentioned support from their partners and only one of these partners provided significant support. In only two instances was a father mentioned, only one of whom, a businessman, was able to provide significant support.

Only two VOs had grown up in families that were in business and therefore had a head start in terms of exposure to business from an early age. This may be a factor to be used when identifying potential entrepreneurs.

B. Norms

The norms operative in the VO bonding capital context were about services to family (free or not free or an exchange of services), assistance via advice and information, tangible support, investment in the family, and personal pride in taking responsibility.

Free services for close family consisted of VOs supporting their younger siblings with schoolwork via internet research or providing assistance to family members, e.g. receiving faxes. The common factor is that this personal effort and not expenditure of money. Similarly, a brother provided IT support that required expertise and time.

Paid services were linked to the level of effort required, whether it was for work, and whether the family member could indeed pay for this service. VO3's mother was a teacher and she paid for the typing of her school question paper.

An example of the exchange of services instead of payment was the arrangement between VO13 and his brother who worked in Pretoria. The brother was a courier of colour photos printed in Pretoria for customers, and VO13 provided him with free email. For both parties the service did not involve costs, just effort.

Advice and information were freely offered in order to improve the VO business. The mother of VO3 provided business advice, such as that a larger printer would improve the business. VO13 used an uncle's business plan to write a "business profile" (VO13, 2012a:1). Family members also distributed information about their VO's business to other businesses.

When VO16 switched businesses he selected business services that the family knew, in this case it was catering since his mother was already involved in this type of business.

Tangible and financial support from family were focused mainly on assisting with equipment to support the VO's core business income such as lending them a laptop or printer or, in one instance, contributing money towards buying a printer. Only one VO reported ad hoc and small-scale loans by family members, but it may be a more frequent practice.

VOs used their business activities to invest in family members' skills to mutual benefit. A good example is VO4, who had trained his wife, his daughter and two of his sisters and therefore had the benefit of his wife and sisters keeping his office functioning when he was absent.

The generation of income also allowed VOs to make financial contributions and take responsibility for supporting their family or partners. A special example was VO11, who was very proud of taking responsibility by providing financial support to the mother of his son. He was proud that her family appreciated it that he did not run away from responsibility.

The degree of close involvement of the immediate family members was fairly high and also showed the variety of ways in which VOs could be assisted. In most cases the assistance was reciprocal and the family and the VO benefited. The value of emotional support to stay the course as an entrepreneur should not be underestimated.

The degree of personal empowerment of VOs due to being able to take responsibility for growing family members' future prospects or supporting one's own child was evident.

Most families did not have extensive extra financial resources and hence the support of most families would not make a significant difference to scaling up a VO's business.

C. Sanctions

The sanctions that were mentioned by the VOs had to do with the relationship between a VO and his or her mother. VO10 lives with her child at her mother's home. VO10 wanted to leave the project due to a long period of seven weeks without internet access. She wanted to get a job and in response her mother advised her to do so and also get out of her house. VO10 also said that her mother would scream at her. The support provided by the mother to VO10 and her child could have been a burden to her and, it seems, a burden that she wanted removed by VO10's leaving home.

The other context where a form of sanction was applied also involved a VO and his mother. As an only child, VO12 had a close relationship with his mother, who was interested in his wellbeing and provided moral and financial support as well as advice to him, such as: "she tells me to always have a plan… explore opportunities" (VO12, 2013b:18). VO12, in the context of a discussion on the exchange of information in relationships, stated that he did not give his mother much information, as he did not want her to get too involved in the business (VO12, 2013a). The reason he gave was that she made things too complex for him by wanting to know too much about the details of his business. He said: "Basically, keep her in the loop and not fully detailed ... Not to worry her and all that" (VO12, 2013b:22). In this case he seemed to receive too much attention and wanted to reduce the complexity of the interaction. The question might be asked if the expressed wish to not make

her worry too much also had to do with VO12's experiencing that too much attention can be intrusive.

It was surprising that these were the only examples of conflict between VOs and their family that were reported as in many instances parents did invest in their children's business. This may of course also be due to VOs not wanting to share such personal information.

6.2.1.2 Bridging social capital

As mentioned previously, informal or very small businesses (e.g. one-person businesses) and VOs are considered to be equals and hence relationships with them were considered to be Bridging social capital.

A. Networks

The VO relationships were diverse in terms of relating in different ways to different kinds of entities.

Broadly speaking, VOs had business relationships, friendship relationships and supportive relationships. Some of the business relationships also involved friendship and support and some of the friends were customers too. Support was provided by friends as well as entities or people that were not friends.

VOs were involved with a wide range of people and entities: individuals, friends, other VOs, government officials, business people, and entities such as schools, NGOs, and churches. In some cases the linkage to an entity was via a friendship with an employee of the entity.

Business relationships

The business relationships with individual customers covered both young and old. VOs had many customers who were students: young people as students at primary and secondary schools, full-time FET college students and older part-time tertiary students who were distance learning students mostly at the University of South Africa (UNISA). The part-time tertiary students were diverse and linked VOs to employees and professionals in the community such as: nurses and sisters from a local hospital (VO4), teachers and principals (VO6, VO10 and VO11), police (VO8) and employees of SASSA (VO11).

There was a large variation in the types of customers that were considered by VOs to be particularly important to them.

VO1 addressed the needs of older customers, who were probably a bit less familiar with technology, by creating a personal relationship with each person in a group of middle-aged customers by giving them her cell phone number in order to provide a personal service when they needed it. She related: "You know these people, most of them they are the ones that give me a wake-up call in the morning and ask me where are you, we need you now." (VO1, 2013b:4).

Business people were important to VO2's business due to their support in providing referrals to other businesses. VO3 had particularly close relationships with three of her business customers while VO9's closest business relationship was with the business owner whom he helped to understand the business's finances.

Many of the business relationships had an element of friendship or support mixed in. VO5 used his business friends as a network as well as people who knew him from school. VO6 and VO7 did business with small businesses in a collaborative way, as discussed in more detail in the next section on norms.

Relationships with large businesses were often built on personal relationships, e.g. via the son of the business owner. The possibilities of co-investment formed the basis of some of these relationships. These relationships are considered to be linking capital and are discussed as such in a separate section.

VO-to-VO relationships

As entrepreneurs, VO-to-VO relationships had a purely business character as well as different admixtures of business and friendship.

VO9's business relations with other VOs were limited and business-like and he had contact with three VOs via email (VO8, VO10 and VO16). They shared information on the lowest prices of supplies such as printer toner cartridges.

On the whole, VO-to-VO business relationships were fairly close and varied in degree from regular communications to a high degree of business collaboration.

VO10 reported that she and VO3 were especially close and communicated almost on a daily basis about frustrations and business aspects such as prices. VO3 had close business relationships with VO4 and with VO6 and VO7 who shared a VO business located not far from her home. In addition to providing her with information they also assisted her with stationery and banking and she used their internet when her internet was down.

VO4 reported that he had close links to VO3 in particular (as reported by VO3 as well) and VO8 and also had relationships with VO13 and VO14 (VO4, 2012b). VO2 mentioned that she wanted to grow her relationship with VO8 since she had observed the growth of his business (VO2, 2013a).

The proximity of VO offices played a big role (e.g. VO3 and VO6/VO7). VO6 mentioned VO1, who was based in an adjacent area, as well as VO5 whose office was located in the same town.

Close-knit relationships existed between three VOs (11, 12 and 15) who described themselves as being "anchors to each other" (VO12, 2013a:27). They created a pricing sheet with their own credo "We are not a dying type" (VO15, 2012a) at the top of the page (Figure 34).

Figure 34 The credo of VOs 11, 12 and 15 (VO15, 2012a)

The different sources of psychological support, such as the friendship between these three VOs are discussed in Chapter 9 (Section 9.4).

The experience of sharing a VO office had a definite influence. VO14 stated that he shared information with VO13 and had a close relationship with him due to the fact that they had shared a VO office in the past.

VO6 described his relationship with VO7 as consisting of: sharing everything (including clients), good communication (they let each know when they will not be in the office), and thinking together by talking about ideas together, for example. Since an interview with VO7 could not be arranged, his perspective on the relationship is not known.

VO12 described the relationship with VO11 as being very close and referred to it as a business relationship that had grown into a close friendship. VO11 is someone to talk to and it is good not to be alone. VO11 referred to them sharing all the clients, but VO12 presented a more nuanced picture. He stated (VO12, 2013b:2): "We share a business yes, more or less." As mentioned in the Appendix, they both had relationships with a large business, but VO11 focused on the owner, while VO12 had a relationship with his son. This illustrated the collaboration between them and a business without necessarily sharing exactly the same relationships.

Non-profits (NGOS and schools)

The linkages to non-profit organisations as customers are mostly via direct or indirect personal relationships. These relationships are discussed under linkage capital. In this section the more informal person-to-person business and friendship relationships are discussed.

The interactions with schools are discussed first, followed by those with NGOs and churches.

Schools were the anchor tenants in the BB4All project plan and hence relationships with schools were strategically important to VOs. A variety of relationships existed with admin clerks, teachers and principals.

VOs' links to schools were mostly via the admin clerks due to the operational role of the clerks in maintaining internet access to the school. VOs phoned clerks to find out if there was a problem at the school such as the electricity having been switched off. Some of these clerks did not express real interest in the internet access and, as reported by VO15, his relationship with some admin clerks were limited to network-related issues such as switching the power to the HPNs back on. These relationships have been grouped under bridging capital since they do connect the VO to the school community.

There were, however, other admin clerks that were more engaged with the VOs and these relationships have been grouped as being linking capital for the VOs.

The same pattern holds for teachers and principals as well. VO15 found that, in general, secondary school teachers were not interested in computers, but they did refer students to him for internet research. Some teachers were just customers for VO services as illustrated by VO11 who had very limited business from teachers, which included the repair of a teacher's laptop at her home and

business cards and quotes for a teacher with a part-time business. Teachers did refer other teachers to VOs as well. These VO-teacher relationships have been reflected as bridging capital. On the other hand, VO4 mentioned that he exchanged technical advice with a maths and electronics teacher at a technical secondary school. This relationship may or may have not been a basis for influencing the use of internet in the school and by the school principal, but did indicate that there was some probability of this occurring, and hence this has been grouped under linking capital as well.

Principals mostly handed over the liaison with the VOs to the admin clerk of the school. There were some exceptions, which are discussed under linking capital.

The links to NGOs were primarily direct and long standing. VO2 was the Deputy Secretary of a Youth Care Centre NGO and administered their email for them. VO14 had links to two NGOs. He worked for a health and development information centre as an administrative secretary and they read their email at his office while an Early Childhood Development Centre used his phone. An indirect linkage was utilised by VO13 who was linked to many pre-school care centres via his mother who was the principal of a pre-school care centre.

VO14 had a deep relationship with his church since he was an evangelist and second-in-command in his church. This relationship also led to business for him from the congregation. VO9's church reached out to him as a small business as part of their strategy to support small businesses via sponsorships and business advice. During the research interview VO8's pastor was busy in the VO office. They have a close relationship. The pastor is also an entrepreneur who runs a business and also deals with a number of tenders.VO8 reported receiving a lot of support from several pastors: "I have this close friendship with lots and lots of pastors… I even noted a sense of jealousy in my spiritual father, my pastor" (VO8, 2012b:5). He said that this pastor joked with him about whether the other pastors were going to steal him and that his reply was "No, you have nothing to worry about. I am only close to them because I see them as your friends. So, I like them because of you, yes" (ibid.).

Friendship relationships

VO11 referred to his "home boy" friends who did him a favour by referring their friends to him. VO2's experience also showed the importance of friends, as her business was supported by information and business referrals via her friends. VO6 shared a lot of business experience with his friends. The roles of friends are expanded upon under the next section on norms.

Support relationships

As mentioned above, certain VOs focused on certain customers and this relationship did include a support element as well. There were also relationships that were declared by VOs to be mainly aimed at providing support. VO14 supported the unemployed youth and provided them with information about jobs and bursaries. Soccer was an important way of supporting the youth in the community. VO4 was the owner of a soccer club which he tried to run as a business. VO16 played for a club and was also the team manager of a soccer club whose players were mostly still at school.

To summarise, a few remarks on what was of interest. The strong role played by relationships with church members was to be expected. What was surprising is that not more VOs mentioned church-related relationships. The fact that no mention was made of VO relationships with parents of

students was of interest. Parents must have been involved by providing money for their children to use the internet at the VO office.

Of greater import was the VOs relative lack of focus on building strong relationships with schools. This aspect is covered in detail in the linking capital section.

B. Norms

The dominant theme that emerged was that of support for the VOs as small businesses from all areas of the local community, from individuals to community organisations and the private and public sectors, and that this support included both passive and active forms of support. Support was also exchanged in the VO-to-VO relationships at a business and emotional level and norms developed here as well. Reciprocation was a pervasive theme and VOs did reciprocate via their support of the development of communities and private and public sector entities via personal relationships and services. In all of the relationships, trust was important, and while trust was offered freely by many individuals as a first step, VOs had to earn that trust by delivering good, locally relevant and customer-centric services. VOs in their role as VOs shared a collective identity in the community and hence had a shared responsibility for protecting their good name as service providers and protecting and building the VO brand of Internet for All.

Support for small businesses run by young community members

Personal support and appreciation

In addition to the broader sense of the VOs being part of the community and hence being supported by entities such as businesses, community organisations, NGOs and the like, there was also individual support that was deeply personal.

VOs experienced generosity and appreciation from customers. A retired teacher, who was a regular customer of VO11 and VO12, bought a new printer for their use after a burglary at their shared office. VO9 received loans from a business customer. It was common for teachers to refer students to VOs to assist them with doing research for assignments, and VO15 reported that: "at the end they came and thanked me" (VO15, 2012b:18).

Advice and information

Frequent exchange of advice and information occurred between customers and VOs. Community members suggested additional services, and VOs were especially thankful for the good business advice they received from business owners and school management. Examples mentioned included the vice-principal of a school who taught VO5 project planning, and the advice received by VO9 on how to make a business phone call.

Marketing of VOs

Individuals and people representing organisations referred customers to VOs. Friends played an active role, but individuals from the community were also well represented. VO15 reported many word-of-mouth referrals by his customers: individuals referred their friends, NGOs referred other NGOs, and students referred students. VO10's referrals came from community members, VO3's, the FSC, from her landlord, as well as her mother and brothers, thus representing bridging, bonding and

linking capital. Linkages to organisations came via individuals such as the principals who referred learners, and a supermarket owner and a landlord who referred members of their churches to VOs.

The diversity of referrals included entities or people that one would generally consider to be trustworthy. Among these entities churches played an important role since the VOs were known to their fellow church members. VO14's strong relationship with his church led to the pastor being an active marketer of his video services to the community at large (e.g. taxi owners), but especially to the congregation for family events such as weddings and parties. VO9's church played a networking role as well, as it supported small businesses by holding seminars where business advice was provided to the interested entrepreneurs. VO14 and VO9 were very well aware of the value of word-of-mouth marketing and friend-to-friend referrals by members of their church.

A wider support base was introduced to VO9 via the local traditional council (Makhoboko) who told the community about his services.

Connecting VOs to other businesses

A personal connection to a network of small businesses was created for VO13 by his mother, the principal of a pre-school care centre. People know and trust her, and this has made the many pre-care centres trust him too. VO13 commented that they are good clients since they talk to each other and you only need talk to one of them! The pre-school care centres are an example of a close-knit business network.

As mentioned above, VO9's church supported small businesses via seminars which also provided an opportunity for small business owners to meet each other as well.

Some of the VOs' friends were in business too and it was natural for VOs to do business with their friends. An interesting norm agreed upon by VO5 and his friends was that they would only ask for business assistance from each other when it was really necessary.

Collaboration between businesses

The VOs had resources such as office space and access to internet and equipment (e.g. a printer). Collaboration with other small businesses occurred where skills were pooled to mutual benefit, for example a graphic design entrepreneur used the office shared by VO6 and VO7, who were hence able to offer a design and printing service. VO6 was also taught how to do graphic design and use the relevant software. VO6 taught another young entrepreneur IT skills in exchange for his assistance with customers. The landlord of VO10 had a guesthouse next to her office and accordingly marketed his guesthouse as having easy access to an Internet café.

In general, mutual referral of customers between VOs and other service providers also occurred between VOs and direct competitors such as Internet cafés or a public facility such as a library.

Reciprocal exchanges of assistance and favours

Various types of exchanges occurred between VOs and customers, VOs and landlords, and VOs and friends. VO business advice to vegetable farmers was reciprocated with a discount, and VO office services were provided free to a landlord who gave business advice and encouragement.

Social capital   153

Favours were exchanged frequently with friends. Friends received free internet access and returned the favour by assisting customers in the VO office, providing information about jobs, and acting as buyers for VOs. If friends needed services that cost VOs money, such as printing, they normally had to pay for them.

Some VOs and their friends were bound together by a shared common interest such as music, and in VO12's case this led to the development of business ideas.

VO-to-VO norms

A close-knit group of three VOs collaborated in business at many levels and supported each other (VO15, 2012a).

In general, VOs exchanged free services and technical and business advice and information. In closer VO-to-VO relationships, small loans were provided, VOs worked together to provide a service and, most importantly, emotional support was also provided.

VOs also developed relationships with each other because they could see the potential of growing their businesses with each other, or benefiting from a specific resource that a VO had, for example, being part of large business network.

A general pattern was the referral of customers to other VOs. This happened when a VO did not have the time or resources to serve a customer or did not have the required skill. VOs showed great respect for geographical business boundaries and referred customers to their closest VO. VOs recognised the "ownership" of each VO of his or her geographical area as defined by the cluster of schools they had been assigned.

VOs supporting community development

VOs have invested mainly in the development of the unemployed youth, by employing some of their friends and hence developing their skills, inviting people to take part in learnership programmes and collecting information about bursaries and jobs. One VO was a member of a soccer club who had the goal of motivating young people to stay at school and provide financial assistance towards tertiary studies.

The creation of personal relationships with senior citizens in order to provide VO services that suited their special needs can also be considered a form of investment in community development, in this case fostering the adoption of ICT services.

At the organisation level, VOs assisted NGOs in improving and lowering the costs of their communication and reporting to government.

Expectations of reciprocal support and solidarity

VOs, NGOs and community members in general developed expectations of each other. From a VO perspective, it was asserted that support delivered by a VO to a community should be reciprocated as a form of support of his business. VOs soon learned that some NGOs wanted to befriend them so that they could receive free services, which constituted exploitation. These patterns were repeated

by individuals who expected free services, especially internet access, presumably because it was well known that VOs did not pay for their internet access.

<u>Trust is offered and then earned</u>

Customers offered their trust in VOs freely and, for example, asked them to keep their email passwords, read their email and alert them if action was required. VOs recognised the importance of trust. A VO described himself as being a trusted source of advice to young boys and grandmothers (i.e. those that need help the most) and that, in general, trust was the reason for customer referrals.

Pride and concern about good service delivery

VOs were concerned about the speed of the service desk's response to customer requests and took action to expedite the reaction. At the individual level good service delivery was characterised by being sensitive to customers' constraints and special needs.

VOs were proud of the quality of their own services and collaborated with each other in order to improve services. One VO expressed individual responsibility for protecting the overall VO brand.

Equal treatment for all VOs

One VO articulated a general feeling among VOs that a certain VO had been singled out by the project team for special treatment.

C. Sanctions

Sanctions resulted mainly from VOs being taken advantage of by other VOs, by customers such as schools, NGOs and individual community members. An important example of a different reason for sanctions was to protect customers. In most cases sanctions were applied informally by VOs themselves or as a community of VOs.

Abuse of VO-to-VO relationships

A VO misused the practice (or norm) of mutual exchange of services between VOs by requesting too many free video editing services from another VO without some reciprocal value exchange. In this case the VO could simply refuse to provide this service. Because of overuse the laptop of a VO broke down three times and the FSM instructed the nearest VO not to accede to his request to borrow her laptop.

Customers taking advantage of VOs

VOs developed various strategies for dealing with customers who expected free services. Some VOs used an indirect approach by developing excuses such as not having ink to do printing, while others opted for the direct approach of reminding customers that they were a business like any other.

Being taken for granted versus being appreciated

Dynamics developed between schools and VOs where VOs felt that schools were abusing the fact that network-focused technical support was free by calling VOs out to schools unnecessarily, instead of learning to help themselves. These same schools could therefore expect slow responses. On the

other hand, if VOs felt that a school appreciated their assistance, they would go out of their way to help.

Protecting customers and protecting the VO brand

The norm of protecting the image or brand of VOs, which is also a form of social capital, was applied in practice by VOs not referring customers to their closest VO because they considered this particular VO to be absent from his office all of the time. This is an example of a norm (referral) being overridden by VOs due to the norm of providing good customer service, in order to protect the brand or image of VOs as a whole.

VOs and the businesses of "foreigners'"

South Africa has experienced an influx of entrepreneurs from other African states and Asia in particular, and xenophobia has been expressed in different ways, including violent protests and burning of businesses (Moyo, 2013). In the Nkangala context significant numbers of small businesses were observed that were owned by non-South African citizens, but this reality was mentioned in only two VO interviews.

VO1 referred to the fact that the people within the community also included foreigners, e.g. Nigerians and Pakistanis, and that the NVC learnership teacher had persuaded her to start to "communicate with this [these] Pakistan [sic] guys, these foreign guys, because they are the ones who know business much more" (VO1, 2013b:6). As a result, VO1 no longer saw them as foreigners who should not be spoken to, but as friends that she does business with and has learned from.

During an interview, a VO preferred not to buy a cool drink from the nearby supermarket, owned by Pakistanis, and said that he supported a spaza that was a little further away as it was owned by a member of his community.

In summary, sanctions were mostly enforced informally and were based on informal and broadly based understanding and unspoken agreements. Some of these understandings were inadvertently created by the project approach, the major example being the assumptions by the schools and community that VO services were free because schools did not pay for VO technical network support services and that the internet access of VO offices was free.

6.2.1.3   *Linking social capital*

As mentioned previously, VO relationships with informal or very small businesses were considered to be bridging social capital, while larger, well-established formal businesses were considered to be "powerful" and outside the community even if they were owned by members of the community, and hence relationships with these entities were considered to be linking capital.

A. Networks

In the micro level context, VOs had relationships with two major groups, one that was automatically involved because of the project model, which consisted of schools, landlords and the project team, and one that VOs targeted as being important to them as entrepreneurs, which consisted of municipal ward councillors, social departments of local government and formal businesses.

Schools

The relationships between VOs and schools are mostly not via the principals, and if there was a relationship with a principal it was mostly with the principal as an individual customer of the VO. One school was mentioned by a VO because they had actively encouraged learners to go to the VO office for assistance with internet research.

For technical support reasons VOs often had relationships with the admin clerks at the gateway school, because if this school was not connected, none of the other schools in the cluster was connected either. In most cases VOs mentioned close relationships with only two or three schools; these relationships were due either to the VOs' being a past student of the school or having shared a technical interest with a teacher who was interested in IT, or to the fact that a family member was a teacher who could convey service requests from teachers who required personal assistance for their own distance education.

VO5 was an exception, as he visited one school regularly in order to build a relationship, which led to his being contracted by the school to procure and install ICT equipment. Service provision to the school rather than just personal services to school personnel was also reported by three other VOs who carried out Wi-Fi and computer installations.

The cost of transport to schools played a role in determining which schools VOs could afford to visit. Geographical influences will be discussed in Section 6.4.1.

Landlords

Relationships with landlords as business owners were often personal and close due to exchanges of technical advice and landlords playing a business mentorship role. It was interesting that VOs did not mention the use of these relationships to gain access to funding or business networks.

BB4All project team

VOs had relationships with members of the project team, who assisted them in a variety of ways. The FSM provided the greatest amount of assistance, which consisted of mentoring, business advice and carrying out procurement for VOs in the city, where prices were lower, of equipment or consumables such as toner cartridges.

The BB4All project technical manager provided technical assistance to VOs who were providing ICT services to schools (e.g. how to configure a Wi-Fi router), as well as acting as an intermediary for a VO to the Service Desk by logging calls on a VO's behalf. His position of authority led to a quicker response to the support request and hence the VO's service to the school was faster. This was a good example of a linking relationship having an impact on business efficiency.

In the case of VO4, the advice flowed from him to the FSM and was about how to influence the circuit manager of the provincial education department in order to win him over to support the project. This provides an example of a VO supporting the building of relationships between the project team and the circuit manager level of the school system.

Relationships with local government

Two VOs had designed strategies to grow their business by developing linking capital. VO5's stated strategy was to deal with as large an organisation as possible, and hence a strategy of building relationships with people with influence, e.g. education department circuit managers, was required.

VO14 made contact with the local municipal ward councillor in order to act as an intermediary between the citizens and the councillor, so that his office would become known to the citizens in the ward, and to act as a link to the ward councillor for the citizens. His own linking capital increased and he increased the linking capital of his fellow community members.

VO8 knew Community Development Workers (CDWs) and acted as an intermediary between them and citizens by providing forms. He built a relationship with the ward councillor since, as a student, the councillor used VO8's services for doing assignments and emailing them.

Unions

VO5 made contact with the organiser of the South African Democratic Teacher's Union (SADTU) who had an office in his area. The organiser was interested in using ICTs to provide training and to enable all the SADTU offices in the area to communicate via email (VO5, 2013b).

Relationships with large businesses

Relationships with businesses were mostly based on strong personal relationships. VO12 and VO11 collaborated with a large business via two relationships: VO11 had a relationship with the owner of the business while VO12 was friends with his son. VO1 was linked to a business network via her father, who owned a printing company, and he was her closest business partner.

Summary

In summary, relationships linking VOs to schools are very important since schools are the anchor customers of VOs in the VO model. The interviews with VOs painted a picture of VOs having significant relationships with only a few of the schools that were assigned to them. The fact that the interaction was mostly to provide services to school personnel and not with the school as an entity may have been due to the fact that schools did not pay for internet access or VO technical support and was therefore not automatically a paying customer of a VO.

A concerted effort to get the schools as the anchor clients on board was vital to the success of the VOs and of the project as whole. The question is whether VOs really understood and lived the importance of successful adoption by the schools of the internet access as their contribution to the overall business strategy of the project in persuading the Mpumalanga Provincial Department of Education to pay for the internet access to the schools.

B. Norms

Norms developed in the VO interactions with people from four different types of entities, namely schools, the project, businesses and local government. Some of the common themes were: the variety of types of support provided to VOs, e.g. information, advice and emotional support; the

need for collaboration in order to develop value; and the dynamic of expectations being created and proved false.

Schools

VO and school interaction norms entailed expectations from both parties that were due to a variety of reasons.

In a few cases a VO's focused investment in a relationship with a school was rewarded. VOs were pro-active in creating an expectation that they would act in the school's best interests by delivering small support services for free, while at the same time marketing their ability to provide additional services. VO5 invested in his relationship with a school in this manner and was asked to buy and install ICT equipment.

The 'project effect': a common norm was that schools took VOs for granted and expected them to deliver free services, over and above the scope of their technical support services to maintain internet access. VO11 mentioned that teachers ask him for free advice regarding their personal computers when they see him at the school, but do not visit the office for services. The expectation of free services does arise in most schools, since they receive free internet access and free technical support for maintaining it.

Some VOs reacted to this dynamic by providing support services that were commensurate with the degree of cooperation and appreciation that was received from the school in question.

The schools that VOs had attended themselves sometimes had the most extreme expectations that VOs were obliged to deliver free services to them. This could be referred to as the 'Alumni effect'.

A reciprocal exchange of services and assistance was established between a few VOs and the admin clerks at schools. VO2 had a close relationship with an administration clerk at a school and provided a backup email service if the internet at the school was down.

Project

As mentioned under 'linkages', VOs had personal relationships with some of the project team members and hence we distinguished between norms of formal and informal support.

Informal support could also be seen as project team members deciding to go the extra mile to support VOs beyond what was expected from the project. This support included business and technical advice as well as procurement support. The service desk personnel shared their knowledge with VOs and, for example, provided advice as to which equipment suppliers had the best prices.

At a personal level, project team members such as the FSC also provided emotional support to VOs.

Formal support from the project was provided above and beyond the project scope if it was clear that a VO was showing initiative, entrepreneurship and investment. A loan was granted to assist VO13 to build his own office after he had saved a significant percentage of the building costs.

VOs responded to inadequate or slow project support by adopting a norm of "do it yourself" rather than waiting for project support.

Unfortunately, some VO expectations from the project were completely outside the scope or ability of the project to deliver. The major issue was that VOs wanted to exploit the market opportunity of providing broadband internet access to individuals and business customers at their homes or business premises. They did not understand the degree of investment in the capacity of the wireless network backbone that was required, or the brief of the project to focus on connecting educational institutions.

In some cases, these unmet expectations led to the VOs' becoming disillusioned about the business prospects and therefore developing other types of businesses and neglecting their core role as technical support. We could call this norm: "Unmet business growth expectations leading to disillusionment".

Business

A norm that was commonly observed among VOs and businesses was that advice, information and referrals of customers to other businesses were freely offered by businesses to VOs, who mostly reciprocated.

If the possibility of competition existed several different norms were followed: direct competition, agreement on how to complement each other's services and agreement to charge the same price for common services such as printing.

In a direct competition scenario, it was interesting that nuanced positions were adopted. One VO had a particularly interesting perspective on the future that included economic growth for his community as a whole, which thus included successful competitors for the greater good of the community. He said: "I need xx to realise success…. Yes, I see their success actually" (VO6, 2013b:23). VO6 also expressed a need to keep a close eye on them: "Let my enemies be near to me" (ibid.).

VO6 reached an agreement with a computer business located in the same centre as the VO office on how to complement each other's services. This occurred because the VO and the businessman knew each other personally.

Collaboration between VOs and businesses took on many forms, but a common theme was co-investment by combining VO resources (e.g. internet access, skills, office space) with the resources of a business.

In the case of VO2, her investment was her time and IT skills while the business partner gave her graphic design software and trained her to use it. She was thus enabled to edit photographs for them. Provision of equipment such as large capacity printers or personal computers was also offered to other VOs in order to enable business growth.

VO5 and a printer company identified a different kind of business opportunity based on easy access to schools as a market (presumably due to his school relationships) and sold books of Grade 12 examination questions.

Special services were developed by VOs for larger businesses, such as opening the VO office at any time in the week, day or night. This indicated the tremendous effort some VOs made to build relationships with the larger businesses.

Government

Official and unofficial collaboration took place between government officials and politicians and VOs to deliver services. VOs extended the reach of government and improved the accessibility of their services to the community by providing government forms for free and acting as a communications channel between a ward councillor and his ward. The unofficial collaboration consisted of an official lending a government printer to a VO that he knew well. This norm could be described as distributing government resources to assist small business development, or more simply, as "friends help each other"!

C. Sanctions

Formal sanctions were applied when a VO overstepped the geographical boundaries between VO business clusters that had been created by the project, or violated a business contract. An example of a situation in which informal sanctions would be applied was in the context of a personal agreement reached between a VO and a business person.

Forced to apologise

VO5 agreed to a deal with a circuit manager to do a job for all of the schools in the circuit. The VOs whose clusters of schools were included were angry that they had not even been consulted, and the FSM forced him to apologise at a VO meeting. From his perspective he had done nothing wrong and was acting out his strategy of talking to people with influence.

Abusing the goodwill of a landlord

VO4's landlord had provided him with multiple chances to pay his overdue rent over a period of 18 months, but in the end he was evicted by his landlord. The money had been transferred to his account by the project for the express purpose of paying monthly office rental. Two agreements were thus broken, an agreement with the project and an agreement with the landlord. This damaged the trust in VO4 on the part of the landlord and the PM.

Do not break a deal

A computer business owner had reached an agreement with VO6, as mentioned in the previous section, about delivering complementary services rather than competing directly. In the interview VO6 made it very clear that if they were to compete there would be trouble with his friend.

On the whole there were very surprisingly few reports of formal sanctions being applied. There were many instances of VOs not delivering on their project service-level agreements (FSM interview, 2013a), but it has to be remembered that this was fundamentally a research project and not a formal business, and a personal and relational approach to supporting VOs to grow into entrepreneurship was adopted by the field support team (FSC and FSM) and the PM.

6.2.1.4 Summary of the micro-level social capital

The micro-level relationships of VOs were diverse and included personal relationships, their relationships with contact persons and learners at schools, business relationships, relationships with other VOs, relationships with community organisations (churches, NGOs, traditional leadership), relationships with government officials and interactions with the individual project team members.

Family relationships were the most important and diverse source of support to VOs. Bonding capital dominated the other forms of capital. VOs received many forms of support: information, advice, accommodation, staffing of their businesses by siblings, small loans and office equipment from mothers, and referrals to customers. Mothers were the single most influential source of support, while support from fathers was not mentioned. Members of the extended family did provide some support, especially if they were in business themselves. A general constraint was that most families did not have large extra financial resources and hence the support of most families would not enable significant scaling up of a VO's business.

The VOs in turn provided support to their families by investing in their business skills, as well as providing free services, advice, and financial support.

Bridging capital was mostly provided via relationships with friends, customers, churches and fellow VOs. The relationships with the anchor customers, the schools, were unfortunately relatively few, given the large numbers of schools that were connected. Churches were significant customers and supporters, and a context for building bridging capital in the community for four VOs.

The dominant norm in bridging capital was passive and active support for the VOs from individuals and the local role players. Reciprocation was a pervasive theme and VOs did reciprocate via personal relationships and services. Trust was important and, while trust was offered freely by many individuals as a first step, VOs had to earn their trust by delivering good, customer-centric services.

Support was exchanged in the VO-to-VO relationships at a business and emotional level, and norms and sanctions were developed regarding the mutual exchange of services. VOs also protected their collective identity (the brand of VOs), for example by not referring customers to a VO that did not provide good customer service.

The VOs' linking capital to schools as customers was generally underdeveloped, and only a few VOs had built business relationships with a few schools each. A downside was the expectations of schools that VOs would deliver free services, especially those VOs who were alumni of a school (a disadvantage of social capital). The project business model of providing free internet access to school and free VO technical support was an obstacle to VOs' building business relationships with schools as paying customers.

An interesting variety of services was developed by VOs for business customers based on business owners' trust in VOs and VOs customisation of services to fit a business owner's needs. Some VOs spent a considerable amount of effort to build personal relationships with the owners of large businesses, without apparent success.

In two cases, however, VOs did derive benefit by providing services to citizens to meet government requirements (e.g. photocopies of IDs) and extending the reach of government's services to citizens.

Few sanctions were reported, and the significant instances of these, as explained above, dealt with VO-to-VO relationships and business boundaries. The project followed a personal and relational approach to supporting VOs to grow into entrepreneurship, rather than that of a formal business relationship governed by legal contracts.

6.2.2   Meso-level social capital

The relationships that influence the VOs at the meso level are more generic than those at the micro level and hence these relationships are presented in the text below, rather than as an appendix. It seems to be fairly easy to define a local ecology or community or communities in which people participate, but the concept of a community is notoriously difficult to define, since it includes identity and a sense of unity, and covers a broad spectrum from place-based communities to virtual communities (Averweg & Leaning, 2011; Stoecker, 2005; Brunt, 2001). In this study there is both place-based (the geographical communities where VOs live) and virtual communities (the VOs and the BB4All project team).

The conceptual distinction between the micro- and the meso-levels is fairly difficult to maintain for the components of networks, norms and sanctions. Norms are easier to distinguish, as we can ask what is the "kind of common understanding of how to behave that ends up facilitating everyone's actions"? (Halpern, 2005:15). In this research it was experienced that the VOs and rural community share, to a large extent, a common home language (Ndebele) and a second language (English). There was also a shared Ndebele culture, and people were also involved in traditional tribal structures. In addition to cultural commonalities there were faith communities (mostly Christian), the NGOs (many of which were created by community members, such as home-based care centres), and small and large businesses that were wholly locally owned or owned by companies external to the Nkangala communities. An example of a local norm involved the use of taxis which were an important mode of transport for people. The customers expected compliance with informal rules, such as being picked up and dropped off at a spot of their choice along a route.

Sanctions may also be easily identifiable, since they may include formal punishment meted out by the traditional tribal structures or a church, as well as informal sanctions applied if shared rules of behaviour in these communities are broken. These shared rules of behaviour include not taking advantage of those who are poor; fathers providing for their children, and grandparents looking after their grandchildren while the parents are away at work. Taxi owners can expect sanctions from the provincial traffic police if their vehicles are overloaded, not roadworthy or unlicensed; however, the researcher's personal experience suggests that local customs are applied differently in different cases, such as whether the driver is from the area or not, and that this influences whether a driver receives a fine or a warning, and whether bribes are solicited or not.

In terms of networks or relationships, it has been argued that meso- or macro-level effects do require micro-level explanations embedded in personal relationships at the micro-level (Halpern, 2005). It cannot be expected that all the people in Nkangala (or in the VO clusters) have personal relationships with each other, but daily interactions occur that are guided by a shared common understanding of how to behave based on forms of shared identity (e.g. Ndebele, faith based, being a business person) (ibid.).

In the description and analysis of the micro level, the detail of the personal interactions between VOs and the different communities (church-based, cultural, or business) was described and hence the micro-level explanations referred to above have been provided in most cases. In the description and analysis of the meso level, this level of detail is therefore not provided unless required to improve understanding.

Table 9 Meso-level perspective of social capital

Meso-level perspective on social capital	Bonding social capital	Bridging social capital	Linking social capital
Networks	**Neighbourhood or workplace (where you live, where your VO office is)** *Business networks:* VO6 described how two other businesses used the VO6/VO7 office to conduct their businesses and learn from each other. VO8 described how he collaborated with his next-door competitor regarding pricing of services. *VO to VO links:* The VOs can be regarded as being a community in itself, all playing the same role of network support for the project. *Church related networks:* VO9's church had a business development programme for congregation members who wanted to develop small businesses that connected small businesses to each other as well as to experienced business people (VO9, 2013b). *Local government services supported by VOs:* VOs 11 and 12 helped to build the IT capacity of the volunteers from the community working at the library to assist customers with internet use (VO12, 2013a).	**Links between communities** *Church networks:* The pastor of VO8 was a link to a support network that was built via the friendship between the pastors of different churches in the region (VO8, 2012b). This pastor is also an entrepreneur who ran a business and dealt with many tenders hence creating linkages between the church and business communities (VO8, 2012b). VO14's pastor marketed his video services at church driven community events such as the road prayer held twice a year which was attended by taxi drivers and owners, traffic police and church congregations (VO14, 2012b). A supermarket owner and VO9's landlord referred their churches to VO9 for typing services (VO9 , 2013). Small business owners had the opportunity to meet experienced business people at seminars organised by VO9's church (VO9, 2013b). *Soccer clubs:* As discussed at the micro level some VOs are very involved in soccer clubs that probably have players from more than one local community. Since the goal of the club where VO6 is involved is to use soccer to motivate and assist learners to complete secondary education and go on to tertiary studies, the families of the players are in effect also involved (VO16, 2013b).	**Links between strata** *Education system:* The FSM reported that VO3 had a good relationship with her circuit manager from the provincial Department of Education (FSM interview, 2013b). VO5's strategy was to build his business by dealing with as big an organisation as possible and to build relationships with people with influence, e.g. education department circuit managers (VO5, 2013a). The FSM developed a good relationship with the District manager over a period of time (FSM, interview, 2013b). The project team management held a few meetings with the District manager who supported the project at the District level as well as at the Provincial Department of Education. *Local government services:* As mentioned under Bridging capital, VO8's office was near government offices. Via a Social Development CDW friend he provided citizens with free proof-of-residence forms at his office, thus reducing the load on the government office (VO8 b, 2012).

			The project:	This did, however, lead to people
			The project held an enterprise development workshop (co-facilitated by the researcher) in partnership with Microsoft South Africa, to which all the entrepreneurs in the area were invited by VOs and the FSC. A Somalian shop owner also attended (Marais, 2012a).	seeing him (VO8) as being part of the government because of the free forms.
			Business networks:	VO8 was linked to the local municipality as he rented his office from them.
			VO1 provided an example of the variety of business customers of a VO. She did business with Nigerians, Pakistanis and Chinese business people who owned grocery, liquor and furniture stores (VO1, 2013b).	VO14 acted as an intermediary between the citizens and the local municipal ward councillor, to such an extent that the community associated him with the ward councillor and complained to him about services, and VO14 had to convey these complaints to the councillor (VO14 Interview transcript).
			VO5 was the only VO who created a formal business relationship with an accredited trainer so that he could conduct training.	
			VO4 had to establish a relationship with an accredited trainer in order to prepare a quote for training the teachers at a school.	
			Businesses networks were created by businesses who knew of each other and customers were referred to each other.	
			VO relationships with customers:	*Unions:*
			VOs provided a so-called "job market" service to collect information about employment opportunities. They also collected tender information.	VO5's strategy was to link to the unions as well, including SADTU, a teachers' union (VO5, 2013a). SADTU is the major national teachers' union and has a regional presence as well.
			VO-to-VO networks:	*VO linking the BB4All project team to the school system:*
			The VO-to-VO relationships spanned the small community boundaries, as evidenced by their referral of customers to the VO office closest to the customer.	VO4 stated that he had given the FSM information and advice about how to 'handle' the circuit manager of the provincial education department, in order to win him over and gain his support for the projects (VO4, 20123b).
			Traditional leadership structures:	
			The local traditional council (Makhoboko) informed the community about VO9 and his services (VO9, 2013a).	
			Local government services:	*The world of business:*
			VOs 11 and 12 and the nearby provincial library referred customers to each other (VO12, 2013a).	Business customers referred VOs to
			VO8's office was located in a building which included	

		government offices (DSD and SASSA). A post office was also located on the premises. VO8 could provide services such as photocopying to all the citizens from far and wide who came to these premises for government services.	their customers, for example, VO1 was referred to a mining company via a security company (VO1, 2013a; VO1, 2013b). *The project linked VOs to experts:* The project contracted experts in small business development to design and conduct VO business training and change management and thereby introduced VOs to consultants who work throughout Southern Africa. Some VOs developed personal relationships with the consultants and related how they had the confidence to contact them for assistance (VO1, 2013b).
Norms	**Community customs** *Fathers should support their children:* VO11 was very proud of taking responsibility by providing financial support to the mother of his son and that her family appreciated this. *Support the unemployed youth:* VOs provided on-the-job training to friends who wanted to learn and in many cases were willing to assist just for the work experience. VOs paid them what they could afford (VO2, 2012a). Other forms of support included providing information about jobs and bursaries (VO14, 2013a). *Support young entrepreneurs:* Collaborations between small businesses and large businesses were mentioned by VO6. *Support people from your own community:* Churches: VO14's pastor marketed his video services to the congregation by saying that as a church member you should support you own	**Out-group understanding** *Soccer clubs:* The soccer club that VO6 was involved with was a support network for youth from the communities. *Business norms:* *Mutual referral of customers between VOs and other service providers:* Businesses who knew one another referred customers to each other if they could not assist the customer themselves. *Leveraging each other's resources:* Business partnerships and investment offers were made to VOs by large businesses that saw the potential to combine their resources with the VOs' resources (internet access and clientele). *Business rules of conduct:* VO4 gave a school a training quote that used the name and logo of an accredited training company that he had made contact with, but did not inform them or ask them to develop	**Mutual respect** *Trusted link with local government:* VO14 was seen by his community as a trustworthy intermediary between them and the local municipal ward councillor. *VO business customers trusted VOs:* The fact that VO business customers did refer their customers to VOs, thus putting their own reputations at risk, showed trust in the VO's ability to deliver services. *Fostering personal support relationships:* The project's experts in small business development had many years of experience in mentoring rural entrepreneurs, and their

	community (VO14, 2012b). VO9's church referred congregation members and small businesses to him (VO9, 2013b). *Traditional leadership:* VO13 was granted the use of community land on which to build his VO office (VO13, 2012a). *Belong to a faith community:* There were many references in VO interviews to church activities and to pastors. The walls of many VOs offices also had quotes on them from Christian writers and the Bible. VOs could also rely on spiritual support, such as pastors and their mothers praying for VOs. *Customer training needs:* VO1, VO5 and VO13 stated that customers wanted accredited training, while they themselves were not accredited trainers. *VO customs:* Advice, information and assistance were freely offered, but fellow VOs had to pay for services that cost VOs money, such as printing. Free services were exchanged between VOs but there was an unspoken agreement about whether this constituted a fair and mutual exchange. VOs shared learning about doing business in the various communities and with the various types of customers. Referral of customers to their nearest VO office. Protection of the brand was important to one VO in particular, but VOs did generally act to protect customers from VOs who did not deliver a good service, in order to prevent damage to the shared VO reputation.	the quote with him. The school and the training company were hence deceived. *Use of VOs as outsourced offices:* Businesses large and small used VOs as outsourced offices who handled their email for them, for example. Churches also used VOs in this way; VOs referred to this as being the admin office of their church. *Churches support young entrepreneurs:* VO9's church supported small businesses via sponsorships and business advice (VO9 interview transcript, 2013). A supermarket owner and VO9's landlord referred their churches to VO9 for typing services (VO9 interview transcript, 2013). *Not supporting "foreigners'" businesses:* VO1 was, to the knowledge of the researcher, an exception in doing business with a variety of non-South Africans.	willingness to personally engage with VOs led to VOs having the confidence to contact them for assistance.
Sanctions	**Exclusion**	**Group conflict**	**Enforcement**

VOs protecting customers against VOs: VOs 3 and 10 did not refer customers to VO16, who is in close proximity, since he was considered to be absent from his office all the time (VO10, 2013b). *A VO was singled out as an abuser of free services:* A VO overused his privilege of free video-editing services provided by another VO. Informal sanctions were applied by the VO voicing his displeasure to the other VOs. *VO strategies for dealing with customers who expect free services:* VOs refused to deliver services for free that had direct costs such as printing.	*Breaking business conduct rules:* The FSM found out about the unethical conduct and misrepresentation of VO4 when he provided a training quote to a school and instructed the VO to withdraw the quote. The training company involved did not want to work with him anymore. *VOs not supporting "foreigners'" businesses:* During an interview, a VO preferred not to buy a cool drink from the nearby supermarket, owned by Pakistanis, and instead went to a spaza that was owned by a member of his community.	CSIR had contracts with the VOs that were enforced mostly via personal discussions with the FSM or the PM. The CSIR licensee had agency contracts with VOs. VO8 had to provide reasons, with the assistance of the FSC and FSM, in order to persuade the local municipality to renew his office rental contract. Renewals were not automatic and hence sanction would consist of simply rejecting the renewal application.

6.2.2.1 Bonding social capital

A. Networks

The major sources of VO-related networking interactions were business relationships, VO-to-VO business relationships, their churches, and government community service points such as libraries.

In the case of the library, the relationship was formed due to a lack of technical skills on the part of the staff and volunteers at the library.

The VOs themselves can be considered to be a community in itself, formed on the basis of their relationship with the project and the entrepreneurial intent that most VOs shared. VOs referred customers to each other creating new VO-to-customer linkages.

Research done by Granovetter (1973, 1985 & 2005) identified the importance of both close and weak ties with people who are employed to find out about employment opportunities and to get personal referrals to employers. VOs' friends benefited from their relationships with VOs to get access to formal (e.g. the NVC internships) and informal training and employment at VO offices.

VOs also played the role of weak ties that were used by job and tender seekers due to their provision of access to information about jobs and tenders via the internet, the so-called "job market" service as well as emails alerting customers regarding tenders. This could be considered to be a bridging social capital network and is mentioned here with reference to the topic of gaining employment via strong and weak ties.

B. Norms

General community norms and norms that developed among VOs emerged. General norms included: family responsibilities, religious norms, supporting unemployed young people to get jobs or to start and grow businesses, and supporting people from your community.

Family-related norms were: parents support children, children support parents, siblings support each other, and the members of the extended family support each other. In the VO business, spouses supported each other. Unmarried fathers were also expected to support their children and the mothers of their children. Mothers were the only parents that VOs mentioned as sources of support.

Support for unemployed young people was provided by many entities in many different forms. Businesses supported small businesses; churches provided skills development and, in one instance, also actively marketed a VO's services to the congregation; and traditional leadership structures provided land for a VO to build an office.

VO norms in relation to other VOs covered free advice, information and assistance, but fellow VOs had to pay for services that cost VOs money, such as printing. Free services were exchanged between VOs, but there was an unspoken agreement about whether this constituted a fair and mutual exchange. Fairness and respect for each other's business areas were shown by referral of customers to their nearest VO office. VOs shared learning about doing business in the various communities and with the various types of customers.

Protection of the brand was important to one VO in particular, but VOs generally acted to protect customers from VOs who did not deliver a good service, in order to prevent damage to the shared VO reputation.

VOs also supported unemployed young people, by providing on-the-job training to friends at a minimal salary. Other forms of support included providing information about jobs and bursaries to anybody in the community.

In general, VOs were religious and drew on their faith and faith communities for support, especially pastors. Their business was conducted in the context of their faith, as demonstrated by quotes from Christian writers and the Bible on the walls of many VOs offices. Some VOs stated that their mothers prayed for them.

C. Sanctions

VOs were in a process of slowly getting to know the norms of business and the FSM played an important role in educating them and enforcing sanctions if customers were deceived.

Sanctions among VOs were imposed in an informal fashion. VOs protected customers against VOs who did not deliver good services by not referring them to these VOs. An example of VOs protecting VOs was that VOs shared with each other the abuse by one VO of the privilege of free video-editing services provided by another VO.

VOs refused to deliver services for free to customers who expected free services that had direct costs, such as printing services.

6.2.2.2 Bridging social capital
A. Networks

VOs were involved with many of the networks in the community: traditional leadership structures, soccer clubs, business networks, church networks and local government.

As mentioned under Bonding social capital, churches played an important role in creating links in and across communities.

The project played a limited role and the researcher knew of only one opportunity to create such links: a business development workshop to which all the entrepreneurs in the area were invited by VOs and the FSC and which were attended by a Somalian shop owner and other businesses.

Some VOs had developed a network of a variety of business customers, e.g. Nigerians, Pakistanis and Chinese business people who owned grocery, liquor and furniture stores.

B. Norms

Business and developmental norms were prominent, and some businesses also supported the general development norm to support emerging young entrepreneurs and well as the unemployed youth in general.

The business community had their own norms regarding the mutual referral of customers between businesses that knew each other. VOs observed this norm and were also its beneficiaries.

Social capital   171

The norm of not using a company's name to get business without materially involving them in the business deal was illustrated by a VO's unauthorised use of the name and logo of an accredited training company and their subsequent reaction.

The norm of leveraging each other's resources to mutual benefit was demonstrated by the business partnerships and investment offers that were made to VOs by larger businesses that saw the potential of combining their resources with the VOs' resources (e.g. internet access and clientele). If VOs had not received free internet access from the project, some of these linkages might not have occurred, since here was an opportunity to gain access to "free resources".

VOs were seen as trustworthy by other businesses and entities such as churches, which used VOs as outsourced offices that handled their email for them, for example, or VOs acted as a complete outsourced administration service.

Support was provided to young emerging entrepreneurs by a variety of entities. One of the most active sources of support was churches. VOs were also linked to a variety of churches by VO customers who referred their churches to VOs.

C. Sanctions

The FSM found out about the unethical conduct of VO4, who had misrepresented the involvement of a training company and provided a training quote to a school, and instructed the VO to withdraw the quote. The training company sanction was that it did not want to work with him anymore.

As discussed in the micro level section, xenophobia has been expressed in many South African communities and hence was probably also present in Nkangala. The researcher observed many small businesses owned by non-South African citizens, but information was provided in only two VO interviews. One VO did apply sanctions by not supporting "foreigners'" businesses.

6.2.2.3 Linking social capital
A. Networks

The linking relationships between strata were mostly personal and not institution-to-institution. The project did play an institutional linkage role with the Mpumalanga Department of Education at provincial, district and circuit levels, built a relationship with a national government agency, The Innovation Agency (TIA) and had a contractee-contractor relationship with the DST. These relationships did not really focus on building capital at the meso level, but built macro-level relationships that, in time, could support the building of meso-level social capital. An exception was the relationship with the District manager fostered by the FSM, which was used by the project team management to show local support (at District level) to the Provincial Department of Education.

VOs had personal relationships with circuit managers, local offices of national government and local government (via ward councillors). A formal business relationship existed on account of the local municipality being the landlord of one VO.

The other entities with which VOs had personal relationships were a teacher union and businesses that operated across the region.

The project contracted experts in small business development to design and conduct VO business training and change management and thereby introduced VOs to consultants who had worked throughout Southern Africa. Some VOs developed personal relationships with the consultants.

The VOs had to take the initiative to make these linkages with local government; the fact that no reciprocal response was elicited from any of the national or local government entities was disappointing, but was probably due to the personal and informal nature of the relationships. Formal institutional agreements to improve the collaboration were probably required.

B. Norms

A significant norm was the trust that was placed in VOs by community members and by VO business customers. VO14 was used by his community as an intermediary to the local municipal ward councillor. VO business customers had enough trust in VOs as business people to refer them to their customers, even though this might entail risking their own reputations.

The project's experts in small business development had many years of experience in mentoring rural entrepreneurs and knew that a personal relationship with an expert was required to provide effective support to a VO. They accordingly showed their willingness to personally engage with VOs, which led to VOs having the confidence to contact them for assistance. The experts' norm was to go the extra mile to foster personal relationships because of their passion for developing entrepreneurs, and this was a personal norm that the project team knew about, as some of them had worked with the experts before. The people involved in the development of rural entrepreneurs with the assistance of ICT formed a small research and practitioner community in South Africa which included members of the CSIR project team. The norm described above was a shared norm in this community, as experienced by the researcher who was a member of this community.

C. Sanctions

VO linkage relationships that involved sanctions were contractual and involved the CSIR, landlords and the commercial company who was the CSIR licensee.

Contractual issues between the CSIR (as the legal entity) and the VOs were managed via personal discussions with the FSM or the PM, rather than being strictly enforced via legal action.

The local municipality of VO8 was his landlord, and the renewal of the office rental contract had to be motivated very well before they decided to renew the contract.

The CSIR licensee had agency contracts with VOs which covered aspects such as the agent's commission structure.

6.2.2.4 Summary of the Meso-level social capital
The development of meso-level social capital required effort and was based mostly on investment by VOs in personal relationships with individuals in entities operating at the meso-level, e.g. local ward councillors.

The project did not really focus on building capital at the meso level, but did build macro-level relationships that, in time, would support the meso-level social capital. An example was the

relationship with the District manager that was used by the project team management to show local support (at District level) to the Mpumalanga Provincial Department of Education. The norm used by the project team in selecting business development experts was to find people who shared a passion for developing entrepreneurs, which manifested itself as a willingness to go the extra mile with VOs in order to foster personal relationships that would enable VOs to have the confidence to be pro-active and ask for advice. These were linkages between the VOs and experts who had relationship networks at provincial and national level.

The VOs had to take the initiative to make these linkages with local government and other entities; however, formal institutional agreements to improve the collaboration were probably required. A focused effort by the project team would have been required to find the way to facilitate a form of agreement between VOs and these entities, since most VOs were not formally organised as commercial entities. A possible strategy was for the project to use government's small business development programmes, for example, to support VOs to be enrolled in a programme that develops informal and/or small businesses to become eligible as formal suppliers to government.

A significant factor in building meso-level capital was the trust that was placed in VOs by community members and VO business customers. This trust enabled a VO to be an intermediary between the community and the local municipal ward councillor. VO business customers had enough trust in VOs as business people to refer them to their business's customers, even though this might harm their own reputations.

At this level the general community norms and norms that developed among VOs emerged strongly. General norms included: family responsibilities, religious norms, support for unemployed young people and support for people from your own community. Family-related norms were: parents support children, children support parents, siblings support each other, and members of the extended family support each other. In the VO business, spouses supported each other. Unmarried fathers were also expected to support their children and the mothers of their children.

A norm also became evident in the behaviour of the project's experts in small business development, namely that personal relationships were required to provide effective support to a VO. This led to VOs having the confidence to contact them for assistance at any time.

6.2.3 Macro-level social capital

The major focus of the research was at the micro level and therefore the richest information was obtained regarding this level, with some information about the meso level, the context of the communities in which the VOs lived and worked. The macro level refers to a regional or national level and the nature of bonding, bridging, and linking networks at this level. The macro level was dominated by relationships between the CSIR and other entities which form the national government system of agencies and statutory bodies. As the project execution agency the CSIR had to build relationships with the major clients, such as the Mpumalanga Provincial DoE.

Table 10 Macro-level social capital

Macro-level perspective on social capital	Bonding social capital	Bridging social capital	Linking social capital
Networks	CSIR had relationships on a formal level with DST as the contractor and as the national government department that the CSIR reports to. Via the project launch formal contact was made with regional traditional structures, e.g. the local kings. This introduced VOs to the local kings.	TIA approached CSIR, as a fellow government entity, in order to meet a performance target regarding the number of NVC learnerships supported by them (PM interview, 2015). CSIR project team individuals had personal relationships with national and provincial government departments including the DST and the Mpumalanga DoE. The project also provided ICT infrastructure to support a project of the Mpumalanga DoE in order to strengthen this relationship.	*International agreements:* The project was funded under a bilateral DST/EU agreement. *Project team and VO linkages to the Mpumalanga Provincial Department of Education:* Business development was done by the project team to obtain financial support from the Mpumalanga Provincial Department of Education for school internet access and the VOs as such. VO5 presented his experiences as a VO to the Mpumalanga Provincial Department of Education during a business development and marketing visit to the provincial capital. *Business relationships:* CSIR had a relationship with Microsoft South Africa. Project team members linked VOs to the Microsoft Foundation which, in turn, linked the project team with a Microsoft partner that provided a financial record-keeping service for small businesses. The project team created a deal with a commercial phone-to-fax and fax-to-phone service company to provide VOs with accounts. *Linkage to and advice on how to deal with national businesses:* A fencing business gave VO4 advice regarding how to tender for the South African national energy utility (Eskom) and informed Eskom about his business and services (VO4, 2013a). *Licence and transfer strategy:* The CSIR exit and transfer strategy to a commercial Internet Service Provider created a formal agreement with the company, as a CSIR licensee and VOs were contracted as agents of this company. CSIR requested change management assistance from a company that introduced the VOs to professionals in order to assist them in forming a commercial entity.
Norms	**Community customs** Acknowledgment of the role and influence of the	**Out-group understanding** The project team tried	**Mutual respect** *Provincial autonomy:* The project was owned by the DST, a national department. The autonomy granted to South

| | regional traditional structures by the project, DST and the VOs.

The regional traditional structures may cross provincial boundaries.

There are protocols to be adhered to by the project and CSIR in interacting with dignitaries and project stakeholders at national and provincial levels. | to involve the Mpumalanga Department of Education at all levels in order to build mutual understanding of the education and ICT context.

CSIR and TIA both expected that as government entities they would collaborate to mutual benefit and to the benefit of the citizens. | African provincial governments was both an asset and a hurdle, leading to the DST not being able to materially influence the Mpumalanga Provincial Government to provide tangible support to the project or the VOs.

Sustained internet access to the schools and viable VO businesses as outcome:
The principle was that the project should exit to a commercially sustainable entity that would operate the internet access on a commercial basis.

VOs knew that their project contract was of limited duration. The project team did their best to ensure that VOs would be accepted and used by the commercial licensee. The employment or use of VOs could not be formally contracted, as the licensee had to have the freedom to operate on commercial principles.

Corporate citizenship:
Major corporates are obliged by South African legislation to carry out Corporate Social Investment (CSI) and therefore Microsoft participated.

Developing new markets:
Microsoft also had a business interest in understanding how to design services for the so-called market at "the bottom of the pyramid" (Prahalad & Hart, 2002). |
| **Sanctions** | **Exclusion**
The only example was the issue of xenophobia, the behaviour towards "foreigners" that has been discussed at micro and meso levels. | **Group conflict**
The VOs experienced a culture shock during the transition from the CSIR project as management to the commercial relationship with the licensee. | **Enforcement**
Contractual routes for enforcing the terms of the CSIR licensing agreement with the licensee were established and formal management of the hand-over process was executed. There were no direct sanctions against VOs. They could decide to continue with their own individual businesses but then had to find their own resources such as internet access. |

6.2.3.1 Bonding social capital
A. Networks

CSIR had relationships as the contractor of DST, as a member of the government system as a statutory body, and as the project level contractee with sub-contractors. The project team members had relationships with the Nkangala context as part of the project execution process.

Via the project launch, formal contact was made with the provincial structures and the regional traditional structures, including the two local kings. The VOs were also introduced at the launch to all the dignitaries, including the local kings.

CSIR had formal relationships with DST as the contractee and as the national government department that the CSIR reports to as a statutory body.

A significant factor was that there were no significant project-focused relationships between DST and the Limpopo and Mpumalanga Provincial governments, or with the national Department of Basic Education, or with the most important customer, the Mpumalanga Provincial DoE (PM interview, 2015).

B. Norms

There was an acknowledgment of the role and influence of the regional traditional structures by the project, DST and the VOs. There were protocols that had to be followed by the project and the CSIR in interacting with dignitaries and project stakeholders at national and provincial levels.

C. Sanctions

The only example was the issue of xenophobia, the behaviour towards "foreigners", as discussed in more detail at the micro and meso levels.

6.2.3.2 Bridging social capital
A. Networks

TIA approached CSIR, as a fellow government entity, in order to meet a performance target regarding the number of NVC learnerships that were supported.

CSIR project team individuals had personal relationships with national and provincial government departments including DST and the Mpumalanga DoE.

The project also provided ICT infrastructure to support a project of the Mpumalanga DoE in order to strengthen this relationship.

B. Norms

The project team tried to involve the Mpumalanga DoE at all levels in order to build mutual understanding of the educational and ICT context.

The real barrier here was the difference between a project of finite duration sponsored by a national government department, and the responsibility of a provincial department of

education to provide educational resources and support (e.g. teachers, content, IT support, administration functions) on a continuous operational basis. The norm for a department is to be primarily operationally focused and not to execute large projects. Norms for adopting the considerable resource burden from an externally owned project, assigning an owner and incorporating the financial needs into a line budget item in a provincial budget, seemed improbable to the researcher. A provincial department with a mandate to provide good education of equal quality to all the learners is probably biased towards equal distribution of financial resources among the many districts rather than investing in one particular district.

CSIR and TIA both expected that as government entities they would collaborate to mutual benefit and to the benefit of the citizens.

C. Sanctions

The VOs experienced a culture shock during the transition from the CSIR project as management to the commercial relationship with the licensee. The nature of sanctions was different in a commercial context.

6.2.3.3   Linking social capital
A. Networks

Networks were built on the basis of the mandates of institutions such the EU, DST and CSIR, legislation governing local companies, and VO and project-driven needs regarding business development.

The international link was via DST to the EU as part of a bilateral DST/EU development agreement that funded the project. The CSIR had a relationship with Microsoft South Africa and therefore project team members could link VOs to the Microsoft Foundation which, in turn, linked the project team to a Microsoft commercial partner that had developed appropriate financial record-keeping services for small businesses.

Pure business relationships involved the project team and a VO. The project brokered a deal with a phone-to-fax and fax-to-phone service company on behalf of VOs. A VO received valuable advice from a business customer on how to deal with a national business, and this customer also informed the business about the VO's services. This illustrated the reach of a personal linkage across strata.

A relationship with the District manager that had been formed by the FSM was used by the project team management to show local support (at District level) to the Provincial DoE. Business development with the Mpumalanga Provincial DoE was carried out by the project team in conjunction with a VO in order to obtain their financial support for school internet access and the VOs as such. This involved face-to-face meetings.

CSIR's mandate in this project was not to become a commercial player, and hence CSIR followed an exit and transfer strategy to a commercial Internet Service Provider. To facilitate this process CSIR requested change management assistance from a company, creating a linkage between VOs and this company. The company introduced the VOs to professionals in order to help the VOs to form commercial entities.

New linkages were formed, but existing relationships between the CSIR project team and the VOs were also broken in the exit strategy.

B. Norms

At the macro level the constitution of South Africa, the regulatory environment, global business trends, developmental principles and institutional policy played a role.

The South African constitution grants a high level of autonomy to the nine Provincial governments and DST could therefore not force the Mpumalanga Provincial Government to provide tangible support to the project or the VOs, but had to use other means.

Norms regarding who may supply what services to customers existed. In terms of telecommunications services, CSIR only had a research licence, and therefore at some point had to transfer operations to a commercial telecommunications licence holder. In a provincial department of education, some services were procured centrally and limited budgets for certain types of services were allocated to schools. Schools could also raise funds. Schools therefore had funds and a measure of autonomy in choosing suppliers, for example, choosing to contract VOs to install a Wi-Fi network.

Global business trends, such as the development of the so-called market at "the bottom of the pyramid" (Prahalad & Hart, 2002), may have influenced Microsoft to participate. Another influence on Microsoft was that companies were obliged by South African legislation to carry out Corporate Social Investment (CSI).

The development principle was the ideal that the project itself should end, but that the business model that had been researched and developed should be transferred to a commercially sustainable entity that would deliver the internet access on a commercial basis.

Another development principle is not to exploit participants, and therefore the project team did their best to ensure that VOs would be accepted and used by the commercial licensee. The employment or use of VOs could not be formally contracted as the licensee had to have the freedom to operate on commercial principles.

CSIR commercialisation policy governed the transfer process and the allowed commercial models. In this case a licensing strategy was followed and a single licence was awarded.

C. Sanctions

Contractual routes for enforcing the terms of the CSIR licencing agreement with the licensee were established and formal management of the hand-over process was executed.

There were no direct sanctions from the CSIR against VOs. They could decide to continue as individual businesses, but then had to find their own resources such as internet access and office space.

6.2.3.4 Summary of the macro-level social capital

The major influence on the sustainability of the VO model during and after the project was the schools as the planned anchor clients. The schools were under the control of the Mpumalanga Provincial DoE, which provided financial and human resources as well as support systems.

The project team and the VOs followed a bottom-up strategy, with the district manager as an ally, to build relationships with the department and demonstrate the value of the services to the schools. This strategy did not succeed in convincing the decision makers in the department to adopt the model and pay for the services. A suggestion was made that the province could encourage schools to make use of the same service provider in spending their own allocations (Marais, 2013b). This would not entail any extra costs to the province and shifted the purchase decision to each of the multitude of schools (176 in this project), most of which did not have enough financial resources to meet their existing needs. A senior DST manager suggested that, in these matters, a conversation between the Director-General of DST and the equivalent level manager at the Mpumalanga Provincial government is normally effective to make progress, and that the DST could have played a more active role (Marais, 2015c). The fundamentals remain: who had the budget and the mandate, and what was the understanding of the "seller", namely, the project team, VOs and DST, of the "buyer's" decision-making context, e.g. resource availability, ICT strategies, and socio-political influences?

As mentioned early on in this chapter, linking capital is the ability of a group to engage entities higher up in the hierarchy in order to gain access to resources. What have been described here are two possible strategies for building linking capital: the project's bottom-up relationship-building strategy with the demonstration of benefit to the participants, and the direct executive-to- executive intra-governmental strategy suggested by the DST manager.

 If the regional community (the meso level), composed of the schools, learners, parents, and community leaders (e.g. pastors), and the regional political leadership had been mobilised to support the VOs and the project in making the benefits of this initiative known to the key decision makers, the social capital that might have been harnessed could have had a greater effect than a project team with a small measure of VO participation trying to sell a service to the Mpumalanga Provincial DoE. The concept of a project executing an exit strategy is conceptually a questionable approach in these kinds of contexts where the long-term sustainability is to be found in a larger system context of a government delivering services to citizens.

6.2.4 Summary of the different levels of social capital

The focus of this research is to describe and understand the social capital of VOs and how this can be used in ICT4D initiatives to improve development outcomes for participants. The derived research question of how the use of social capital plays a role in growing VO businesses and VO entrepreneurship was the focus of the VO interviews, and the use of the three different levels provided a systemic perspective.

A major trend was that the role that VOs as individuals could play in building social capital diminished as the context expanded. At the micro level VOs were dealing with people on a

personal level, and support was almost guaranteed from your family, your friends, fellow VOs, pastors, the government official you knew and the individual project team members. The context was fairly simple: one person helping another as guided by unspoken rules without the interference of organisational rules. VOs in close-knit personal relationships were very important sources of business support and personal encouragement to each other. VOs were connected via deep personal relationships to organisations such as churches and NGOs on an informal basis. Personal relationships existed with school personnel and circuit managers.

At the meso level, entities, groups and group norms started to play a more important role. An important example was the support provided by a VO's pastor who not only made clear the duty of the congregation to buy services from one their own but also acted at a community road safety day to market his church member's services to all the groups present. Another example was that a VO received permission from traditional leaders to build his office on communally owned land.

Relationship building became more of a means to an end, for example, to do business with a large business, and required more focused effort by the individual VOs to build a relationship. Access to the decision maker became more difficult and indirect via a chain of relationships. In two cases VOs built relationships with the son of a businessman in order to build a business relationship.

VO5 followed a definite strategy to build relationships with people with influence in their organisations such as circuit managers. The other VOs saw this as a threat rather than an opportunity for the VOs as a group, since they were locked into the concept of geographically delineated business areas. VOs did not harness the potential of collective action by collaboration or coordination.

At this level the project as such was needed as an active partner, engaging with customers together with VOs and representing their interests in general. So, while VOs did take individual initiative to build linkages with the employees of national government (e.g. DSD via Community Development Workers), formal institutional agreements to establish formal collaboration would probably have required a focused effort by the project team, VOs and local community representatives.

At the macro level, the interactions were project-driven and not VO-driven, and VOs had a very limited role. The interaction between people became one of representatives of organisations that were guided by organisational objectives, rather than personal ones. This does not mean that personal values and relationships disappear; in fact, they may become more important in order to gain access to key decision makers and to get over the hurdle of the inherent inertia of large organisations with prescribed mandates and rules.

The argument for dealing with the three levels as a whole is that there are systemic relationships between the dimensions consisting of the components, character, and levels of analysis. The business development efforts reflected a systemic relationship.

A discussed in the summary of the macro-level in the previous section, a formal systemic relationship existed between the schools, the circuit, district offices, the Mpumalanga

Provincial DoE and the Mpumalanga Provincial government. The learners and their parents were also participants in this system as the beneficiaries of the education provided. The suppliers to the schools had business relationships at school and provincial level. As discussed above, schools had a measure of autonomy in choosing suppliers, and a school did contract VOs to install a Wi-Fi network. Due to a lack of commitment at central level, a possible strategy was to convince the individual schools, who had been connected by the project as well as the additional schools, as a collective to make a choice for the collection of VOs as their shared service provider.

6.3 Influences on the social capital of the VOs

Three influences on the social capital formation of VOs are discussed, namely the influence of geographical proximity, the role of ICT and the degree of heterogeneity in the business community.

6.3.1 Influence of geographical proximity

VOs had access to the internet and to cell phones. In the analysis of the interviews, personal contact that was enabled by physical proximity emerged as being important in forming VO-to-VO relationships. The question is why this was still so important, given the availability of ICT communication and social media tools to VOs. Proximity also influenced business relationships. In the next section we return to the role of ICT use in relationship building.

The influence of geographical proximity on VOs' relationships to customers and businesses and VO-to-VO relationships is summarised.

6.3.1.1 VO-to-school relationships

The relationship and level of service experienced by schools were strongly influenced by geographical proximity to the VO office as well as the travel patterns of public transport.

Examples have been mentioned in the micro-level social capital discussion, and behaviour patterns are summarised here and illustrated via Google Earth maps.

Schools close to VO offices were mentioned by VOs as the schools that they had personal relationships with. Maps of the cluster of VO16 are used to illustrate this pattern. VO16 had close links to three schools (out of a total of 15) that are all fairly close (of the order of 15 to 30 minutes walking time) (VO16 transcript, 2013).

In Figure 35 the complete VO16 cluster is shown.
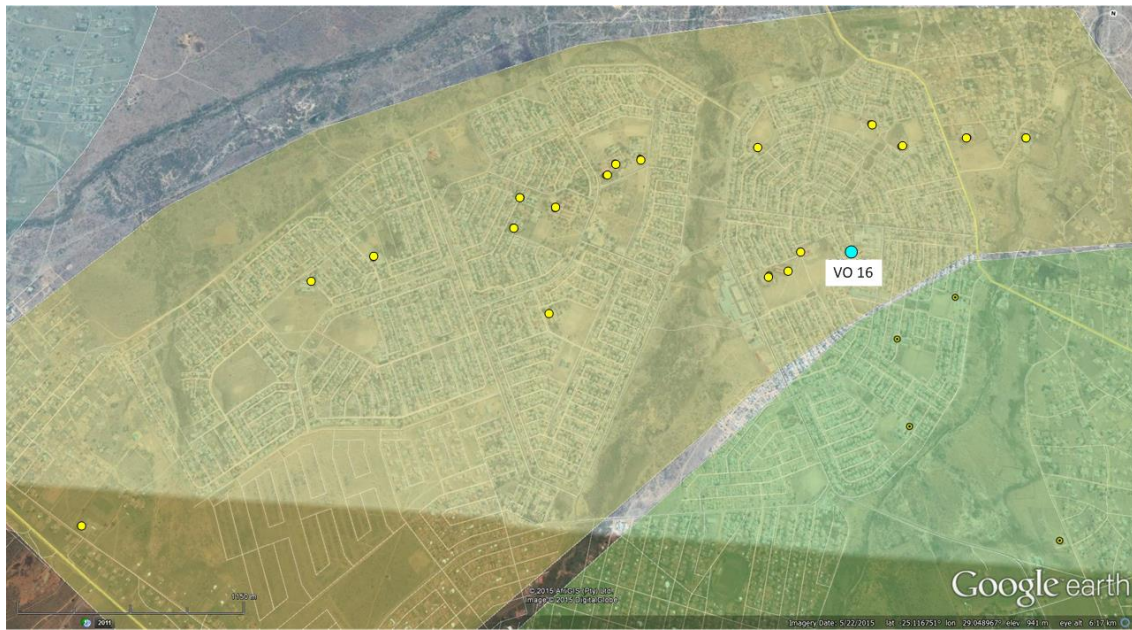
Figure 35 The cluster assigned to VO16 (schools shown as yellow dots)

The cluster extends from left to right at the top of the map and VO16's office, located in the middle to the right, is labelled. The BB4All schools are widely distributed across the area, as indicated by the yellow dots. Three schools are close to the VO office. The scale bar at bottom left indicates 1km.

The next figure shows that the schools are within walking distance. The scale bar indicates 200m.

Figure 36 VO16's office and the three nearest schools

As mentioned before, both VO2 and VO5 are close to schools that are en-route to their offices and this was mentioned by them as a factor in building relationships with these schools, as frequent visits were made possible by zero or low travel costs and convenience. The KwaMhlanga Senior Secondary school is approximately 200m to the left of VO5's offices in the middle of Figure 37.

Figure 37 The nearest school to VO5's office

6.3.1.2   *VO-to-customer relationships*

The office of VO6 and VO7 was very well located in a building near a major crossroads in KwaMhlanga (VO6, 2013a). A Further Education and Training (FET) college, a computer shop/internet cafe, an architect, a restaurant, a supermarket/shop and various other businesses such as a hair salon are located in the building. The FET college students had to pass by the VO office to exit the building.

According to VO6, the FET students were very important to the viability of their business, to the extent that internet access at the FET college might reduce their business drastically.   VO6 assigned a large amount of influence to them and remarked that "if they die" the business will be in trouble, "but if they are still here" the business will go on (VO6, 2013:20).

VO13 chose the location of his office so that it would be at the centre of the community: next to the South African Post Office building containing all the local post boxes, across the road from a supermarket, and near other two other shops and the taxi rank (VO13, 2012a). In addition, learners had to pass his office on their way to and from school.

VO8's office was well situated on the corner of a busy intersection in the middle of Verena. On the premises there is a U-shaped complex which includes government offices (Department of Social Development (DSD), Department of Home Affairs and the South African Social Security Agency), a restaurant, a hairdresser and a print/copy/lamination shop, which is right next to

his office. A post office is also located on the premises in a separate building. VO8's office is on the corner closest to the entrance from the road to the complex (Figure 38).

Figure 38 VO8's office at National government service points

VO15's office had a good location on a main road in a building next to large supermarket. His office was next door to a doctor's rooms (VO15, 2012a).

Easy accessibility by the community to his business was important to VO14, and it was important to him that he was located in the community (VO14, 2013b). This benefit worked both ways – during the interview a small child brought cell phone vouchers so that VO14 could recharge his public phone (which is connected via a cell phone network).

On the whole the advantages reported outweigh the disadvantages, except in the case of VO-to-school relationships and service levels. The cost and frequency of taxis resulted in VOs not developing relationships with many of their schools and not providing good support services. Schools as markets for the VOs' extended range of services as provided at their offices were also limited by distance. An advantage may become a disadvantage as well. Overdependence on a particular source of customers might be a disadvantage, for example the high importance of the FET college students to the business of VO6 and VO7.

6.3.1.3   *VO-to-business relationships*
In both collaborative and competitive business relationships proximity played a role.

There were mutual referrals of customers by VOs and other service providers that were in close proximity. When the internet access of the office of VO11 and VO12 was down they referred customers to the nearby library (VO12, 2013a). The proximity of the South African Social Security Agency (SASSA) office on the same site as the library was good for business too, as people made photocopies of their IDs (VO12, 2013b). The VO office and the library is about 100m apart as the crow flies (Figure 39).

Figure 39 VO11 and VO12 office with the nearby Marapyane Library

The proximity of the computer business to the office of VO6 and VO7 did lead to a special business arrangement having to be made in order to avoid direct competition with each other, as discussed in the Appendix (VO6, 2013b). This arrangement was made easier on account of the friendship between the VOs and the owner of the computer business (ibid.).

VO6 competed with two nearby internet cafés, one of which is within walking distance, and stated that, in order to compete, he had to make sure that he can offer all of the services that they do (VO6, 2013a). VO6 did refer to the closest business as having a negative influence on his shared business with VO7 (VO6, 2013b).

VO1's father created a new printing branch in the shopping complex where her office is located. This would facilitate business referrals between their businesses.

VO16 reported that his business was constrained by the location of his office in a side street that is one block from the main street where all the internet cafés that are his competitors are located (VO16, 2013a).

6.3.1.4   *VO-to-VO relationships*

The proximity of VO offices to each other played a role in the VO-to-VO relationships. The references to distance found in VO interviews are: VO2 is friends with three VOs (VO6, VO7, and VO10) who are fairly close to her office (VO2, 2013b); VO3 has built a good relationship with VO6 and VO7, whose office was not far from her home (VO3, 2013b); and VO6 mentioned VO5, whose office was located in the same town, as well as VO1, who was based in an adjacent area (VO6, 2013b).

The geographical context of the relationships of VO2 is illustrated in Figure 40, where it can be seen that VO2 was located on a major north-south regional road and had relationships with VOs who are located on the same road (VO6/VO7, VO10).
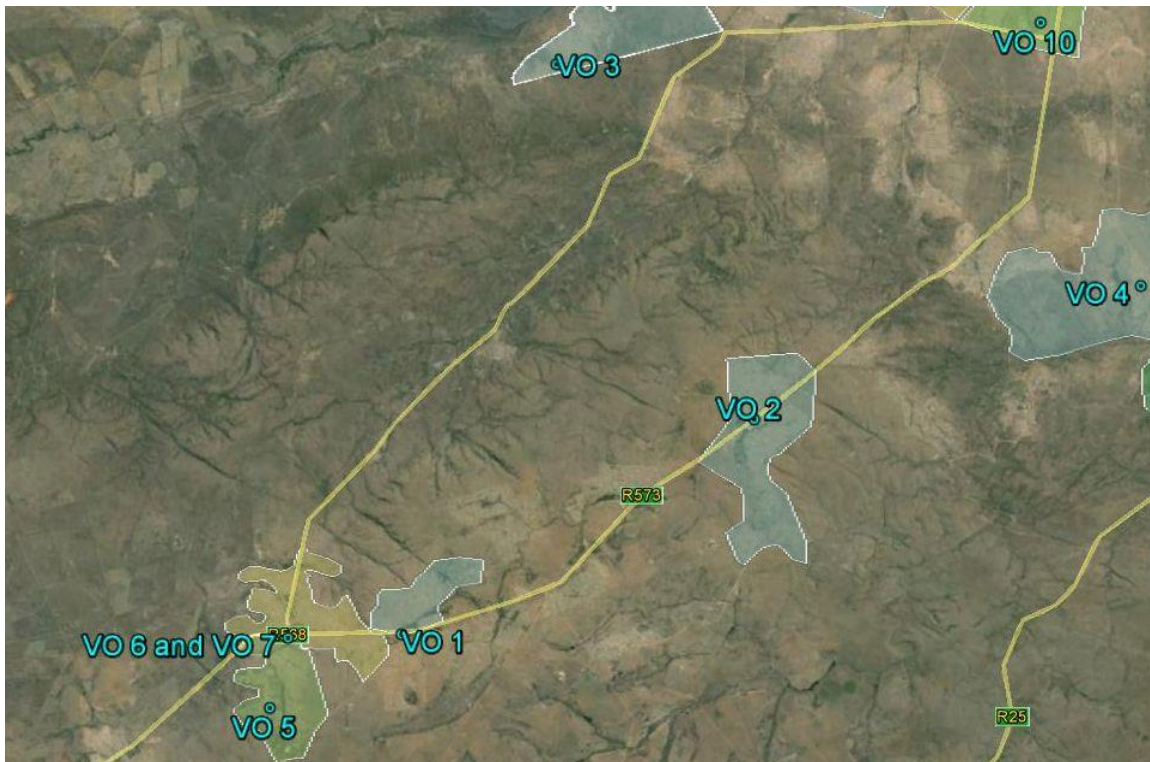
Figure 40 VO2 relationships to other VOs

VO2 had, as it were, "drop-in" visits from VOs who were travelling along this major road and this rather than the actual distance between each other, was the major factor. The proximity of VO6/VO7, VO5 and VO1 to each other is apparent – they are clustered together in the lower left-hand side of Figure 40.

6.3.2   The role of ICT

6.3.2.1   The focus of the VOs
Improving customers' business processes

In previous research the facilitating role of ICT in the building of social capital via enhancing information flows and connecting individuals was highlighted (Adam & Urquhart, 2009; Yang *et al.*, 2009). In this research, this role of ICT was not a major theme for the VOs themselves. Their focus was mainly on improved information flows in their customers' businesses as means of adding value to their customers via personal services. The communications between the VOs and their customers and between their customers' customers and family as well as general business processes were improved by the use of ICT. A particularly interesting role of some VOs was that of being the "human interface" for the customer or friend between different types of communication applications. Examples of some of the interfaces created are as follows: email to cell phone voice call or SMS, voice call to internet search to SMS of results

back to the customer cell phone. These interfaces and services were required to improve the speed of reaction to triggers for action of their customers in their business processes. In tender processes VOs assisted by scanning for tender opportunities advertised via email and also alerted customers to responses to tenders they had submitted. This was enabled by the trust placed in VOs to read customers' email on their behalf and therefore they could inform customers via SMS or a phone call, enabling them to react in time. The major influence of VOs was in enabling the adoption of ICT by their customers; this vital role is discussed in Chapter 8, Networks of innovation.

Improved visibility of a sports team in a community

VO6 used social media to enable visibility to the community of his soccer team's activities. He created a Facebook page for the soccer team so that "Everyone who wants to know where we are playing can see [it] there" (VO16, 2013b:4). ICT was used here to increase the flow of information to a wider audience to support mainly bridging capital.

6.3.2.2   Use by VO customers
Communication with distant family members via VOIP applications was in demand by mainly non-South Africans, for example, Somalians and Pakistanis (VO12, 2013b; VO13, 2012a). In this case ICT was used to maintain bonding social capital (DCITA, 2005).

6.3.2.3   Use of social media for VO-to-VO communication and relationship building
A Facebook group was created by VO16 for sharing and discussing issues of mutual concern. At one point the group was closed down because of negative comments made by one of the VOs and the tenor of the conversation that ensued (FSM interview, 2013).

6.3.3   Perceptions of foreigners – heterogeneous communities
Xenophobia was mentioned in the micro level section on bridging social capital. The topic came to the fore in only two VO interviews and was most probably underrepresented due to reluctance on the part of VOs to talk about it. Because of the potential importance of collaboration between all the small businesses in an area, e.g. collaborative buying, this barrier to the creation of bridging capital is mentioned as one of the influences to take note of.

The possible benefits that can accrue were illustrated by the experiences of VO1. VO1 participated in the NVC learnership (VO1, 2013a). The NVC trainer had a major influence on VO1 in terms of altering her perceptions of foreigners and as a result relationships were built:

> Yes, so if they come here they no longer foreigner, it's my friend, okay my friend, invoice my friend. Invoice, I pay, you know my friend, I pay. The English is not proper, but their service is good and the money is flowing in at the end of the day. (VO1, 2013b:6)

VO1's husband has also benefited since the Pakistanis used her husband's electrical installation skills (ibid.).

In this case a business trainer persuaded VO1 to see the "foreigners" differently, as fellow business people that she could learn from and therefore start building a business relationship with, people whom she had previously not considered having any relationships with.

6.4 Looking into the future: VO plans to build social capital to grow their business

6.4.1 Introduction

One of the interview questions about the future was: "In order to achieve your VO business goals, which links (relationships) would you want to establish or strengthen in the future?" (Marais, 2013a:3).

VOs were surprised at the many relationships that they did have and this realisation led to the realisation that they were not alone, as discussed in Section 4.7.5. VO9 said that the interview process "makes you realize who is around and supporting you" (VO9, 2013b:27).

VOs could identify which relationships were important to the success of their business, what needed to be strengthened, what relationships were missing, what relationships should be cut.

6.4.2 Examples of plans for relationships

VO12 mentioned that a good relationship with the Service Desk was important to future business growth (VO12, 2013b). Building relationships with schools was important in order to increase the number of student customers, and the relationship with the schools needed to be clarified (so that they would not expect free services) (ibid.). VO12 mentioned that he wanted to improve on his good relationships with small businesses so that "I am the person they go to when they want some things" (VO12, 2013b:38). Additional printing clients would result from an improved relationship with the nearby library, since the more people do internet searches, the higher the demand for printing (ibid.). Maintaining a good relationship with VO11 was important as well. VO12 could not identify new business relationships that needed to be developed.

VO6 is the middle brother of three brothers and shared advice with his mother. His plans for the future included growing the support from his mother and brothers (VO6, 2013b). VO6 also wanted to strengthen the sharing of business experiences with his friends (ibid.).

6.4.2.1 Strategic thinking about building relationships

VO6 identified that he needs to get business from NGOs as well as from local and provincial government. He had an interesting insight into how to spark government's interest in your business:

> *it is like the government when you provide something to the NGO's, you get recognised quickly… Like an orphanage, if somebody has an orphanage and we would deliver milk every day for free, in the long run the government will take you, because you are making a difference in the community. Something will come, you just have to be patient*. (VO6, 2013b:24)

The schools were important to VO9 (2013a) since they will always be there and therefore he was always telling their students to come and visit his office, especially since the students will grow-up and then remain his customers.

6.4.2.2   Clear plans for the future

VO13 had very clear plans for the future and could list them quickly (VO13, 2012a).In terms of relationships, he planned to collaborate more with his business friend who was very good at designs (e.g. for T-shirts, USB drives, diaries) since this business is quite profitable. He viewed his friend as being lazy and said that he could do much better (ibid.). VO13 also wanted to collaborate with a training company to train teachers to use Microsoft Office applications (ibid.).

He required support in terms of business development, specifically to gain access to government departments for business opportunities as well as access to the Sector Education and Training Authorities (SETAs) for learnerships. He wanted to register as a supplier at the local municipality and at a hospital. He expressed the need to identify a good supplier of cheap computers which he would resell cheaply in turn, as well as suppliers of anti-virus software (ibid.).

6.4.2.3   Examples of relationships that needed to change

VO8 (2012a) commented that his relatives do not have money and that they want and get free services from him. This is one of the negative influences that he wanted to reduce in his plans for the future.

VO10 (2013a) felt alone and mentioned that other VOs were selfish since they did not want to be disturbed in their offices. She needed to improve relationships with VOs in order to share information and wanted to get business advice from an experienced business person (ibid.).

The question about relationships led VO2 (2013a) to identify quite a few new businesses as competitors that she needed to be more aware of. VO9 became more aware of competitors too and, while he had visited them, he had not realised that they are actually competing with him.

6.5   Reflections on social capital in the phases of the project

As the project phases unfolded there were also changes in the relationship dynamics in the project as a social system, and social capital was created, destroyed and used. The researcher was aware of, or participated in, most of the aspects mentioned here, and the information presented draws on personal experiences (notes made at meetings) as well as interviews with the key role players such as the PM, the FSM and the VOs.

6.5.1   Complexities at the launch of the project

A VO became the "poster girl" for the project during the launch of the project by dignitaries, including the Minister of Science and Technology, and this led to other VOs expressing envy and feelings that she had been unfairly singled out and showcased while other VOs were not (and their personal opinion was that she was not doing a good job as a VO) (VO5, 2013b).

6.5.2 Stabilisation and formalisation of operations

There was friction between VOs and the newly introduced Service Desk with its well-defined role and procedures for managing technical support. VOs asked: 'How can they tell me what to do when they do not understand the local context and how difficult it is for us to meet their demands?' (VO10, 2013b). VOs did not have personal transport and had to rely on taxis, and therefore the costs of travel were high and their response time was constrained by the taxi operators who had set times and fixed routes. Any deviation from the normal time and/or routes would require the special hire of a taxi or a favour from a friend with transport.

The project policy was that VOs were not paid for getting to schools to deliver services (FSM, 2015). These costs were expected to be covered from the monthly stipend and other income earned via the use of their office facilities (ibid.). It should be noted that their offices were paid for by the project until the end of year four (ibid.).

6.5.3 Communication throughout the project

VOs had stated repeatedly in the interviews that they enjoyed the meetings where all of the VOs and the project team were together (VO6, 2013a; VO5, 2013b). The meetings were however expensive and required a lot of coordination by the PM, FSM and FSC because of to the widespread distribution of the VOs in the Nkangala District. Taxis had to be hired specially for the day to take VOs to the CSIR campus in Pretoria or to a more centrally located meeting venue at the southern end of the district. Meetings could therefore only start at 10:00 in Pretoria and around 9:00 at the venue in Nkangala and for safety reasons had to end by 16:00 at the latest. The total cost for such a meeting including transport, venue hire and catering was approximately R12 000 (FSM interview, 2013a).

The reunion and personal encounters are very valuable in creating a sense of identity and belonging and to refresh personal relationships. Therefore, these meetings were vital in building bonding social capital among the VOs and thus strengthening the VO-to-VO network, as well as building bridging and linking capital with the CSIR team and companies such as Microsoft. At the meetings VOs could raise concerns, make suggestions and "speak on behalf of" some of the more reticent VOs. The project team could then respond and raise their own concerns, make suggestions and make decisions in a shared context where all of the VOs knew the basis of the decisions made.

6.5.4 The dynamics of social capital during the exit phase of the BB4All project

Social capital was destroyed (as relationships were ended) and created (as new relationships were formed or existing relationships were strengthened) in the exit or transfer phase of the project to a commercial licensee. The importance of social capital was understood at a personal level and at a project and contract management level, but not to an adequate degree. The performance of the licensee in meeting agreed-upon obligations during the transfer process was inadequate and hence the project manager was placed in the very difficult position of having to engage on a regular basis with the licensee to attempt to deal with operational issues that were already the responsibility of the licensee (PM, 2015). This all took place in a context where the VOs would continue to contact the PM and/or FSM in order to report problems. In some cases, customers contacted the FSM directly and placed him in the same difficult position. The VOs contacted the FSM about the changes brought about or

lack of support by the commercial license in order to report problems. The commercial licensee demonstrated a mixture of understanding relationship building and being realistic about how to deal with the reality of commercial operations and human resourcing and funding constraints.

The CSIR BB4All project leadership did realise the potential impact on the VOs and the project team (including CSIR employees and contractors) of the exit of CSIR and the transition to the licensee. A company was contracted that specialised in assisting employer and employees to deal in a human-centred and collaborative manner with the inevitable consequences of large changes in a company such as its closure (PM, 2015).

6.5.4.1   Social capital destroyed or reduced
Personal relationships have been formed during the six years (2009 -2015) of the project. CSIR employees and project contractors expressed sentiments of regret that the transition has now happened, and anger that the commercial licensee has proved unable to provide sufficient management focus and enough resources to provide adequate support to the transition process and that therefore VOs and customers are now being left with unreliable connectivity and slow technical support (PM, 2015).

In the end the project team understood that this was a project and that it would end at some date. The question was what constituted a responsible and supportive exit and transfer to the commercial licensee, as well as the personal question of how to say goodbye to VOs and the project team.

Because the VO contracts had been extended from a planned three years to six years via the team leadership's efforts, the PM thought that the VOs no longer believed her when she said that April 2014 to March 2015 was the last project year (PM, 2015). They had hoped that CSIR would continue supporting them. A certain level of dependency on CSIR had been created. In the last year of CSIR being in control of the project, costs had to be reduced and, for example, the VO office rental was not being paid any more. Most VOs did in fact manage to pay the rental themselves.

The NVC learnerships organised via the project were the last attempt to provide resources (a stipend and people to assist them in their offices) to the VOs. Unfortunately, not all of them participated in the training, since they decided that the money was not worth the time and effort, as they had enough income. Some did participate, but did not do the required learnership work (ibid.). This was the last opportunity that the project could offer them to gain income, learning and support, and the ideal was that they would make the most of it (ibid.).

6.5.4.2   Social capital in flux – destruction and creation
The fundamental departure point of most VOs was that the clusters were assigned to them, they had been responsible for the schools and customers and therefore they felt that the clusters belonged to them and they wondered how the project/CSIR could pass them on to a third party without consulting them. "Why were we not considered as a possible owner of the network," was a question asked by VO5 (Marais, 2015c). After their engagement and contracting with the licensee, their feedback was that they were now just agents selling their products, and that they were not respected as business people in their own right (ibid.). A

regular source of income had disappeared, as they do not get paid to maintain the network. During the handover process, the maintenance contract with the existing companies for backbone maintenance had expired and the licensee did not react quickly enough to do the maintenance and repair themselves (PM, 2015). The impact on the VOs was that they were ashamed at the decrease in the network availability and were powerless to do anything about it. Their relationships with their customers deteriorated and they made statements regarding this situation along the lines of 'We cannot look customers in the eye anymore and tell them the internet is down' (Marais, 2015c). VOs were used to being part of a family, the project, with a "mother", the project manager, to whom they could talk to resolve problems (PM, 2015). In the new commercial context, they are being treated as individuals who have to perform to make sales otherwise they can be fired as agents. The researcher's observation was that the licensee was not used to working with anybody other than agents and employees and that dealing with VOs as individual entrepreneurs presented a challenge.

Despite attempts made to grow the concept of a "VO network" (e.g. via meetings) and the concept of sharing a common brand as "Internet for All" (branded clothing and signage), the most impressive display of bonding social capital fostering collective action (collective social capital) emerged as the VOs were confronted with the realities of the transition to the licensee. For the first time in the project the VOs took collective action to achieve a shared goal of dealing with the real and perceived threat represented by the commercial licensee. This can also be called 'bounded solidarity', a type of social capital as group cohesion that develops in adverse conditions (Portes & Sensenbrenner, 1993). A director of the change management company offered to assist the VO in his private capacity to introduce representatives of the VOs to legal professionals to explore the viability of forming a legal entity that could negotiate with CSIR and the licensee regarding scenarios for access to the BB4All network, explore forms of business collaboration, and develop totally new business strategies with new partners (Marais, 2015b). In a very short period of time at the meeting the VOs elected representatives and this process was started.

At the time of writing the plan had developed for the formation of three cooperatives, which all 15 of the remaining VOs elected to become part of. These cooperatives would be negotiating with services providers who wanted to sell internet access and other services into the Nkangala area. The contract between the licensee and the VOs did not bind them to an exclusive agent relationship or prohibit them as entrepreneurs from pursuing other business relationships or becoming involved in any business products or services (Marais, 2015b).

The cooperatives presented a new opportunity to build on the social capital of VOs, in the form of both VO-to-VO relationships and the many relationships built over years between VOs and customers, organisations, government entities and businesses in the Nkangala area.

6.6   Summary
The research regarding the social capital of VOs was presented via the use of a multi-level concept of social capital that consisted of micro, meso, and macro levels. At each level the different forms of social capital, namely bonding, bridging and linking capital, were

investigated and for each form of social capital the components of networks, norms and sanctions were described and analysed.

Micro level: The micro-level analysis delivered the richest and most diverse information of all the levels owing to the focus on the individual VOs in the interviews. The micro-level relationships of VOs were diverse and included personal relationships, relationships with contact persons at schools, learners, business relationships, relationships with other VOs, relationships with community organisations (churches, NGOs, traditional leadership) and government officials and interactions with the individual project team members.

Family relationships were the most important and diverse source of support to VOs, and bonding capital dominated the other forms of capital in terms of the many forms of support received by VOs. Mothers were the single most influential source of support. VOs reciprocated by improving siblings' business skills, free services, advice, and financial support. Most families did not have large extra financial resources and hence the support of most families would not enable significant scaling up of a VO's business. VOs reciprocated by improving siblings' business skills, free services, advice, and financial support.

Bridging capital was provided mostly via relationships with friends, customers, churches and fellow VOs. The relationships with the anchor customers, the schools, were unfortunately relatively few. Churches were significant customers and supporters and provided a platform for building bridging capital in the community. VO-to-VO support was important and functioned at a business and emotional level. VOs developed norms and sanctions regarding the mutual exchange of services.

The dominant norm was passive and active support for the VOs from all the role players in the local community. Reciprocation was a pervasive theme. In all of the relationships trust was important and while trust was offered freely by many individuals as a first step, VOs had to earn this trust by delivering good services. Innovative services were developed for business customers based on trust in VOs and the willingness of VOs to customise services to fit a business need.

Only a few VOs had built business relationships with a few schools each and therefore the VOs' linking capital to schools was low. A disadvantage of social capital was the expectations of most of the schools that VOs would deliver free services, especially those VOs who were alumni of a local school.

The few sanctions that were mentioned dealt with VO-to-VO relationships and business boundaries.

Meso level: The development of meso-level social capital required effort and was based mainly on investment by VOs in personal relationships with individuals in entities operating at the meso level, e.g. local ward councillors. This relationship also showed the trust that a community had in a VO that enabled him to be an intermediary between the community and the local municipal ward councillor.

Formal institutional agreements to improve the collaboration with such entities were probably required, which had to be facilitated by the project. In practice the project team did not really

focus on building capital at the meso level, although there were a few efforts such as the relationship with the District manager that was built by the FSM.

At the meso level general community norms and the norms that developed among VOs emerged strongly. General norms included: family responsibilities, religious norms, support for unemployed young people and support for people from your own community. Family related norms were: parents support children, children support parents, siblings support each other, and members of the extended family support each other.

Macro level: This level was dominated by project-driven relationships as the CSIR as the project contract holder was seen to be responsible for stakeholder management and business development.

The major influence on the sustainability of the VO model during and after the project was the schools as the planned anchor clients. The schools were under the control of the Mpumalanga Provincial DoE. The project team and the VOs followed a bottom-up strategy, with the District manager as an ally, to build relationships with the department and demonstrate the value of the services to the schools. This strategy did not succeed in persuading the decision makers in the department to adopt the model and pay for the services. The only progress was a suggestion made by the department that it could encourage schools to make use of the same service provider in spending their own allocations. This shifted the purchase decision to the individual schools, most of which did not have enough financial resources to meet their existing needs.

The argument for dealing with the three levels as a whole is that there are systemic relationships between the dimensions consisting of the components, character, and levels of analysis. The business development efforts showed the need for developing systemic relationships. The need for using social capital was discussed in the summary of the macro-level social capital (Section 6.2.3.4). The regional community could have been asked to support the VOs and the project in communicating the multitude of benefits experienced to the key decision makers at the macro level (e.g. the Mpumalanga DoE). This could have had a greater effect than the BB4All team with some VO participation trying to sell a service to the DoE and would have been an instance of social capital enabling collective action.

External influences: Three external influences on the social capital formation of VOs were discussed, namely the influence of geographical proximity, the role of ICT and the degree of heterogeneity in the business community.

The relationship with schools and the level of service provided, were strongly influenced by geographical proximity to the VO office as well as by the travel patterns of public transport. Schools that were close to or en-route to VO offices received good services from VOs because of zero or low travel cost and convenience. In both collaborative and competitive business relationships, proximity had a positive or negative influence. The proximity of VO offices to each other had a positive effect on VO-to-VO relationships.

In previous research the facilitating role of ICT in the building of social capital via enhancing information flows and connecting individuals was prominent. In this research the important

role of ICT was to improve information flows in the VOs customers' business processes as a means of adding value. Some VOs played the particularly interesting role of the 'human interface' for the customer between different types of communication applications (e.g. email to SMS).

Xenophobia came to the fore in only two VO interviews and is a barrier to the creation of bridging capital.

Future plans: When asked to develop business growth plans based on a social capital perspective, VOs could identify which relationships were important to the success of their business, what needed to be strengthened, what relationships were missing, what relationships should be cut. An important benefit of the focus on social capital was the realisation of VOs that they did have many relationships that provided support.

Project phases: As the project phases unfolded the relationship dynamics in the project as a social system became evident. During these phases the social capital of VOs was created, destroyed and gainfully used by VOs as a result of various influences and interactions between VOs and between VOs and the project team.

The most dramatic influences were observed during the exit or transfer phase of the project to a commercial licensee. Social capital was destroyed (as relationships were ended) and created (as new relationships were formed or existing relationships were strengthened - as VOs took collective action). This phase did demonstrate that, to a degree, the importance of social capital was understood at a personal, project and contract management level, but that this understanding was insufficient to enable the design and execution of a strategy to nurture social capital creation in this complex project phase.

The adoption of a social capital perspective led to the development of a rich picture of the personal, business and institutional environments within which the VOs and the project team functioned. The main research question of what the social capital of VOs is has been addressed via a comprehensive description that used a multi-level concept of social capital. The micro-level description illustrated how VOs used social capital for their own benefit, and for the benefit of their customers. The striking example is how trust enabled innovative services to be delivered. This finding is explored in more detail in Chapter 8: Networks of innovation. At the initiative level, the influence of social capital in improving development outcomes was discussed with a focus on the desired outcome of improved sustainability of VOs on account of the department's agreeing to pay for services to the schools. Possible reasons for the project's failure were advanced and an alternative strategy based on mobilisation of meso-level social capital was suggested. In conclusion, the importance of building social capital due to the pervasive influence of social capital in its different forms from micro to macro levels was revealed.

7 Community service and social entrepreneurship

The context and content of Chapter 7 are shown in the thesis map.

Introducing the problem

The context

Methodology and Data collection

Analysis and findings

Social entrepreneurship	Community service in a personal capacity	Community service as part of VO business values	VOs living out community service in their businesses	VOs managing community expectations

Reflections on the Choice Framework

Considerations for development practice

Conclusion

7.1 Introduction

One of the main themes that emerged from the analysis was that VOs referred to themselves as helping the community by delivering services to the community. In terms of social capital concepts, these actions may arise from their being from the community and identifying with the community and its norms. VOs are businesses owners too, and there is an interaction and possible conflict between being an entrepreneur and being a member of the community. In order to distinguish the nuances that existed in the concepts of community service and entrepreneurial business, it is useful to engage with the concept of social entrepreneurship. The research on social entrepreneurship is valuable from a sustainability perspective too, as NGOs have struggled to survive on donations and have been exploring business models for deriving income from their services to citizens that should be delivered by government. Hybrid forms have been evolving between community services delivered by Community-based Organisations (as public or private non-profit entities), the business models of the large transnational NGOs, the transformative developmental interventions such as the Grameen Bank (Yunus, 1998), and the traditional for profit business models.

The VOs told the researcher how they delivered community services of a practical nature both in their personal capacity and as owners of VO businesses. In this chapter both of these aspects are explored, as well as the grounding of community service in the VOs' business values, the complexities of combining community service and business, and the management of community expectations.

In order to frame the discussion, the concept of social entrepreneurship is introduced.

7.2 Social entrepreneurship

7.2.1 Introduction

In Chapter 6 the various dimensions and uses of the social capital of VOs was discussed and at the micro and meso level the many exchanges of support and free services between VOs, individuals, NGOs, businesses and churches were analysed. Free services by VOs were shown to be a means to support the adoption of internet-based services that would provide income to VOs. This indicated an investment approach to the delivery of free services. As mentioned in Chapter 5, the analysis of the interviews showed that VOs also showed a particular sensitivity to providing cost-effective services to students. This illustrated the need for VOs to balance the need for financial sustainability, being true to personal values, and the interdependence relationships between themselves and the community they live in, i.e. social capital. These complexities form part of the 'VO model' and engaging with the evolution of social entrepreneurship provides a means to articulate the various elements of this model as demonstrated by the practices and motivations of VOs.

7.2.2 Defining social entrepreneurship – Definition 1

Martin & Osberg (2007) attempted to develop a clear and bounded definition of social entrepreneurship. They started by defining entrepreneurship and by identifying a commonality among theorists who see entrepreneurs as people who have an exceptional ability to "see and seize upon new opportunities, the commitment and drive required to pursue them, and an unflinching willingness to bear the inherent risks" (ibid.:31).

Entrepreneurship therefore describes "the combination of a context in which an opportunity is situated, a set of personal characteristics required to identify and pursue this opportunity, and the creation of a particular outcome" (ibid.:31).

7.2.2.1   *Different value propositions*
Martin & Osberg (2007) disagreed with the idea that social entrepreneurs are motivated by altruism while "normal" entrepreneurs are motivated by financial gain. The crucial distinction that they identified was the difference in value proposition (ibid.). A "normal" entrepreneur's value proposition is focused on addressing a market that can afford the offering and therefore has the potential for financial profit that will sustain the entrepreneur's venture. A social entrepreneur does not anticipate a substantial profit since the main aim is to create value for an underserved, neglected market in the form of transformative benefit.

In analogy to their definition of entrepreneurship, Martin and Osberg defined social entrepreneurship as follows:

> *We define social entrepreneurship as having the following three components: (1) identifying a stable but inherently unjust equilibrium that causes the exclusion, marginalization, or suffering of a segment of humanity that lacks the financial means or political clout to achieve any transformative benefit on its own; (2) identifying an opportunity in this unjust equilibrium, developing a social value proposition, and bringing to bear inspiration, creativity, direct action, courage, and fortitude, thereby challenging the stable state's hegemony; and (3) forging a new, stable equilibrium that releases trapped potential or alleviates the suffering of the targeted group, and through imitation and the creation of a stable ecosystem around the new equilibrium ensuring a better future for the targeted group and even society at large*. (Martin & Osberg, 2007:35)

This definition of social entrepreneurship emphasises the creation of a significant and enduring outcome in the form of a new stable ecosystem. The latter results from adoption, on a significant scale, of the new model or concept that is introduced over a period of time via social entrepreneurship in action. It seems unlikely that many people would be able to claim to be social entrepreneurs, given this set of criteria for "membership of the club".

Martin and Osberg (2007) adhered quite strictly to this interpretation and hence took pains to distinguish social entrepreneurship from other forms of social activity that deliver social benefit. Their examples of other kinds of social ventures are social service provision and social activism.

7.2.2.2   *Social ventures*
In their interpretation of social service provision, an unfortunate, unjust, stable equilibrium is identified and a project or programme is designed to address it, through one or a few instances of new ventures such as a school for AIDS orphans (ibid.). The crucial issue is that the new stable equilibrium would only be established if this concept grew to a network of schools with stable funding and support, i.e. there should be many available choices for AIDS orphans – an entire system of schools.

Social activism is also motivated by the existence of an unfortunate, unjust, stable equilibrium. The key difference is that the focus is not direct action such as creating a venture that acts in the system, but a strategy of indirect action to influence key role players in the system (e.g. government and NGOs) to act to establish a new equilibrium. A key example of social activism is the life of Mahatma Gandhi (ibid.).

Martin and Osberg (2007) did mention that the real world is populated with hybrid forms rather than with the pure forms of the three types of social activities or ventures. The hybrids may be constructed by going through sequential phases (such as a strategy to drive the growth of social entrepreneurship through the use of social activism in order to spread the concept as quickly as possible) or by going through parallel approaches where synergy is developed between social entrepreneurship and social activism (ibid.). For example, a single instance of a successful social service provider can be used as the basis for the creation of a large social activist campaign for systemic reform, which may influence the key role players to establish a new stable equilibrium.

7.2.3 Defining social entrepreneurship – Definition 2

7.2.3.1 The concept of total wealth

A different and significant approach to the definition of social entrepreneurship was developed by Zahra *et al*. (2009). They identified the factors that made it difficult to develop a clear definition of social entrepreneurship as the many different ways in which it has manifested, the widely different research communities engaging with it, and the fundamental issue that both "social" and "entrepreneurship" are ambiguous concepts that, when combined as one term, can only lead to an increase in ambiguity. In order to illustrate the diversity, no fewer than twenty definitions of social entrepreneurship or social entrepreneurs were identified in the literature. The strategy that Zahra *et al*. (2009) used was designed to avoid the trap of developing a comprehensive definition that includes all of this diversity. They did this by electing to use these two strategies: firstly, integration of the commonalities in the existing departure points regarding social entrepreneurship and, secondly, design of the definition to enable the development of a means to assess the creation of total wealth. The concept of total wealth was introduced to respond to the combination of both social and economic considerations in social entrepreneurship and was defined as follows:

> *To us, "total wealth," has tangible (e.g., products, clients served, or funds generated) and intangible outcomes such as wealth, happiness and general well-being. Thus, Total Wealth (TW) = Economic Wealth (EW) + Social Wealth (SW). Further, TW=EW+SW, where EW= Economic Value (EV) – Economic Costs (EC) – Opportunity Costs (OC); SW Social Wealth= Social Value (SV) – Social Costs (SC). As a result, TW= EV+SV – (EC +OC+SC).* (Zahra *et al*., 2009:522)

This definition covered the spectrum from purely economic to purely social wealth generation. This deviated significantly from the approach of Martin & Osberg (2007), which interpreted social entrepreneurship as a form of entrepreneurship that therefore always includes wealth creation. A social entrepreneur's focus is not primarily on wealth creation, but does not exclude it. Instead, the major difference lies in the value proposition for a market that has

potential for profit, as opposed to creating value for a neglected market as a transformative benefit (ibid.).

The use of the concept of total wealth by Zahra *et al*. (2009) is problematic because of the difficulty in defining and measuring the concept of social wealth, which is complicated, in turn, by the problem of measuring outcomes such as having clean water or the empowerment of women entrepreneurs. Baker (in Zahra *et al*., 2009) views social value as subjective and context-dependent. The justification provided by Zahra *et al*. (2009:522) for the use of a social wealth measurement was that the concept provides a "promising heuristic for evaluating social opportunities and ventures. It also delineates the distinctiveness and contribution of social entrepreneurship". In order to arrive at a definition of social entrepreneurship, the key aspects that are considered include the motivation to take risks in developing new entities with new business models, as well as individual characteristics such as values, skills and capabilities (ibid.). The following definition was proposed:

> *Social entrepreneurship encompasses the activities and processes undertaken to discover, define, and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner*. (Zahra *et al*., 2009:522)

The key aspects here are the diversity of motives, venture types and implementation strategies that are employed to foster social wealth. As a means of simplification: social entrepreneurs identify and solve different problems in different contexts in different ways (ibid.).

7.2.3.2   *A typology of social entrepreneurship*
In order to develop their typology of social entrepreneurship, Zahra *et al*. (2009) used the work of Hayek (1945), Kirzner (1973) and Schumpeter (1942) on entrepreneurship, to identify differences and similarities among social entrepreneurship practitioners. They present three different types of social entrepreneurs (social bricoleurs, social constructionists and social engineers) in order to demonstrate the differences in how social problems are identified and addressed and how resources are used, as well as to highlight the perspective on social impact in the system of interest. Examples are provided in Table 11 as a means of illustrating the typology (Zahra *et al*., 2009:523).

Table 11 Typology of social entrepreneurship (Zahra _et al._, 2009:523)

Type	Social Bricoleur	Social Constructionists	Social Engineer
Theoretical inspiration	Hayek	Kirzner	Schumpeter
What they do?	Perceive and act upon opportunities to address a local social needs[sic] they are motivated and have the expertise and resources to address.	Build and operate alternative structures to provide goods and services addressing social needs that governments, agencies, and businesses cannot.	Creation of newer, more effective social systems designed to replace existing ones when they are ill-suited to address significant social needs.
Social scope and timing	Small scale, local in scope-often episodic in nature.	Small to large scale, local to international in scope, designed to be institutionalized to address an ongoing social need.	Very large scale that is national to international in scope and which seeks to build lasting structures that will challenge existing order.
Why they are necessary?	Knowledge about social needs and the abilities to address them are widely scattered. Many social needs are non-discernible or easily misunderstood from afar, requiring local agents to detect and address them.	Laws, regulation, political acceptability, inefficiencies and/or lack of will prevent existing governmental and business organisations from addressing many important social needs effectively.	Some social needs are not amenable to amelioration within existing social structures. Entrenched incumbents can thwart actions to address social needs that undermine their own interests and source of power.
Social significance	Collectively their actions help maintain social harmony in the face of social problems.	They need the social fabric where it is torn, address acute social needs within existing broader social structures, and help maintain social harmony.	They seek to rip apart existing social structures and replace them with new ones. They represent an important force for social change in the face of entrenched incumbents
Effect on Social Equilibrium	Atomistic actions by local social entrepreneurs move us closer to a theoretical "social equilibrium."	Addressing gaps in the provision of socially significant goods and service creates new "social equilibrium."	Fractures existing social equilibrium and seeks to replace it with a more socially efficient one.
Source of Discretion	Being on the spot with the skills to address local problems not on others' "radars." Local scope means they have limited resource requirements and are fairly autonomous. Small scale and local scope allows for quick response times.	They address needs left un-addressed and have limited/no competition. They may even be welcomed and be seen as a "release valve" preventing negative publicity/social problems that may adversely affect existing governmental and business organizations.	Popular support to the extent that existing social structures and incumbents are incapable of addressing important social needs.
Limits to Discretion	Not much aside from local laws and regulations. However, the limited resources and expertise they possess limit their ability to address other needs or expand geographically.	Need to acquire financial and human resources necessary to fulfil mission and institutionalize as a going concern. Funder demands oversight. Professional volunteers and employees are needed to operate organization.	Seen as fundamentally illegitimate by established parties that see them as a threat, which bring scrutiny and attempts to undermine the ability of the social engineers to bring about change. The perceived illegitimacy will inhibit the ability to raise financial and human resources from traditional sources. As a consequence, they may become captive of the parties that supply it with needed resources.

Social Bricoleurs

The term *Social Bricoleurs* is based on the combination of Hayek's (1945) work on the unique role that local knowledge plays in identifying entrepreneurial opportunities, with the concept of bricolage used by Levi-Strauss (1966) to describe the use of whatever resources are readily available to fix the problem that is faced, or to create new opportunities. Zahra *et al*. (2009) adopted a definition of bricolage as the use of "whatever resources and repertoires one has to perform whatever tasks one faces" (Weick quoted in Zahra *et al*., 2009: 524). The bricolage approach depends on intimate knowledge of the local system's diversity of resources, which is consistent with Hayek's focus on local knowledge Zahra *et al*. (2009). The intimate knowledge of local problems or needs that are unattainable by outsiders enables Social Bricoleurs to address local issues that would well have remained unknown. The unique value that Social Bricoleurs provide was described well by Zahra *et al*. as follows:

> because of their localized and oftentimes tacit knowledge, Social Bricoleurs are uniquely positioned to discover local social needs where they can leverage their motivation, expertise and personal resources to create and enhance social wealth.(Zahra *et al*., 2009:524)

Their scope and scale of action are limited by the constraints of the locally available resources, and by their own skills. The actions of these social entrepreneurs may easily be missed by funders and researchers and, if discovered, may not fit in with the normal funder agenda of scalability (Zahra *et al*., 2009). Martin & Osberg (2007) stressed the replacement of an existing stable unjust equilibrium of large scale and scope with a new stable equilibrium. The scope of social bricolage entrepreneurship is much smaller. It is about dealing with local social problems in order to move the local system (which may be just one village) towards what Parsons (quoted in Zahra *et al*., 2009:524) described as an ideal "social equilibrium", with social peace and order being created by local individuals who act.

The VO model's strategy of identifying young people from the *local context* who wanted to be entrepreneurial fits in well with the Social Bricoleur concept. The similarities and differences, as seen in the attitudes and actions of the VOs, are discussed in the sections to follow.

Social Constructionist

Kirzner (in Zahra *et al*., 2009) inspired the creation of the *Social Constructionist* category by identifying an entrepreneurial focus on opportunities that are created as a result of those unmet customer needs that are not met by the existing service providers. This leads to the introduction of innovations that increase social wealth via new "systemic changes in expectations concerning ends and means" (Kirzner quoted in Zahra *et al*., 2009:525). The scope increased from small-scale local problems that are being dealt with by local people via unique locally embedded solutions to the larger scope of social problems and the development of systemized institutional solutions that are relevant to a variety of contexts. Fowler and Teegen *et al*. (in Zahra *et al*., 2009) consider these solutions relevant because they address gaps in the fabric of social systems.

Zahra *et al*. (2009) used the term Social Constructionist because new scalable solutions are developed (constructed) that consist of new processes for delivering services and goods. They mentioned Jacqueline Novogratz, who founded the Acumen Fund in 2001, as an example of a Social Constructionist entrepreneur. Acumen (quoted in Zahra *et al*., 2009:525) described their fund as a "non-profit venture fund that uses entrepreneurial approaches to solve the problems of global poverty" .The US-based fund targets its philanthropic "investments "at entrepreneurs and organizations that are "focused on delivering critical, affordable goods and services—such as water, healthcare, and housing" to help improve the lives of the poor (ibid.). The fund support consists of loans and equity investments, augmented with management assistance and the provision of links to larger resource networks.

A key role that Novogratz played was to bring together the knowledge and resources of two worlds, namely the business world of developed countries and the world of local entrepreneurs, in order to empower local and global institutions to adopt new approaches to solve problems (Zahra *et al*., 2009). This involved working with existing institutions to get the job done. It gives rise to the challenges involved in collaborating with a wide network of players with different agendas while remaining true to the social goals.

As discussed earlier in this section, this concept relates to the definition of social entrepreneurship by Martin and Osberg (2007) by having a systemic focus on the creation of new stable equilibriums and ecosystems. However, it does not meet the criterion of replacing the existing entrenched sub-optimal equilibrium in a sphere of social activity.

The VO model, which established a network of local technical support (VOs) close to the customers (e.g. schools), represented a new solution with the intention of supplying fast, locally informed and customised support services. This is in contrast to the usual model of generic and centralised technical support based in a central town in a District or Province. The network of VOs supported by the head office could be regarded as a good example of Social Constructionist entrepreneurship. The VO model was developed and funding was obtained for initiating the BB4All project by a senior manager at the CSIR Meraka Institute, who could therefore be identified as playing the role of the Social Constructionist entrepreneur, albeit a temporary role from within an institutional context.

Social Engineer

The *Social Engineer* category is characterised by the need to bring about revolutionary and systemic change in order to get to new solutions (Zahra *et al*., 2009). The existing entities are entrenched and not capable of leading the required systemic change. The theory of Schumpeter is used as a basis, which includes his influential concept of "gales of creative destruction" of existing business via entrepreneurs creating new business models and business structures (Schumpeter as quoted in Zahra *et al*., 2009:526). This concept relates to the definition of entrepreneurship by Martin & Osberg (2007) as the creation of new stable equilibriums and ecosystems that replace the existing entrenched sub-optimal equilibrium in a sphere of business. The scope of the systemic problems that are addressed is global, and the new solution constitutes a threat to the prevailing sub-optimal equilibrium but does require widespread popular support as a parallel strategy. In order to describe social entrepreneurship, Zahra *et al*. (2009) use as the example of a Social Engineer the same person

that was used by Martin & Osberg (2007) – Mohammed Yunus. This founder of the Grameen Bank and receiver of the 2006 Nobel Peace Prize created a new type of bank that offered small loans to poor women especially, and used trust and interdependence as a point of departure by making a group jointly responsible for individual loans (Yunus, 1998). This challenged banks' gender perceptions and created new social dynamics amongst the lenders.

Within the category of social engineers, Zahra *et al*. (2009) also included the description of Waddock & Post (quoted in Zahra *et al*., 2009:527) of "catalytic alliances" that create new ways of dealing with systemic social problems by mobilising citizens and reshaping their attitudes without actually delivering services themselves. These social engineers build alliances with well-known public figures such as Bruce Springsteen in order to bring critical systemic issues such as widespread and recurring starvation in Africa into the public consciousness. In Martin and Osberg's (2007) typology, this would be an example of social activism.

7.2.4   Mapping Definition 1 and 2 to each other

In Table 12 the typology of Zahra *et al*. (2009) and the definitions of social entrepreneurs, social service provision and social activism used by Martin & Osberg (2007) are mapped to each other.

Table 12 Mapping social entrepreneurship typologies (Zahra et al., 2009; Martin & Osberg, 2007)

Zahra et al. (2009) → / Martin & Osberg (2007) ↓	Social Bricoleurs	Social Constructionists	Social Engineers	Social Engineers driving Catalytic Alliances
Social Entrepreneurs	No. The scope is limited to local context and local solutions. VOs	No. A systemic scope, but the new stable equilibrium co-exists with the existing sub-optimal stable equilibrium. The manager driving the VO model.	Yes. A systemic scope. The new stable equilibrium provides a credible alternative with potential to replace the existing sub-optimal stable equilibrium to a significant degree.	No.
Social Service provision	Yes. A new stable equilibrium is not established. VOs	Yes. A new stable equilibrium is not established.	Yes. A new stable equilibrium does not replace the previous sub-optimal equilibrium.	No. No actual service provision by the Social Engineer.
Social Activism	No. Social services are provided, even if only in a single context. Some VOs?	No. Social services are provided by existing institutional forms.	No. Social services are provided by new systems.	Yes. Sole reliance on activism to play a catalytic role to mobilise the public to put pressure on service providers.
Hybrid forms	VOs Social Bricoleurs combined with social service provision.		Yes. Social activism combined with Social Entrepreneurship. Grameen Bank used social activism to disseminate the new solution.	

Martin & Osberg (2007) did not create typologies of social entrepreneurship. Instead, they drew a boundary between social entrepreneurship and other means of delivering social benefit such as social service provision and social activism, and discussed hybrid forms between these three concepts. Their strict criteria for social entrepreneurship mean that only certain types of social engineers, as described by Zahra *et al*. (2009), partially qualify as Social Entrepreneurs. As Martin & Osberg (2007) admitted, their definition can only be applied after the fact when the new equilibrium and new ecology has been established and has replaced the previous equilibrium. It may therefore be more accurate to describe social engineers as

potential social entrepreneurs or as a hybrid form, due to the admixture of social activism as discussed by Martin & Osberg (ibid.) with respect to the Grameen Bank. They may also be described as social service providers on a path to full social entrepreneurs with systemic impact. As shown in Table 12, the type of social engineer that drives catalytic alliances also does not meet Martin & Osberg's (ibid.) criteria for a social entrepreneur, but does fit in with the definition of social activism. Social Bricoleurs fall into the social service provision category.

7.2.4.1 Categorisation of VOs and BB4All project team members

The above discussion reflects Martin & Osberg's (ibid.) view that very few pure forms exist and that hybrid forms of social activity dominate. The "pure" types thus become building blocks by means of which reality can be described. The BB4All project, the VO model and the VOs themselves provide examples of hybrids and are provisionally categorised in Table 12. A general discussion on the hybrid models and building blocks encountered in the VO space is provided below. In the section thereafter, detailed descriptions of the different manifestations of VO services and entrepreneurial attitudes are demonstrated.

In terms of the Martin & Osberg (2007) definition, VOs with their businesses do not qualify as social entrepreneurs, but can be described as social service providers and social activists. The description of a Social Bricoleur type of Social Entrepreneur fits the VOs well, as they focus on solving local problems using local resources. They do receive support from the project in the form of internet access, office rental and a monthly stipend, but the business services that they develop are reliant on their own understanding of local needs and the harnessing of own and local resources.

The definitions of Martin & Osberg (2007) can be used to describe VOs in terms of a hybrid model of Social Service Providers with a degree of Social Activism, as they use a parallel strategy of encouraging internet adoption in the community, government entities and businesses while acting directly in the system by delivering services. In summary, VOs can be described according to Zahra *et al*. (2009) as social entrepreneurs with the approach of Social Bricoleurs, while their limited scope leads to their definition as social service providers and not Social Entrepreneurs in the Martin & Osberg (2007) delineation of social activities.

The VO model, as demonstrated in the BB4All project, may in future provide an example of a parallel approach combining social entrepreneurship and entrepreneurship. The scope of the BB4All project as discussed in Chapter 3 was to demonstrate the VO model as an alternative to the existing set of models for rural broadband connectivity, which range from a government service delivered via government employees to pure commercial models (Bailur, 2015; Attwood & Braathen, 2010; Van Belle & Trusler, 2005). The BB4All project was used by the senior manager who designed and sold the project to DST as a means of influencing the key role players in the South African broadband internet access policy development and connectivity provision (government and key telecommunication agencies and companies). This was done by means of technical advice as well as the experience gained with the BB4All VO model. This approach towards influencing the telecommunications system does not follow the normal social activism approach but also has a societal goal in mind - in this case broadband internet access for all.

The next discussion is on the interactions in a VO's life that include community service (social service provision at small scale), being an entrepreneur and being a social entrepreneur. The definition of social entrepreneurship of Zahra *et al*. (2009) is used. As mentioned in the Introduction, the VOs deliver community services both in their personal capacity and as owners of VO businesses.

7.3 Community service in their personal capacity

7.3.1 Introduction

VOs played a community service role in their personal capacity within their communities. An excellent example of how a love for sport can be a basis for action is that of the two VOs who were involved in soccer clubs. Another departure point for community service was the philosophical view held by VO12 that doing good is, in itself, worthwhile.

7.3.2 Soccer and community development

The players of the soccer club to which VO16 belongs were mostly still at school (VO16, 2013a). VO16 was a player as well as the team manager of the club. Their team won 15 out of 16 games in the year of the interview (2013) and were being promoted to the South African Breweries league for the region. This is the league that is watched by soccer scouts from the larger clubs, and VO16 thought that two of the players would be recruited before the end of their first year in the league (ibid.).

VO16 explained that the goal of the club was more than just playing soccer:

> *We like to run things differently because soccer is something that pulls people out of the street. … So as time goes on we are trying to get them registered to be FET, further studies.* (VO16, 2013b:8)

The team assisted the parents of learners that wanted to go to tertiary institutions by giving them half of the administration fee for applications. The focus was on motivating learners to finish school. The team also paid for medical assistance when somebody was injured. VO16 had built a Facebook page for the teams so that "Everyone who wants to know where we are playing can see there" (VO16, 2013b:4). VO16 was therefore part of an organisation that had a development focus and that built support networks in the community. This could be described as being part of a social service that was delivered to the community via the soccer club. In terms of Zahra *et al*.'s (2009) definition, the soccer club owner(s) may be described as (a) Social Entrepreneur(s), as the club is exploiting opportunities to grow social wealth (getting youth off the street) by managing the club in a new way (distributing money for medical costs and tuition costs).

VO4 had also been extensively involved in soccer from an early age and was the owner of the local soccer club (VO4, 2012a). He listed the soccer club as a major influence on the influence map during the interview, and he wanted to grow the soccer club as a business or start a soccer academy (VO4, 2012b). If VO4 did indeed start the soccer academy, he may be viewed as a Social Entrepreneur if social wealth was created by an innovative approach to the

established concept of an academy. In terms of other community service activities, VO4 mentioned that he had started a development trust which can be described as social service provision (ibid.).

VO4 used to play soccer and then realised that he was getting too old and needed to start a business of his own in order to be independent (VO4, 2012a). He saw the soccer club as a formative influence on him and saw a way of helping the club by applying the skills that he had learnt.

VO4 said "I was still a bit young, maybe ten or twelve, then I grew up and I started to own a club when I was still a young thing ..." (VO4, 2012b:28).

In the process of becoming a VO, he had learnt to be responsible. This experience, in addition to his newly acquired skills, was applied in the club. "Everything I have learnt here I am just teaching them how to use a computer and something like that, ja" (ibid.). He had built a website for the club and also provided money for transport.

He reported that he had gained life experience as a VO, which he had applied to the soccer club. Conversely, the club had also taught him things about people that he has applied in his business.

He mentioned that the club has taught him many things, such as "Discipline, to respect other people, to go out to work with other people because people are very different in a way" (VO4, 2012b:29). He also used the different positions in soccer to explain how people are different, while still being similar: "Even if they play in soccer, in playing in different positions…strikers, defence, the goalkeeper, so when you combine all those things, they are people" (ibid.).

VO4 applied this learning to help him understand the different behaviours his customers:

> Even the customers, some of them come just so they can say 'I want this', he doesn't talk, he doesn't say anything and you have to do this. You don't have to talk to him or her because when you talk too much they will tell you something, they will get down there. Then someone will just say 'ah, Mpho…' (VO4, 2012b:29)

VO4 illustrated that life is not lived in boxes, and that what you learn in one part of life (e.g. your life in sport or in business) is used in other parts of your life.

The club was seen by VO4 as part of his business too, as a new project (VO4, 2012b). In his case an intertwining of sport and community development interests and business interests was observed, which provides an interesting view on social entrepreneurship.

As discussed earlier, VO4 saw the soccer club as an opportunity to apply the business and computer skills that he had learnt and to provide computer skills training to the soccer club members. This creation of social wealth via a soccer club is innovative and places the soccer club ownership in the context of social entrepreneurship and not as a pure for-profit enterprise. VO4 mentioned that he paid for transport costs. This provided a context of using the resources at hand (his own profit), and hence is an example of a Social Bricoleur.

In the soccer club initiatives of both VO4 and VO16, the scale is small (only one soccer club). VO16 was not implementing a radically new vision for changing how local soccer clubs function and was following the normal model of seeing them as a feeder service for larger commercial clubs. It was therefore more accurate to describe both soccer clubs' owners as examples of Social Bricoleurs. According to the Martin & Osberg (2007) view, they would be social service providers.

7.3.3 A belief in doing good

VO12 had a basic belief in the need to "do good" and believed that doing good will be good for you. He supported the previous library volunteer at the public library close to his VO office because the volunteer was doing a good thing. VO12 said:

> as long as you are doing a good thing. So just for that…Good karma, so they say… Sharing good karma, seriously. (VO12, 2013b:27)

There was a sense of identification with other people who were also delivering volunteer services to the community, and a belief that such behaviour should be supported. There was an expectation that, if you supported the volunteers, good things would also happen to you. VO12 shared a communal ethos of community service via volunteerism for social benefit, rather than explicitly seizing an opportunity for increasing social wealth through innovation.

In the next section VOs that delivered community services in their capacity as owners of VO businesses are discussed.

7.4 Community service as part of VO business values

Some VOs focused on value creation via reciprocal support relationships between the VO and the community, while others related to the money constraints of community members. This was probably because they too had been in the same situation of not having access to resources. Not all of the VOs articulated community service (social service provision) as a specific value, but it could be deduced from what they did. This section highlights some of the ways in which VOs express their value systems. In section 7.5, a more detailed exposition is provided on how VOs are living out a community service ethos in their businesses.

7.4.1 A long-term vision for adding value to your community as an entrepreneur

At the end of the interview with VO15, an open question was asked regarding the requirements for the success of his business (VO15, 2012a). He thought a lot and struggled a bit with the question, but then came up with an interesting answer: support from the community at a business and a personal level (VO15, 2012b). This support would grow on the basis of good relationships that had been built on good customer service (ibid.). This reflected his recognition of the community-based nature of his business. VO15 had a community relationship focus and his approach was therefore not just about what he could get from the community, but also about what he could contribute. He had already adjusted his services to reduce the cost of internet searches, and had plans to add value to his low-income customers such as caching the results of popular searches (see the next section for additional information) (ibid.). He saw himself as being in service to the community. This reflected a

predominantly social focus rather than a pure business, profit-making focus. VO15 also identified the community as having had the highest level of influence on his business (ibid.).

In accordance with the definition of social entrepreneurship as being primarily about activities designed to exploit opportunities to create social wealth in an innovative manner in their VO business (Zahra *et al.*, 2009), VO15 did qualify as a Social Bricoleur with a long-term vision of becoming a Social Constructionist that would change the definition of what an internet café in a community can be. His customers did have access to a few scattered internet cafés, but his value proposition lay in adapting his services to fit the local context, which included many school-age children with limited money who needed affordable internet access.

7.4.2   A responsiveness to the customers' lack of money

During the visit to VO8's office, the researcher observed that he advised a girl who wanted a photograph for her school identification card to bring her friends along so that he could charge them a better price (VO8, 2012a). This reflected the intimate knowledge that this VO has of his community, how he was sensitive to customers' need to save money and his ability to respond quickly. As mentioned above, this adaptation of his services to fit the context increases social wealth rather than being just for profit. VO8 could therefore be described as a Social Entrepreneur or, more specifically, as a Social Bricoleur.

In the next section the focus shifts to VOs as business people.

7.5   VOs living out community service in their businesses

There were various interesting ways in which VOs wove community service into their lives as business people. As the examples below will show, the VOs not only responded to the needs of their customers, but also identified with their customers because of their deep connections with the local community. They identified with customers as their fellow community members. They demonstrated a partial focus on social wealth creation, combined with instances of entrepreneurship behaviour.

Three approaches to combining responsiveness to community needs with business needs are discussed:

- VOs provided free services as a way of responding to the need for information collated and tailored to meet specific needs such as searching for employment. Furthermore, VOs provided trusted advice that empowered customers to do their own searches in order to get the greatest value out of the paid-for internet searches.

- VOs found means of providing cost-effective and value-adding services that demonstrated their identification with their customers' money constraints.

- VOs had developed win-win approaches to meet community needs by collaborating with service providers to the community (such as government and NGOs) to improve service delivery, while at the same time expanding their customer base and extending their range of services.

7.5.1 Free services in response to community needs

Two major types of free services emerged from the interviews. VOs collected and provided information and then added value by curating the information. Furthermore, they shared knowledge in the form of know-how and trusted advice.

7.5.1.1 *VOs as information hubs and curators of information*

Most VOs mentioned the collection and sharing of information as being part of their service to the community.

VO11 provided detailed information of the variety of free services offered to the community. He provided schools and students with information about tertiary education (such as bursaries) and the dates of the open days of tertiary institutions such as the University of Pretoria and the Tshwane University of Technology (VO11, 2013b). VO15 shared this information with VO11 and VO12 (ibid.).

VO11 assisted with internet searches so that the correct information could be found. An example was the help he provided to a group of students to find the contact details and directions to a bookshop in Pretoria (VO11, 2013b).

In another instance, someone had used posters to advertise tests for jobs and subsequent interviews for which R300 had to be paid (VO11, 2013b). VO11 found out that the posters were fraudulent and warned people about this by showing them how to pick up the news about the fraud on the internet. This may be seen as an act of social activism.

VO11 saw this as a service in support of the community: "Maybe I'm giving back to the community to go there… to warn people" (ibid.:12). When asked, VO11 said that the local library was not good at helping people to detect fraud that is spread via the internet. Curation and vetting of information is required, and the local library does not have those skills, instead relying on volunteers (ibid.).

All of these services could be described as being typical of social bricolage, as the VOs use their local knowledge and their own resources to solve local problems.

7.5.1.2 *Building relationships by sharing know-how, providing trusted advice*

VO14 saw himself as a trusted source of advice:

> *Young boys will always ask me what I think and I give them advice… the same with the old grannies. There is a trust between me and the people that refer me.* (VO14, 2013b:20)

VO14's attitude toward assisting students with internet searches is interesting. He taught them how to do internet searches on their own: "I just want to make sure that if I am not there, maybe he is in another internet café and maybe there is no one to help so he or she must be able to check on his own" (ibid.:13). He also taught people how to search for jobs. He acknowledged that he also benefited from the teaching and learning: he learnt from his pastor's son and other students who do computer studies at school (:14).

VO14 provided advice and was building local people's capacity to create social wealth and is therefore a Social Bricoleur.

7.5.2 Consideration of customers' constraints

VOs had to find ways to deal with their own constraints such as a lack of equipment, as well as the constraints of their customers, which were mainly a shortage of money. In particular, they had found ways of adding more value than the normal internet cafés by using their technical skills (e.g. the ability to deal with computer viruses) and advising their customers how to save money, for example by aggregating demand. These are examples of dealing with local problems using local resources, i.e. bricolage in action. These VOs could hence be considered to be Social Bricoleurs.

7.5.2.1 Dealing with VO and customer constraints

VO15 had made plans to deal with two types of constraints. He had the business constraint of having only one desktop PC for client use (as discussed in more detail in Chapter 8 on Networks of innovation – see Section 8.5 on Service innovation). This led to long queues, as only one person could use the computer at a time. From a customer perspective, the constraint was the long waiting times, while many of them are actually searching for the same information (VO15, 2012b:25). Their other constraint was lack of money. VO15's solution was to ask them to work together in groups, which saved them time and money while allowing him to serve more customers (ibid.)

In addition, he had developed a plan to create folders on the desktop PC to store the results of previous searches so that students could access this information without having to pay for internet access (ibid.).

7.5.2.2 Adding more value than internet cafés

The VOs had an advantage over internet cafés. According to VO11, the owners of the internet cafés, who were technology-savvy, were never there and employed people who knew nothing (VO11, 2013a). This was in contrast to the VOs, who were in their offices and were able and willing to help customers to search the internet.

The closest internet café to VO11 and VO12's office was in the nearby local shopping centre. This internet café did not allow customers to touch their computers or to bring their own USB drives, as they wanted to charge for typing services as well. These VOs did allow customers to use USB drives and do their own typing. Internet cafés were also expensive, and VO11 thought that they were asking too much for printing, especially of colour prints at R10 per copy versus the R4 charged by him (VO11, 2013b). VO11 felt that he could not ask as much money as the internet café when the customer was standing there looking at him (VO11, 2013a). This is another example of social capital influencing VO behaviour, in this case identification and empathy with a fellow community member. It also illustrates the balance between a pure profit motive and the sensitivity to affordability, without going to the unsustainable extreme of subsidising free services.

VO8 demonstrated a customer-centric approach during the interview, in this example that was discussed earlier (section 2.3.2). A girl came in asking if she could have a photograph taken and printed for her school identification card (VO8, 2012a). VO8 asked her to bring her friends

along so that he could charge them a better price, by printing all their photographs on one page of photo paper. This reflects the intimate knowledge that VOs had of their community, and how they responded in order to help customers to save money.

7.5.2.3 *VO providing advice to save customers money*

VO11 related that the Lutheran church wanted information via the internet for the learners in their school (VO11, 2013b). VO11 told them to use the Encarta Encyclopaedia on DVD, rather than to just go to the internet automatically. VO11 exhibits a concern for saving customers money. This is one of the major benefits of the VOs' being local, as they have experience of getting by with little money. This sensitivity was mutual: the church brought paper if they wanted to do a large amount of printing. This reduced this VO's need to keep paper in stock and reduced the cost of printing for the church as well.

7.5.3 Win-Win approaches

A diversity of approaches had been developed by VOs in order to build win-win situations in their community contexts. VOs built the technical skills of local entities that delivered services to the community, and extended the reach of some of these entities by marketing their services to VO customers. Some VOs increased accessibility to government services, which at the same time provided good marketing of the VOs' other services to the community. VOs provided employment by appointing assistants in their offices and, more importantly, developed the technical and business skills of the people employed, which in turn increased the social wealth of the community.

7.5.3.1 *VOs advise and train local community services on how to improve and extend their services*

VO12 explained the local library situation as follows: the library had three PCs connected to the internet that were run by a volunteer who did not necessarily have internet or software skills (VO12, 2013a, 2013b). VO12 showed the volunteer how to use Portable Document Format (PDF) files (VO12, 2013b). When the VO office shared by VOs 11 and 12 had no internet access, they referred customers to the library. The library was also a source of customers since library users may only do three printouts each. As a result, they came to the VO office for printing and internet research services (VO12, 2013a).

VO11 advised the library to put job advertisements up on their walls as a service to the community (VO11, 2013a). In-depth knowledge of the local service provision gaps provided both entrepreneurial and social wealth creation opportunities that show the admixture of social and entrepreneurial aspects in social bricolage.

7.5.3.2 *VO providing advice and extending the reach of advice providers*

In his personal capacity, VO12 provided important advice to students. A good example of this was assisting them with advice on how to apply on-line for bursaries (VO 12, 2013a). VO12 also had a relationship with an NGO, the Youth Advisory Centre (YAC) (VO 12, 2013b). This centre provided skills development training (e.g. computer skills), information about jobs and free internet access. VO12 passed on the career guidance information from YAC to the students who visited their office (ibid.). This relationship extended the reach of the NGO to more students. Local knowledge, local resources and personal relationships all played a role in

increasing social wealth in the community. The provision of career guidance information was an example of the use of social capital to access a resource via the relationship with the YAC, which in turn enabled service delivery to the students.

7.5.3.3 Integrating entrepreneurial aims with community development objectives

Two VOs, namely VO14 and VO8, illustrated different degrees of integration between entrepreneurial objectives and community development objectives.

VO14 provided a particularly good example of a high degree of integration. His approach has been discussed in more detail in Chapter 8, Section 8.8.3 on Building networks of relationships for business growth.

VO14 (2013a) had a long-term view on growing his business and on playing a role in community development. He obtained proof of residence forms from the local municipal ward councillor in order to enable easy access to the forms by the community at his office. Not only did the community get an improved governmental service, but the VO got the benefit that his business became well-known and his income increased. This followed on from people's need for copies of their identity documents as part of the process. VO14 assisted the students and unemployed youth in the community by providing free information about jobs and bursaries. His income was derived from printouts. His key insight was that the students of today are the unemployed youth of tomorrow because of a lack of education and knowledge of job opportunities. In addition, VO14 (2013b) added value to NGOs in the community by providing services, advising them about access to funding, and improving and reducing the cost of their communications with funders.

VO14 was in effect building a business-to-government relationship in order to deliver services to the community, and was using that relationship to build his business-to-community relationships and services. This strategy fits in with what Zahra *et al*. (2009) described as being characteristic of a Social Constructionist Social Entrepreneur: VO14 demonstrated an entrepreneurial focus on opportunities created by unmet community needs, needs that had not been met by the existing local government.

VO8 did not articulate a strategic approach but did deliver value to customers and to his business by providing services on behalf of a government department (VO8, 2012a). He provided proof of residence forms to his customers through his relationship with a CDW (Community Development Worker) from the local office of the national Department of Social Development (ibid.). These customers might want photocopies of their identity documents or other services and hence added to his income. VO8's service is better described as social bricolage rather than social constructionist.

7.5.3.4 Developing skills and creating employment

VO3 created employment and transferred skills to a young woman in the community who was unemployed (VO3, 2012a). During the interview with VO3, she helped clients as VO3's assistant. VO3 paid her R600 per month, compared with the stipend of R1500 per month that VOs received from the project at that time.

VO4 contributed to his family as well as to his community by growing other entrepreneurs. His two sisters worked for him in the VO office until they had acquired skills, after which he asked them to go out and look for a job. One of the sisters started a car wash business and the other one found employment (VO4, 2012a).

During the interview, VO8's assistant was taking care of the office business (VO8, 2012a). VO8 said that that he had started teaching her how to provide the various services.

VO8 asked two women (one of whom was his girlfriend) to take part in the learnerships, which were supported by the TIA and organised by the CSIR and the project team (FSM interview, 2013a). This provided an opportunity to study and gain work experience while being paid a monthly stipend.

All three VOs created social wealth by training assistants, and benefited from the services that the assistants provided. VO8 offered learnership opportunities and would benefit from the free services provided by the two assistants, as their learnership would pay them a stipend.

Participation in the system of learnerships provided an opportunity that was seized by the VOs. However, it did not constitute an innovation and is hence regarded not as social constructionist entrepreneurship, but as rather social bricolage.

7.6   VOs managing community expectations

The fact that VOs grew up in their community held positive and negative implications for their businesses. VOs went to local schools, attended local churches and were known in their communities. The major dynamics played out in the relationships that VOs had with schools and churches. This section will focus mainly on these dynamics, but other community dynamics are discussed as well, such as the relationship with local government and appeals that individuals made to VOs.

7.6.1   Being from the community

The expectation that VOs would provide free services emerged as a major theme, describing a disadvantage of relationships that VOs had in the community. People and institutions made unfair demands, which reduced the entities' social capital by making the VOs reluctant to continue these relationships. Since VOs were from the community, more was expected from them. It may well be that they were not viewed as "pure" entrepreneurs, and that they would hence be expected to go the extra mile or, in negative terms, would be taken advantage of – showing a lack of respect for them as business people. There were different types of actors who get free services from VOs and there are different reasons for VOs' providing these services. Three major types of actors were identified as having expectations of VOs, namely schools, churches and members of the community. The VOs' interactions with these actors are explored below.

7.6.1.1   Schools expect and receive free services

The interactions with schools were complex and related to the VO business model, the project business model and the personal relationship with schools.

The major influence on VO business strategies for schools was the fact that the project provided free internet access and technical support via VOs. The positive implication was that it was easier for VOs to deliver low-cost or free internet access. However, schools then expected VOs to deliver free services as well. There were numerous examples and only a few of these are discussed below.

VO5 mentioned that the principals of his schools would expect favours when they phoned him to come and fix their internet: "Then they say you can just have a look at this thing before you go" (VO5, 2013b:4).

VO11 and VO12 were both from the area, and went to a secondary school which fell within their clusters (VO11, 2013a). VO11's interpretation was that all the schools expected free services from them because the internet access and the technical support related to it were, in fact, free. VO11 provided the example that teachers asked him for free advice on their home PCs or laptops when he saw them at the school, instead of visiting him at his office (VO11, 2013b). VO11 thought that if the schools were paying for the internet they would also be willing to pay for other services like fixing laptops (re-installing of software, etc.) (ibid.).

In the case of the secondary school that VO11 and VO12 both attended, the expectations were higher. An additional link to the school was that VO11's sister worked there as an administration clerk. VO11 highlighted the downside of "being local" in that the personnel of his old secondary school expected labour-intensive free services from the VO business.

An alumnus of the school shot a video about the school and then brought the video to them for editing, since the school expected that they would do it at no charge (VO11, 2013b). According to VO11, this school's teachers also expected them to write their CVs for free (ibid.).

VO12 recounted the same issue of the schools expecting free services. VO12 was frustrated that schools expected him to help them, and that he felt he had an obligation to do so:

> If you don't want a stab in the back, through work and all that. They stay cross… It takes the energy. Extremely hard. To go there for a pat on the back. No. (VO12, 2013b:27)

This is an example of an important relationship that should be re-established on a different footing. The distinction needed to be made clear between the provision of free technical support for internet access as part of the project, and the provision of commercial services such as assistance with office software applications. It also required raising the awareness of VOs as individual entrepreneurs who were providing a service to the BB4All project (CSIR), and who were also offering their own services to individual customers and entities in the local context for payment. This also provides a good example of the possibilities of the abuse of relationships (the negative results of social capital).

7.6.1.2 Balancing negative and positive effects regarding schools

Relationships were to a large extent influenced by the fact that the schools received free internet and technical support for internet access from the project, and by means of VOs as service providers to the project. The fact that schools expected free services and free advice led some VOs, e.g. VO12, to see schools as a nuisance and not as a real customer, as they did

Community service and social entrepreneurship   217

not pay. On the positive side, VO12 had also received encouragement from his school principal.

VO16 recounted the balancing act as he saw it. The effort that VO16 had to put in to get to a school, as opposed to the cooperation and appreciation that he received in turn, played a vital role in the quality of the relationships. The schools to which he had close links were all fairly close by (approximately 15 to 30 minutes walking time) (VO16, 2013b). VO16 did not like the gateway school because they did not learn how to fix their own faults, and in the heat of summer he had to walk far to get to them. VO16 felt that schools needed to pay for his services as there would be an additional benefit: "then they will start learning, because now they are taking advantage" by calling him out unnecessarily (ibid.:19).

VO16 did mention one school that appreciated him and wanted to pay him for his services (VO16, 2013a). It was a primary school with staff members who were mostly elderly women. He described the principal there as having a heart. They understood that he was helping them. He did administrative services for them as the administration clerk could not really type and was not very computer-literate. At the time of the interview, VO16 said that he would be assisting them for the following two weeks (ibid.).

There were other examples of deep relationships being built with schools, which resulted in an expanded service offering. VO5 developed a strategy of building a trusted relationship with a school and hence was asked by them to do ICT procurement on their behalf. Two of the VOs have combined forces to install a Wi-Fi network at a school.

7.6.1.3   *Being taken advantage of by your church*
VO10 complained about the fact that the church pastor and department heads put a lot of pressure on her to get things done (such as typing of reports) without her having a choice. The net result was that she felt that "I don't have a personal life any more, honestly" (VO10, 2013a:33).

Most VOs, however, did report that churches were willing to pay for services.

7.6.1.4   *Community members expect free services*
VOs reported that free services were provided to customers. The researcher also observed this during interviews. VO5 offered some services for free, as many VOs did (VO5, 2013a). A particularly clear example was that during the interview at VO5's office, the dentist's receptionist came in and he had to leave to go and fix a software problem for her.

Observations during interviews revealed a pattern where people used laptops and accessed the internet for free. During the interview with VO6 (2013a), a person came in and hung around. He wanted to get onto the internet for free and said that "a little help goes a long way". VO6 knew him well and said that one day he would need to pay! (ibid.)

A CSIR researcher who came from the same area as VO8 and was a friend of his mentioned that he had seen a security guard sitting outside VO8's office using VO8's laptop to watch videos from a USB drive (CSIR Researcher, 2015). As mentioned by the researcher, this behaviour does indicate a lack of awareness of the danger of allowing other people to use USB drives on your computer (ibid.). Being friendly could come at a high cost.

The expectation of free services can be seen as an assumption made by the community regarding free access to resources via the VOs, due to relationships based on mutual membership of the geographically- and/or culturally-based community. This could lead to erosion of the social capital of community members because of their assumed personal relationships with the VO, which followed from their mutual community membership. The social capital was based on person-to-person relationships that had been built over time, and where reciprocation of value exchange occurred. VO6 made it very clear that a particular community member cannot rely on free services forever. The definition of social entrepreneurship does not exclude for-profit services and includes both social and economic considerations. The question is whether the major focus is social or economic.

7.6.2   A VO being seen as a representative of government

As discussed in the section above on VOs living out community service in their business, VO14 provided proof of residence forms to the community at his office (VO14, 2012b). VO14 also had regular contact with the local government ward councillor. Because of this situation, VO14 stated that the community associated him with the ward councillor and complained to him about services. VO14 then phoned the councillor and passed on the complaints (ibid.). This created an additional and easily accessible communications channel between the community and the ward councillor. The net result was that the community saw him as representing local government. This may constitute a double-edged sword for the VO concerned.

7.7   Summary

The discourse of community service was discussed using two definitions of social entrepreneurship, and the concepts of social service provision and social activism. According to Martin & Osberg (2007), VOs do not qualify as Social Entrepreneurs because they do not establish a new stable equilibrium in their relevant socioeconomic system, but may qualify as social service providers and/or social activists.

As mentioned in the introduction to this section, the definition of social entrepreneurship as developed by Zahra *et al*. (2009) was the definition of choice. There were many examples of VOs acting as Social Bricoleurs and one example of a VO acting as a Social Constructionist.

The social services provided by the VOs and the social wealth created by VOs need to be seen in the context of their membership of the local community. Through their actions, trust in VOs is built, their relationships with the community are strengthened and therefore the social capital of VOs and of the community as a whole is increased.

The relationship between social entrepreneurship and social capital is a close one. The main aim of social entrepreneurship is to create value for an underserved and neglected market as benefit while not expecting to make a large profit. The delivery of this benefit depends on having an intimate knowledge of local needs that is acquired via a variety of close relationships, i.e. having social capital. The identification of the diversity of local resources that can be used to deliver benefit depends on local knowledge that is acquired via high trust relationships and networks of social relationships, i.e. social capital in all its forms (bonding, bridging and linking social capital).

The analysis showed that VOs deliver community services both in their personal capacity and as owners of VO businesses. Two VOs played a significant role in their individual capacity via their involvement in the very popular sport of soccer.

In acting in their capacity as business owners, VOs have demonstrated that their community service is grounded in their set of business values. These values range from a general sense that it is good to do good, a sensitivity to the constraints experienced by their fellow community members and, finally, to a long-term vision for adding value in your community as an entrepreneur.

The actual business practices that have evolved as VOs are living out community service in their businesses show flexibility and innovation, and that win-win situations can be achieved. The business practices show that free services such as the integration and curation of information have value to both the community and market the other services of the VOs such as printing. Because of the VOs' intimate knowledge of the community's constraints as well as their own equipment constraints, they have found ways to offer additional services by using their technical skills and have advised their customers how to save money by, for example, aggregating demand.

The win-win situations that have been developed by VOs include building the technical skills of local service delivery entities as well as extending their reach in the community. This support enables VOs to deliver unique services in the community and attract people to their offices. VOs contribute to employment and skills development by hiring assistants for their offices.

The management of the expectations of schools, churches and members of the community that VOs will provide free services is the major theme that emerges as a disadvantage of the VOs' social capital in terms of loss of income due to them "being local".

The major influence on the relationships between VOs and schools is that the project provides free internet access and pays VOs to provide technical support to schools for this access. Schools therefore expect VOs to deliver free services, as they fall in the VOs' clusters of schools connected by the project. This relationship should be re-established so as to make clear the distinction between the provision, on one hand, of free technical support regarding internet access as part of the project by VOs as entrepreneurs providing a service to the BB4All project (CSIR), and the commercial services offered by VOs as entrepreneurs on the other, such as assistance with office software applications and printing. Abuse of relationships is always possible and reflect the negative side of social capital.

The additional influence that results from being alumni of the local secondary school is demonstrated by the experiences of VO11 and VO12. This school expects them to provide labour-intensive services such as video editing for free. These experiences have led VOs to see some schools as a problem rather than an opportunity, hence compromising the relationship and reducing the social capital between schools and VOs. It has probably also played a role in their enthusiasm for marketing their services to additional schools.

Most VOs reported that churches were willing to pay for their services. There were also experiences of unreasonable demands from church customers.

VOs face daily demands for free services from community members. The researcher observed this during the interview visits.

The reality of mixing community service and business interests has led to interesting innovations by VOs as well as to conflicted responses, especially to unwarranted expectations by schools for free services, which are the result of project design realities and the fact that some VOs grew up in the local community.

In summary, a long-term perspective on the possible evolution of social entrepreneurship has been presented. By adding extra value to services such as internet access in comparison to the local internet cafés, VOs did provide alternatives to the dominant non-optimal equilibrium of paid-for 'basic' internet access. They did this by providing additional assistance in the form of advice on how to search, and they reduced the cost of the internet access service by encouraging customers to aggregate their demand. The fact that VOs received free internet did undermine the idea that this would be the nucleus of a new stable equilibrium, since the project funding and duration was finite. As part of a business strategy to market their services and build business relationships with their customers, it might be viable for VOs to continue to provide additional and cost-effective services – provided that this would result in enough additional uptake of paid-for services to make the business viable.

At the time of the research, most VOs were Social Bricoleurs and there was one example of a VO who functioned as a Social Constructionist Social Entrepreneur.

As mentioned in the introduction, the VO model as demonstrated in the BB4All project may in future provide an example of an alternative approach to the existing set of models for rural access to broadband connectivity. The senior manager who initiated the project acted as a social activist by using the project to influence strategic change. The CSIR's commercialisation process led to a licence being granted to a company to use the VO model in the current deployment area (CSIR Meraka Institute Commercialisation Manager communication, 2014). The CEO of the company may be considered a Social Engineer Social Entrepreneur.

Social activity in the form of social entrepreneurship, social service provision (or community service) and social activism are present among VOs and in the BB4All project team.

8 Networks of innovation

The context and content of Chapter 8 are shown in the thesis map.

Introducing the problem

The context

Methodology and Data collection

Analysis and findings

Innovation in use of ICTs in development	Diffusion of innovation	CAS & Service Organisations	Service innovation & customers	Innovative business collaboration	Overcoming the lack of resources	Relationships for business growth

Reflections on the Choice Framework

Considerations for development practice

Conclusion

8.1 Introduction

Innovation to develop services that meet the needs of the customers for effective and efficient use of internet access and deal with the various constraints due to the rural location is a key theme that emerges in the VO interviews. In many of these services the key enabling element is the trust that has developed between the VOs and their customers in personal relationships. The social capital that has been built by VOs through the trust relationships is the foundation for the innovation. This approach to innovative service delivery can be contrasted with the normal role of an internet café where the prime aim is to sell internet access time (Bailur, 2007).

In addition to the creation of new innovations, the diffusion of innovation also plays a very important role in ICT4D. The general idea is to get ICT to people, in other words to provide access to computers, software applications, and the internet. The next step is the decision to use the innovation, and it in this innovation-decision process (Rogers, 2003) that VOs also play a vital role that will be discussed in this chapter.

In the ICT4D context the VO office and services can be viewed as a variation on the concept of telecentres. The use of telecentres as a strategy to bring internet access to people who cannot afford it and/or are in remote locations was in its day an innovation and was described as "a new symbol of hope for community development" (Hunt, 2001:1). The concept continues to be used as a platform to deliver developmentally oriented services and has many different names, such as: Community Communication Centres, Infoshops, Telecottages, Community Access Centres and Multipurpose Community Centres (Attwood & Braathen, 2010; Gurstein & Harris, 2001). The literature on the various kinds of innovations that have developed gradually in ICT4D is discussed first. An overview of the larger context of innovation and the diffusion of innovation (with a special focus on the role of social networks) is then presented in order to locate and contextualise the innovation encountered in the domain of ICT4D. xxx

The balance of the chapter is devoted to discussion of, and reflection on, the various instances of innovation that have been developed by VOs and their networks of relationships. The instances of innovation are discussed on the basis of the following clusters (Figure 41).

The innovation clusters are discussed in Sections 8.5 to 8.7. In the next sections overviews of innovation are presented from the perspectives of: innovation in ICT4D, diffusion of innovation in general, and diffusion of innovation in Service Organisations.
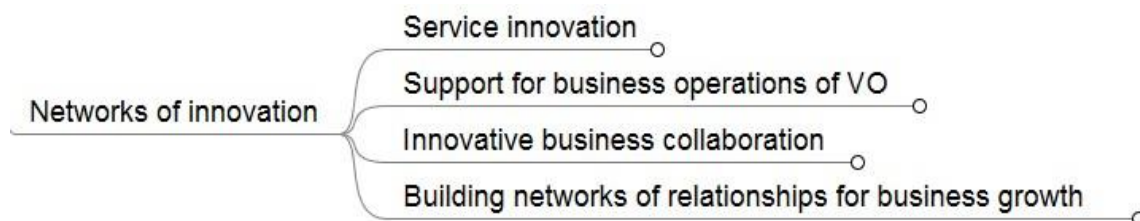
Figure 41 Mindmap of sub-themes

8.2 Innovation in the use of ICTs in development

In this section the thinking regarding innovation in ICT4D is discussed in order to place the use of ICTs to deliver internet access and associated benefits in the general context of innovation in support of development aims.

There are many different perspectives on the use of ICTs to further developmental aims. In addition to the ever-evolving ICT4D perspective, which is still largely technically focused, we will briefly cover what we

consider to be the most relevant perspectives that enrich the ICT in development research arena, namely the information systems (IS) and community informatics (CI) perspectives.

The literature on innovation is also vast, and we have limited the selection to what we consider to be the most relevant works in the context of village operators and ICT delivery and usage in a community. The departure point of this research is the role of social capital in supporting the development of the VOs as entrepreneurs. This makes the role of social capital in innovation relevant in general, and particularly so in the study of innovation by small entrepreneurs. We have discussed the role of VOs as social entrepreneurs (Social Bricoleurs) providing services from a VO office. This brings into focus the field of research into entrepreneurial innovation, as well as the research done specifically on the innovation in telecentre strategies, services and sustainability.

We have now mentioned the concept of innovation many times, but a definition of innovation has not yet been provided. In accordance with the focus on the role of social capital in innovation and in the diffusion of innovations, we adopt the definition used by Rogers (2003:12) in his overview of research in the diffusion of innovation: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption". This definition also seems particularly apt in the development context, as it emphasises the individual's perception of something as being new, rather than the wider notion of an innovation being something novel in the context of the field of human endeavour, including the scientific, socio-economic and technological dimensions. Rogers (2003) argued that newness of an innovation to a person is not just about hearing about it for the first time, but can also be described by the degree of persuasion involved and the actual decision made to adopt the innovation. In this research instances of *para-poor* and *per-poor* innovation (as defined by Heeks (2008)) was found that involved active participation in the creation of new innovations and the adaptation of an innovation by the poor in their communities, and not just passive adoption which is the underlying assumption of Rogers (McMaster & Wastell, 2005). The creation of innovations is discussed in Section 8.3.4.

As a way of describing the path to achieving developmental impact via ICT use, the concept of an ICT4D value chain (Heeks & Molla, 2009; Heeks, 2014) has been used to illustrate the many different activities that contribute to outcomes and impact. This also naturally leads to the consideration of more systemic and holistic approaches.
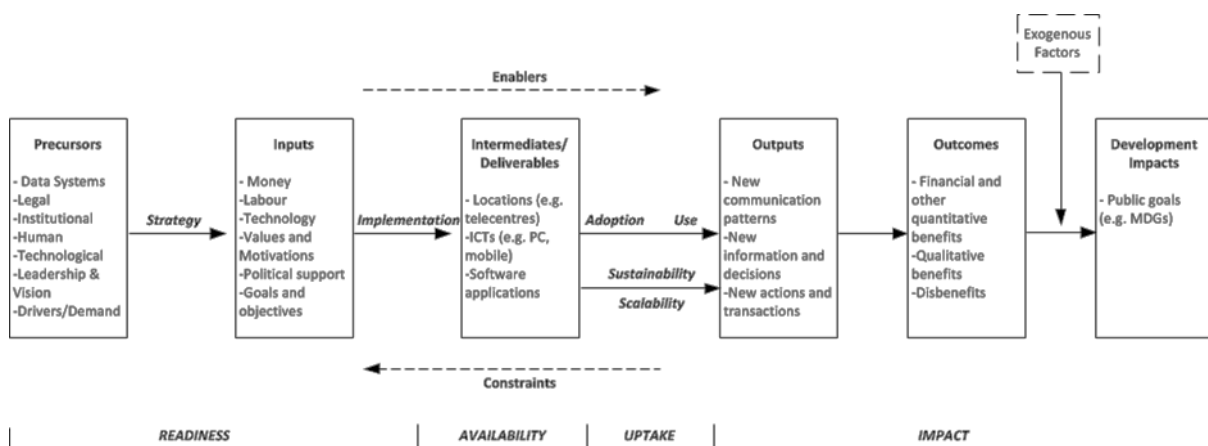
Figure 42 The ICT4D value chain (Heeks, 2014)

As shown in Figure 42 telecentres play a role in the *availability* part of the value chain. Telecentres provide a public venue at which connectivity and access to information is provided by ICTs such as telefax, telephones, computers and the internet (Bailur, 2007; Gomez, Ambikar & Coward, 2009.). Telecentres have

been used as a development vehicle by governments and NGOs and hence normally support socio-economic development as well, by providing information and services (including IT training) in areas such as agriculture, health, education, government services and microfinance, in contrast to a purely commercial internet café or cybercafé (Gomez, 2014; Bailur, 2007; Madon, 2004; Benjamin, 2001).

Even something as apparently simple as making information available at a telecentre requires a special kind of intermediary, an *infomediary* as previously discussed in Chapter 2 (Social capital, infomediaries and micro-entrepreneurs (Section 2.6.2.2) and Social capital in the evolution of ICT4D (Section 2.7.2.2)). Gould & Gomez (2010) used the term *infomediary* "to emphasize the role of brokering or transferring information in a culturally appropriate manner, by taking into account the norms of each group of people they connect".

In this role good relationships with customers are vital and therefore the building of various types of social capital is required. Masiero (2011:13) described telecentre entrepreneurs as being more than change agents as referred to in the diffusion of innovation work of Rogers (2005), since they guide a customer from the first innovation decision (e.g. going to a telecentre) to an ongoing process of adapting and adopting ICTs to derive value. This role is described in more detail in Chapters 7 and 8.

A literature review on the impact of ICTs conducted by Sey & Fellows (2009) found that in public access venues (such as telecentres) infomediaries make important contributions to the viability and sustainability of these entities (see also Ramírez, Parthasarathy, & Gordon, 2013). This finding reflects the well-known tendency for people to trust people they know personally, which leads to increased belief in the information provided. This was confirmed by Schilderman (2002) in his research on the information systems of the urban poor, and he hence identified social networks as their most important source of information. The social networks of VOs combined with their knowledge of local culture should improve their ability to be trusted infomediaries, thus enhancing the effectiveness of information provision beyond mere availability.

Availability of information and of ICT equipment is only an interim step, and thereafter *uptake* (adoption and use) is required in order for individuals to realise developmental output and outcomes (Figure 42). In other words, the concept of innovation, as defined by Rogers, is involved. Bailur (2007) made the very pertinent point that the notion of telecentres as a development strategy is based on a premise that the combination of connectivity, which is a purely *technical* problem, with public access, which has *psychological*, *social* and *economic dimensions*, will lead to developmental outcomes. It is important to think of all the possible influences on interactions between the service provider and customer at a telecentre or, in this research, at a VO office, that may affect the likelihood of realising the desired outcomes.

8.2.1 Phases in the evolution of ICT4D

To place telecentres in the context of the unfolding role of ICT in development and describe the shifts in the locus of innovation, the construct of three phases of ICT4D (labelled 0.0, 1.0 and 2.0) as developed by Heeks (2008) is used (please refer to the Chapter 2 for a more detailed description).

Phase 1.0, starting in the mid-1990s with the emergence of the internet, is characterised by the use of ICTs by large development actors as a development tool, with telecentre strategies as a starting point to deliver access to ICTs and services to poor communities in primarily rural areas. The experiences in this phase brought to the fore issues such as scalability and sustainability, as referred to in the uptake phase of the ICT4D value chain in Figure 42. The key shift in the ICT4D 2.0 phase is seen in the view that ICTs are more

than just a development tool, but are in fact an integral part of development, a platform for potentially transformative development (ibid.). A new approach to development, "Development 2.0", is enabled, in which ICTs enable the transformation of "the processes and structures of development" Heeks (2010:22). ICTs are now productive tools to be adopted by individuals as part of improving their lives, for example by earning income via the use of ICTs (Heeks, 2008).

In terms of innovation, the key nuance identified by Heeks (ibid.) is the move from a *passive* diffusion view of technology and development to an *active* innovation view, where innovation-centric interventions are used to achieve development goals. Three different innovation strategies can be used: *pro-poor* (for the poor), *para-poor* (working with the poor) and *per-poor* (innovation by the poor in their communities). The new generation of ICTs, such as social technologies and ubiquitous mobile communications, enable per-poor innovation that empowers people. As discussed later, the diffusion of innovation as a process is not passive *per se*, and actually plays an important role in each of these innovation strategies as people go through a process before making an adoption decision.

8.2.2 The living labs approach

This approach shifts product or service testing from the development and testing laboratory to the real-life context of users (the living lab) in their homes and places of work, where the possibilities of collaboration and, indeed, co-creation of innovations between designers, developers and users can emerge (Følstad, 2008).

The BB4All project was developed with this concept in mind, as there was an imperative to stimulate innovation in rural areas (Roux & Marais, 2011), as mentioned in the project description in Chapter 3. The CSIR research group in which the researcher worked was actively researching and propagating the living labs concept in ICT4D in Southern Africa (Stillman, Herselman, Marais, Pitse Boshomane, Plantinga & Walton, 2012; Herselman, Marais, Pitse-Boshomane & Roux, 2009; Pitse-Boshomane, Marais, Morris, Roux, Janse van Rensburg, Herselman, Makan & Mulder, 2008). The interactions between the VOs and customers as VOs develop and test services with their customers in the local community are a good example of a living lab approach to service development as discussed in Chapter 7 and later on in this chapter. At the BB4All project level, the network of VOs and customers formed a living lab. Direct feedback was received from VOs regarding the usability of the internet connectivity as well as the software applications developed to display the local wireless mesh network status of their cluster and the whole network (PM, 2015). Customers provided feedback mainly to the VOs, who then conveyed the types of issues experienced to the Service Desk and the FSC and FSM. Because the VOs were also users of the connectivity and were from the area (some VOs actually went to school at customer schools), they had an in-depth knowledge of the user experience, which informed not only their own service development but assisted in the development of network operational procedures. An example is found in the explanations and demonstrations at schools of the importance and implications of disconnecting or switching off the WMN node at the school, especially if a school is a gateway (PM, 2015; FSM, 2013a). VOs also conveyed customers' ideas for novel uses of the network, such as connecting surveillance cameras via the network to a command centre for security services (VO5, 2013a, 2013b).

A summary of how the VO model fits into the context of the development ICT4D strategies and living labs approaches is provided in Table 13.

Table 13 The VO model in the context of the evolution of ICT4D and the living labs concept

Topic	Comments
VOs in the ICT4D value chain (Readiness, Availability, Uptake and Impact)	
Availability	Telecentres for making ICTs *available* to people. **VO offices as a form of telecentre.**
Uptake	Role of *infomediaries* that transfer information in a culturally appropriate manner and contribute to sustainability of "telecentres". **VOs as trusted *infomediaries* since they are part of local social networks. People trust people they know. Main sources of information are social networks.**
Impact	**VOs *developing services for and with customers* to help them derive real value from internet use (e.g. managing finances, tendering online).**
VOs in ICT4D strategies	
ICT4D 1.0 (Heeks, 2008)	Emergence of the internet, use of ICTs as a development tool (*telecentre strategies* as a starting point to deliver access to ICTs and services) **VO offices as telecentres.** A *Passive* diffusion view of technology and development. **BB4All connects schools to the internet. VOs provide just internet access.**
ICT4D 2.0 (Heeks, 2008)	ICTs are an integral part of development, e.g. as productive tools adopted by individuals as part of improving their lives (Heeks, 2010). *VO services* **help the community to make ICTs productive for them.** An *Active* innovation view: innovation-centric interventions. Innovation strategies: *pro-poor* (for the poor), *para-poor* (working with the poor) and *per-poor* (innovation by the poor in their communities). **VOs participate in *pro-poor* innovation (VO15 encouraged learners to do internet research on similar topics as a group) and initiate *para-poor* innovation by developing services for shared needs (e.g. finding jobs and tenders) and *per-poor* innovation by developing services with customers to suit the diversity of needs (read email for people, SMS the gist of urgent emails).**
Living Labs (Følstad, 2008)	The co-creation of innovations between designers, developers and users in the real-life context of users. **The VO and customer interactions in VO offices and customer premises are the "real-life contexts" where co-creation of services occurred**. **Example: The development of an annual eFiling service into the creation of monthly financial statements for businesses.**

The next section will focus on the diffusion of innovation and the roles of social networks therein.

8.3 Diffusion of innovation

The theory and research on the diffusion of innovation is introduced, the influential Diffusion of Innovations Model (DIM) is discussed and applied. The on-going development of DIM, the critical evaluation thereof, and alternative diffusion models are outlined. The section ends with the application of diffusion of innovation models in development.

8.3.1   Research on diffusion of innovation

The scholar Everett Rogers devoted his research career to the study of the diffusion of innovation, starting with his doctoral dissertation which analysed the diffusion of innovations among rural farmers in a county in Ohio (Rogers, Singhal & Quinlan, 2009). Given that this research also deals with a rural context and the diffusion of services enabled by technological innovation, there is a certain degree of similarity to the context in which Rogers' research was done.

Rogers is widely recognised as the researcher who developed a theory of the diffusion of innovations that applies to a wide range of types of industries, innovations and cultures, and his book "Diffusion of Innovations" was the second-most cited book in the history of the social sciences according to the 2009 Social Science Citation Index (ibid.). The theory has been critiqued from various perspectives and selected examples will be discussed in Section 8.3.4, including a challenge to IS research community regarding the pervasive use of a diffusion model that uses the basic assumptions underlying Rogers' model (McMaster & Wastell, 2005).

Diffusion of innovations was defined by Rogers (2004:13) as: "Diffusion is the process through which an innovation, defined as an idea perceived as new, spreads via certain communication channels over time among the members of a social system".

Rogers' PhD literature review of the research done on the diffusion of many different kinds of innovations in different sectors of the economy showed the similarities and common patterns (Rogers, 2004). According to Rogers (2004, 2003) and Valente & Rogers (1995), the Ryan & Gross (1943) research into the diffusion of hybrid seed corn among farmers in Iowa provided the basis for the diffusion model. Ryan and Gross established the research methodology commonly used (retrospective survey interviews of adopters of an innovation) and made the term "diffusion" popular, but they did not, at that time, use the concept of "innovation" (Rogers, 2004).

The research of Ryan & Gross (1950, 1943) reinforced the finding that the rate of adoption of an innovation creates an S-shaped curve over time. Only 10% of farmers had adopted a new corn seed hybrid five years after its first use in 1928, but only three years later the adoption percentage had increased rapidly to 40%, eventually levelling off as the population of non-adopters decreased, with only two non-adopters remaining out of the population of 257 farmers used for the analysis by 1941 (13 years after availability). Ryan & Gross (1950:666) made it clear that their first hypothesis, "That the temporal diffusion pattern of the adoption of hybrid seed was characterized by three distinctive sequential periods namely, slow initial growth, followed by a rapid rise in the rate of adoption and a final short period of decline", was designed to allow for the testing of previous research by Chapin (1928) on the S curve of *cultural* change in agriculture. Although their focus was on the resistance to cultural change, the change researched was *technological*, and therefore, in their view, involved "none of the culture lag concepts and few of the emotional resistances common to many instances of culture change" (Ryan & Gross, 1950:666).

The other distinguishing features of their research were the intra-community scope of analysis, rather than a larger regional or national scope, and the collection of primary data via personal interviews.

An interesting linkage to the current concept of a Living Lab is the description of the role of neighbours who were early adopters that was used by Ryan & Gross:

> In a sense the early acceptors provided a community laboratory from which neighbors
> could gain some vicarious experience with the new seed over a period of years. The

importance of this local laboratory is attested by the weight given to "neighbors" as influences toward acceptance. (Ryan & Gross, 1950:681)

Owing to this role the nature and time dependence of the influence of neighbours and salesmen differed (ibid.). Salesmen were the major single source of knowledge about the new seed, but neighbours were the most influential. Salesmen's main influence was during the early phases of the introduction of the seed, while neighbours' influence was greater as the time went on. Ryan and Gross (1950:686) therefore distilled two types of "diffusion agencies", introductory (the salesmen) and activating (the neighbours with whom personal relationships exist). Rogers (2004) summarised the contribution of this research as showing that the meaning of the innovation grew over time as personal experiences were shared between farmers – this then being the core of the innovation diffusion process.

In the VO context, the importance of close relationships between people in the same type of business in diffusion of new services was discussed in Chapter 6 where the role of word-of-mouth marketing of a VO's services among a group of home-based carers was described.

A highly important result was that the more conservative farmers would still conduct their own experiments, even if they were exposed to other farmers' experiences (ibid.). This held true for all farmers; the real benefit of the exposure was that the period of experimentation of the late acceptors was shorter than that of the earlier adopters. Farmers needed to test for themselves. This pattern of behaviour may also hold for the community members who are introduced to the value of internet use via their personal hands-on experience in the VO office or via use of a VO's service to directly experience the benefits for themselves.

Another significant finding was that some of the key differences between early and late adopters were the size of the farm, income level, and amount of education, age and degree of social participation (Ryan & Gross, 1950). Social participation was used to refer to "farm operators who had a more secular pattern of social life" (ibid.:664) characterised by more frequent visits (nearly three times) to the nearest large city, Des Moines, which was about 130 km away (ibid.). Ryan & Gross suggested that the farmers "most responsive to secularized contacts may represent a social type also most responsive to innovation in agricultural practice" (ibid.:664). In this context secularisation refers to a trend towards a sociological configuration of wide social contacts, e.g. via special interest groups, and identification with a way of life, urbanisation, in contrast to traditional rural farm life that centred on interactions with the family and neighbours – "solidary primary group rural living" (ibid.:707). Early technology adoption was not associated with access to information or knowledge since that was freely available to all farmers; the key factor was suggested to be the identification with a more secular (or urban) type of life, the associated readiness to engage beyond closely linked rural community life, and hence an increased readiness to let go of traditional farming techniques and embrace new techniques (ibid.).

Increased urbanisation is still a dominant trend in the developing world and in South Africa the urban population percentage was 52% in 1990, 64% in 2014, and was projected to increase to 77% by 2050 (UN, 2014:21). A change in life orientation away from traditional rural life to a more "urban" culture is evident in rural areas too. Technology use is also identified with being not rural (or not "backward"). In another ICT4D project that the researcher participated in, rural teachers equipped with tablets admitted to now feeling more equal to their urban teacher counterparts (CSIR, 2015). In the interviews with VOs, they commented that learners want the latest in technology (VO2, 2013b), that technology is a priority since it is growing every day (VO14, 2012b), and that their friends are into technology (VO9, 2013b).

8.3.2 The Diffusion of Innovations Model (DIM)

The diffusion of innovations model, as mentioned in the previous section, was argued by Rogers (2003), in the literature review of his PhD dissertation, to be "a general process, not bound by the type of innovation studied, who the adopters were, or by place or culture. I was convinced that the diffusion of innovations was a kind of universal process of social change" (ibid.:xci). Indeed, Rogers stated that "the diffusion of innovations explains social change, one of the most fundamental of human processes" (ibid.:xviii). This section is based largely on the summary in Rogers' book (2003).

The key elements of the model are: "the innovation, communication channels, time, and the social system" (ibid.:11). The well-known diffusion process diagram illustrates the adoption pattern over time (ibid.:11).
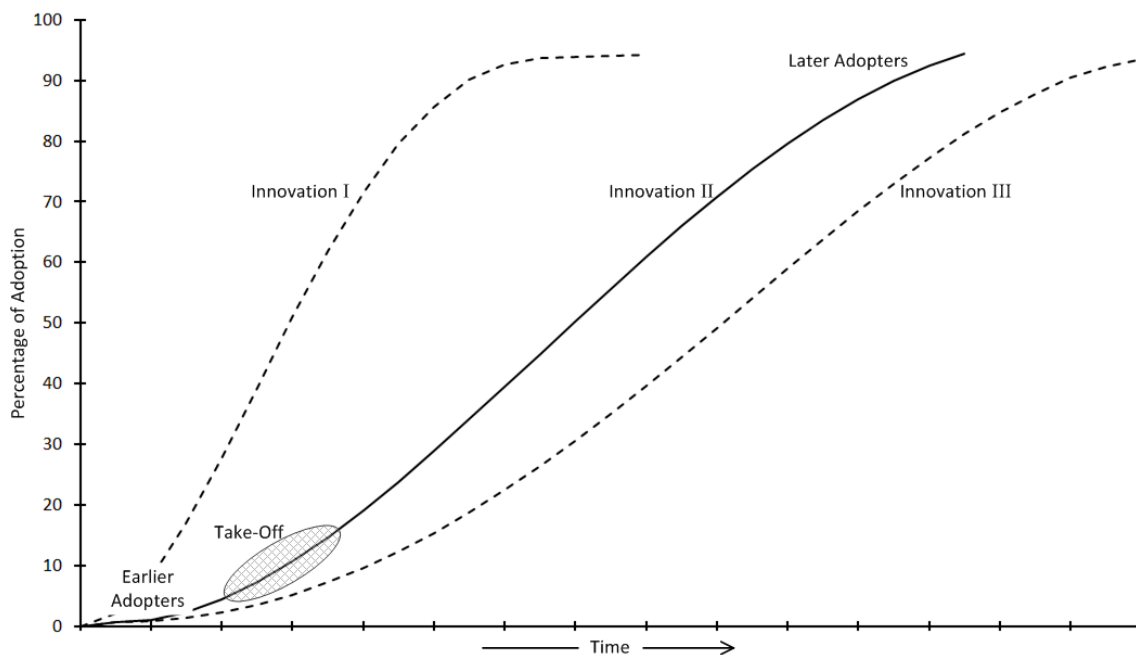
Figure 43 The diffusion process (Rogers, 2003:11)

Each of these elements will be discussed briefly in the section, with a more in-depth discussion in the next section when the diffusion of innovations model is applied to the VO and customer interactions.

8.3.2.1   The Innovation

In the section in this chapter on Innovation in the use of ICTs in development, Rogers' (2003) definition of innovation was discussed. The key idea is that an innovation is anything that is perceived to be new and that this includes hearing about it for the first time, the level of persuasion, and the actual decision made to adopt the innovation.

In the context of the process described in

Figure 43, a subset of the major research questions in diffusion on innovation research is the following (ibid.):

- the differences between early and late adopters of innovation

- the influence of the perceived properties of an innovation on the adoption rate
- the particular shape of the adoption curve, with a rapid increase in adoption at around ten percent adoption.

We now return to the nature of the innovation. In the case of technological innovations, it is important to note that Rogers (2003) acknowledged that technology and innovation are often used as synonyms. His definition of technology was broad: "A technology is a design for instrumental action that reduces the uncertainty in cause-effect relationships involved in achieving a desired outcome" (ibid.:13). In addition, he pointed out that technology normally has hardware and software components, where the hardware, the tool, is a physical embodiment of the technology and the software constitutes the information foundation for the hardware. Thus a cell phone has hardware (e.g. microprocessor and antenna) and software (e.g. the operating system and applications such as email).

The surprising feature of Rogers' definition was that since a technology may be mostly information based, he considered political philosophies, religions and policies to be "software innovations" (ibid.:13). Hence in ICT4D one may consider developmental theories and policies to be technologies or software innovations too, and not just the hardware.

The online Merriam-Webster (n.d.) dictionary defines technology as either "the practical application of knowledge especially in a particular area" (e.g. information and communication technology), "a capability acquired via the practical application of knowledge" (e.g. secure communications), or "a manner of accomplishing a task especially using technical processes, methods, or knowledge" (e.g. new technologies for communication, e.g. cellular networks) , or "the specialized aspects of a particular field of endeavour" (e.g. educational technology). The meaning closest to Rogers' definition is the use of knowledge in getting a task done; however, Rogers did focus on broader outcomes rather than just tasks.

Owing to the nature of the definition of technology as a design for action that reduces uncertainty about how desired outcomes can be achieved, information is required about the nature of the how (the cause-effect relationship) to reduce the uncertainty (Rogers, 2003). The nature of the decision-making process about an innovation is therefore seeking and processing information in order to determine the how as well as the advantages and disadvantages compared to the known. Uncertainty needs to be reduced to a level of comfort for the individual before the adoption/rejection decision can be made.

VOs can and do play a major role in the innovation decision-making process of customers by providing information and demonstrating the advantages of, for example, internet use.

The boundaries of a technological innovation are determined by the perceptions of the users and it is common for users to perceive two or more innovations as being closely related; this has been defined as a "technology cluster" by Rogers (2003:14). Therefore, the interdependence between innovations diffusing into use cannot be ignored, as users' experiences and perception of an innovation influence the reaction to the next innovation encountered (ibid.). In the VO context the introduction of smart phones, laptops and data access via the cellular network is present at the same time. Hence the introduction of their internet-based services is influenced by their customers' perceptions and experiences of the related innovations that have already been adopted or rejected.

Not all innovations are equal. Of particular importance is the role that the perceived characteristics of a particular innovation play in its adoption rate (ibid.). Rogers (2003) discussed this set of characteristics (or attributes): relative advantage, compatibility, complexity, trialability and observability.

Users are not just passive adopters of an innovation, but may alter an innovation while adopting and implementing it, and this reality has been labelled as "re-invention" (ibid.). As will be illustrated, VOs can and do play an active role in their own adoption and implementation of an innovation and also assist customers to do the same. VOs and their customers can be considered re-inventors. Research has shown that innovations that are amenable (pliable) to re-invention diffuse more rapidly, and the probability of adoption being sustained is higher (ibid.).

8.3.2.2   Communication channels

Research has found that the conditions for the successful transmission of an innovation from source to receiver via a communication channel (e.g. television or telephone) depend on the nature of the "information exchange relationship between the two individuals" (Rogers, 2003:18). We have mentioned the hybrid corn research, which showed that salesmen were useful for the wide distribution of information, but that the influence of information from a person you know who is engaged in a similar activity (corn farming) is highly significant in the adoption of an innovation. In fact, the general similarity between two people (e.g. education and socio-economic status) was found to increase the degree of persuasiveness of such interpersonal channels (face-to-face) or interactive communication via the internet or social media (ibid.). The subjective experience of an innovation by somebody like yourself that you know (a so-called near peer) is more important than objective scientific information, and hence the diffusion process may have a large modelling and imitation behaviour component (ibid.).

VOs, being from the local community, have the advantage of similarity, personal relationships and interpersonal communication in influencing the adoption of their own and other innovations.

The degree of similarity between two people who interact is called homophily and, as we have discussed, has advantages for diffusion of innovation due to increased effectiveness of communication; it is simply a fact that most people interact mostly with homophilous people (Rogers, 2003; Rogers & Bhowmik, 1970). The problem is that innovation also involves interaction with people who are not similar to you, which is called heterophily, and communication in these interactions is more difficult. The person who knows about an innovation may be more technically competent, use specialised terminology and be unlikely to share a great similarity with the person he or she is talking to, since knowledge of an innovation tends to relate to education and socio-economic factors. These similarity concepts are encountered in social network analysis as well, and communication between these groups may manifest in the very important so-called bridging links between groups (see Chapter 6).

8.3.2.3   Time

The diffusion process occurs over time and hence time is a very important variable that is influential in the innovation-decision process, the level of innovativeness of the person or entity involved compared to others, and the rate of adoption of an innovation in a system (ibid.).

The innovation-decision process describes the phases of first knowledge of an innovation to the decision to adopt or reject and the subsequent implementation, use and confirmation of the decision by the person or entity. Rogers (2003:20) called these five main steps: "knowledge, persuasion, decision, implementation and confirmation".

The only step that really requires explanation is the confirmation step, where a person "seeks reinforcement of an innovation-decision that has already been made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation" (ibid.:20). As mentioned previously, the role of interpersonal communication networks becomes important as people evaluate the merits of the innovation for their situation (i.e. from the persuasion step and thereafter).

People differ in the amount of time (the innovation-decision period) that it takes for them to go through these five steps, and for some it may take years. Coupled to this phenomenon is the level of comparative innovativeness of a person, which is the degree to which adoption takes place earlier than among other people. Adopter categories are used to classify the innovativeness of people in a social system as "(1) innovators, (2) early adopters, (3) early majority, (4) late majority and (5) laggards" (ibid.:21).

The rate of adoption brings in the final time-related concept of the relative speed of adoption of an innovation in a system. The familiar S curve (see

Figure 43), is produced when the number of people adopting an innovation is presented as a cumulative frequency over time. Innovators adopt early, when the number of people adopting per time period is low, while laggards adopt when the number of adopters per time period levels off as fewer new adopters remain. The rate of adoption refers to a system of people and is quantified as the time it takes for a certain percentage of the members of a system (e.g. a community or organisation) to reach adoption. Many factors influence the rate of adoption, including the perceived relative advantage conferred by the innovation, degree of compatibility, as well as the characteristics of the social system as a whole, rather than the individual behaviours.

8.3.2.4   A social system

The context of innovation diffusion is the people in the boundaries of the system (e.g. national or village level) who share a common problem and a mutual goal (ibid.:24).

Thus, as seen by Cilliers (2005), the boundaries are both a product of the way we describe the system (people who share a problem) and a function of what actually happens in the system, i.e. the solving of problems and the diffusion of innovation. The boundary enables and constitutes the innovation (ibid.).

The boundary is also influenced by the social structure of a system, and social structure and communications interactions are generally major influences on innovation diffusion. Other influences are norms, opinion leaders, change agents, innovation-decision types, and the consequences of an innovation (Rogers, 2003).

Patterned (including formal) social arrangements, such as the hierarchies in a bureaucratic entity, build the social structure of the system (ibid.). The informal structure elements created via interactions in interpersonal networks are what are referred to collectively as the communication structure of the communication flows. Homophilious and heterophilious communications structures form due to the differential likelihoods of two individuals communicating with those similar or dissimilar to them. As discussed in the corn hybrid study, the communication between neighbours is influential in the adoption process and is an example of *system effects* on the behaviour of people who are part of the social system and who are independent (to a degree) of the influence of personal characteristics (ibid.; Rogers & Kincaid, 1981). The influence of the VOs, since they are members of the social structure of the social systems of the general community and local businesses, is part of the system effects on innovation adoption of the other members of these social systems.

Another important influence is the norms of a social system, defined by Rogers (2003:26) as "the established behaviour patterns for the members of a social system". In the concept of social capital, norms are a very important integral part too (see Chapters 2 and 6). Norms operate at various levels in society, manifest in various forms such as cultural or religious norms, and can stifle change (ibid.).

Other influences are norms, opinion leaders, change agents, innovation-decision types, and the consequences of an innovation (Rogers, 2003).

Certain members of a social system play special roles with respect to diffusion of innovation and are called opinion leaders and change agents.

The hybrid corn research found that community leaders were not as influential as those directly involved in the innovation process, and other research has shown the most innovative may be considered to be deviants with low credibility and hence low influence (ibid.). The most influential people are described as opinion leaders who are regularly able to influence attitudes or behaviour of people in the desired direction (for or against an innovation). This informal role is an earned one, based on a track record of technical competence, being accessible, and conformance to the norms of the relevant social system. People are willing to model their behaviour on that of opinion leaders. The relative differences observed in opinion leaders include being more cosmopolitan, having a higher socio-economic status and being more innovative. A vital consideration is the unique and influential position at the centre of the interpersonal networks in the system's communication structure, what can be described as being highly regarded or being an authority in SNA terminology (Kleinberg, 1999).

In the VO communities, this research indicated that church pastors play this kind of role and are especially influential since they combine formal and informal roles. In the case of VO14, his pastor has become a strong marketer of his video services to the congregation (VO14, 2013b). Change agents also influence the social system, but are professionals "who influence[s] clients' innovation-decisions in a direction deemed desirable by a change agency" that is outside the social system (Rogers, 2003:27). Change agents may use the opinion leaders in the system to assist them. Change agents may well be professionally trained people with an associated higher status and hence could be heterophilious from the members of the system; change agencies therefore employ change agent aides who are not as highly trained and are more homophilious with the clients to do most of the actual influencing. In ICT4D projects the term 'change agent' is loosely used to describe what Rogers calls an opinion leader or a change agent aide. A difference is that many projects do try to identify and influence these individuals, but do not often directly employ them. In the case of BB4All, the field service manager was a contracted training professional who lived outside Nkangala and whose job it was to manage the VOs with assistance from the field service manager. This is a clear change agent role. The FSC lives in the Nkangala area and was paid on a contract basis to be a manager and mentor and a change agent to influence mainly the VOs and key stakeholders such as Department of Education stakeholders. VOs, in turn, were paid a monthly stipend to deliver technical support services, but were also expected to influence the adoption of the internet especially by the principals, teachers and learners of the schools in their cluster. They acted as change agent aides, having less of a professional education. A key difference is that the VOs and the FSC are from the area and hence are members of the social system, sharing a common goal of using the internet to add value to the lives of people. They are inside the system, but do have a definite goal of influencing people and, depending on their degree of influence and technical competence, may well be described as opinion leaders rather than change agents or change agent aides as defined by Rogers' definition.

In addition to norms, opinion leaders and change agents, a major influence on innovation diffusion is the different kinds of innovation decisions that manifest themselves in a social system.

Rogers (2003) distinguished between decisions made by a person independently of the other members of the social system (optional innovation-decisions) and those made by more than one member or by members with a certain status. A consensus decision made among the members of the system that leads to

most members' conformance is termed a collective innovation-decision (ibid.). If the decision is made by the members of the system with a certain status due to power or expertise, an authority innovation-decision has been made and the result is that individual members have no real influence and have to go along with the decision. These terms describe a continuum of members' influence on innovation decision-making. The nature of the system (e.g. a commercial company or consumer activist group) influences the prevalence of a type of innovation-decision. Other differences include the rate of adoption: the fastest adoption rates can normally be traced to authority decisions, while consensus decisions take longer than optional decisions. A well-known phenomenon is the disobedience of the citizen to authority decisions enforced by laws; a prime example in the South African context is the 'hands-on' rather than 'hands-free' use of cellular phones by drivers.

Culture may be a powerful factor, and in the Nkangala context the official blessing of two local Ndebele kings was sought and they and their families were guests of honour at the official launch of the project by the national Minister of the Department of Science and Technology. The provincial political power structure was represented by a Member of the Executive Committee of the Province of Mpumalanga (CSIR, 2014).

The type of innovation-decision often changes with time and hence a contingent innovation-decision describes a choice that can only be made after a previous decision. The classic example is the mandatory installation of safety belts in cars, which made an optional decision to use safety belts much easier since it was not accompanied by the extra effort of self-installation (Rogers, 2003). If internet access is available at a VO office, then a community member does not have to make the decision to buy a suitable device and pay for personal internet access. The contingent innovation-decision has now become whether it is worth paying for internet access for a certain amount of time at a VO office or an internet café.

Finally, a major influence on innovation diffusion is the consequences of an innovation that may play out as changes at social system level as well as changes at the personal level. Three classes of consequence are (Rogers, 2003:31)

- desirable versus undesirable consequences (functional or dysfunctional effects on the social system)
- direct versus indirect consequences (immediate versus second-order responses to an innovation) and
- anticipated versus unanticipated consequences (changes recognised and intended by members, or not).

In the context of any community, change agents introduce innovations expecting desirable, direct and anticipated consequences, but in some cases unanticipated consequences occur. In the BB4All project, an example was the unapproved use of the name of an accredited training company by a VO in order to market their own training to a school (FSM, 2014a). An innovation's form, physical appearance and function, and the value add to the life of people, may be anticipated by the change agent (Rogers, 2003). The real complexity is that change agents are often not able to foresee how the members of the social systems will subjectively perceive an innovation, i.e. what meaning it will have for them (ibid.). As discussed later, there were examples where even the function was not anticipated and re-invention occurred. As previously discussed (Section 8.3.2.2 and Rogers, 2003: xx-xxi), communication in interpersonal networks in social systems is a two-way process in which meaning is socially constructed; this is very different from the assumption that an external change agent can know or prescribe the meaning of an innovation.

8.3.3 The influence of new technologies and new research on the DIM

In the 5th and last edition of Rogers' book, Diffusion of Innovations, published in 2003 before his death, the new additions since the 4th edition (1995) are summarised as:

- "changes in the contributions of various diffusion traditions, with marketing, public health, and communication coming on strong in recent years"

- "many studies of the diffusion of new communications technologies like the Internet and cellular telephones"

- "expanded understanding of diffusion networks through concepts such as the *critical mass* and *individual thresholds*"

- "the use of field experiments…to test the effects of such *diffusion interventions as using opinion leaders*" (Rogers, 2003: xv, my italics)

In a 2004 article, Rogers stated that the most important additions since 1962 are these concepts:

- "The critical mass, defined as the point at which enough individuals have adopted an innovation that further diffusion becomes self-sustaining."

- "A focus on networks as a means of gaining further understanding of how a new idea spreads through *interpersonal channels*."

- *Re-invention*, the process through which an innovation is changed by its adopters during the diffusion process." (Rogers, 2004:19, my italics)

In this study 'interpersonal channels' is discussed in the next section. In the interaction between VOs and customers 're-invention' played a significant role and is discussed in Sections 8.4 and 8.5 as innovation in service organisations or 'service innovation'.

8.3.3.1 Four models of diffusion networks

In this research, the networks of personal relationships of each VO have been studied and hence the research on the influence of interpersonal networks on the diffusion of innovation, as mentioned above, is of particular importance. xxx

Valente (1996) summarised the research since 1962 as the development of four models of diffusion networks, with the work of Rogers as the first model.

The initial approach by Rogers and others who adopted a network approach to diffusion research was to focus on the social system as a whole and to use the number of times an individual was nominated by other members as a network partner to determine the degree of opinion leadership, which was then correlated with the relative time of adoption of an innovation by this individual (Rogers, 1962; Valente, 1996).

The second model was developed by Granovetter (1982, 1973) and emphasised the structural features of a diffusions network, especially weak ties (bridging links) that connect subgroups in a social system. The third model, by Burt (1987, 1980), made the argument for the influence of the degree of equality in network position, or structural equivalence (as discussed in more detail in Chapter 6 and 7).

Valente (1996) presented his own research as the fourth model that took on board the tendency of people to adopt a behaviour based on the proportion of the members of the social systems that have already

adopted the behaviour. A person with a low threshold will adopt a particular behaviour even if relatively few in the social system have done so, while a high threshold means that a person's adoption is delayed until the majority has adopted the behaviour (ibid.). The major difference is that Valente chooses the personal social networks of a person as the unit of analysis, rather than Rogers' choice of the members of the whole social system who share some common goal. Measurement of individuals' thresholds with respect to their personal networks develops an improved understanding of interpersonal interactions and influences on the adoption choice of individuals (ibid.). Research results based on the use of personal social networks as the unit of analysis in the study of innovation will be referred to in the discussion of VOs role in innovation diffusion.

8.3.3.2   *The internet*

The influence of the internet has been pervasive and, as stated by Rogers (2003: xviii), "the widespread diffusion of the Internet since 1990 has changed the nature of the diffusion process in certain important ways". The rapid diffusion of the internet has brought to the fore the phenomenon of critical mass, while the interactive communications via the internet have reduced the influence of spatial separation between the participants in conversations about ideas and innovations (ibid.). At the same time the digital divide has been identified and researched in order to understand the inequalities that develop as a consequence of innovation and the barriers to the its widespread use by all people. The development theme is taken forward in the next section.

8.3.4   Diffusion and development

In the application of the classical diffusion model to the development processes in "developing nations" in the 1960s, some limitations in the diffusion framework became apparent (Rogers, 2003: xix). In particular, Rogers (2003: xix) stated that some "development programmes outran the diffusion model on which they had originally been based" and thus the classical model had to be altered.

The possible shortcomings and the premise of the general applicability of Rogers' diffusion model have been researched extensively. A valuable general overview as well as the introduction of innovations as part of a developmental agenda has been provided by Greenhalgh, Robert, MacFarlane, Bate & Kyriakidou (2004). Their systematic overview of the diffusion of innovations in service organisations summarises the early studies of innovation diffusion in diverse fields such as rural sociology, medical sociology, communication studies and marketing, and they have also developed a theoretical critique of the classical innovation diffusion theory. According to the authors, the early studies "produced some robust empirical findings … on the attributes of innovations, the characteristics and behavior of adopters, and the nature and extent of interpersonal and mass media influence on adoption decisions" (ibid.:589). Their theoretical critique of these studies focused on what they considered to be an incorrect shared set of assumptions:

> *(1) the only relevant unit of analysis is the individual innovation and/or the individual adopter;*
> *(2) an innovation is necessarily better than what has gone before and adoption is more worthy*
> *of study than is non adoption or rejection; (3) patterns of adoption reflect fixed personality*
> *traits; and (4) the findings of diffusion research are invariably transferable to new contexts and*
> *settings.* (Greenhalgh *et al.*, 2004:590).

McMaster & Wastell (2005:386) pointed out that causation in the social contexts is "complex, situated and ideographic" and that therefore inference from the statistical properties of a population to simple causal laws for individuals or groups of people is invalid. This supports the assertion (1) above. The term "pro-innovation" bias is used to describe the assumption made in diffusion research that adoption of an innovation is desirable and failure to adopt is resistance (ibid.). This agrees with (2), adoption is good, and

(3), since the labelling of people as being "resistant" is rejected. Furthermore, they also disagree with the "principle of progress- that few people are creative while the majority only imitate" which is a key tenet of diffusion theory (:385). In terms of (4) the argument is that innovation cannot be reduced to simple causality, but is a dynamic interaction between social and technical systems that has a "processual character" (:386) and hence "innovation is local and situated" (:398) and it cannot be assumed that it can be used in every context. The influence of social context is included in Rogers' theory, but the Technology Adoption Model (TAM) that is frequently used in IS research, excludes this influence (McMaster & Wastell, 2005).

Research areas that did not share this set of assumptions or that extended the theory base were identified, and the areas of particular importance for this research were found to be Development studies and Health promotion.

In the study of development of nations or societies, the scope of research on diffusion of innovations had to be increased to include the context (political, technological, ideological, etc.) of the creation of the innovation and the context of the participants' society, in which the meaning and social value of an innovation is shaped (ibid.). In particular, "Diffusion of innovations was reframed as centrally pertaining to the appropriateness of particular technologies and ideas for particular situations at particular stages in development" (ibid.:590). Of great importance to the developmental context are these findings:

> *(1) that the meaning of an innovation for the agency that introduces it may be very different from that held by the intended adopters and (2) that 'innovation-system fit' (related to the interaction between the innovation and its potential context) is generally a more valid and useful construct than 'innovation attributes'* (Greenhalgh *et al*., 2004:590).

Innovation attributes are "often assumed to be fixed properties of the innovation in any context" (Bourdenave as referred to in Greenhalgh *et al*., 2004:590). As mentioned above, McMaster & Wastell (2005) argues that innovation is a dynamic interaction between social and technical systems which excludes the simple acontextual causality that the use of 'innovation attributes' assumes and therefore the interaction focus of 'innovation-system fit' is more valid and useful.

In the promotion of health, a new strategy has emerged with similarities to development work, where partnership and community development models have replaced the standard model of conveying advice from the change agency to the target group (Potvin, Haddad & Frohlich, 2001). In the developmental field, participatory development approaches are currently generally accepted and implemented (Kleine, 2010).

8.4   Diffusion of innovation in Service Organisations

8.4.1   General overview

ICT4D can be described as a technological innovation process that serves local priorities and hence requires local innovation instead of the introduction of technologies developed elsewhere (Heeks, 2008). Rogers wrote an article on the benefits of combining the diffusion of innovations model and complex adaptive systems theory (Rogers *et. al*, 2005). The value that can be realised is the use of these theories to construct "predictive or applied hybrid models of induced change in population behavior" (ibid.:2). The model that was developed depends on the existence and strength of weak ties (bridging links) among the members of a social system composed of heterogeneous groups. If these groups share a common aim, a focused

intervention by an innovator to grow these weak ties may "prompt and, to an extent, guide the complex emergence of innovation adoption in social systems" (ibid.:2).

The perspective that VO businesses are primarily focused on personal service delivery makes the work done in innovation in service organisations highly relevant.

8.4.2   Innovation in Service Organisations

In the previously mentioned study by Greenhalgh *et al*. (2004) of the diffusion of innovations in service organisations, the application of complexity research to innovation was found to be relevant and important. The departure point is to see innovation as emergent patterns of interactions that arise due to the responses of people relating to each other and to their shared local context. These patterns of interactions (innovations) may persist or transform. The diffusion of innovations in an organisation then becomes fundamentally a mutually or co-adaptive process, in which the innovation and the organisation adapt to each other (Fonseca, 2001). As shown in Figure 44, this kind of adaptive process is far removed from centrally managed and planned change in orderly systems (Plsek, 2003).
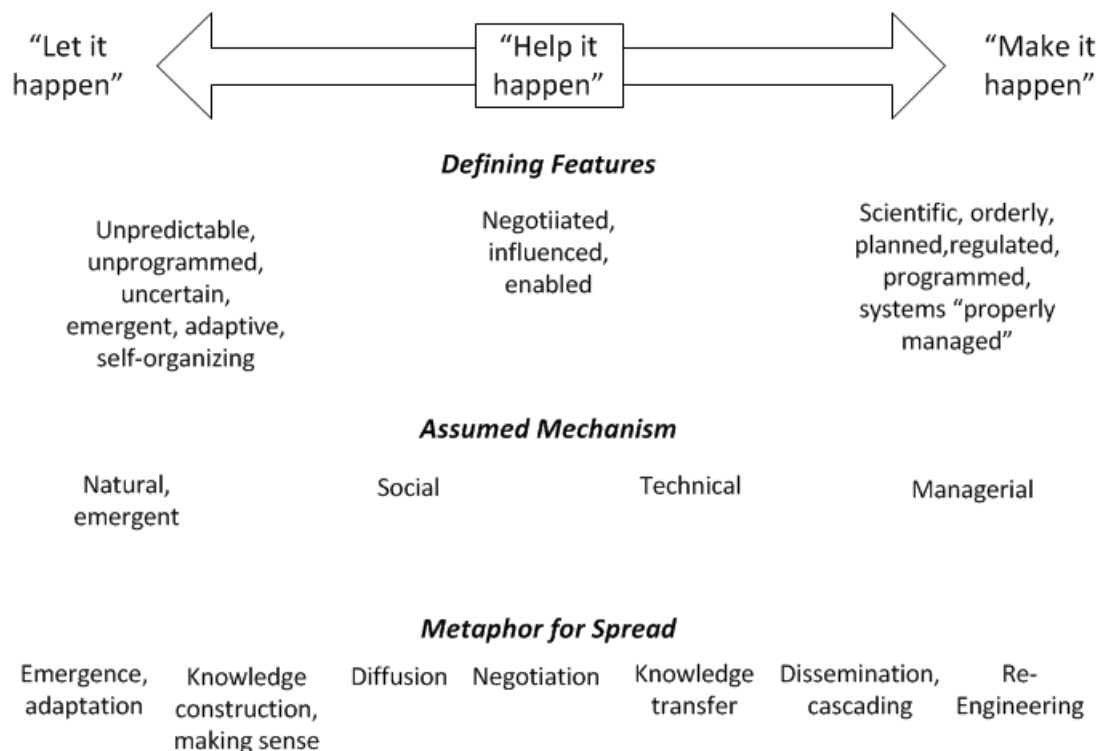
Figure 44 Different conceptual and theoretical bases for the spread of Innovation in Service Organizations (Greenhalgh *et al*., 2004:593)

The study showed that the VO-to-customer interaction is social, personal, face-to-face, and that meaning is gradually co-constructed with the customers (as mentioned in the previous section on the diffusion of innovation model and as will be explicated in more detail later).

On the basis of the earlier discussion of living labs, the nature of innovation diffusion and the discussions in Chapters 3, 6 and 7, and the sections that follow, the VOs' innovation processes were mapped to Figure 44 as shown in Table 14.

Table 14   VO innovation processes in interaction with customers

Patterns of innovation		
"Let it happen"	*"Help it happen"*	*"Make it happen"*
Innovation was not planned, but allowed and encouraged by the BB4All project as a sign of VOs being entrepreneurial.		
Defining Features		
Unpredictable, unprogrammed, uncertain, emergent, adaptive, self-organising	*Negotiated, influenced, enabled*	*Scientific, orderly, planned, regulated, programmed, systems "properly managed"*
Innovation was driven by the VOs responding to the similarities of the needs of *groups of customers* (leaners researching same topics, businesses eFiling tax returns) and meeting the specific needs of *individual customers* (a lawyer wanting just-in-time research, converting urgent email to SMS for an NGO). Co-creation of innovative services with customers emerged. Collaboration with entrepreneurs to share resources and skills.		

Assumed Mechanism			
Natural, emergent	*Social*	*Technical*	*Managerial*
Very few predefined services. VOs responded to challenges of diversity of needs, the variation in customer knowledge of ICT and internet use, and variation in customer access to ICT equipment.	Face-to-face interactions with customers (at VO offices and at customer premises) and sharing of knowledge by family, friends, other VOs, businesses, and the project team.	VOs had technical resources: access to the internet, a printer, video camera and a laptop. Some VOs learnt special skills (video editing, development of financial spreadsheets).	

Metaphor for Spread						
Emergence, adaptation	*Knowledge construction, making sense*	*Diffusion*	*Negotiation*	*Knowledge transfer*	*Dissemination, cascading*	*Re-engineering*
Co-creation with customers to meet needs.	VOs making sense with customers of value of internet use.	VO to VO. Word of mouth.	VOs and businesses agree on pricing and services.	Between VOs and customers. Between VOs.	Church pastors disseminating VO services to community.	

The table is a high-level introduction to the nature of the innovation described in Sections 8.5 to 8.8.

The co-adaptive process was studied at the VO and customer level. The commercialisation of BB4All would be the next level where co-adaptation of innovation between the VOs and the licensee, and the licensee and the customer base, should take place according to this model (Plsek, 2003; Fonseca, 2001).

8.5   Service innovation for and with customers

The customers of the VOs exhibit a wide range of attitudes towards computer and internet use, and their levels of internet adoption and skill vary widely and may grow as they experience the benefits of internet use.

In response to the wide diversity among customers and their needs, VOs have had to adapt their services. The customer-driven need of VOs to adapt their services is a driver of innovation. Rogers (2003:5) referred to a case study in which the focus of the introducer of an innovation was "'innovation-oriented' rather than

'client-oriented'". In this research VOs have shown both kinds of orientation due the adoption of a customer-centric approach by most VOs. VOs assist in the diffusion of existing innovations, but have also gone beyond being a 'client-oriented' introducer of innovation to the co-creation of innovations with customers in the form of new services.

In this section the general behaviour of VOs having to innovate to meet the different types of service needs of customers is described first as shown in Figure 45. The types of customers are described, followed by an overview of the different kinds of service innovation that have been developed by VOs, with and without customer participation, in response to customer needs.
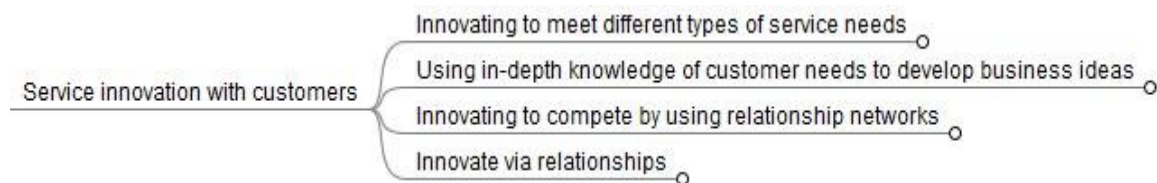
Figure 45 Mindmap of service innovation

The analysis of the VOs' services has shown that, in addition to the diversity of customer needs, there are other types of factors that influence the development of innovative services and general business innovations, namely the in-depth knowledge of the customers' needs and businesses, the use of networks of relationships to compete with other businesses, collaboration with other businesses, and strategies to compensate for their lack of resources and skills.

These drivers of VO (and customer) innovation are covered below.

8.5.1   Innovating to meet different types of customers' attitudes and needs

VOs adapt to the different types of attitudes and needs of customers. These attitudes and needs range from: (1) people who do not want to acquire computer skills and want somebody to do things for them even if they do have computers, (2) people or entities who want to use the internet but lack human resources, equipment and affordable internet access and (3) experienced ICT users who need specialised support.

8.5.1.1   *Customers who do not want to develop computer skills*

Some customers do have the requisite equipment such as laptops but still want a personal service rather than doing it themselves. These services include typing, emailing and internet use in general. These services are based on *trust* in the VOs to protect their privacy since it includes reading and processing of personal emails. A good example is the principal who relies on VO2 (2013a) to read his email on his computer in his office since he feels more comfortable if she does it rather than the school staff. VO1 (2013a) and VO3 (2012a) also provide the same service. In the case of VO3, teachers actually ask her to keep their email passwords for them (VO3, 2012b:14). These manifestations of trust go beyond Rogers' research on the advantages of knowing change agents (communication effectiveness increases if a customer knows a change agent) or VOs as members of the social system having the status of an opinion leader due to technical competence, and whose behaviour is modelled by other people.

8.5.1.2   *Customers who want to use ICTs and internet but have limited skills and resources*

The combination of internet access, technical support and general office services for organisations or business people is prevalent.

These services are provided to entities such as churches or NGOs that VOs typically have close personal ties with. In the case of VO10, she does administration, typing of reports, emailing, photocopies, printing, faxing and maintaining the church Facebook page (VO10, 2013a). VOs 8, 11 and 14 also have strong business relationships with their churches, offering similar office services (VO8, 2013a; VO11, 2013a; VO14, 2012a). In the case of VO12, his uncle has what he calls "a big business" and he provides office-type services to him for tenders (VO12, 2013a).

In the case of some businesses, these relationships are built over time as the value of the VOs' services becomes clear. Basic services such as creating email addresses and receiving and sending faxes grow over time to more complex value-adding services such as eFiling of tax returns (VO1, 2013a; VO9, 2013a; VO11, 2013a; VO12, 2013a).

A general need for basic technical support exists. VO11 and VO12, who share a VO business, mentioned that computer virus removal, set-up of internet access via 3G cellular network modems and software installations are in high demand (VO11, 2013a; VO12, 2013b).

The business owner therefore saves time and does not incur extra travel costs. This is a good example of a VO playing a vital role in developing ICT skills in a business and saving the business time and money.

A very important group of customers who are not treated as purely business customers and where the starting point is not the existence of close relationships, is the government services and community support services that do not have computer skills and are in great need of assistance.

VOs 11 and 12 are helping community members, schools (teachers and admin clerks), the nuns at the Lutheran Church, and the library to use the computers that they have (VO11, 2013b). The library is near them and is equipped with computers and free internet access, but does not have trained personnel to assist their patrons to use the internet for information searches or other uses. The library depends on volunteers from the community who are not computer literate but see an opportunity to gain skills and therefore require training, which is provided by the VOs. This is an example of internet facilities that are deployed by an institution (the government in this case) without the provision of extra trained personnel or training for existing personnel.

In summary, VOs help in various ways to unlock the potential of computer and internet use for people who have computers but lack skills.

There are negative aspects to the VOs' adapting to meet their clients' needs. During the interview, VO10 complained about the fact that her church (in the person of the pastor and department heads) puts a lot of pressure on her to get things done, such as typing of reports, without her really having a choice (VO10, 2013a). The net result is that she feels that "I don't have a personal life any more, honestly" (ibid.:33).

8.5.1.3   *Experienced ICT users who need specialised technical and business support*
VO11 is an example of the many VOs who repair computers for customers in addition to meeting their basic technical support needs. VO11 offers a diversity of services, but is especially proud of his ability to fix technical problems (VO11, 2013a). He recounted how he reset a BlackBerry Messaging service user code that the Pretoria shop of a major cellular network company could not fix.

In terms of the application of more advanced ICT software skills and combining them with other skills, VO9 provides services such as monthly financial statements based on a good knowledge of software applications such as Microsoft's Excel spreadsheet software and financial skills (more detail is provided in the section on value-added services further on in this chapter)**.**

In the case of VO1, it is a team effort that enables specialised support. Her husband is a building contractor and has a registered company. According to her, he is good at accounting, and that is why businesses come to her office for support with doing budgets for tenders and quotations (VO1, 2013a).

In response to their customers' diversity of needs, most VOs have exhibited an attitude of flexibility rather than just offering their existing services. This makes good business sense too in terms of retaining customers and getting more business from them. This attitude and the resultant customer service strategy are explored in the next section.

8.5.1.4   *Customised personal, quick and flexible services at all hours*

A common strategy has evolved among VOs to respond to customers' needs for what can be called   a "service partner" who grows with you to meet your-ever-evolving needs, rather than being just a provider of fixed and inflexible services such as a print shops or internet cafés.

Some businesses want a just-in-time internet search service, for example the landlord of VO10, who is a lawyer in addition to being a business property owner. He phones VO10 from court in order to obtain pertinent information from the internet as soon as possible (VO10, 2013b). He calls her back and she reads the information back to him. This is a specialised Personal Assistant service. Another example is the service of VO13 to email CVs for customers on demand.

In addition to reacting to customer requests in normal office hours, VOs provide a flexible service by being available after normal office hours at the VO office and also going to the premises of businesses after hours. VOs 1, 6 and 13 open up their VO offices at weekends to assist customers with urgent matters such as meeting deadlines for submission of job applications and tenders.

VO1 has provided her cell phone number to a group of middle-aged individuals to meet their service needs, and she describes the end result as follows: "You know these people, most of them they are the ones that give me a wake-up call in the morning and ask me where are you, we need you now" (VO1, 2013b:4). These requests are normally about a fax that they need to receive. In this case a dependency on VO1 has been created that is probably due to a variety of reasons such as the convenience of the service, personal choice not to use ICT themselves, lack of money to buy their own ICT equipment, lack of easy access to ICT equipment, lack of ICT skills or lack of confidence that they will master the required ICT skills.

In the case of a transport business who does school tours, VO1 does bookings for their business with accommodation providers via the internet (VO1, 2013a). She has become an integral part of one of the main business processes of this business. She also provides email assistance over the phone to the transport business owners (ibid.). They fetch her after-hours as well to come and assist them at their premises. When they required updates of anti-virus software they brought their PC to her office and paid her for her services (ibid.).

Another example of technical support by phone is VO11, who has cultivated a very good relationship with the owner of a big local business and provides formal and informal services, including technical support over the phone at night to solve tablet use problems (VO11, 2013b).

VO1 stated that business customers will wait for her in her office when they want to compile a quotation, and if it gets late they will take her home (VO1, 2013a).

VO15 provides a personal service by telling his customers in person or, if he has an individual's contact details, sending them an SMS when he has found a job or a learnership opportunity that may suit them (VO15, 2012b).

Networks of innovation   243

8.5.2   Using in-depth knowledge of customer needs to develop business ideas

On the basis of VO11's knowledge of his customers and their preferences and needs, he has developed ideas for business offerings. An example of increasing the value proposition of an offering is to enhance the DVD produced for customers of, for example, wedding pictures and videos, by printing a colour photo on the DVD itself rather than just on the DVD case cover (VO11, 2013b). VO11 has heard from customers that they want to see their pictures on the DVD. A new service proposed by VO11, based on a customer request, is the transfer of videos from old video tapes on to DVDs.

In common with almost all of the VOs, VO11 wants to provide internet access to homes and businesses in response to numerous customer requests (ibid.).

VO1, in response to the fact that taxi owners bring a pile of accounts for doing a tax return, has suggested to them that she should extend the annual eFiling service to a monthly service of producing financial statements, so that they will be better prepared for the annual filing deadline (VO1, 2013a). An interesting reciprocity that has developed in these relationships is that, while she does get paid for her services, she has also received free transport from the taxi owners in exchange for her help (ibid.). Another interesting situation reported by VO1 had to do with trust. In order to solve a businessman's dilemma that he does not quite trust his partner, who is the only one who can use email, she has offered to teach his wife to use email in order to reduce his reliance on his partner (ibid.).

8.5.2.1   *Value-added services*

VO1 has developed many value-added services such as assistance with preparing tax returns, registering companies, preparing Corporate Social Investment (CSI) applications for NGOs which involve creating a business plan and a business profile (VO1, 2013b). As mentioned in the previous section, VO1 adds a high degree of value to a transport business since she has become integrated in their business by booking accommodation for their customers via the internet.

VO9 adds value to his customers beyond basic financial services such as eFiling of tax returns. Due to one customer's need to understand his finances better, coupled with VO9's own interest in finances, he has developed a financial record-keeping service using his spreadsheet software knowledge (VO9, 2013a). VO9 is paid for the monthly financial records and the customer has supported VO9 by lending money to him and has provided business advice, such as how to make a business telephone call (VO9, 2013b).

VO9 also offers free financial advice on an informal basis. He has advised a school administration clerk who sells cosmetics to use a cashbook to keep track of where the money goes (VO9, 2013a). He also advises his uncle who has small transport businesses (VO9, 2013b). VO9 provides an example of the diffusion in their network of the knowledge gained by VOs during their training in how to run a small business.

8.5.3   Innovating to compete by using relationship networks

In order to be able to provide a competitive colour photo printing service, VO13 has demonstrated his entrepreneurial spirit by investigating many avenues for getting colour photos printed. He tried sending photos to a Kodak printing centre via email, but they did not want to cooperate (VO13, 2012a).

Using his relationships network, VO13 did develop an innovative solution, which consists of emailing photos to his brother who works in Pretoria and getting the photo prints back via his neighbour who travels to and from Pretoria on a daily basis for his own business (as mentioned in Chapter 6, Section 6.3.1.1.) (VO13, 2012a). According to VO13, a service has been created that is a 'hand in before 8:00 and get your prints delivered by 17:00' service! This shows how relationships are used to remove transport costs and bypass conventional processes to make a fast enough low-cost service possible.

8.5.3.1 Selling services to the VO network versus free sharing of ideas

VO10 mentioned that a VO was sending out emails listing services and was asking clients R250 to come to a VO's office and explain the services to them (VO10, 2013b). This VO realised that the VOs themselves constitute a market and should therefore be used to generate income. The situation did elicit interesting dynamics showing the tension between barter-type exchanges among fellow VOs versus a transactional customer approach.

VO10's reaction was that she felt that it was unfair to charge for an idea and that she could implement an idea herself without assistance. VO10 made the suggestion that the exchange of business ideas and the introduction of new business ideas among the VOs would be a good thing to do (VO10, 2013b). The situation at that time was that she was communicating only with VO3 and VO8 and not with the others. Her suggestion was that social media could be used as well as monthly meetings: "But we should organise seminars, maybe …saying we're meeting in a month once…. And we get there and we share" (VO10, 2013b:60). She understood the potential value of growing the relationships among all the VOs in order to realise the value of sharing information and business ideas (i.e. the diffusion of innovations). It also shows that she recognises that the current network of relationships was not adequate and that interventions were required to increase their scope and usefulness.

8.5.4 Innovation via the use of relationships

8.5.4.1 Using business relationships as the source of new business ideas

We have mentioned how customers are sources of new service ideas. Other businesses are also good sources. VO11 planned to use his existing relationship with the owner of a big hardware business to develop new business ideas together and to fund the development and implementation of these ideas. An important aspect of the relationship with this big businessman is that, according to VO11:

> So some people because they are big or something, they just like oh, it's a small business, not important you know, but that guy he will listen. (VO11, 2013b:28)

This shows the importance of high-quality, deep relationships. It also demonstrates the view of some business people that small businesses are not important to them. It is therefore up to the VOs to build these relationships.

VO11 also wanted to strengthen his relationship with VO15 as a business partner so that together they can buy PCs to start small internet cafés (VO11, 2013b).

8.5.4.2 Relationships with friends that stimulate entrepreneurship

VO12 mentioned that he has friends who want to get into business (VO12, 2013a). They want to use the VO office as a base and run a talent agency for musicians. VO12 is very interested in music and DJs (Disk Jockeys), and musicians are some of his important customers and close friends. Personal relationships are playing a key role in generating new business uses for the VO office infrastructure and are stimulating entrepreneurship.

8.6 Innovative business collaboration

There are many instances of VOs in innovative business collaborations (e.g. VOs 8, 11, 12, 13), but VO6 and VO7 (a shared VO business) provide an in-depth view of the way mutual benefit develops in very close

relationships with other businesses. These relationships include the sharing of the resources in the VO office and providing services from which both parties benefit.

8.6.1 Close business collaborations

During the interview with VO6, there were three people in the office most of the time, namely the young owner of a graphic design business and a young businessman with a meat supply business together with his girlfriend (VO6, 2013a). The businessman with the meat supply business was assisting customers on VO6's behalf and was also getting on-the-job IT skills training from VO6. He is the son of the owner of a big construction business and hence is a bridging link for VO6 to the world of big businesses in the area.

Both of these businesses are actually running their businesses from the VO Office. During the interview, the owner of the graphic design business brought his laptop and started working and using the internet (VO6, 2013a). VO6 said that he is in the office every day and that money does not change hands; instead they help each other. VO6 can rely on him to be in the office to assist customers when he or VO7 is out of the office (VO6, 2013b). The benefit to VO6 is that he is learning from him about software and graphic design.

A practical example of the collaboration took place during the interview. When two young women inquired about business cards and labels for items they make, VO6 and the graphic designer spent a lot of time telling them about developing a brand, printing T-shirts, putting labels on their goods, using company logos on their documents (VO6, 2013a). The researcher observed that VO6 was in fact the person giving the most advice. This marketing activity may lead to business for both of them, such as graphic design work as well as printing, typing, use of internet, email and website design.

Another benefit to the VO is the business referrals of customers. VO6 regarded VO7 as the biggest source, followed by the graphic design business, and then the referrals by and among the students of the FET college located in the same building complex (VO6, 2013a).

8.7 Enabling VO Business operations to overcome the lack of resources
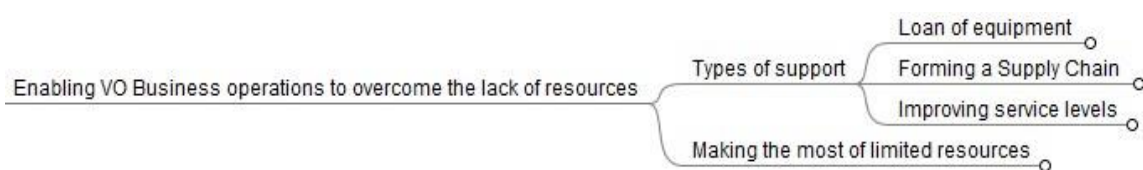
Figure 46 Enabling VO Business operations to overcome the lack of resources

There are external sources of support to help the VOs to overcome their resource constraints in addition to their own innovative approaches.

8.7.1 Types of support

Three major examples of support for the VO businesses will be discussed, namely the contributions made to the VO business supply chain network, the loan of equipment and the support for service level improvement.

8.7.1.1 *Forming a Supply Chain network*

The FSM has played a major role in providing supplies to the VOs on his regular visits, which entail driving between his home in Gauteng and the VO offices.

VO8 received tangible business support via the project since the FSM has bought a printer and print toner cartridges on his behalf (VO8, 2012b). The FSM has also bought toner cartridges on behalf of VO15 (VO15, 2012b).

Friends also play a role in the supply chain. VO2 mentioned a friend who works in Pretoria and who brings her printer toner from Pretoria (where prices are lower) if she asks him to (VO2, 2013b:23). During the interview, VO8 mentioned that he had bought a printer from a friend and that he was still bargaining with him regarding the price (VO8, 2012a).

VO8 has a competitor next door to him in the building and the two businesses share photocopy paper when they run out (VO8, 2012b).

These are examples of how the difficulties of procurement due to the rural location, such as high transport costs to affordable suppliers located in the metropolitan areas, can be overcome via the use of relationship networks.

8.7.1.2 Loans of equipment

The VOs are heavily dependent on laptops and printers for their internet office-type services such as typing, printing and internet access. The following examples of equipment loans are presented.

One of the printers used by VO8 had been lent to him by a Community Development Worker (CDW) friend. VO8 remarked with a smile that it is government property that he has borrowed. This is a good example of access to a resource that is gained via a relationship (VO8, 2012a).

The prime example of how support can be derived from a network of relationships was demonstrated by the responses to the burglary at the VO office shared by VOs 11 and 12.

At the time of the interview with VO11, in February 2013, he had been without a laptop since the July 2012 burglary (VO11, 2013a). His partner in the shared VO business is VO12. VO12's laptop was not in the office at the time and was hence not stolen. During this period (July 2012 to February 2013), VO11 had been supported by people in many different ways, e.g. by being loaned a laptop. This event demonstrated the diversity of people in his support network and how they assisted him.

The principal of a primary school lent VO11 his laptop until he had to use it himself for doing assignments for his tertiary studies (VO11, 2013b). VO11 stated that "I usually use his laptop" (ibid.). In return, VO11 has tried to set up an old printer for the principal to use with the laptop, an example of the mutual exchange of favours. His sister, who is a clerk at a high school in his cluster, lent him her school laptop when the schools were closed (ibid.). VO11's friends, his "homeboys", have tried to help him as well, and he related that "whenever they see someone selling a computer they just call me, where are you, even this, my friends go to Police Station and report the matter" (VO11, 2013b:5).

The support of VO15 has been especially important to VO11 and VO12, as his office is so close (it only costs R10 taxi fare to get to it) (VO11, 2013b:5). VO11 related how he used VO15's printer to do funeral programme prints for a burial society (VO11, 2013b).

In the interview with VO12 two weeks later, he had good news: a retired teacher for whom they do eFiling had lent them a printer/photocopier/scanner/fax in February 2013 for as long they needed it (VO12, 2013a). This is significant support from a customer and a good example of social capital in action.

VO12 was very upset about the burglary and named the thieves as an actor and attributed the greatest (negative) influence to them (VO12, 2013a).

The support by VO15 was probably crucial to the survival of their business. VO12 and VO11 could use his printer/scanner until they had one (VO12, 2013a). VO15 can also print and scan at their office now that they have a printer/scanner and no money changes hands. VO12 referred to the relationship with VO15 as: "We help each other" and "We are anchors to each other" (VO12, 2013b:27). These three VOs demonstrate the mutual exchange of favours.

8.7.1.3   Improving service levels

VO2 is concerned about the speed of response to customers' requests for technical support and expressed the opinion that "When I call (FSM) or (FSC) they respond immediately, they call"; the service desk process is seen by the VO as a "long process" (VO2, 2013b:17). In VO2's cluster of schools there is one admin clerk who calls her early in the morning if the internet connection is down to come to the school on her way to the VO office (VO2, 2013b). This bypasses the formal technical support service process, which should start with a call to the service desk.

Providing information is an important component of the services VOs offer. There are numerous examples of information coming in via bridging links. VO2 has a friend who works in Pretoria and who sends her circulars regarding government jobs that she can pass on to her customers (VO2, 2013b). She, in turn, shares these circulars with her VO friends (VO6, VO7, VO8 and VO10), who are also fairly close to her office (ibid.). Her uncle provides her with information from a provincial Department of Justice (ibid.:14).

An example of just-in-time support from friends was provided by VO8. VO8's assistant phoned VO8 early on in the interview because she could not help a particular customer, and VO8 immediately phoned a friend to come and help her (VO8, 2012a). This illustrates the network of friends being called upon by VO8 as a just-in-time resource.

8.7.2   Making the most of limited resources

VOs have had to bootstrap themselves from a low resource base due to the basic departure point of the project, which is that their prime role is to provide local technical support to the networks connecting the schools (as described in Chapter 3). VOs have developed and explored a number of strategies.

VO15 (2012a) made plans to deal with the constraint of being able to afford only one desktop PC for client use and having to deal with a regularly experienced peak in customer demand. The students from a local school come to his office at more or less the same time as a deadline looms. This means that it often happens that they want to search for information on the same topic, e.g. for a science expo project or an assignment. They come at the same time and, therefore, a long queue develops:

> INTERVIEWER: Do you get times when people are queuing too – when there's a queue?
>
> INTERVIEWEE: Ja, there are times like during this time when the expo.
>
> INTERVIEWER: Ja, ja, all the kids at once?
>
> INTERVIEWEE: Ja, they just come like all of them all around there at the same time.
> Who am I going to help first? (VO15, 2012b:25)

VO15 has developed a strategy to ask them to work together in groups, as they are all searching for the same kind of information in any case, and it saves them time and money and he can help more people (VO15, 2012b). This shows a concern for saving his clients' money and optimising his resources.

This client behaviour pattern has led to VO15 developing a plan to deal with the scenario when the students come in at different times to research the same topics. His plan is to create folders on the desktop PC to store the results of previous searches:

> *Yes, and create something else, like maybe for instance like for those who are doing the research, because most of the time this one will come and do the research and that one will come and do the research, I was thinking that maybe if I can just create a folder, with this section after they leave, we can put them in one folder. And then the other one which comes he can just get it a bit sooner.* (VO15, 2012b:26-27)

VO15, driven by his consideration for the time and money constraints of his clients, has responded by coming up with the innovative solution of storing information locally.

8.8   Building networks of relationships for business growth

Figure 47 Building networks of relationships for business growth

Several VOs have developed innovative strategies and services in order to grow their businesses. These strategies operate at different levels, e.g. a focus on schools as a source of customers, on businesses (large and small), on community, and on the network of fellow VOs.

8.8.1   Schools as a long-term source of customers
Strategic thinking to ensure a lasting source of customers was exhibited by VO11, VO14 and VO15.

VO11 (2013a) planned to expand his customer base by increasing the number of internet-literate users and therefore stimulating demand. His proposed strategy is to use his relationships with his school network to expand internet use at schools to learners. VO11 related that even at a school that uses internet access (e.g. the gateway school of his cluster), he saw that the students practise basic computer skills such as typing while at the same time the teacher is surfing the internet. Students have smart phones, but most them who visit his office do not have something as basic as an email address (ibid.). However, there are also schools where learner internet access is promoted. He has observed a computer teacher creating email addresses. He suggested to the teacher: "don't make email addresses, teach them how to make email addresses" (VO11, 2013b:28). He has also advised the computer teacher that use of email should start as early as with the Grade 9 students.

VO15 (2012a) has also realised the potential of the schools as a market and has developed a strategy to help teachers to become more IT literate so that they can send more learners to him to do research. His reasoning is that the teachers will then also use his facilities more in their own tertiary studies (emailing

assignments, downloading assignment questions, doing research). VO15 has built close relationships with two of his 16 schools and he stated that he can grow his relationships with more schools and offer them additional services (VO15, 2012b). VO15 described the potential for building school relationships as: "Ja we can just move close like a network" at each school, starting with the teachers, then the students and then the parents (ibid.:28).

A software designer friend wanted to open a second business and VO15 suggested that the schools need software for subjects such as mathematics and science and that his friend could survey the needs and provide the appropriate software (VO15, 2012b).

8.8.2   A business focus

As mentioned in the service innovation section of this chapter, some VOs have developed highly personal, flexible and customised services for businesses, for example VOs 1, 6, 11 and 13. We have also discussed the innovative business collaboration models developed by VO6.

In terms of adopting a wide range of strategies for building networks of relationships for business growth, VO5 provided an outstanding example.

VO5 has followed a wide ranging network-building strategy as well as a focused strategy in which individuals or entities are targeted. Via these strategies he has developed an extensive list of business opportunities, of which a few are listed below:

- A company wants to link up surveillance cameras via the internet.

- Technical support to local government from their official state IT support agency is very expensive for small jobs.

- Provincial government staff do not want to travel all the way to the provincial capital (Nelspruit – Bombela) for meetings and could use video conferencing instead.

- The local South Africa Democratic Teachers Union (SADTU) manager wants to do training of members so that he can use the internet to communicate with members. (VO5, 2013b)

VO5 has developed in-depth relationships so as to understand schools as customers better and has also focused on bigger organisations and the targeting of specific people as entry points to businesses.

The prime example of VO5's in-depth relationship-building strategy is the school that he checks in on each morning (VO5, 2013b). According to him, this behaviour has led to his being seen as a staff member. This relationship has led to computer procurement of R30 000 that he carried out on their behalf and the installation of a wireless router at the school (ibid.).

VO5's other focus is to build his business by dealing with as big an organisation as possible and to build a network of relationships with people with influence (VO5, 2013a). An example is the relationships that he says he has developed with many of the circuit managers of the Department of Education of Mpumalanga.

He also uses his business friends as a network, as well as the fact that people know him from school (ibid.). This also illustrates the benefit of being local.

VO5 is one of the few VOs who mentioned the overarching strategy that is required to sell the VO model. The VO model can be sold via the people if the correct approach is adopted of not appearing as if you have all the answers (VO5, 2013a). He is also very conscious that as a VO he is also building the overall VO brand

and therefore must act correctly in order not to damage the brand (VO5, 2013b). VO5 indicated that he wanted to sell the VO model to stakeholders, such as the Mpumulanga Provincial Department of Education, in order to grow the profile of the VO network as a whole.

An example of focused relationship-building to connect to large business is the strategy followed by VO6 that was mentioned in the section on close business collaboration. He has built a close relationship with a young business man whose father owns a big construction business which at the time of the interview had just got a contract for R14.2M (VO6, 2013a). VO6 is teaching his son IT skills while, in turn, the son is helping VO6 in the VO office (ibid.). This is the strategy of a small businessman to connect to the network of big businesses via his son as a bridging link.

8.8.3   A community focus

VO14 is an example of using entrepreneurial skills combined with a community development focus to achieve business growth.

VO14 (2013a) has a definite community service focus (e.g. provision of proof-of-residence forms) combined with entrepreneurial considerations. He has the entrepreneurial understanding to use his church and community services to build an extensive network of clients and referrals to potential clients. His long-term community development focus is shown by his approach to teach students so that they can help themselves, as well as by his eagerness to assist unemployed youth to get jobs (ibid.). He is eager to learn from everybody, including school students.

Churches play an important role in the lives of many VOs, for example, as customers (who, as discussed previously, want to use ICTs and the internet but have limited skills and resources), by supporting skills development, and providing marketing support derived from the social capital associated with church membership (Chapter 6, Sections 6.3.1 and 6.3.2), and as a psychological resource (Chapter 9, Section 9.4.3). In the case of VO14, this role is particularly significant, as he is an evangelist and second-in-command in his church (VO14, 2013b:21). His love for video-making and editing is combined with his relationship with his church. He takes videos free of charge of Sunday sermons, but then sells the copies of the videos. The pastor markets VO14's services for all church-related events such as weddings or funerals – he actually instructs the congregation to use his services:

> *One of the church members will be hosting a wedding or a party so he will tell them about me and say there is a person who is doing videos and you don't have to go outside the community if you need someone to film a wedding or a party and we support this man and his business.* (VO14, 2013b:17)

VO14 also covers community events, for example the yearly road prayer attended by pastors, taxi owners and the community (VO14, 2013b:6). He videos that and then sells the videos to the attendees. In this case as well, the pastor instructs the taxi owners to pay for the videos (VO14, 2013b:17).

VO14 is also very well aware of the value of word-of-mouth marketing and friend-to-friend referrals by members of the congregation. He said:

> *These are the first people that supported me. They also market me to their neighbours if their neighbours have an event and show them my quality*. (VO14, 2013b:18)

These strategies show an entrepreneurial attitude in using referrals via networks and the recognition of the importance of delivering a quality service.

A broader community-level focus also forms part of VO14's strategy. He delivers an important service to the community by providing proof-of-residence forms at his office. VO14 showed initiative by going to the local municipal ward councillor with a dual agenda: "Because I had an agenda that people must know this office" and "because I'm trying to reach out to the community where the counsellor cannot get to" (VO14, 2013b:44). VO14 sees the provision of proof-of-residence forms as a marketing strategy that makes people aware of him and his services. People would typically also make a copy of their identity document when they collect the form, so this brings in business as well (:11). This illustrates a long-term view on growing a business while playing a role in community development.

VO14's other community focus point is the unemployed youth, and his role of getting information about jobs and bursaries for them is important to him (VO14, 2013a). He calls his office an Information Office, and he provides information for free while printouts have to be paid for (VO14, 2013b:20). VO14 surprised the researcher with the insight that the students of today are the unemployed youth of tomorrow, and that he hence needs to pay more attention to them (VO14, 2013a). This is an example of a long-term view on community development.

VO14's community focus extends to providing services and advice to NGOs. He mentioned a health and development information centre that uses his internet access to get application forms for funding from funders (VO14, 2013b:9). He has close ties to them, as he worked for them as an administrative secretary. They read their email at his office, fill out forms, scan them and email them to the funders. He also produces letters and invitations for an Early Childhood Development Centre and they use his phone (:10). They have to provide updated lists of the children at the centre to the Department of Social Development, and he has copied the information to a spreadsheet so that they can send the information to the department electronically rather than travel the few kilometres to their offices (:15).

VO14 sees his market as both the community as a whole and the church community, and he sees the councillor and the pastor as the avenues to get to these markets. VO14 said: "Yes, I think the councillor should support me. And then I think the pastor and the church should support me. Because this is my immediate constituencies" (:47).

These are excellent examples of a VO playing a vital role in the diffusion of innovation and creating innovative services to grow their own businesses, improving the services delivered by government and increasing the efficiency of an NGO's business processes. VO14 benefits from and influences the diffusion of innovations such as using ICT software applications and internet access (e.g. moving communication from paper to email and the distributed provision of proof-of-residence forms) in the local community. His influence on the diffusion of innovation is enhanced by his being part of the social structures in the community such as the church, NGOs, and local government structures such as the municipal wards.

8.8.4   A VO network focus

The offices of VO15 (Seabe cluster) and the shared office of VO11 and V12 (Marapyane cluster) are fairly close to each other in the north-west corner of the Nkangala District Municipality, while being fairly far away from any other VO office.
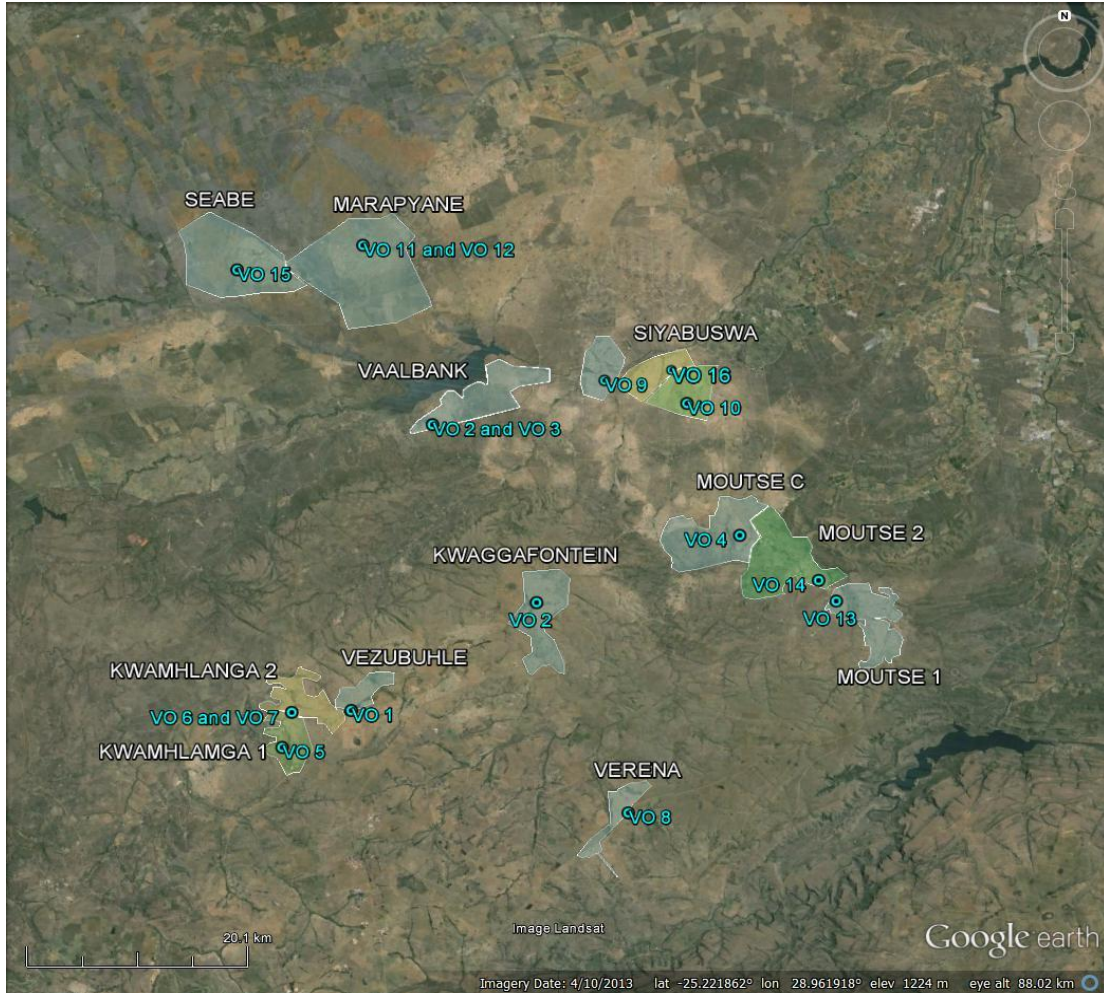
Figure 48 Overview of the VO clusters

The distance by road between these two offices is about 13 km, while they are between 34 and 37km respectively from the closest other VO office at Vaalbank (VO3).
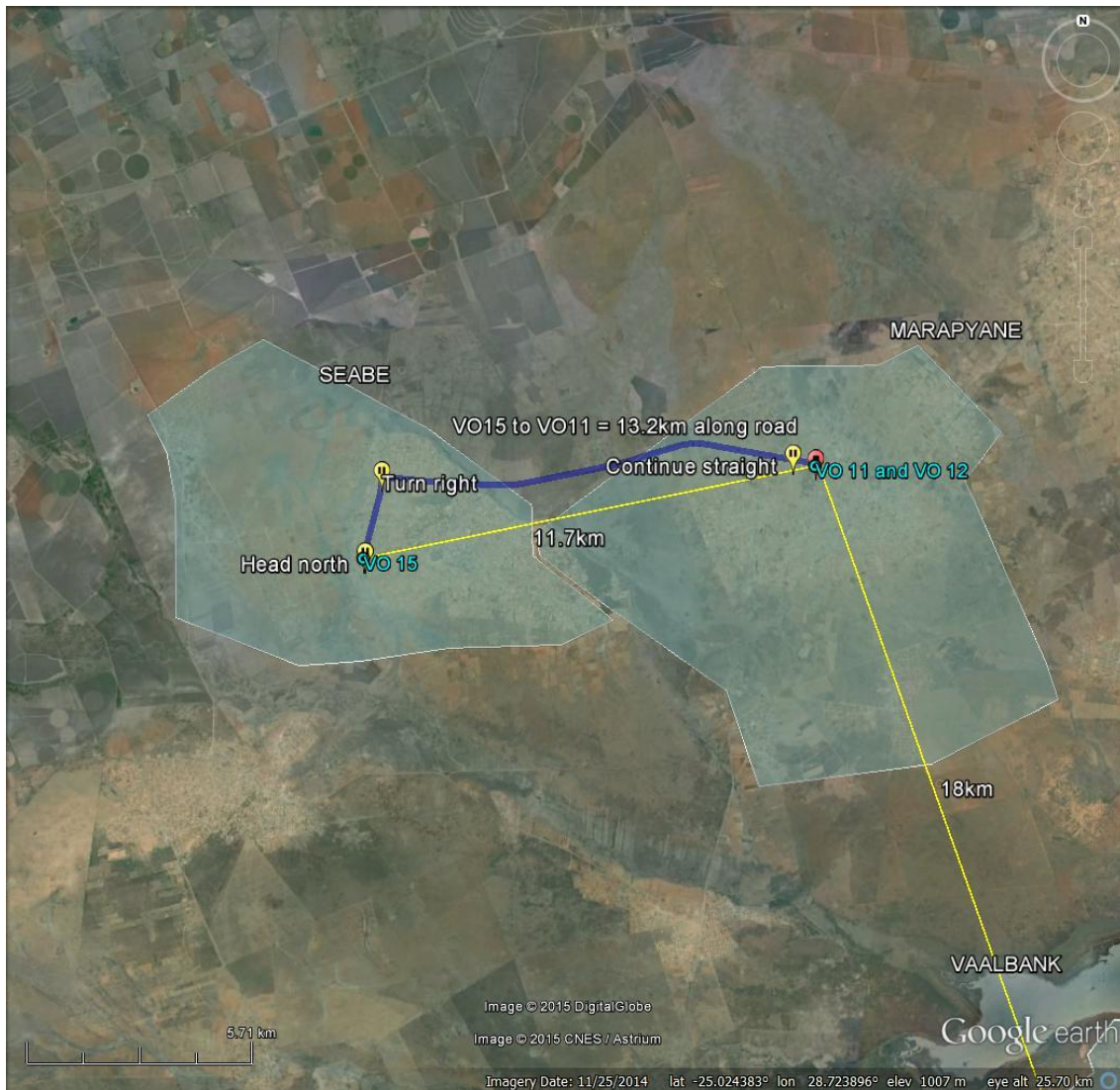
Figure 49 The distance between the VO15 office and shared office of VO11 and VO12

Close relationships between VOs 11, 12 and 15 have developed. VO11 (2013b) mentioned VO15 as the only VO friend that he has apart from VO12. VO11 and VO12 support each other as business partners and friends (ibid.). They advise each other regarding technical computer issues, finances and how to make contact with schools via the principals in order to do business with them (ibid.).These three VOs' skills complement each other, they learn from each other and support each other in order to serve customers. VO11 (2013a) fixed VO15's laptop and PC for him while VO15 showed him how to use "Gmail video" (i.e. Google Hangouts). VO15 has also helped VO11 to repair a laptop (VO11, 2013b). As mentioned earlier, the support from VO15 was probably crucial to the survival of the VO11 and VO12 business after the burglary. VO12 and VO11 could use his printer/scanner until they had one of their own (VO12, 2013a).

An illustration of their close-knit relationship and shared sense of identity is that they created a pricing sheet with their own credo of "We are not a dying type" as can be seen in Figure 50.
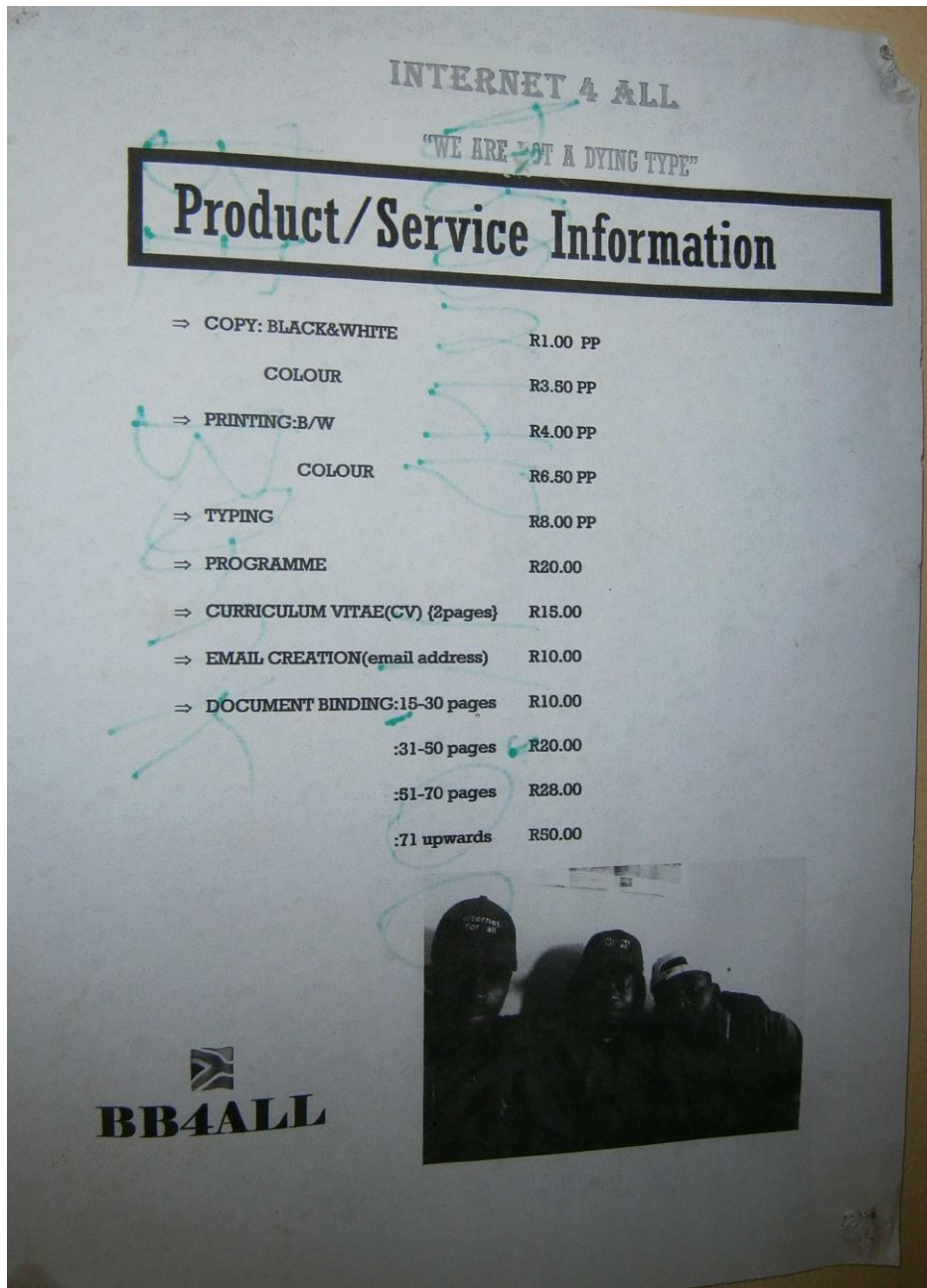
Figure 50 A pricing sheet created by three VOs

Their relationship was also discussed in Chapter 6.3.1 as an example of micro-level bridging social capital.

VO16 and VO9 (one of the three Siyabuswa VOs) provide another example of collaboration to deliver a service. They joined forces to install a Wi-Fi network at the high school that VO16 attended.

8.9   Summary

8.9.1   Introduction

Two aspects regarding innovation behaviour were encountered in the research, namely the diffusion of innovation and the various ways in which innovation occurs in the interaction between VOs and customers.

The question is: What are the major influences on these behaviour patterns?

The frameworks used in this chapter and the findings are shown in Figure 51.
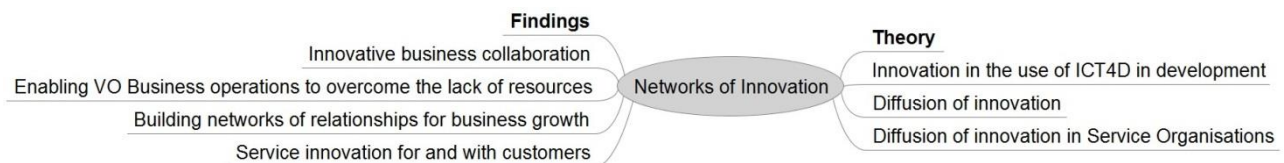
Figure 51 An overview of Chapter 8

8.9.2   Theories applied to the VOs role in innovation diffusion and creation

The VO model was situated in the context of ICT4D, by using the construct of a value chain, and in the evolution of ICT4D. ICT4D evolved from simply making ICTs available (in phase ICT4D1.0) to using ICTs in innovation (ICT4D 2.0) (as illustrated in Table 13 in Section 8.2). The particular innovation focus of the BB4All project was a living labs strategy, with co-creation of innovations between designers, developers and users in the real-life context of users.

In comparison to availability only strategies in an ICT4D value chain, VOs can enable uptake and impact as *trusted infomediaries* that develop services for and with customers. The degree of trust that developed led to VOs keeping customer passwords and reading email on their behalf of customers in order to inform them of urgent emails via SMS messages. VOs moved beyond passive innovation adoption strategies (e.g. internet connectivity) to active innovation strategies which included pro-poor innovation, since they were acutely aware of poverty and customers' lack of ICT resources. Para-poor innovation occurred by developing services for shared needs, such as providing collated jobs and free tender information. Per-poor innovation consisted of developing services with customers to suit their particular needs, such as the email to SMS service described in Table 13 for people without internet access. This example also illustrates the living lab approach of co-creation of services in context.

Research on the diffusion of innovation provided insight into the influence of social capital on the adoption of innovations and on the re-invention of an innovation by VOs and customers.

Rogers (2004) used the finding that the neighbours of farmers were the most influential in influencing innovation adoption by Ryan & Gross (1950) to state that the core of the innovation diffusion process was that the meaning of the innovation grew over time as personal experiences were shared between farmers. The meaning of internet access did grow as VOs and customers shared experiences. The argument of McMaster & Wastell (2005:398) that "innovation is local and situated" was supported by the innovations of VOs and their customers in the WMN clusters as local contexts. This behaviour can be described as an 'innovation-system fit' (Greenhalgh *et al.*, 2004:590).

Networks of innovation   256

The research findings support the importance of 're-invention', i.e. adopters changing an innovation (Rogers, 2004). Re-invention and the creation of new innovations occurred. The living lab concept of co-creation was used to describe the new innovations created by VOs and customers.

Innovation benefits of the VO approach as discovered in the project and research include the vital factor that VOs and customers are not just passive adopters of innovations, but play an active role and can be considered as re-inventors. Innovations that are amenable to re-invention, such as the VOs' service innovations, diffuse more rapidly and have an increased probability of sustained adoption. The rate at which the group of VOs innovated as small individual businesses is unlikely to be matched by central services development and piloting. The diversity of the exploration of business opportunities and the customer-centric and co-creation approach to service development is grounded in VOs' being forced to innovate and the willingness of customers to test services with people whom they know and trust. Social capital is a valuable asset that enables diffusion of innovation and the development of new innovations.

The research on diffusion of innovation in service organisations shed light on the nature of the service focus of VOs. Based on the departure point that innovations are emergent patterns of interactions that arise due to the responses of people relating to each other and to their shared local context, the diffusion of innovations in an organisation becomes fundamentally a mutually or co-adaptive process, in which the innovation and the organisation adapt to each other.

The service innovation processes that played out between VOs and customers was discussed in the context of the VO as a largely independent entity that is supported by the BB4All project as an organisation (Table 14). The service innovation processes was characterised as being allowed and encouraged by the BB4All project, as well as unplanned, emergent and negotiated (with customers). The major mechanisms for change were natural and social with an element of technically driven change due to the VOs access to ICTs and their skills development. The metaphors for the spread of change that were applicable are: emergence, adaptation; knowledge construction, making sense; diffusion; negotiation; knowledge transfer; and, dissemination and cascading.

8.9.3 Findings regarding innovation created in VO and customer interactions

There are many different ways in which service innovation occurs in the interaction between VOs' and customers. This included VOs responding to the diversity in their customers and the concomitant diversity in needs, the development of in-depth knowledge of the customers' needs and businesses, the use of networks of relationships to compete with other businesses, and, in general, innovation via relationships such as the use of business relationships to develop new businesses and the stimulation of entrepreneurship through relationships with friends.

Innovative business collaboration was practised by many VOs and mutual benefit developed in very close relationships with other businesses. A common pattern was the sharing of the resources that are available in the VO office (e.g. VO customers ranged from first-time computer users (willing and unwilling) to organisations that wanted to use ICTs to improve their administration and other services. VOs enabled customers to benefit from internet use via personalised value-added services. VOs became what can be called a 'service partner' who grows with you to meet your-ever evolving needs, rather than being just a provider of fixed and inflexible services. This depended on the building of deep relationships based upon trust that develop over time. The degree of trust that developed was illustrated by VOs reading email on behalf of customers.

Networking for business growth was used to grow markets via a customer focus, a business focus, a community focus and a VO network focus.

Some VOs were aware of the potential of the schools as a market and developed strategies to help teachers to become more IT literate so that they can send more learners to VOs to do research and use VO facilities more in their own tertiary studies. VOs encouraged internet use at schools by learners. A VO advised a computer teacher that use of email should start as early as possible in high school (e.g. Grade 9). Services to customers such as the distribution of job information were improved by using family and VO networks to obtain information from a diversity of sources.

VOs developed differing approaches to growing business via relationship-building with small and large businesses. VOs innovated with other small business owners to combine their strengths to offer more comprehensive services, thus fostering the growth of both businesses. Focused relationship-building with a large business was done by a VO by investing in a relationship with the son of the owner. A network-building strategy with a wide range of private and government entities was adopted by another VO. In addition, this VO focused his relationship-building on people with influence in these organisations. Friends who are in business were also used to extend his business network.

VO14 developed an approach that combined entrepreneurship and community development. He used his close relationships with a local church, an NGO and a local government official to achieve both objectives by acting as a channel for services from local government and helping NGOs report to national government.

In general, VO-to VO networks were used to provide advice on technical and business issues and refer customers to each other. Some VOs collaborated from time to time to deliver a service. Three VOs developed a close-knit relationship and shared sense of identity, which led to them learning from each other, complementing each other's skill sets to deliver services, and lending equipment to each other.

VOs operated their businesses in a resource-constrained environment where customer funds are limited, their own equipment base is expensive to obtain and maintain, and their own skills were also limited. VOs developed strategies to compensate for their lack of resources and skills, such as reducing their own operations costs and improving the affordability of their services. Low cost supply chains were created based on relationships, equipment was lent from friends and family, and service levels were improved, for example, by encouraging customers with similar information needs to form a group that searches the internet together. On an operations level, a VO showed how just-in-time support from friends can alleviate staffing constraints by simply making a telephone call.

internet access), collaboration to complement each other's skills and learn from each other, developing services from which both parties benefit, and thus increasing the scope of the services offered.

VOs were more than the innovators, salesmen and change aides of Rogers (2003), and more than infomediaries and social connectors (Díaz Andrade & Urquhart, 2010). The fact that they were entrepreneurial and members of the local community made the key difference, leading to innovation to fit services to customers' needs, co-creation of innovation with customers (active innovation), and the use of networks of relationships to compete with other businesses and to compensate for a lack of resources (the use of social capital). Most of them also focussed on delivering benefit to the community and therefore acted as Social Bricoleurs.

8.10 Summary of the three theme chapters

In the last three chapters the three high-level themes that were distilled from the VO interviews have been discussed in detail. The major findings are summarised here before we reflect on the findings of this research in the next chapter in the context of the Choice Framework (Kleine, 2010).

The scope of the VOs' social capital was described at the micro, meso and macro levels in Chapter 6 and the nature and influence thereof on VOs were illustrated by discussing the VO interactions with networks, the prevailing norms (values), and the existence of sanctions at each of these levels. The valuable role of social capital in action at the micro and meso levels was evident in the support that VOs received due to their bonding, bridging and linking capital. The macro-level discussion showed that the potential of social capital development in the community and at government to government level was not used by the project or project funders to obtain the necessary support from the major customer, the Mpumalanga provincial DoE.

The VOs' sense of having opportunities to making a difference in their communities, was explored in Chapter 7 by analysing the different activities of different VOs with respect to the concepts of social entrepreneurship and entrepreneurship. Due to the limited scope of their actions, VOs did not qualify as Social Entrepreneurs *per se* but as social service providers that exploit opportunities to create social wealth in an innovative manner in their businesses. As defined by Zahra *et al*. (2009), most VOs acted as Social Bricoleurs that solve local problems using local resources.

Finally, in this chapter the role of social capital in enabling innovation, especially co-created service innovation with customers, was highlighted. In the next chapter the research findings are discussed in the context of the Choice Framework of Kleine (2010).

9 Reflections on the Choice Framework

The context and content of Chapter 9 are shown in the thesis map.

Introducing the problem	
	Chapter 1

The context	

Chapter 2   Chapter 3

Methodology and Data collection	
	Chapter 4

Analysis and findings	

Chapter 5   Chapter 6   Chapter 7   Chapter 8

Reflections on the Choice Framework		
Similarities and differences between research contexts	The story of a VO	Psychological capital

Chapter 9

Considerations for development practice	
	Chapter 10

Conclusion	
	Chapter 11

9.1 Introduction

This chapter reflects on the findings of this research in the context of the theoretical framework that was chosen, as discussed in Chapter 2, the Choice Framework of Kleine (2007, 2010).

There are certain similarities between this research and the research done by Kleine (ibid.) in Chile to analyse the influence of governmental ICT policies on a sample of 29 rural micro-entrepreneurs. Kleine researched the influences on these micro-entrepreneurs of government-driven initiatives of telecentres that provided free internet access, a campaign to foster digital literacy, and a sudden shift of government procurement from being paper-based to an online platform (ibid.). Kleine also used this research to test a framework that was developed during the course of preparing for the fieldwork in Chile (Kleine, 2007). The initial framework was refined in the fieldwork and resulted in the first version of the Choice Framework that is being referred to in this chapter (Kleine, 2010). Due to the limited space available in a journal paper, Kleine elected to tell the story of one female micro-entrepreneur's use of a telecentre as a means to present a holistic view while still covering enough detail for the conceptual nuances to emerge (ibid.).

In this chapter the similarities and differences between the two research contexts are discussed and then Kleine's strategy of telling the story of a micro-entrepreneur is emulated by telling the story of one VO combined with analysis that uses the Choice Framework structure as well as insights based on the multi-level social capital framework.

The Choice Framework includes a comprehensive list of personal resources, of which social resources (social capital) is but one. In the VO interviews psychological resources were prominent, with family and friends playing important roles. In this chapter we discuss three examples of psychological capital: self-belief in a VO to VO context, as an individual behaviour, and the relationships of VOs with churches.

9.2 Similarities and differences between the two research contexts

The obvious similarities are the focus on rural micro-entrepreneurs, the provision of internet access and the investigation of the many influences on their usage of internet access.

A major difference was that this research focuses mainly on the supply side, while Kleine's research had a demand side focus. VOs were established as service providers of, amongst other things, telecentre services. The services were provided via an entrepreneurial model instead of the free government supported services in Chile. VOs provided more than just access to the internet. VOs collaborated on a more informal basis with customers (some of them micro-entrepreneurs) to assist them to derive value from internet usage and at the same time new customer-driven services were developed. The other major difference was that the VOs operated in a project context rather than a government-driven initiative. The context of internet usage was a VO office or a school, rather than a public space such as a library.

9.3 The story of a VO

9.3.1 Introduction

Kleine's strategy of telling the story of a micro-entrepreneur to illustrate the application of the Choice Framework is emulated here, with the key difference being the simultaneous application of the Choice Framework and the multi-level social capital framework that has been adopted in this research.

VO1 was selected as the example since she developed a range of services to meet the needs of a diversity of customers that included elderly individuals and large businesses. Bongeka (not her real name, is an Ndebele name which means something that makes you thankful), a young woman from the Nkangala area, had one child, was supported by her partner in her VO business and she related how she provided a range of customised services to a transport business that provided package deals for school tours (VO1, 2013a). She booked accommodation on their behalf via the internet. She also provided email assistance over the phone to the transport business owners and, in case of need, they fetched her afterhours as well to come and assist them at their premises. When they required updates of anti-virus software they brought their PC to her office and paid her for her services.

9.3.2   Outcome

The primary outcome (as per Sen's definition) was that Bongeka had the choice of being or not being an entrepreneur who runs her own business, e.g. the choice to become a Village Operator. A major secondary outcome in this case was that she wanted to provide a good service to her customers. For this customer this meant that she made full use of her resources (e.g. internet access), skills, personal attention, and her time to enable the transport business to do their business better and to develop their own IT skills. The customer responded by requesting additional services and paying her. This service and the customer's responses to it was an 'achieved functioning' as described by Sen. Her aspiration of delivering a good service was realised and hence qualified as a 'capability' in Sen's terminology.

From a social capital perspective, bridging capital at the micro level had been created due to the relationship between Bongeka and her business customer. The support of her partner in the VO business was bonding capital.

9.3.3   Agency

Bongeka's child was less than two years old at the time of the interview. Her partner, her sister and her brother assisted her in the VO business, which was part of her social capital (social resources), that allowed her the freedom to go to the customer's premises while her child was being looked after and the office was being attended to. Bongeka's father owned a substantial printing business with a few branches. Bongeka was outgoing, friendly and confident and this temperament together with her having grown up in the home of a business man, provided her with the psychological capital to engage easily with customers and develop new services to fit customer needs.

Bongeka was a member of this community and therefore had the cultural resources to know how to interact with customers and whether it was safe to be picked up to go to this customer's premises after normal business hours, and to delivered back home by them. Bongeka trusted the customer and this trust was probably developed over time as the business relationship developed. In this particular case, an added factor was probably the fact that Bongeka's father was a well-known business man. The researcher made this assumption due to the fact that his main business was located right next to the same main road and had highly visible signage that used his name. If Bongeka was ill-treated by a customer, it could be expected that sanctions would be imposed at a personal and business level in some form or other, for example by Bongeka's father, Bongeka's partner, her father's business friends, and community members.

At the micro level the relationship with this business constituted linking capital (a relationship between a small entrepreneur and a larger business). At the meso level, belonging to the same community was bonding capital that included knowledge of the local customs, norms and sanctions. This local knowledge was also referred to above as a cultural resource, in analogy to Kleine's use of the term. This indicates a degree of overlap between the concepts of meso-level bonding social capital and cultural resources, with

the latter being a much broader concept since Kleine used the cultural capital concept as described by Bourdieu (1986). Halpern (2005) refers to cultural capital as social norms that play a role in private behaviour (e.g. South Africans like a 'braai' (barbeque) while the Swiss might prefer a fondue) and to social norms that influence the nature of general social interactions with each other (e.g. South Africans will normally greet each other) as just a form of social capital. The three states of cultural capital, as described by Bourdieu &Wacquant (1992:119) are: an embodied state, an objectified state and an institutionalised state. The embodied state or habitus that an individual lives in (inhabits) is partially described in the discussion that follows regarding security. An important aspect of the institutionalised state of cultural capital in these communities is the prestige attached to the pastors of the churches. Bongeka did have financial capital to invest in resources. This capital was contributed to by making a profit and using this profit for investment in her business. The researcher observed two printers and a PC for customer use (VO1, 2013a). The project provided a multi-function fax/copier/scanner/printer, a steel cabinet for safe storage and free internet access. Bongeka as well as the project, therefore, invested in the material resources and services (e.g. free internet access) required for her to provide affordable services to her customers.

The physical resources of Bongeka's business were protected by her partner who acted as a security guard by sleeping in the office and had prevented a burglary.

Bongeka had geographical capital since her office was easily accessible to customers due to its location in a small complex of shops right next to the main road from Pretoria and just north of the major town of Kwa-Mhlanga (see Figure 52 and the related discussion on proximity in Section 6.4.1.4).

Figure 52 Office of VO1 in the corner of a shopping complex

The attractiveness of the complex of shops to customers had been enhanced by the fact that her father had opened a printing shop there. The main road to Pretoria (City of Tshwane Metro) runs from left to right and the office of Bongeka is located in the right-hand corner of the shopping complex next to the road.

The co-location of the printing shop was due to a business strategy of Bongeka and her father. Bongeka did the designs for the signage boards that he printed and they both referred business customers to each other (VO1, 2013a). The design work developed Bongeka's IT and design skills (technical skills) and the referrals created bridging capital to the network of businesses that her father had built over time.

Bongeka's partner contributed to her business in a variety of ways and they formed a close business partnership. He had a registered construction company, was an electrician and skilled in accounting. He was also the person that mostly visited the schools and therefore Bongeka could spend more time in her office, serving customers. An illustration of the magnitude of his role was that the other VOs referred to him as the "extra VO" (FSM, 2013a). In turn, Bongeka referred her customers to him for construction and electrical services.

Bongeka's ability to achieve the primary outcome of her choice to be an entrepreneur and the secondary outcome of her choice to provide good services to customers, in this case the transport company, was enhanced by: the physical resources (equipment) and free services (free internet access) of Bongeka's business; her psychological capital to engage easily with customers; the bonding social capital in the form of support for her business from her siblings, her partner and her father to help her run the business; the meso-level bonding social capital in the form of trust between her and the customer as members of the same community with the associated possibility of sanction that allowed her to accept their transport to their premises; her technical IT skills; and the geographical capital in the form of easy access for customers

9.3.4 Structure

As stated by Kleine (2010:686), "The agency of individuals is a shaper of, and is shaped by, the structure in which it operates." This is another way of stating the central tenet of Giddens' influential structuration theory (Giddens, 1984).

The structure within which Bongeka operated—the BB4All project—was described in detail in Chapter 3. Therefore, only a summary is provided here. The project was conceived in a context where the provision of broadband access to all the citizens of South Africa was a national government priority, with rural communities and rural schools as a special focus. Unemployment, especially among youth was also a national priority and small business development had been identified as one of the ways to stimulate entrepreneurship and increase the levels of employment, an example was the New Venture Creation learnership that VOs participated in (see Chapters 3 and 6). The VO model was thus created by CSIR as a means of supporting the deployment to and support of broadband access in schools and communities via an entrepreneurial model where a young individual from the community would be the local supplier of technical support and ultimately internet access as well become a village Internet Service Provider. The project was a technology demonstrator of the CSIR's Wireless Mesh Network technology as well as research into the viability of the VO model in supporting a significant number of schools in a rural area.

Another influential structure was Bongeka's secondary school. The project created a list of possible VOs by requesting secondary school principals to recommend young people who had attended their school, were unemployed, and were possible entrepreneurs. The recommendation of Bongeka was an example of the usefulness of her micro-level linking capital.

The project was consumed by the technical problems of having to take over the backbone and the deployment of the WMN to the many sites (see Chapter 3). As a research project, the VO model was being developed during the course of the project, and therefore a well-defined business model with services and products, strict operational procedures, and tight management structures were not in place. VOs had the

freedom to choose their own path to entrepreneurship and to define and develop their own business with its unique portfolio of products and services. The project field support team provided business training and mentorship, while the researcher, as the team member researching the VO business model, provided broad guidelines in consultation with the project team for allowed products and services that would be aligned with the project's objectives and what would be forbidden, e.g. to start a shebeen (tavern) in the VO office (see Chapter 3).

Another temporary structure that influenced the agency of VOs was provided by the NVC learnership which required defined actions for the stipend received. This training programme regulated the way in which each VO trained their chosen interns, and required time and effort from VOs to do assignments and pass examinations in order to complete the learnership and obtain the qualification.

Bongeka, with her partner, siblings and her father's assistance, had created her own VO business structure with its resources (equipment and staff), ways of doing business (personalised, flexible services at the office and at the customer's premises) and business relationships. All of these structural elements shaped the interactions between her and her customers, and in turn the VO business structure was shaped by the VO-customer interactions. The concept of social capital highlights the relationships and the networks of relationships that influence these interactions (e.g. due to norms) and the social resources that the VO and the customer could use.

In the previous section the influences of the community as a structure (e.g. social relationships) on Bongeka's services were discussed, for example, safety norms, and norms on when and where business is done. The community norm that a mother is the main caregiver of her young child influenced the business pattern of Bongeka mainly being in the office, while her partner went out to the schools in her cluster.

9.3.5   Dimensions of choice

In the Choice Framework of Kleine (2010:687), "an individual's resource-based agency can operate within a given structure to achieve degrees of empowerment such as existence of choice, sense of choice, use of choice and achievement of choice". Bongeka had the choice of taking part in the project as a Village Operator and taking the first steps to becoming an entrepreneur. Then, having made this choice, she had to choose how to run her business. In her case she chose to deliver a good service to her customers (a secondary outcome) and she had to choose how to do that.

Her selection by a school principal resulted in the project team contacting her and hence she became aware of the existence of the project and of an entrepreneurial role called a VO operator (awareness of the existence of choice). The fact that her father was in business, that she had the support of her family and her partner who was also in business, provided her with bonding and bridging capital (she had relationships with two businesses already), and combined with her outgoing personality (psychological capital) probably all contributed to her having a sense of choice. She exercised her choice (use of choice) and joined the project as a Village Operator, and thus achieved her desired outcome (achievement of choice).

Bongeka's achievement of a secondary outcome of providing a good service to customers, required a large variety of capitals as covered in the section on Agency (e.g. financial, physical, social, psychological and geographical). At the micro and meso level social capital norms played a role. Examples include micro-level norms in the relationship with her siblings (they decided to help her by working in her office) as well as community level norms on safety and when and where business is done (norms of meso-level community bonding capital).

9.3.6 Conclusions

Kleine (2010) developed these four conclusions from the application of the Choice Framework to the case of a woman micro-entrepreneur (ibid.:687-688):

1. It allowed her to "theorise the use of ICT in a systemic and procedural way which reflects the systemic and pervasive impact of ICT. The 'impact of ICT' is not conceptualised in a cause-and-effect chain; instead effects are carefully disaggregated and their systemic interrelatedness and co-causality is demonstrated"
2. "the Choice Framework offers a way to operationalise Sen's capability approach in the context of ICTs and development."
3. "the Choice Framework introduces key new aspects to existing frameworks. It explores the role of cultural resources and geographical resources and stresses the particular role of psychological resources. It recognises the effect of informal social norms on the usage of time and space, which also frame ICT usage. These informal norms are often related to gender, age and ethnicity. In addition, it makes visible the 'sense of choice' step, which is a key step towards understanding whether and how people use new technology"
4. "the Choice Framework is a 'living tool' which clearly positions ICT usage not as an end in itself, but ICTs as being linked to different elements: embedded in structures, influencing agency, affecting dimensions of choice and as being, potentially, also a part of a complex mix of outcomes an individual may aspire to (in Sen's terms, their capabilities). In such a systemic framework which maps processes of development, ICTs are transversally relevant and widespread (not ubiquitous) but they are neither an end in themselves nor on their own effective levers for creating social change. ICTs are profoundly linked into social, political or economic interests and in this combination obtain power to transform societies."

The analysis of the Bongeka case showed elements of all four conclusions. Among the resources, social and psychological resources had major influences, as found in the Kleine research. The presence of geographical capital (as mentioned by Kleine) and the important role it plays in a business context was demonstrated. In the rural areas of this research, personal transport is not affordable to many and hence the limitations imposed by public transport usage and the dependence on favours from people who do have vehicles were important influences on the existence and sense of choice. In this case the transportation issue illustrated the (often contested) claim that "social capital is the capital of the poor" (Woolcock & Narayan, 2000; for an opposing view see Gertler, Levine & Moretti, 2006).

The major influence of social capital at micro and meso levels in supporting and influencing the achievement of outcomes was clearly shown as well as the many ways in which the use of social capital as a concept enriched the systemic description and created a degree of coherence in the description. In this case, even the existence of choice was influenced by social capital.

Kleine (2010) used Bourdieu's definition of social capital which emphasises the resources available to each member of a group (see discussion in Chapter 2, Sections 2.3.5.3, 2.6.3.5 and 2.6.4). This definition is at the micro level of social capital and does not deal with the possibility of institutional relationships at the macro level. The focus on relationships in social capital is aligned with the general approach of Bourdieu who wanted dualistic alternatives of either individual or collective to be replaced by the "primacy of relations" (Bourdieu & Wacquant, 1992:15). In the discussion in Chapter 6 on the sustainability of the VOs, the importance of linking capital at the meso level and bridging and linking capital between institutions at the macro level was illustrated (see sections 6.3.2.4 and 6.3.3.4). The use of the three level social capital framework made a coherent description of the individual to institution and institution to institution

relationships possible within the conceptual frame of social capital. The Choice Framework refers to resources (such as social capital) as an individual matter, as "individual agency-based capability inputs" that "together with structure-based capability inputs, can be converted into capabilities" (Robeyns as quoted in Kleine, 2010:680). The structure component of the Choice Framework does include institutions, organisations, and norms which therefore contribute to 'structure-based capability inputs'. In the case of social capital as an "individual agency-based capability" input, the interaction with "structure-based capability inputs" has been described in a clear and systemic manner by the use of the three level social capital framework which includes, for example the influence of norms at family, community and national levels.

The case of Bongeka showed that ICT use was very important to the business of the customer and that Bongeka could add tremendous value to the customer's business via her ICT resources and skills. This provided support to Kleine's conclusion that the Choice Framework positioned "ICT usage not as an end in itself, but ICTs as being linked to different elements: embedded in structures, influencing agency, affecting dimensions of choice and as being, potentially, also a part of a complex mix of outcomes an individual may aspire to (in Sen's terms, their capabilities)" (ibid.:688). The importance of ICTs and their use was contextualised relative to all the other influences that were made visible by the use of a systemic framework such as the Choice Framework.

The extensive use of social capital to describe the case of Bongeka served as a relatively simple way to provide rich descriptions of the social dynamics that were at play.

In the next section the importance of psychological capital in the lives of VOs are discussed in more detail.

9.4 Psychological capital: belief

9.4.1 Introduction

As mentioned in the introduction of this chapter, psychological resources were prominent in VO interviews with churches as one of the most important sources of psychological support. Other sources of psychological support included; family, friends, customers, and project team members as well VOs themselves with psychological resources such as taking pride in being able to support your child and her mother. Some VOs formed close-knit relationships, a prime example being the three VOs (11, 12 and 15), who created a pricing sheet with their own credo "We are not a dying type" as discussed in Chapters 6 and 8 (VO15, 2012a). The different sources of psychological support were discussed in Chapter 6.

In this section an example of belief in oneself is presented and the influence of participating in a communal belief system represented by churches on identity formation and psychological capital development is discussed.

9.4.2 Believing in oneself

VO8 mentioned in the research interview that in order for his business to succeed, encouragement and belief in oneself is required (VO8, 2012a). In the influence maps created in the interviews some VOs emphasised that they themselves have a huge influence on the success of the business (see Chapter 5). In many VO offices, for example, the shared office of VO11 and VO12, inspirational messages were displayed on the walls (VO11, 2013a).
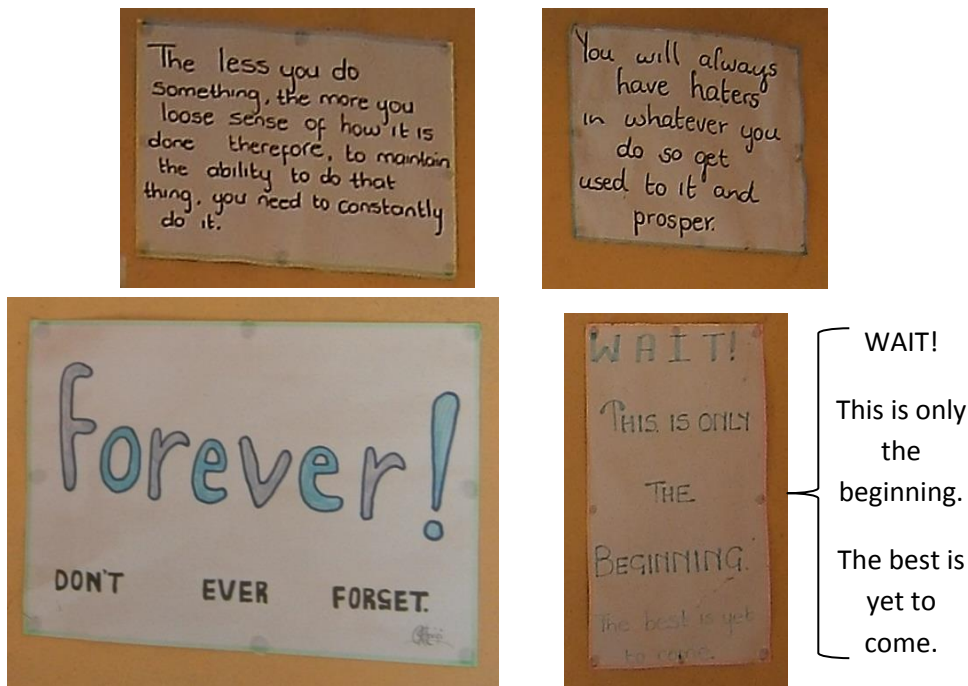
Figure 53 Inspirational messages: Office of VOs 11 and 12.

9.4.3 VOs supported by churches

During the interviews it was evident that spiritual support and encouragement were very important in VOs' lives as psychological capital. Seven of the 15 VOs interviewed mentioned the role that churches played in their lives. Many VO offices had biblical messages on the walls as shown Figure 54 (VO10's office).
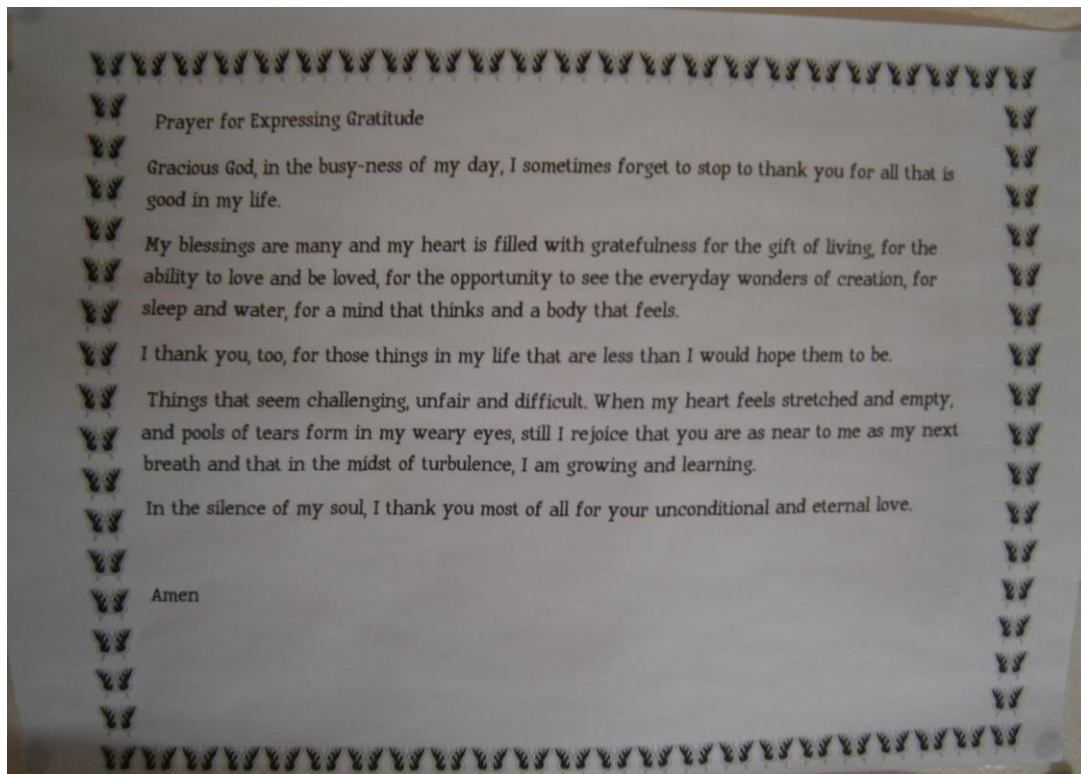

Figure 54 A gratitude prayer on the office wall of VO10

As mentioned previously the VO model assumes that there is value in being from the community. In this case the value is derived from membership of community organisations and churches can be interpreted as being one of these institutions.

In the Choice Framework, the role of the church in terms of an individual's membership thereof and as an institution, could be described as part of the psychological and social resources as well as the mutual influence between agency and structure with associated norms.

The foundation of social resources is trust, which was influenced by church membership. VO5 mentioned his membership of his church as part of his variety of bases of support and networks. He saw value in being a church man since if people see you in church "levels of trust builds around it" and credibility is important in business (VO5, 2013b:40). This showed his awareness of the importance of trust, and how to build it.

The relational aspect also includes an identification or membership component where VOs self-identify with the church and with other entities such as the BB4All project. In psychology, this identification was discussed by Brewer & Gardner (quoted in Davis, 2013:13) using social identity theory which distinguishes between individual's relational social identities, which are "(i) those that derive from interpersonal relationships and interdependence with specific others," and their categorical social identities, which are "(ii) those that derive from membership in larger, more impersonal collectives or social categories". In general VOs had relational social identities due to their roles and responsibilities with regard to individuals across the different social groups with which VOs identified, such as the VOs, their soccer club, and their church. VOs also had categorical social identities due to their roles and responsibilities (commitment) to a group as a whole such as a church community or being a participant in the BB4All project. Davis (2013), following Sen (2002), expresses this as the development by individuals of relational and categorical social identity capabilities.

Therefore the role of the church in a VO's life is not only as psychological and social resource and as part of their network (structural capital), but also forms part of the development by individuals of relational and categorical social identity capabilities.

There are problems in the relationships between the VOs and the churches as well that negatively influence psychological resources. The high esteem that VOs have for pastors may lead to them being vulnerable to exploitation. As discussed in Chapter 7, many VOs supported the administrative functions of the church. In VO10's case she complained about the fact that her church pressured her to get things done (such as typing of reports) without her having a choice. She felt that her choice on how to balance work and social life was being taken away (VO10, 2013a:33).

9.5   Summary

Social capital (or social resources), the focus on this research, is but one aspect of the Choice Framework's components of development outcomes, dimensions of choice (degrees of empowerment), structure, agency and resources. In order to place the research findings in the context of the Choice Framework the strategy used by Kleine of telling the story of one female micro-entrepreneur's use of a telecentre was emulated. Kleine chose this strategy as a means to present a holistic view while still covering enough detail for the conceptual nuances to emerge. The choice was made to tell the story of a VO's services to one business, followed by analysis that used the Choice Framework structure and added descriptions using social capital concepts from the multi-level social capital framework.

There are commonalities in the VO contexts, as discussed in Chapter 6, but telling one VO's story brought to the fore the uniqueness of each VOs individual characteristics, relationship networks, and the actual operative norms and sanctions.

In each of the Choice Framework components, the influence of social capital could be demonstrated, thus illustrating the conceptual reach and the pervasive influence of the different forms of social capital at the different levels in society. The use of the three level social capital framework made a coherent description of the individual to institution and institution to institution relationships possible within the conceptual frame of social capital.

The focus on relationships in social capital is aligned with the general approach of Bourdieu who wanted dualistic alternatives of either individual or collective to be replaced by the "primacy of relations" (Bourdieu & Wacquant, 1992:15).

For a development practitioner to develop an intervention based on the (necessary) complexity of the CF does seem to be a daunting task. The advantage of the combination of HSD and a multi-level social capital framework is that the analysis of the system of interest and the conceptualisation of interventions in the system is made easier to understand and execute while the inherent complexity is not obscured or ignored.

The Choice Framework includes a comprehensive list of personal resources, including psychological resources, which emerged as an important resource for the VOs as entrepreneurs. Three examples of psychological capital were highlighted, the belief in oneself as expressed in a VO to VO context and as an individual behaviour, and the relationships of VOs with faith communities. The belief in oneself was clearly important to VOs to keep on trying and not to lose faith that the business would grow.

The identification with and commitment to a group such as a church community, made it clear that VOs had developed both relational (commitment to individuals) and categorical (commitment to a group) social identity capabilities. The negative influence on psychological capital that an unequal relationship with a church's management can have was experienced by a VO. This did provide a necessary reminder that relationships include both positive and negative aspects.

10 Considerations for development practice and project design

The context and content of Chapter 10 are shown in the thesis map.

Introducing the problem

Chapter 1

The context

Chapter 2   Chapter 3

Methodology and Data collection

Chapter 4

Analysis and findings

Chapter 5   Chapter 6   Chapter 7   Chapter 8

Reflections on the Choice Framework

Chapter 9

Considerations for development practice

The conceptualisation of the BB4All project | The design and implementation of the BB4All project | The transfer of the BB4All project

Chapter 10

Conclusion

Chapter 11

10.1 Introduction

The aim of the chapter is to start from the development approach advocated in this research and use the findings gained from the application to the BB4All project of a social capital perspective (within the Choice Framework) to develop considerations for the improvement of the conceptualisation, design, implementation and transfer of ICT4D initiatives in order to improve the likelihood of sustainable outcomes. This is the derived research question: "How can this understanding of the role of social capital be used to improve the conceptualisation, design and implementation of ICT4D initiatives?" It is an attempt to use the detailed answers to the main research question of "What is the social capital of Village Operators (VOs) and how can this resource be used in ICT4D initiatives to improve development outcomes for participants?" as the basis from which to reflect on possible alternative options that could have been adopted in this particular project context. These alternatives are then presented as possible considerations for other projects of a similar nature. Some considerations are applicable to any development initiative. The approach used is to describe the conceptualisation, design, implementation and transfer phases of the BB4All project, reflect on each phase using the conceptual frameworks and findings, explore possible alternative options, develop considerations for improvement of project practice, as well as to re-think perspectives on the role of a project in the context of participant systems, followed by a summary.

10.2 The conceptualisation of the BB4All project

10.2.1 The problem

The systemic problem that led to the conceptualisation of the BB4All project was that approximately 17 000 of the total of 26 500 public schools in remote areas of South Africa have limited or no access to digital communication facilities such as the internet, landlines, cell phones or fax machines (CSIR, 2014) (please refer to Chapter 3 for more details). The commercially based supply of telecommunications services is constrained due the view of major telecommunications operators that rural areas are not economically viable (ibid.). In addition, the SA government realised that broadband infrastructure can be a significant contributor to economic growth, especially in rural areas, and, as a result, initiated the Broadband-for-All, community-based wireless mesh network project in order to bridge the 'market gap' in rural areas and test the use of new wireless mesh technology to provide these communities with wireless internet access (ibid). The output of the project was to be a tested "model that ensures that rural communities have access to broadband connectivity" that used "low-cost, locally-owned and supported infrastructure" (ibid.:iii) and one of the ambitious objectives was that "long-term permanent change" would be created by the project (:iv).

The project was thus conceptualised with two key aspects in mind: the provision of a large-scale demonstrator of a wireless mesh network (WMN) as a broadband solution, and the establishment of a Village Operator (VO) model to support access to and increase the use of the technology. The teachers and learners in more than 170 schools were the primary customers but more than 200 sites were connected in total including nutritional care centres and a radio station. Young people from local communities were trained as VOs to become local entrepreneurs (micro-enterprises) responsible for operating and supporting the BB4All service in their assigned cluster of schools and respective communities.

10.2.2 Sustainable development as the goal

The departure point of this research is the problem of sustainability. In the ever-evolving world of ICT4D, a persistent problem has been the sustainability of ICT4D initiatives (Toyama, 2015, 2010, 2009; Heeks, 2002). Many of these initiatives were planned and executed in a top-down fashion by large funders and

governments, and these failures have stimulated the search for new strategies to achieve long-term sustainability. The approach that was followed was to consider the different levels of systems that are involved since the reasons for failure do not lie exclusively or mainly inside the scope of control of a project, but within the community itself, and outside the community in the larger socio-economic system which includes the public and private sectors as well as civil society, the national economy and external systems such as the international donor community and global economics. A systems approach with respect to the analysis of the sustainability (or lack thereof) of development initiatives was therefore adopted.

As discussed in Chapter 1, a systems thinking approach that is grounded in development theory was represented by the idea of human scale development advanced by Max-Neef and collaborators (Chigona e*t al.*, 2009) that was used to arrive at a definition of sustainable development:

> *Sustainable development is achieved through self-reliant human scale development which flows from the individual level to the local, regional and national levels, and which is horizontally interdependent and vertically complementary*. (Roode, 2002)

The implications of this definition of sustainable development for development strategy were explored. Fundamentally, the departure point is to start activities at the local level (bottom up) and then communities and development initiatives work towards the achievement of complementary activities at the higher levels using as basic building blocks the alignment of interests through the acceptance of mutual interdependence (Chigona e*t al.*, 2009) (See Chapter 2). Translation of interests is required in order to build alignment of interests. The provision of internet access is an example of the translation of interests in order to build alignment of interests: the uptake and use of access is dependent on the interplay of factors at the personal and community levels that need to be understood by both community level and government level actors in order to achieve their development interests.

In line with the idea of human scale development, the ideal is that the translation process starts with the individual at local level. The understanding of the interests of other levels should also be greater among key actors at local level, and the process of translation of interests to achieve alignment should be driven from the bottom up, hopefully resulting in the building of networks across all levels. The end result would be the bridging of all sorts of divides, including the digital divide.

10.2.3 The VO model in the context of sustainable development

The VO model is conceptually ideal for driving alignment of interests since the process of translation of interests start between the individual VO and his or her customers. As we have discussed in Chapter 6, bridging and linking capital were developed at the micro level between VOs and their community customers, businesses, school personnel, churches and local government officials. The next level, what was described as the meso level in the social capital framework, in BB4All ideally then should have involved the participation of entities in the education system, such as schools (represented by principals), circuit and district managers of the provincial department of education, as well as entities such as communities (traditional leadership structures), churches, NGOs, businesses and business networks or organisations (chambers of commerce), the local branches of national government (SASSA offices and CDWs), local municipalities. In the Choice Framework these are called opportunity structures.

From a project conceptualisation perspective, the question is who or what is the entity that would represent the VOs at this level, or would it be up to each VO to build relationships and align interests? Should it be a form of joint collaboration between VOs and the project that present a unified front and act

as an entity with a strategy and a presence at this level, e.g. a VO network structure with initial support from the project?

Up to this point we have focused on a development approach. The realities of projects being interventions of finite duration and limited scope have to be addressed. If sustainability is taken seriously, a strategy with a long-term focus needs to be developed for life after the project.

10.2.4 Considerations

At the conceptual level a consideration emerges that projects such as BB4All ideally should involve the participation of entities at the micro and the meso level in order to achieve the goal of complementary activities at the higher levels.

Consideration: A bottom up development strategy requires fostering the participation of entities at both micro level (individuals) and the meso level (community level structures) in order to foster alignment of interests from a basis in local realities to the macro level (e.g. government) interest so that complementary development activities are designed at this level, instead of alignment being driven by top down development strategies.

At the micro level, models that enable the development of local entrepreneurs such as the VO model is conceptually ideal to start activities at local level in order to drive alignment of interests through the natural process of translation of interests that develops between entrepreneurs and their customers in developing services, as well as the sense of mutual interdependence.

In addition, entrepreneurs as members of the local community also achieved complementary activities at the meso level (e.g. providing church administration services and the church marketing VO services to the local society) through the alignment of interests as a result of the development of micro-level linking social capital between entrepreneurs and individuals and entities within the local society context (civil society, private sector and public sector).

Consideration: Entrepreneurial development models develop entrepreneur to customer relationships via the development of services that meet customers' needs (a translation of interests). The customers are from both the micro and meso level, thus fostering alignment of interests as well as the building of linking capital.

Consideration: To build alignment of interests with the macro-level entities, meso-level entities such as an entrepreneur network or cooperatives need to be developed that can grow business relationships with meso- and macro-level entities in which alignment of interests is fostered to support the creation of complementary development activities at the macro level.

In line with the definition of sustainable development used, this strategy should be useful to any development initiative.

10.3 The design and implementation of the BB4All project

10.3.1 Introduction

The research project had iterative design and implementation processes, with feedback loops from implementation that informed new thinking about design. The project design consisted of several project streams (referred to in Chapter 3). The most relevant streams at a strategy level were stakeholder

management and business modelling. The project plan included four phases: technology development and deployment, improving the stability and quality of the network, establishing operations as a proof of concept, and developing a business model and transfer to commercial partners.

Stakeholder management included the liaison with DST, two Provincial Departments of Education, the local community traditional leadership structures and a very definite element of strategic business development. Lower level stakeholder management was also required to facilitate implementation, for example, the backbone required access to a high site owned by a community radio station which was granted through offering free internet access.

Business modelling focused on the VO level, the level of a service provider who would be responsible for delivering the internet access, and the relationship between the organisation and the VOs (e.g. a franchisor- franchisee model). As a research project the VO model was not cast in stone; it was a concept that required implementation and iterative development during the course of the project.

As mentioned in the previous section, if sustainability is the goal, then the project strategy should include a long-term focus to enable the different participants to be able to continue delivering and receiving benefit after the project has ended

In this type of project with an entrepreneur development and 'market gap' focus, two types of business development strategies are required. A customer development focus on who will pay for what (the market), and an organisational development focus on what kind of entity will be providing support to the entrepreneurs, providing business services and signing contracts with customers (the business).

10.3.2 Market development for achieving sustainability

10.3.2.1 *Introduction*
The major influence on the sustainability of the overall VO model and the BB4All model during and after the project was the schools as the planned anchor clients with the majority belonging to the Mpumalanga Provincial DoE. To each individual VO as an entrepreneur, the services they sold to their customers were very important since this was income over and above the stipend. The aggregation of the customers of the 15 VOs represented an important market in its own right, not only for the VOs, but also as the scope of the difference the project as a whole was making in the community to close the 'market gap' by providing internet access at VO offices, and most importantly, the adoption and use by customers to add value to their lives (increased freedom to choose) through the facilitation role of VOs. There were thus two streams of business development, which can broadly be described as focused on either education system customers or non-education system customers (individuals and entities in the VO cluster contexts and beyond).

10.3.2.2 *Market development: The education market*
Project team experiences

In practice the project team engaged with the provincial department at two levels, the local and regional level, i.e. circuit and district manager level, and provincial head office level (Chapter 6).

At the local and regional level, personal relationships as well as project to customer relationships were formed. Two VOs had good personal relationships with circuit managers. VO5 built relationships with circuit managers in order to grow his own business with the regional footprint of the education department via relationships with people with influence (micro-level linking capital).

From a project perspective, the field support manager (FSM) developed a good relationship with the district manager to get his support for operational issues (e.g. to get cooperation from circuit managers and principals via the official management channel) and the project team leadership met with the district manager and his circuit managers to sell the overall BB4All concept. The district manager did see the benefits and supported the project at the district level as well as at the Provincial DoE (meso-level linking social capital). The project team management could therefore demonstrate support (at district level) to the Provincial DoE. The project also provided ICT infrastructure to support a project of the Mpumalanga DoE in order to strengthen this relationship (meso-level linking social capital).

This strategy did not, however, succeed in convincing the decision makers in the department to adopt the model and pay for the services. The department did suggest that what it could do was to encourage schools to make use of BB4All as the preferred service provider in spending their own *budget allocations*. The purchase decision was therefore to be shifted to the individual schools, most of which did not have enough financial resources to meet their existing needs. Thus the focus was brought back to the local level.

Development of considerations

Considerations can be developed via an approach of fostering the vertical alignment of interests via the building and use of multi-level social capital.

The major questions asked during the project included: Did the Mpumalanga DoE have enough existing resources (financial and technical) to support internet access to more than 170 schools? If not, would they be willing and able to re-allocate funds from other initiatives' budgets? What was the existing model for supporting internet access?

During this research new questions developed, one of which was: Would the department be willing to make the effort to search for external sources of funding to support the approximately 170 schools? At the meeting attended by the researcher at the head office where the business case of the project was presented, it was clear that the model was to experiment in a few schools and that donations such as the BB4All project were accepted, but that a strategy to connect all the schools did not have a high priority due to financial and resources constraints such as the funds to outsource the internet access provision and the ICT personnel at head office required to monitor and manage this scale of outsourced ICT service provision (Marais, 2013b).

At the strategic level a key question arose: Who owns the problem of sustainability? Is it the project that has to deal with it as part of the normal project process, the CSIR, the Provincial Department of Education, the schools, the VOs, the current VO customers, the society as a whole as served the current VOs and BB4All internet access footprint (private sector, public sector, civil society)?

If a decision has been made as to who owns the problem of sustainability, the next question is what is a viable strategy to achieved sustained benefit, and, amongst all the possible strategies, what would be the customer development strategies be that would be considered given the scope of this research. In a project of a similar nature as BB4All, with existing project objectives, how can the development and use of social capital support customer development strategies?

Who owns the problem?

As we have discussed, it may be true that the Provincial Departments of Education owns the problem with respect to schools, but their ability to resolve it was limited and they required assistance. Schools could not be the sole owners of the problem as most schools do not have enough resources and could, at best, just

cope given what they had. The DST and the CSIR did not own the problem since it is not their mandate. The issue of whether the project owned the problem does require unpacking (see Chapter 6). The VOs, as entrepreneurs, did own the problem in the sense of schools being a major market for them, but they did not own the necessary network infrastructure used during the project or have the financial resources to operate, maintain and extend the network. The current VO customers benefited from the internet access, but they did not own the problem. The society served by the VOs included the parents whose children were at schools who had internet access and they were one of the investors in their children's future, so, yes, they did in a sense, own the problem and should contribute all the resources they can. Some civil society actors have made ICT in education their mandate and therefore they too have 'owned' up to the problem.

Should the project own the problem?

The project did take the problem seriously and did execute a strategy aimed at supporting long-term sustainability and 'honourable' project exit/transfer. The project's experiences and approach to sustainability of school internet access were discussed at the beginning of this section in terms of the engagement with the key stakeholder, the province. In addition, the VO model was conceptualised, implemented and researched as a bottom-up enterprise driven approach toward enabling long-term, sustained benefit to schools and community.

A project, per definition, has a beginning and an end and is an external intervention of limited scope and duration in the systems that have and own the problem. Participants in this concept, this vehicle and this 'temporary opportunity structure' called a 'project', are influenced by and influence this structure (as described in many theoretical and other types of frameworks, including, the agency – structure interaction formulation used in the Choice Framework – see Chapter 2).

This dynamic (what has been called the 'project effect' in this research) is described and the understanding gained in the research is used to argue for a project adopting and applying a certain strategy to 'owning the problem'. This may be summarised as 'yes and no, but'.

The question becomes whether the project had a natural inclination towards a long-term focus? The pressures of delivery deadlines may tend to drive project management energy to get basic buy-in at the endorsement level, so that, at least the project is not faced with active opposition by the local department officials and principals. The project goals, by definition are not long-term, but to execute a successful extrication strategy (transfer or exit strategy). A project team does not have the same vested interest of a VO or VO grouping that the schools should become a long-term customer providing a solid base of annuity income as well as being the source of new customers in the form of learners who are using VO services at school and then go on to become individual customers.

The role of VOs to support the project

VO5 had the view that relationships with people with influence (circuit managers) should be built in order to secure long-term contracts. The focus of each VO on their individual interests did lead to sanctions being applied to VO5 since he was transgressing in talking to the circuit managers dealing with their clusters. VOs as individuals at that stage in the project could not see the benefits of acting as a collective and also did not trust the motives of VO5 – are you doing this for your own business only or are you really doing this for all of us?

The question is whether VOs really understood and lived the importance of successful adoption by the schools of the internet access (and the building of micro-level bridging and linking capital) as their

contribution to the overall market development strategy of the project to influence the Mpumalanga Provincial DoE to pay for the internet access to the schools? The fact that most VOs stated that they had built relationships with only a few schools in their cluster pointed to a lack of understanding, as well as the fact that short-term constraints such as high travel costs to schools dominated their thinking regarding schools as customers.

Some VOs definitely saw customer development as the project's role, and, in the context of general market development, one VO mentioned that a market survey of his cluster was done by him at the start of his deployment to a cluster and that, therefore, since then the project should have taken it further, an example of not taking responsibility for his own future (VO16, 2013a). Could the project have done more to encourage this understanding?

The project represented VO interests on their behalf (with the exception of the limited direct interaction of VO5) and also the interests of the project.

Following the spirit of bottom-up alignment of interests, a business development strategy should focus on bottom-up development and the usage of the social capital of the local society as a whole.

The roles of the VOs, the schools and the local community in addressing the problem of sustainability in general, and in particular, the funding of services to the anchor customer, should have been explored with them. New forms of collaboration and ownership could have developed. The suggestion was made in Chapter 6 that an alternative strategy based on mobilisation of meso-level social capital (collective action), by collaboration with, for example, churches, whose congregation includes the families who have children in the local schools, could have had a larger effect than a project team with a small measure of VO participation trying to sell a service to a provincial department of education. The sellers and the entity or rather entities asking for resources to ensure sustained service delivery should be changed.

These groups should have spearheaded the general engagement with problem owners and sources of assistance and, in particular, stakeholder management of the province.

This study showed that VOs had created social capital that was not used in the overall education market development.

Consideration: Initiation by the project of collaborative market development by leaders in the community and VOs that are focused on the education department with local schools as allies. The facilitation role of the project should be gradually be handed over to a collaborative structure consisting of a local group (e.g. key leaders in the local society, School Governing Board representatives and VOs) as well as representatives of the department.

Consideration: Investigate the use of the social capital developed during the implementation of an initiative to mobilise the regional community (the meso level) composed of the participants and their networks, community leaders (e.g. pastors), and the regional political leadership to support the initiative by making the benefits known to the key decision makers in the entity or entities that own the problem. In other words, use the collective capacity for action. This strategy should be applicable to any development intervention.

Consideration: Facilitate a process whereby the regional community takes stock of the resources that they have and the resources that they have access to via their social capital which could and should be used to support the initiative in the long-term.

As mentioned above, a project's ownership of the project can be described as 'yes and no, but'.

The project is the owner of the problem at the start of the project to get the ball rolling via facilitation ('yes'). Ultimately, a project cannot be the long-term owner of anything as it has no long-term vested interest ('no'). Therefore, the initial facilitation role has to be transferred as soon as possible and this is a responsibility that the project should not neglect ('but'). This strategy should be useful in almost any development project.

10.3.2.3 Market development: The non-education market
Introduction

There will always be overlap between these artificially created customer boundaries (education/non-education) and therefore it has to be recognised that VOs supported, and were supported by circuit managers, principals, teachers and leaners as individual customers too, which hopefully had some influence on the development of local schools as customers.

VOs added value over and above the provision of internet access at their offices. The three major themes identified in this research were: the influence of social capital in its various forms at the micro, meso and macro level, especially in supporting the development of the VOs as entrepreneurs (Chapter 6), that VOs helped the community by delivering services as social entrepreneurs (Chapter 7), and that VOs added value by creating innovative services and played a vital role in the diffusion of innovation (Chapter 8). In both of the latter themes the high degree of influence of social capital were explicated. The freedom allowed in the project context also created a space in which VOs could explore entrepreneurially, which had positive and negative aspects, but on the whole the positive aspects overshadowed the negatives. The three themes and the entrepreneurial development of VOs due to the degree of freedom allowed by the project are used to develop considerations. The influence of the freedom VOs were allowed was woven into the discussion of the themes.

The influence of social capital on VOs' business development

The development of VOs as entrepreneurs is discussed in the next section on organisational development. For non-routine services, i.e. not photocopies, VO-to-customer relationships were mostly based on new or existing personal relationships. The business relationships with schools were mostly via the admin clerks; some schools expected free services from VOs who were alumni, VOs did work for NGOs that were run by their friends, and VOs acted as outsourced admin offices for their own churches. These are examples of the influence of bridging and linking capital on market development. VOs were marketed by their customers, friends and family as well as community level structures such as churches and the local traditional council.

Collaboration in families and with other small businesses led to them marketing VOs to their customers and also increased the increased the scope and value of the services that could be offered to customers. An example of bonding capital in action was the collaboration between VO1 and her husband which added financial expertise to attract business people who wanted to do tenders.

The role of trust was very important in developing new customer bases, delivering unique services to meet customer needs, and retaining customers. An example mentioned previously was the VO who gained

access to many pre-school care centres due to the trust the principals had in his mother, a fellow principal. VOs were trusted with email passwords and gained in-depth knowledge of businesses.

These examples establish the foundational role of social capital and its various manifestations and uses in developing markets for VOs.

Consideration: Entrepreneurs can use personal relationship networks in many ways to grow the market for their services which can more effective and credible and does not require money.

Consideration: Entrepreneurs have to ensure that they are trustworthy since this is the foundation for deepening customer relationships, expanding the services delivered to customers and customer retention.

Consideration: Developing a good customer relationship helps to develop services that fit customers, and therefore are more value-adding, and more likely to used and paid for.

Consideration: At the project design level the feedback from entrepreneurs delivering services based on in-depth knowledge of customers should be used to address one of the root causes of failure, the design-actuality gap (Heeks, 2002) between designers of technology or services and the real-world context of users. There are many possible factors at play here, as pointed out by Masiero (2016), who developed a model that takes into account the interactions between the root-causes of design–reality gaps. In a case study the tracing of a causal chain with the relevant factors and processes led to the finding that expectation failure had occurred. Projects should therefore also be aware of local dynamics and the in-depth knowledge of local entrepreneurs would probably also be useful.

Social entrepreneurs delivering services to communities

Four major dynamics interacted with each other, namely, the fact that VOs were from the local community, VOs wanted to help the community, VOs were entrepreneurs who had to make a profit and the perceptions in the community created by the project's approach to delivering services to the schools. In Chapter 7, these dynamics were described in detail and the concept of social entrepreneurship was explored in order to provide a nuanced description.

VOs did serve their community in their personal capacity, but only community services offered by VOs as entrepreneurs are discussed here.

The fact that VOs grew up in their community held positive and negative implications for their businesses. VOs had to manage the expectations by schools, churches and members of the community that VOs would provide free services. The positive aspects were numerous in the case of churches and the community in general, as mentioned in the previous sub-section.

The relationships with schools were complicated by the project's approach of delivering free internet access and free technical network support to the schools by VOs, which led to the 'project effect' (Chapter 6), the fact that many schools took VOs for granted and expected them to deliver free services, since they were getting a stipend for the network support. Some VOs responded by providing support services commensurate with the degree of cooperation and appreciation received from the school in question.

A long-term, pro-active investment to build a relationship with a school was rewarded, for example, a school trusted a VO to buy and install ICT equipment. Reciprocal exchanges of services and assistance were also established between a few VOs and some admin clerks at schools.

The schools that VOs had attended themselves sometimes had the most extreme expectations of VOs being obliged to deliver free services to them - the 'Alumni effect' (Chapter 6).

Community service as a value was expressed via reciprocal support relationships between VO and community members, as well as VOs' consideration of the money constraints of community members. In other words VOs acted according to community norms. In Chapter 7, three approaches of combining responsiveness to community needs with business needs were discussed: VOs collected and collated information in response to specific needs such as searching for employment and helping customers to search the internet so that they could get more value for their money; VOs found means of providing cost-effective and value-adding services to reduce the costs of services (e.g. printing of school IDs); and VOs developed win-win approaches by collaborating with service providers (e.g. government) to improve service delivery to the community and increase the VO customer base.

The diversity of services offered was one of the benefits of the project's research type approach to developing the VO model that encouraged exploration, the loose management structure that focused on mentoring of VOs and provision of broad guidelines rather than strict management, and, to a certain degree, 'benign neglect' due to the tremendous demands made on the project team by technical deployment and operations issues.

The essence of the value addition of many VOs to communities were that they functioned as social bricoleurs, a type of social entrepreneur that use their in-depth knowledge of the local social needs and of local resources to do the best that they can with local resources to address local issues that would not even have been apparent to outsiders (see Chapter 7). VOs were local innovators driven by local actors in response to the environment.

Consideration: The fundamental basis of the business model of a project should be communicated often and the contributions that customers can and should make to build a basis for sustainable long-term benefit should be discussed and debated as a shared responsibility between customers and VOs. The objective should be to show that free services are not, in fact free, since the project is subsidising them for the short term, and to make clear the profit needed to be made in order to ensure financial viability and long-term benefit.

Consideration: The tension created between an ethos of community service and entrepreneurial reality did result in innovative and cost-effective services being developed. A pre-packaged definition of free (subsidised) services versus paid-for services, would probably have constrained innovation.

Consideration: Completely unfettered innovation can have disastrous consequences for the long-term future by tainting the brand and the business values, and therefore broad guidelines should be developed for what the VO model stands for, and what the project supports given its values and development approach. These guidelines should be developed in collaboration with VOs and preferably customers too, in order to become shared norms and the basis for sanctions. A collaborative development of values should improve the long-term sustainability of development projects in general.

Creation of innovative services and the diffusion of innovation

The project used all of the innovation strategies articulated by Heeks (2008), namely, pro-poor (for the poor), para-poor (working with the poor) and per-poor (innovation by the poor in their communities). Technical innovation to create the WMN technology was pro-poor innovation and VOs interactions with their customers created examples of para-poor and per-poor innovation. The diffusion of innovation (e.g.

internet access and usage) is a process and not just passive acceptance, and plays out in each of these innovation strategies as people go through a process before making an adoption decision.

In accordance with the living labs approach VOs and customers developed, tested and co-created services in the offices of VOs and the premises of their customers. The freedom with which VOs operated enhanced the possibility of innovation.

 VOs, the FSM and the FSC played a key role in the diffusion of innovation as explored in Chapter 8, where the following relevant characteristics and roles were identified.

Rogers (2003) found that the degree of general similarity between two people (homophily) increased the persuasiveness of communication since the subjective experience of an innovation by somebody like yourself that you know is more important than objective scientific information. VOs had the advantage of similarity, personal relationships and interpersonal communication in influencing the adoption of their own and other innovations.

Special roles in a social system with respect to diffusion of innovation are: opinion leaders, change agents and change agent aides.

Opinion leaders have an informal role that is earned based on a track record of technical competence, being accessible and conformance to the norms of the relevant social system. The real test to qualify as an opinion leader is whether people are willing to model their behaviour on a person's behaviour. Opinion leaders also occupy unique and influential positions at the centre of the interpersonal networks in the community's communication structure. In the VO communities, church pastors were opinion leaders and were especially influential since they combined formal and informal roles.

Change agents are professionals who influence "innovation-decisions in a direction deemed desirable by a change agency" that are outside the social system (Rogers, 2003:27). In this research the FSM, FSC and the whole BB4All project team are change agents. Change agents use opinion leaders to assist them. Due to change agents not necessarily being from the community, they could be dissimilar (heterophilious) to the community and therefore change agent aides (VOs), who are not as highly trained and are more homophilious with the community are used by change agencies (e.g. BB4All) to actually do most of the influencing (ibid.).

An innovation that can be changed by users while adopting and implementing it is called a "re-invention" (Rogers, 2003:14). VOs and customers did change innovations to fit them and can be considered as re-inventors. Research by Rogers showed that innovations that were amenable (pliable) to re-invention diffused more rapidly and had a higher probability of sustained adoption (ibid.). The service innovations of VOs fit this description well and hence had the advantage of rapid diffusion and increased probability of sustained adoption compared to 'pre-packaged' innovations.

Consideration: The project design should encourage the use of the service delivery context as living labs where co-creation of innovative solutions with users occurs.

The service delivery context is not just the use of physical structures by staff or entrepreneurs to deliver services. The key concern is the interactions that take place as enabled by the service provider's goals and attitudes and a focus on the facilitation of innovation processes rather than just 'sales' processes. These interactions may be at service delivery points or customer premises.

Consideration: Design project strategies to inculcate and encourage the development of VO relationships to create a VO network due to the tremendous possibilities for supporting the diffusion of innovation via bridging VO networks, shared learning and collective action to the mutual benefit of VOs and customers.

The value of a network of relationships has to be 'sold' to the key participants. In BB4All customer referrals to other VOs were one of the few demonstrations of the existence of a VO network.

Consideration: To enable rapid diffusion and increased probability of sustained adoption, design innovations that are amenable to re-invention and invest in local capabilities (e.g. the VO role) to facilitate participation in this process by local people.

The first prize is innovation by locals to meet local needs in the local environment, as advocated by Heeks and living lab researchers. If an innovation comes from the outside (as most will) user customisation should be supported due to its influence on diffusion of the innovation as shown by Rogers' research.

Consideration: Design a project from a change agency perspective. This would require the identification of and the building of relationships with opinion leaders among the participants, change agents (internal or external to the relevant system/community) and change agent aids.

Use of this perspective may also instil a healthy awareness that the technology itself, or the demonstration by the technical expert, or technology use by a few early adopters, will not have sufficient influence on the innovation-adoption decisions of the whole system of participants.

10.3.3 Organisation development for achieving sustainability

10.3.3.1 Introduction

This section draws on and is guided by the arguments in the previous section regarding who owns the problem. The guiding principles that have been discussed include: Bottom-up development of networks and alignment of interests to achieve complementarity with top-down approaches; a project does not own the sustainability problem but has to facilitate ownership and transfer this role; bottom-up enterprise driven approaches toward enabling long-term sustained benefit; the development of multi-level social capital to support use of local and non-local resources, build capacity for collective action, and facilitate innovation and innovation diffusion.

Guiding principles are normally fairly easy to develop, but difficult to implement in projects. Some implementation lessons have been learned in the BB4All project and these, together with additional theory-based options are covered.

The BB4All project phases referred to establishment of operations as a proof of concept, development of a business model and transfer to commercial partners. The development of VOs as entrepreneurs was budgeted for but the development of an organisation was not the project mandate. Researching and development of a business model and having proof of concept 'operations' were in-scope, but an organisational development process was out-of-scope. The project focused on the development of VOs as entrepreneurs and as part of a minimum technical support structure. Assuming that similar constraints are can be found in many ICT4D projects, implementable considerations for organisational (or delivery mechanism) development are presented.

10.3.3.2 Development of entrepreneurs

Induction and ongoing training of VOs

The training of the VOs was about entrepreneurship (small business development), use of the Microsoft Office software suite and technical skills related to installation of antennas.

Based on this research three additional training topics would be recommended, namely the themes of social capital, social entrepreneurship and innovation. The combination of these themes would show VOs the many ways in which they can add value to the community and to their businesses, and that the foundation exists and new relationships and mutual trust need to be earned in these relationships. This would introduce the development of social capital in its many forms as a way to develop a support base and access to resources that does not cost money.

The value of social and psychological capital to an individual entrepreneur and to the group of entrepreneurs would be the departure point for the social capital topic. Each prospective VO would be asked to map their existing relationships with family, friends, businesses, churches, or NGOs to bring home their existing psychological capital and the bonding social capital and what it means in practice. This would introduce the perspective of belonging to many networks, as a counter to the dominant perspectives of the lone entrepreneur fighting against the odds to make enough money from customers, and the project as the major or sole source of support. Individualism is subtly encouraged by being labelled an entrepreneur and being trained as a small business. The ways in which collective action can be of benefit to the group would be introduced together with the concept of the VO network. The many benefits that can be created include: sharing of resources, sharing and rapid diffusion of knowledge, economy of scale (e.g. bargaining power) and diversification of the types of services by making use of different skill sets and personalities. The value of a group identity (the brand) and associated norms and sanctions to maintain the value is also important.

The options available to serve the community in the form of an entrepreneur for social benefit, i.e. social entrepreneurship, should be introduced to help VOs deal with their own wish to be of service to the community and the inevitable demands that the community would make. They can then make their own informed choices over time about social entrepreneurship or doing business as a 'normal' entrepreneur.

The unique role that VOs can play in a community to create local innovations and assist in the rapid diffusion of innovations is a strategic role that can be used as a VO mission statement in VO training. Sharing of the many ways in which this innovation role has developed when added to reflections on the gamut of entrepreneurial experiences, would be a good starting point for an ongoing training strategy in which the VOs would become each other's trainers and coaches.

Consideration: Training of entrepreneurs should include the topics of social capital, social entrepreneurship and innovation.

Consideration: Develop an ongoing training strategy that enables entrepreneurs to share their experiences and learning in the area of the creation and diffusion of innovation as well as their general experiences of entrepreneurship and social entrepreneurship.

Consideration: Strategies for development of networks and the consideration of the advantages or disadvantages of belonging to various networks to be included as regular discussion points in mentoring and coaching.

10.3.3.3 Organisation development strategy

Introduction

As mentioned earlier, the BB4All project phases referred to establishing operations as a proof of concept, and developing a business model and transfer to commercial partners. The development of VOs as entrepreneurs was budgeted for, but the development of an organisation was not the project mandate. Researching and development of a business model and having proof of concept 'operations' were in-scope, but an organisational development process was out-of-scope. In reality some form of organisation development did take place as discussed below.

Support for building strong relationship networks

Supporting the building of networks between all the project participants was useful as illustrated by examples in Chapter 6 of support among the VOs and with the project team.

Of special importance in the VO model is support for the building of the 'network of VOs' to provide mutual psychological support, business support by learning from each other how to build customer and other relationships that matter, a sense of shared identity (Internet for All) and fostering the capability for collective action (e.g. collaborative procurement). This process should start in the induction of VOs from a social capital perspective as mentioned above. The face-to-face contact at gatherings was considered important by VOs and hence, even with expensive transport costs, a project should budget for it and encourage VOs to make plans for group and personal meetings.

The sharing of local knowledge gained via experience is as valuable as the formal training or even more valuable. To enable learning from customers and others in the local context trust relationships and a sense of being 'one of us' is helpful. Therefore, having and building bridging social capital at the micro-level is a valuable means to gain access and learn from local sources of wisdom about community ways of being and doing, the informal rules of the business world, local support structures and local government. The co-habitation of entrepreneurs in the office of VO6/VO7 was a good example of a model for learning together and sharing connections to the knowledge embedded in local businesses networks.

Consideration: Project management and participants should be aware of the multiple benefits of investing in the building of relationships (social capital in various forms) for personal and collective long-term sustainability of the organisation post-project. The awareness must be translated into plans and actions that evolve as learning occurs with customers.

Consideration: The building of relationships with fellow entrepreneurs by sharing resources such as office space, computers and internet access is a good strategy for enabling rapid learning about how business is conducted in the local context and collaborating to develop complementary and new services.

Operationalising the project

The BB4All team management realised that the CSIR team had research-based operations support experience, but lacked commercial experience of operations, and that it was very expensive to use project people in this role in any case. A project team was also not the ideal vehicle for operations; what was required was a dedicated operations team managed by an operations manager with business experience (see Chapter 3). The project therefore contracted in two commercial companies, one to set-up a service desk with IT systems staffed by two service desk agents, and another to deliver Tier2 technical support services on a call-out basis at the schools with VO support.

We have discussed how relationships between VOs and the service desk developed over time (Chapter 6) and how linking capital had developed with service desk personnel, for example their recommendations of low-cost suppliers to VOs. At the start however, there was a degree of conflict between the operational mind-set of the service desk personnel and VO mind-sets shaped by being an entrepreneur (assigned to a cluster of schools) and having experienced fairly sympathetic and mentoring style operations management via the project team (see VO10's comments in chapter 6). This was handled by sending the service desk agents out to experience the VO context (PM, 2015).

Consideration: Project management should make the fact of transition to operations clear as well as the importance for long-term sustainability of demonstrating effective operational capacity at organisational and VO level and that, therefore, each VO had to take responsibility for the vital and potentially highly value-adding role of local Tier 2 technical support.

Consideration: Change management was required with the development of practical experience of each other's worlds and shared responsibility. Swopping of roles by VOs and service desk agents for a period of time would have been a valuable immersive experience to build understanding and start building bonding social capital as an operations team.

Consideration: Transfer of skills and attitudes of customer service from the contractors to the VOs as the long-term Tier 2 technical support at the local level by using experiential learning and an apprenticeship strategy. Practical learning by going with the Tier 2 team and doing on-the-job training.

Consideration: Start with commercial collaboration (in the form of sub-contracts) as early as possible in the project in order to start the journey to behaving as a business entity delivering services to individual and larger customers, such as schools and the provincial department of education.

10.4 The transfer of the BB4All project

The project focused on transfer near the end of the project (partially in phase 3 and fully in phase 4) (CSIR, 2014). The commercialisation process, which included an open tender process for selecting a licensee was discussed with VOs. The large amount of financial resources required to keep the network operational was also communicated (after the selection of the licensee).

The dynamics that unfolded after licensee selection in November 2013 are described below in some detail to reflect the many interactions between the human, commercial and technical aspects.

The VOs were introduced to the licensee at a meeting in January 2014 where the field support team and some of the project team was present. VOs had the opportunity to ask questions and voice their concerns with the licensee (Marais, 2014a). A series of meetings followed between the VOs and the licensee. A change management company was contracted in February 2014 to assist VOs and project team members to achieve closure and develop positive ways of thinking of VOs (e.g. to realise what skills and resources they had developed) (Marais, 2014b). After the reality of the licensee's takeover and the withdrawal of the CSIR had sunk in VOs started to raise concerns about the contracting model of the licensee (agency contracts with a commission) and the decreased network availability.

The higher level strategic concerns of VOs were voiced during the meetings in the change management process and summarised at the final exit meeting in the presence of the funder (DST), CSIR and the licensee (Marais, 2015c). The major process concerns were that VOs were not invited to tender and were also not

involved in the selection process of the commercial licensee, even though they were not excluded legally since they did not tender (ibid.). At a personal level, VOs felt excluded and hurt that the CSIR and the project team considered them incapable of tendering (see Chapter 3) (ibid.).

VOs also felt strongly that they had shown a lot of commitment by 'hanging in there', since they were under the impression that investment would come when the project ended to increase the backbone capacity so that they can sell internet access to all the people in their clusters who had been asking for it for so long (ibid.). They had a strong sense of ownership and responsibility for the people and the market opportunity associated with their assigned cluster area. They felt that they had been looking after their clusters and that they were left with nothing in the end and their customers had been left in the lurch.

A practical issue was that the existing internet access had become unreliable since the licensee was developing new backbone links that used high sites with a much lower yearly rental than some of the current high sites and was also replacing backbone equipment that had failed with new higher capacity equipment (ibid). Communication between the licensee and the VOs was not adequate according to the VOs and they were left in uncertainty about their options for the future. The VOs were also embarrassed about the lack of service and did not want to talk to schools anymore because they could not say when internet access would be restored.

The VO agent type contract with the licensee did not prevent them from selling their existing range of services to customers (ibid.). The issue was that their own internet access was also affected and hence they could not sell services based on the previous free internet access, but had to find alternative internet services that were costly. In essence only the non-internet services such as typing CVs, doing brochures, photocopies, printing, binding documents and selling airtime, were possible (ibid.).

The human realities were that VOs had high expectations that had built up during the five years or more of their participation in the project. The hard realities at the end were that the CSIR could not fund operations and had to hand over operations to the licensee. The licensee had to spend money to upgrade the network while there was no income from the only clients, the schools. The negotiations with the provincial department were taking longer than the licensee had expected and in the meantime they had to run the network at a loss.

Some of the general learning that can be distilled is that transfer processes always take longer than is thought. Many of the delays cannot be controlled by the licensee. Convincing a customer that had not been paying for a service to make the commitment to pay is not a quick or easy endeavour and obtaining access to new high sites depends on the speed of response of the owners of the site. The only aspect that was under the licensee's full control was the repair and upgrading of the existing backbone of the network that was not affected by the decision to use new high sites.

A period in which existing services are partially or totally disrupted is, in general, very likely, and that will have an adverse effect on the existing customers. The biggest issue was how to deal with the uncertainties. VOs were in the position that they were not directly involved in the three key licensee processes mentioned above. They could only communicate the state of the network to the licensee, but could not influence the development of the new backbone.

The considerations developed offer suggestions for improvement of the transfer process as it was conducted, a strategic perspective on transfer in a project context and the possible role of social capital.

A possible transfer process perspective was to assist any new licensee in the process of convincing the key customer to pay by mobilising all the resources built up over the years. It takes time for the licensee to build relationships and a track record of adding value and the VOs and the community role players could have assisted with this process. In social capital terms: speeding up the development of new social capital using the existing social capital of VOs and existing local customers such as the schools and other users.

Consideration: The development and execution of a strategy to do a handover of the key project relationships via personal introductions by the project team of the licensee to key persons (e.g. the district manager, the contact person at the Mpumalanga Provincial Department of Education, the local kings). This process may contribute to the building of social capital by the licensee and at the same time remind the stakeholders in person that the project has ended and that continued benefit to their constituencies was their responsibility as well (drawing on the linking capital between the individual users such as schools or citizens and the entities with power at the meso and macro levels).

Consideration: The introduction of a change management process as part of a transfer process has huge benefits in giving people the space to articulate feelings and also, in time, to shift the focus to the future and development of new opportunities.

A strategic perspective on transfer in a project context entails asking if the CSIR has to take sole responsibility for the transfer of the project. The participants have a vested interest and also have responsibilities to protect that their interest. A shared responsibility perspective should be adopted by both parties.

There were legal processes to be followed by the CSIR on the service provider side (commercialisation processes), but there were fewer or no constraints on the customer side. VOs and communities could have started marketing themselves as a profitable market, marketed the value of the project approach and the VO model to relevant sources of funding and long-term support, made their needs known to donors, and petitioned the provincial government to release funds to the Department of Education (DoE).

Consideration: A shared responsibility perspective should be adopted by the project and the participants in order to foster the acceptance by participants of the responsibility for their own future, which is a key building block for realising long-term sustainability of an initiative. It can also create new opportunities due to the very different perspectives and relationship networks (social capital) of the collection of participants versus that of a project.

Consideration: Communication and consultation with all of the key stakeholders to inform them of the details of the planned transfer process needed to be done a reasonable time before the process was started. This would have provided an opportunity for the major education customer (the Mpumalanga Provincial DoE), the VOs and all their customers, and the local community and business structures to react and provide suggestions for improvement and consider what resources may be mobilised (making use of existing social capital).

A negative effect could have been increased pressure on the remaining overworked core project team, but a collaborative process could have developed new opportunities.

A strategic perspective driven by a sustainability objective on conceptualisation and design of projects would result in the preparation and realisation of transfer process to be embedded in the project from the very start as an intertwined and parallel process, rather than as the final project phase.

Consideration: Design projects with an embedded parallel process that begins with the end in mind, in other words, mutual understanding of the sustainability issues is developed with participants and system owners from the start of the project in order to develop and execute a transfer process in which they participate.

An additional strategic imperative is to develop knowledge of the system or systems that own the problem of sustainability and the key decision makers in these systems. Based on diffusion of innovation research (see chapter 8), strategies can be developed to achieve desired outcomes in systems. Research done by Rogers (2003, 1995) has shown how knowledge of the social structure can be used to predict when and who to influence. The critical leverage points, i.e. the key influencers, can be identified as well as the nature and extent of their influence. The nested sets of systems that influence each other via social relations can be used to identify how cross-system linkages can be built. Knowledge of the positive and negative aspects of closed and 'cross-linked' systems (bonding, bridging and linking capital) can be used to develop effective and efficient strategies to achieve outcomes.

Consideration: Develop knowledge of the social structure of the system or systems that own the problem of sustainability in order to be able to predict when and who to influence, and develop strategies to influence them to achieve the desired outcomes.

10.5 Summary

The research findings were used to develop considerations for the improvement of the conceptualisation, design, implementation, and transfer phases of similar ICT4D initiatives in order to improve the likelihood of sustainable outcomes. The project phases are used to summarise the considerations in Table 15.

The considerations are based on the theoretical departure point of sustainable development as framed according to human-scale development principles. The role of social capital in the translation of interests between top and bottom levels was shown by starting with individuals at the local level (the VOs) and continuing to meso and macro levels.

An important question to consider as early as possible is who owns the problem of sustained benefit being provided after the end of the project.

Considerations to meet the demands of market development in the education and non-educational contexts were developed. In the education context collaborative business development is put forward as an alternative to project-driven market development. In the non-educational market, the three major themes of the research findings are applied: social capital as the basis for in-depth customer knowledge, the range of services developed due to the tension between community service and commercial gain experienced by VOs, and the creation of innovative services with customers.

The most difficult project phase is the transfer phase. The major strategic consideration is to design projects so that the mutual understanding of the sustainability issues by participants and system owners is developed from the start. The transfer process issues are to facilitate the use by the participants of their social capital and to support the building of relationships with the new entity, while reducing reliance on the project.

As indicated in the text, many of the considerations that were developed are probably applicable to any development initiative since social capital is always present and is probably under-utilized as a source of knowledge and a basis of collaboration to develop and implement viable strategies for long-term sustainability.

Table 15 A summary of the considerations that was developed for each project phase

Project phases	Motivation	Considerations
Conceptualisation		
Establishment of a Village Operator model to support access to and use of the technology.	True to the principle of self-reliant human scale development, the process of the translation of interests between top (province) and bottom (local community) levels starts with the individual at local level (e.g. the VO). The translation of interests takes place in the interaction between the VOs and their customers.	To achieve complementary development activities that are bottom-up aligned, rather than being driven by top-down strategies, use entrepreneur development that aligns interests in business relationships that links micro and meso levels. Meso-level entrepreneur collaboration (in networks or cooperatives) create the opportunity for significant business relationships that link the meso and the macro level, thus completing the bottom-up driven alignment of interests that enables complementary development.
Design and implementation		
Market development for sustainability		
The education market	The project-driven approach to develop relationships with the Provincial DoE did not succeed in sufficient alignment of interests to influence the department to pay for services.	Scope the project's role as a facilitator that initiates collaborative business development focused on the DoE via the bottom-up development and usage of the social capital of the local society as a whole. Mobilise meso-level social capital for collective action by churches and VOs in order to show the extent of the community support for the VOs services to the DoE.
The non-education market	Three major entrepreneur-centric themes identified in this research: 1. The influence of social capital in supporting the development of the VOs as entrepreneurs	To address a root cause of failure such as the design-actuality gap (Heeks, 2002), use iterative project design based on feedback from VOs with in-depth knowledge of customers. A broader analysis may be required in which case the model of Masiero (2016) should be used since it takes into account the interactions between the root-causes of design–reality gaps. Pre-packaged definition of free (subsidised) services vs paid-for services probably constrain innovation.
	2. VOs as social entrepreneurs providing community services	The development of innovative and cost-effective services is supported by the tension between an ethos of community service and commercial reality.

Project phases	Motivation	Considerations
	3. VOs creating service innovations and assisting the diffusion of innovation.	Create instances of a 'space of dialogue' where customer requirements are elicited and co-creation of solutions takes place in an iterative and adaptive manner (e.g. VO offices). Design projects from a change agency perspective. Identify and build relationships with opinion leaders, use change agents and change agent aides.
Organisation development for sustainability		
	VO training regarding entrepreneurship (small business development), use of office software and technical skills is insufficient.	Three additional training topics required: social capital, social entrepreneurship and innovation.
Transfer		
Transfer processes. Licensee selection, introduction and handover.	Improvement of the transfer process design required.	Develop a strategy to do a handover of key project relationships via personal introductions of the licensee by the project team to key persons in order to contribute to the building of social capital by the licensee and at the same time remind stakeholders that continued benefit to their constituencies is their responsibility as well.
	A strategic perspective on transfer in a project context is needed.	Design projects with an embedded parallel process that begins with the end in mind: the development of mutual understanding of the sustainability issues by participants and system owners from the start in order to develop and execute a transfer process in which they participate. Structured engagements such as the influence mapping process should be used for the development of mutual understanding of the sustainability issues and the key actors and influences involved.
	Make use of social capital rather than destroy it.	Develop knowledge of the social capital of the people in the systems that own the problem of sustainability in order to develop strategies to influence them to achieve the desired outcomes. Invite them to use their social capital to create new opportunities for acquiring resources to support long- term sustainability.

11 Conclusion

The context and content of Chapter 11 are shown in the thesis map.
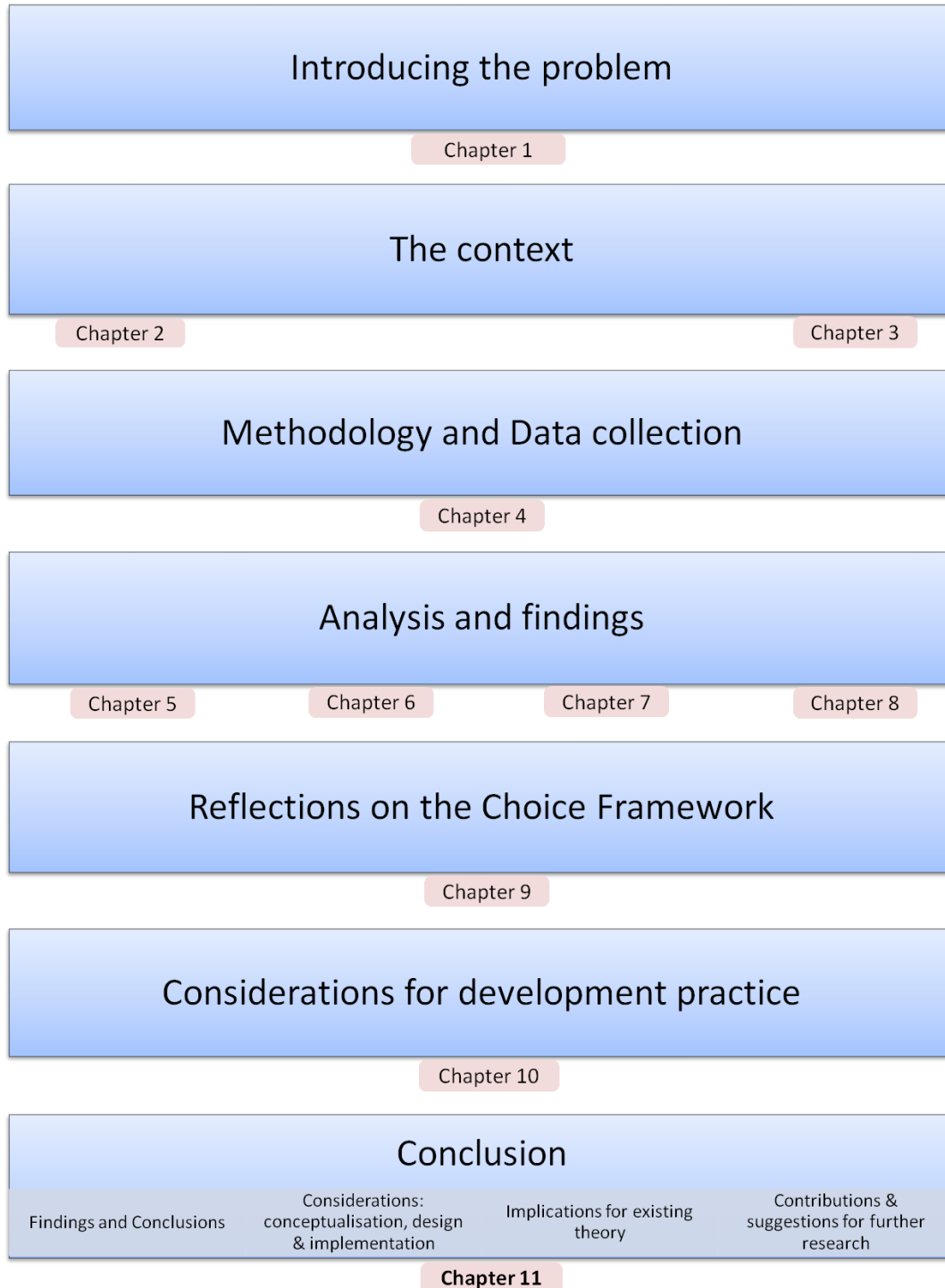
11.1 Summary of findings

The sustainability of Village Operators (VOs) as entrepreneurs was found to be influenced by the values of VOs, their business innovation strategies and the availability and use of the resources that could be accessed via relationships.

The values of VOs included a general sense that it is good to do good, a sensitivity to the resource constraints in the community, and a long-term vision for adding value in your community as an entrepreneur. Many VOs acted as Social Bricoleurs (using their knowledge of local needs, their skills and local resources to grow social wealth) and one VO as a Social Constructionist (meeting unmet needs via introducing new scalable solutions).

The social capital of VOs was a large advantage in enabling access to resources, but also had disadvantages in terms of certain customers expecting free services.

Social capital provided the foundation for business innovation due to the trust of customers in the VOs.

In addition to social resources, psychological and geographical resources had important influences on VOs as entrepreneurs.

The major influence on the sustainability of the VOs during and after the project was the degree of willingness of the Mpumalanga Provincial Department of Education (DoE) to pay for the services to its schools. It was the responsibility of the Department of Science and Technology (DST) and the project to convince the provincial department of the value proposition of these services, but they did not succeed. The considerable social capital accumulated by the VOs in their communities was not used in this process, but could have been used to shift the perspective from keeping a project going to the value delivered to communities.

11.2 Conclusions

The problem statement that this research addressed was:

> Investigating how the use of social capital in an entrepreneurial model for locally based support in a rural context can improve the value and the sustainability of providing access to, and stimulating, the increased adoption of internet-based services

In the Broadband for All (BB4All) project the entrepreneurial model was called the VO model. The main research question and derived questions were to investigate what the social capital of VOs was, how the use of social capital played a role in growing VO entrepreneurs and finally, how an understanding of the role of social capital can be used to improve the conceptualisation, design and implementation of ICT4D initiatives for long-term benefit to participants?

In the following two sections the social capital of the VOs is described briefly by referring to the relationship networks, followed by an overview of the various ways in which VOs and customers benefited from social capital.

The question regarding how a social capital perspective can be used to improve the conceptualisation, design and implementation of ICT4D initiatives for long-term benefit to participants, is discussed in Section 11.5.

11.3 Social capital Description

The social capital of the 14 VOs interviewed was described using a multi-level social capital model of micro, meso, and macro levels combined with three different forms of social capital, namely *bonding* (close relationships, family relationships), *bridging* (relationships with friends and acquaintances) and *linking* social capital (relationships with people with the power to influence). Furthermore, for each of the nine combinations of level and form of capital, the networks, norms and sanctions were described and analysed.

11.3.1 Micro-level social capital

The richest and most diverse descriptions of social capital were found at the micro level. All of the three forms of social capital were well represented.

Bonding capital

Bonding capital consisted of relationships with partners, parents, siblings, uncles, an aunt, a nephew and a mother-in-law. Two of the VOs, one male and one female, were married. Both of the spouses were in business themselves.

Four VOs discussed the relationships with their mothers in detail, while two fathers were mentioned. Close relationships with siblings were mentioned often. Three VOs mentioned uncles, one mentioned an aunt, and one nephew was mentioned. One VO mentioned his mother-in-law.

Only two VOs grew up in families that were in business and therefore had a head start in terms of exposure to business from an early age.

Bridging capital

Outside the family circle, VOs had a diversity of micro-level relationships that could be classified as business relationships, friendship relationships and supportive relationships.

The relationships included: contact persons at schools; learners; business people; relationships with other VOs; friends; relationships with community organisations (churches, NGOs, traditional leadership); local, provincial and national government officials; and interactions with individual project team members.

Regular face-to-face contact was important in building good VO-to-VO relationships, even though they had access to ICTs such as social media tools. As a result, the degree of VO-to-VO bridging capital was influenced by the sharing of an office, the distances between the offices

and whether a VO office was on a frequently used road. The closest relationships were formed when VOs shared or had shared an office or were geographically isolated from other VOs, but fairly close to each other.

Linking capital

The customers of VOs marketed their services by referring their own customers and business contacts to VOs. Two VOs followed the strategy of fostering relationships with the son of the owner of large local business. One VO developed a relationship with the local municipal ward councillor of his community.

11.3.2 Meso-level social capital

The VOs developed relationships with large businesses, their churches, Provincial Education Department officials (district manager and circuit managers), national and provincial government community service points such as Department of Social Development offices and libraries. The project team mediated contact with large multi-national companies such as Microsoft SA.

11.3.3 Macro-level social capital

The VOs had very little direct contact at this level since it refers to relationships between organisations. Relationships were developed by the project and the CSIR as the project contract holder and as a part of the government system of agencies and statutory bodies.

11.4 Usage of social capital to grow VO businesses

11.4.1 Use of micro-level social capital

11.4.1.1 Support for VOs by family

The bonding capital, the relationships with family members, provided the most important and diverse source of support to VOs. Mothers were the single most influential source of support. The mothers of at least four VOs played an active role by assisting to buy equipment, lending equipment, providing loans, buying services, giving business advice, distributing information about VO services and referring customers.

In general, the degree of close involvement and emotional support by immediate family members was fairly high and the value of their emotional support of VOs to enable them to stay the course as entrepreneur should not be underestimated. Some negative interaction did occur. In one instance a VO's mother shouted at her to get a job or get out of her house.

Only two fathers were mentioned. One owned a large printing business and his VO daughter did business for him and they referred businesses to each other. Another VO's father had owned two tuck shops and while working there after school, he had gained entrepreneurial skills and experience.

The direct support by siblings was vital in staffing the VOs' offices and expanding the VOs' business services by, for example, providing free courier services. The VOs reciprocated by

improving siblings' business skills, providing free services, advice and financial support. The social capital in these relationships enabled the mutual exchange of services without requiring money.

Three VOs mentioned uncles who provided support, such as providing information about jobs for VO customers, by being a customer, and providing their business plans as an example. One VO was involved in a business venture with his mother-in-law and he also used her laser printer.

The close collaboration of a VO with her husband allowed her to expand her services by using his accounting skills. They complemented each other by him going out to schools and thereby freeing up her time to serve customers in the VO office.

11.4.1.2 The many sources of support
Support of VOs in a crisis

A tangible example of the generosity and appreciation from customers was the buying of a printer by a customer for use by two VOs after a burglary at their office. One of the VOs was also lent laptops by his sister and a friend.

Support via personal relationships with project team members

Informal support included business and technical advice as well as procurement support. The field support manager (FSM) and field support coordinator (FSC) also provided emotional support such as encouragement to the VOs.

Business collaboration

Some of the business collaborations were valuable sources of support. One form of business collaboration was co-habitation of small businesses in a VO office, where resources such as internet access were shared, skills transfer could occur on a daily face-to-face basis, and shared services could be developed. A prime example was the collaboration between a VO and a graphic designer friend. The VO printed designs for the designer's customers and was taught how to use graphic design software, while the graphic designer had office space and internet access. A young entrepreneur assisted the VO in the office and, in return, he provided computer and business skills training. This relationship was also the link to the young entrepreneur's father, the owner of a large company. Other VOs followed a similar strategy to form relationships with large businesses.

One of the VOs related the many benefits that had resulted from his relationship with a businessman's son and, interestingly, the biggest benefit to him was that the son trusted him, which meant that the son's business contacts would also trust him. He felt it added to his worth as a business person.

11.4.1.3 Influences on innovation
Trust

The trust of the customers in the VOs showed the tremendous importance of trust in building social capital. Trust enabled the VOs to provide personal, flexible and innovative services that

were co-created with their customers and unlocked the value of internet access for them. Trust made *service innovation* possible.

Individuals who were unfamiliar with new technology (e.g. older people) demonstrated their trust in VOs by using them to do personal services such as keeping their passwords and sending and receiving their email.

A variety of influences

In addition to the responsiveness of many VOs to the diversity of customer needs, the development of innovative services and general business innovations were enabled by: the in-depth knowledge of customer's needs and business requirements, the use of networks of relationships to compete with other businesses, collaboration with other businesses, and having to compensate for resource and skills constraints.

Social entrepreneurship in action

The VOs' knowledge of and identification with the community resulted in them acting as Social Bricoleurs and developing cost-effective services to customers with limited resources, especially learners.

Diffusion of innovation

In addition to service innovation, VOs could and did play a major role in *the diffusion of innovation* via their role in the innovation decision-making process of customers by providing information and demonstrating the advantages of, for example, internet use. Diffusion of innovation research (Rogers, 2003) had shown that the subjective experience of an innovation by somebody similar to yourself that you know (e.g. a VO), is more important than objective scientific information and that, therefore, the diffusion process may have a large modelling and imitation behaviour component. VOs, being from the local community, had the advantage of similarity, personal relationships and interpersonal face-to-face communication in influencing the adoption of their own and other innovations.

11.4.1.4 A summary of aspects of micro-level capital

Relationships with family members (bonding capital), provided the most important and diverse source of support to VOs. Financial and emotional support played vital roles. There were a variety of bridging capital based on relationships with friends, customers, business people and project team members. These relationships formed the basis for trust which supported service innovation with customers and the diffusion of innovation. Important enablers of innovation were detailed customer knowledge and different forms of collaboration to develop services and deal with constraints.

11.4.2 Use of meso-level social capital
Relationships with churches

The relationships with churches played a very important role in most VOs lives as a source of psychological support. In addition, churches used VOs' services and church membership built customers' trust in the VOs, making it easier for customers to do business with them. A good

personal relationship with a pastor was especially important, as was seen in an example where a VO was marketed by a pastor to the whole congregation based on his belief that they should support their fellow congregants (bonding capital at the meso level). The same pastor also marketed the VO's services to the whole community at an event (linking capital). This marketing was an example of resources at the meso level substituting for a lack of resources at the micro level (i.e. the VO's lack of money for marketing).

Trust and social entrepreneurship

Trust was a significant factor in building meso-level capital with community members and the business community. One VO had a particular passion for community service and acted as a Social Constructionist by attempting to influence the local government service delivery system. Trust enabled him to be an intermediary between the community and the local municipal ward councillor to improve communication and in the process his business became well known.

VO business customers had enough trust in the VOs as business people to refer them to their business customers.

Schools

Only a few VOs built business relationships with a few schools. A downside was the expectations of schools that VOs would deliver free services, especially those VOs who were alumni of a school (a disadvantage of social capital). The project business model of providing free internet access to schools and free VO technical support was an obstacle to VOs building business relationships with schools as paying customers.

Some VOs invested in building relationships with schools to the extent that they were trusted enough to do procurement on behalf of a school, install Wi-Fi networks, or provide administrative assistance.

Collaboration with larger businesses to leverage resources

The norm of leveraging each other's resources to mutual benefit was demonstrated by the business partnerships and investment offers that were made to VOs by larger businesses that saw the potential of combining their resources with those of the VOs (e.g. internet access and clientele). If VOs did not receive free internet access from the project, some of these linkages may not have occurred since an opportunity was given for gaining access to 'free resources'.

11.4.3 Use of macro-level social capital

The VOs benefited directly for a year from a relationship between the CSIR and the Technology Innovation Agency (TIA). The VOs and their friends participated in New Venture Creation learnerships supported by TIA.

A limited amount of social capital was built due to the lack of significant, project-focussed relationships between the funder of the project (the DST) and the Limpopo and Mpumalanga Provincial governments, with the national Department of Basic Education, and with the most important customer, the Mpumalanga Provincial Department of Education.

The project team followed a bottom-up strategy. A relationship with the district manager that was formed by the FSM, and supported by a VO, was used by the project team management to show local support (at district level). The project also provided ICT infrastructure to support a project of the Mpumalanga DoE in order to build a relationship. This dual-pronged strategy did not succeed, primarily due to the department's financial constraints. The department suggested that the province could encourage schools to make use of the same service provider, i.e. the VOs, in spending their own allocations.

At project exit a senior DST manager suggested that, in these matters, a conversation between the Director-General of DST and the equivalent at the Mpumalanga Provincial Department is normally effective to make progress, and that the DST could have played a more active role.

The fact that the considerable social capital accumulated by the VOs in their communities was not used in this process is considered to be a lost opportunity.

11.5 Considerations for conceptualisation, design, implementation and transfer of ICT4D initiatives

11.5.1 Conceptualisation of ICT4D initiatives

The departure point of this research is the problem of sustainability. A choice was made to use a systems approach with respect to the analysis of the sustainability of development initiatives. Considerations were developed from this standpoint. The definition of sustainable development selected emphasised self-reliant human scale development that flows from the individual level to the local, regional and national levels, and which is horizontally interdependent and vertically complementary. A development strategy, therefore, should start bottom up with activities at the local level, with communities and development initiatives working towards the achievement of complementary activities at the higher levels using as basic building blocks the alignment of interests via the development of networks of relationships around aligned interests between the different levels (see Chapters 2 and 10).

To build alignment of interests, the translation of interests is required. The BB4All project is an example of a sustainable development strategy because of the use of a model that enables the development of local entrepreneurs (e.g. the VO model) to start activities at a local level, and drive alignment of interests through the natural process of translation of interests that develops between entrepreneurs and their customers in development of services, as well as the sense of mutual interdependence.

The VOs as members of the local community also achieved complementary activities at the meso level (e.g. the church marketing VO services to the local society) through the alignment of interests as a result of the development of micro-level linking social capital between entrepreneurs and individuals and entities within the local society context (civil society, private sector and public sector).

The considerations for conceptual designs are therefore as follows:

1. ICT4D initiatives should use models that start activities at local level and drive alignment of interests from the bottom up. The development of local entrepreneurs is recommended as a model that drives alignment of interests and a sense of mutual interdependence through the natural process of translation of interests that develops between entrepreneurs and their customers in the development of services. Development of customers at both the micro and meso level (community level) should be encouraged as this fosters alignment of interests between these levels and develops the linking social capital of entrepreneurs to the powerful.

Based on the difficulties faced by the BB4All project-driven strategies to convince macro-level decision makers that already have their own strategies, ICT4D initiatives should consider the following:

2. The use of a bottom-up development strategy requires facilitating the participation of entities at both micro level (individuals, entrepreneurs) and the meso level (community level structures) to foster alignment of interests grounded in local realities right up to the macro-level interests (e.g. government), so that complementary development activities are designed that are bottom-up aligned, rather than being driven by top-down strategies.

11.5.2 Design and implementation of ICT4D initiatives

11.5.2.1 Introduction

At the strategic level a key question to ask is "Who owns the problem of sustainability?" The next question, given the scope of this particular type of initiative, is "What is a viable strategy to achieve sustained benefit?"

In the BB4All project with an entrepreneur development and a 'market gap' connectivity focus with the schools as the major clients, two types of business development strategies were required. A customer development focus on who will pay for what (the market), and an organisational development focus on what kind of entity will providing support to the entrepreneurs, providing business services and signing contracts with customers (the business). The VOs as entrepreneurs had many customers in addition to the schools. There were thus two streams of market development required, focused on either education system customers or non-education system customers.

11.5.2.2 Market development: The education market
Who owns the problem of sustainability?

Is the owner of the problem the funder, the targeted participants, their customers, an intended customer, society as a whole, or is it the initiative, that has to deal with it as part of a normal project process?

The proposed intervention may lie anywhere between the poles of market-led ICT4D or socially led ICT4D initiatives (Unwin, 2009), which require different sustainability strategies,

and therefore being clear about the nature of the intervention would greatly simplify the ownership answer.

Due to the bigger context of the 'market' gap in rural connectivity, BB4All, as a class of initiative, was close to the middle of these two poles, with the challenge of developing an affordable model with a local entrepreneurial component that would scale and support a shift closer to the market-led side. This model could then be used by government as part of a long-term development strategy, or any collective of entrepreneurs or private sector companies if the model (the service) was economically viable, with the buyer of the service remaining the government.

In the case of BB4All, the project scope was to research and develop a model, not to be responsible for sustainability and hence a transfer phase was planned. In any case, a project, by definition, has a beginning and an end and is an external intervention of limited scope and duration in the systems that have and own the problem. The funder, the DST, had a research mandate, not a line department operations mandate.

The VOs, as entrepreneurs, owned the problem in the sense of schools being a major market for them, and they had to provide value-added, cost-effective services to ensure that whoever owned the problem of providing ICT services to schools was willing to pay.

The Provincial DoE owned the problem of fostering the educational use of internet connectivity and ICTs in their schools, but limited skills and financial resources meant that they required assistance. Provision of internet connectivity may be the problem of communications-focused national departments, but the speed of deployment is often the key constraint. Schools and their parent communities owned the problem of the children's basic education, but also lacked resources.

In BB4All, the project could be considered to be that of a temporary facilitator to get the process of engagement of the real owners of the problem to start engaging with it. The problem owners could, of course, let the project be a project and make it clear from the start that they will not "take over the project". Therefore, the initial facilitation role has to be transferred as soon as possible and this is a responsibility that the project should not neglect.

An ICT4D initiative should consider the following:

a) Where does the intervention lie between the poles of market-led ICT4D or socially led ICT4D initiatives?

b) An initiative's role should be that of a temporary facilitator of a process of engagement of the real owners of the problem to achieve the goal of obtaining early indication of their long-term intent regarding "taking over the initiative" (e.g. by paying for the services in question) and availability of resources.

c) The facilitation role of the initiative should be handed over to a collaborative structure consisting of a local group (e.g. key leaders in the local society, an elected group of entrepreneurs) and representatives of the owners of the problem at macro level during the course of the project.

d) Sustainability is not achieved overnight and hence the initiative should prepare the collaborative structure for the fact that an ongoing facilitation role to build the necessary collaboration over a period of time is required.

The next question is "What is a viable strategy to achieve sustained benefit?"

11.5.2.3 Mobilisation of social capital

If major, macro-level, long-term customers are involved, the support of a variety of entities at the micro, meso and macro level is required as discussed under the previous section on Conceptualisation.

The importance of establishing a collaborative structure to perform an ongoing facilitation role to build the necessary collaboration over a period of time was emphasised in the previous section.

This research has shown that the VOs had created social capital that was not used in the market development. Considerations for similar initiatives are therefore:

a) Investigate the use of the social capital developed during the initiative to mobilise the regional community (the meso level) composed of the participants and their networks, community leaders (e.g. pastors) and the regional political leadership to support the initiative by making the benefits known to the key decision makers in the entity or entities that own the problem. In other words, use the collective capacity for action.

b) Facilitate a process whereby the regional community takes stock of the resources that it has and the resources to which it has access via its social capital, which could and should be used to support the initiative in the long-term.

11.5.2.4 Organisation development

BB4All did not formally create a VO structure that would be the legal entity responsible for signing a contract with the major customer, the provincial DoE, and for delivering according to the contract. The transfer and commercialisation strategy was handed over to a commercial licensee, but the VOs did not have the time to organise themselves to compete for the licence or negotiate with the licensee.

Initiatives that involve the development of entrepreneurs should consider whether:

a) The development of commercial collaboration structures among the entrepreneurs to deal with large customers should be investigated as a collaborative effort between the initiative and the entrepreneurs.

11.5.2.5 Market development: The non-education market

Market development was driven by the development of relationships and services by the VOs. Three major entrepreneur-centric themes were identified: the influence of social capital in supporting the development of the VOs as entrepreneurs, VOs as social entrepreneurs providing community services, and VOs creating service innovations and assisting the diffusion of innovation. The freedom allowed in the project context also created a space in which VOs

could explore entrepreneurially, which had positive and negative aspects, but on the whole the positive aspects overshadowed the negative.

The usage of the social capital of VOs has been described in sections 11.3 and 11.4 (and Chapters 6 to 10) with examples that establish the foundational role of social capital and its various manifestations and uses in developing markets for entrepreneurs such as VOs.

In terms of the influence of social capital in supporting the development of participants as entrepreneurs, some of the key considerations for initiatives are:

a) Entrepreneurs should be encouraged to use personal relationship networks in many ways to grow the market for their services as this approach can be more effective and credible and does not require money.

b) The importance to entrepreneurs of being considered trustworthy should be inculcated since trust is the foundation for deepening customer relationships, expanding the services delivered to customers and customer retention.

c) Developing good customer relationships helps to develop services that fit customers, and therefore are more value-adding, and more likely to be used and paid for.

d) Initiatives should consider the addition of these training topics: social capital; social entrepreneurship; and innovation, especially co-creation of service innovation with customers.

e) In the identification of potential entrepreneurs, consideration should be given to family context. Candidates from families involved in business have had exposure to business from an early age, would receive business advice from their family, and would easily be linked to local business networks.

In terms of entrepreneurs as social entrepreneurs providing community services, some of the key considerations for initiatives were:

a) The tension created between an ethos of community service and entrepreneurial reality resulted in innovative and cost-effective services being developed. A pre-packaged definition of free (subsidised) services versus paid-for services would probably have constrained innovation.

b) To address expectations of all services being free, the fundamental basis of the business model of an initiative should be communicated widely as well as the shared responsibility between customers and entrepreneurs to build a basis for financial viability for sustainable long-term benefit since the project subsidy is short term.

In terms of entrepreneurs creating service innovations and assisting the diffusion of innovation, some of the key considerations for initiatives are:

a) The first prize is innovation by locals to meet local needs in the local environment. Social capital can be used to foster customisation and diffusion of local and external innovations.

b) There are multiple advantages of entrepreneurs (e.g. VOs) being local (similarity, personal relationships and interpersonal face-to-face communication) in influencing the adoption of their own and other innovations.

c) To enable rapid diffusion and increased probability of sustained adoption, design innovations that are amenable to re-invention and invest in local capabilities (e.g. the VO role) to facilitate participation by local people in this process.

d) The initiative design should investigate the creation of 'spaces of dialogue' where customer requirements are elicited and co-creation of solutions occurs in an iterative and adaptive manner.

e) Design initiative strategies to harness the power of networks. Entrepreneurs should be encouraged to develop relationships among themselves and others to create entrepreneurial networks to support the diffusion of innovation via bridging networks, share learning, and build capacity for collective action to the mutual benefit of entrepreneurs and customers.

f) At the initiative design level, the feedback from entrepreneurs delivering services based on in-depth knowledge of customers addresses one of the root causes of failure, the design-actuality gap (Heeks, 2002) between designers of technology or services that are disconnected from the real world user context. A broader analysis may be required in which case the model of Masiero (2016) should be used since it takes into account the interactions between the root-causes of design–reality gaps.

g) Unfettered innovation can compromise future success by tainting the brand and the business values, and therefore broad guidelines should be developed based on the values of the entrepreneurial model (e.g. the VO model), and the values of the development approach adopted by the initiative. These guidelines should be developed in collaboration with entrepreneurs, other participants and preferably customers, to become shared norms and the basis for sanctions.

h) Design a project from a change agency perspective to focus on how the innovation-adoption decisions of the key decision makers and the whole system of participants can be sufficiently influenced. This requires the identification of and the building of relationships with opinion leaders among the participants, change agents (internal or external to the relevant system/community) and change agent aids.

11.5.3 The transfer of ICT4D initiatives

The considerations developed via the study of and the experience gained from the BB4All project consist of a strategic perspective on transfer in a project context with the possible use of social capital, and process level issues.

ICT4D initiatives with sustainability as a goal should consider the following in planning and executing transfer strategies:

a) A shared responsibility perspective should be adopted by the initiative and the participants to foster the acceptance by participants of the responsibility for their own

future, which is a key building block for realising long-term sustainability of an initiative. It can also create new opportunities due the very different perspectives and relationship networks (social capital) of the collection of participants versus that of an initiative.

b) Design projects with an embedded parallel process that begins with the end in mind, in other words, mutual understanding of the sustainability issues is developed with participants and system owners from the start of the initiative to develop and execute a transfer process in which they participate.

c) Develop knowledge of the social structure of the system or systems that own the problem of sustainability to be able to predict when and who to influence, and develop strategies to influence them to achieve the desired outcomes.

The transfer process itself could be improved from a social capital perspective and the following considerations were developed:

a) The development and execution of a strategy to do a handover of key initiative relationships via personal introductions of the new 'initiative owner' (the licensee in BB4All) by the initiative team to key persons in the communities to contribute to the building of the social capital by the 'initiative owner' and at the same time remind the stakeholders in person that the initiative had ended and that continued benefit to their constituencies was their responsibility.

b) Communication and consultation with all of the key stakeholders to inform them of the details of the planned transfer process need to be in place a reasonable time before the process commences. Ample opportunity needs to be created for the major players such as the main customer or customers, the participants (e.g. entrepreneurs and their customers), the local community, and business structures to react and interact to provide suggestions for improvement and consider which resources may be mobilised (making use of existing social capital).

c) The transfer process can be influenced by mobilising all the social resources built up over the duration of the initiative and the resources available to participants by virtue of being local. A new 'initiative owner' should be assisted by a collaborative effort to demonstrate the overall value of the services to the community in order to influence the decision making of the key customer.

11.6 Implications for existing theory

The research engaged with five theories or theory frameworks:

- *Sustainable development* (as defined by Roode (2002), based on the human scale development approach formulated by Escobar (1992) and colleagues)

- *Social capital as a multi-level conceptual framework* (Halpern, 2005)

- The *Choice Framework for ICT4D* (an operationalisation developed by Kleine (2010) of the capability approach to development of Sen (1999))

- *Social entrepreneurship* (Zahra, *et al.*, 2009), and

- *Diffusion of innovation model* (Rogers, 2003).

The implications of the research for the first three of these five theories will be discussed first, followed by an outline of a generic framework. This section concludes by focussing on the more specific entrepreneurial aspects that involved theories of social entrepreneurship and the diffusion of innovation.

The benefits of the HSD approach are that it provides a systems view on development and includes an approach to the dilemma of top-down versus bottom-up development approaches by placing the focus on the alignment of interests to achieve complementary development in the system. The use of relationship networks (social capital) is instrumental to the alignment of interests and this provides a view on the systemic importance of social capital to support the processes that enable sustainable development. The use of Halpern's view of social capital as a multi-level conceptual framework allows the horizontal and vertical relationship networks to be described and analysed in terms of interactions at different levels and highlights the necessity for interactions between the levels (bridging capital) thus demonstrating the systemic role of the use of social capital.

This research adds to the existing research done by the World Bank on the implications of social capital for economic development and the usefulness of the synergy view that incorporates all the different levels and dimensions of social capital to develop policy recommendations (Woolcock & Narayan, 2000). Decisions about the poor are not done at the local level and therefore investment in their organisational capacity and assistance to build local community and social group connections is deemed critical (ibid.).

This research added to this work the implications of social capital for programme design to foster sustainable development within the context of the horizontal and vertical interactions in multi-level systems. The need to develop organisational capacity is illustrated by the need for the VOs as individual entrepreneurs to organise as a form of commercial entity to build social capital at the macro level with other organisations to support business development and influence decisions made at this level. This confirms the usefulness of adopting a multi-level conceptual framework for social capital for the analysis of an initiative since it clarifies the differences between entities and their interactions at different levels, and the inherent requirements for organising appropriately to build social capital.

The CF is aimed at operationalising the Capability Approach which is concerned with the individual's development outcome of freedom to choose. This provides a strong definition of what development is, while the HSD and social capital framework places more emphasis on the dynamics of sustainable development in the multiple levels of a societal system. The CF does build a systems view based on the components of resources, agency, structure, dimensions of choice (degrees of empowerment) and the major development outcome of freedom of choice. The interactions between these components are also discussed.

One of the main contributions of this research was that the influence of social capital on each of the components of the Choice Framework was revealed. The pervasive influence of social capital in contributing to the primary developmental outcome of freedom of choice and secondary outcomes (e.g. providing good service to customers) was thus presented. The use of social capital as a concept enabled a systemic description of the Choice Framework. The coherence of the simultaneous application of the Choice Framework and the multi-level social capital framework to the story of an entrepreneur was demonstrated (see Chapter 9).

The issue of collective decision-making in the Choice Framework could be addressed to some extent by pointing to the need for the individual entrepreneurs to form collectives to be able to develop social resources via interactions with organisations at the macro-level to influence decision-making that would affect every entrepreneur's freedom to choose to deliver services to schools.

The interactions between the informal and formal institutions that influence the opportunity structures of an individual was described and analysed in terms of the influence on the sustainability of development outcomes, in this case, being a viable entrepreneur. The significance of the influence of a project as a 'temporary' structure to the primary development outcome of freedom of choice and secondary development outcomes, such as service innovation, was brought to the fore.

For a development practitioner to develop an intervention based on the (necessary) complexity of the CF does seem to be a daunting task. The advantage of the combination of HSD and a multi-level social capital framework is that the analysis of the system of interest and the conceptualisation of interventions in the system is made easier to understand and execute while the inherent complexity is not obscured or ignored. The CF makes it very clear that social resources are only one of many types of resources and this was confirmed by the emergence of the psychological resources of VOs during this research.

Woolcock & Narayan (2000) saw great benefit in the use of social capital as a common language for different stakeholders. At the initiative level this research recommends using the language of social capital to inform the design of an initiative so that all the interactions driven by functions such as stakeholder management, project management participant training, and project management, will use a new perspective and make different decisions regarding how to contribute toward sustained benefit for participants.

The following framework is proposed:

1. The CF is used to define what is meant by development and to show the many different components and the interactions between them that need to be considered to describe a development initiative as a system.
2. A pragmatic approach to influence the dynamics of development interaction towards a more sustainable development system is provided by the use of the principles of HSD such as the alignment of interests in order to achieve complementarity between bottom-up and top-down driven development. In order to achieve the alignment of interests, the building of relationship networks (social capital) is required.

3. A multi-level social capital conceptual framework is used to describe and analyse the different levels at which relationship networks occur, to characterise the social capital, and to analyse the interactions between the levels (linking capital) thus demonstrating the systemic role of the use of social capital.

At a theoretical level, the limited theory base on sustainability in the field of ICT4D, especially the sustainability debate regarding the merits of top-down or bottom-up approaches, or techno-centric versus socio-centric approaches, is enriched by adopting this approach of bottom-up-driven development to achieve complementary top-down development inputs as well as complementary horizontal development.

From a practitioner perspective the framework can be used to consider the influence on a development initiative of all possible resources, including the invisible resources (e.g. social capital, but also others such as psychological resources). Stakeholder management and other relationship building processes should be guided by the use of the multi-level social capital conceptual framework to support sustainable development. In particular, an assessment should be made before and during the project of the local relationship networks as well as the reach of the relationship networks throughout the levels of the relevant system of interactions.

The use social capital as a common language by the role players may lead to new perspectives being formed that can lead to different decisions regarding the design of an initiative to contribute toward sustained benefit for participants.

By exploring the diversity and richness and usefulness to participants of these invisible resources, the relative importance of these resources may be judged and a decision made by the conceptualisers, designers, implementers and participants of development initiatives as to how much focus and energy will be devoted to the discovery and use of these resources to further the short- and long-term sustainable development prospects of the participants.

The implications are broadly speaking for social capital's role in sustained development at the programme level via the consideration of the existence and use of social capital in the conceptualisation, design, implementation and transfer or exit of a project or development initiative to further the achievement of the objectives, especially the short- and long-term sustainable development prospects of the participants.

The context of this research is ICT4D with an enterprise-led development component, namely the VO model for supporting access to the internet and the adoption of internet usage.

The two theories that were applied were about the role of VOs in the diffusion of innovation and the nature of the entrepreneurship exhibited by VOs. The diffusion of innovation theory was applied by Rogers (2004, 2003) and co-researchers to the tremendous influence of the rapid evolution and adoption of ICTs in the global society.

The framework for understanding the role of the VO consists of innovation dynamics and the road to social entrepreneurship.

1. The combination of VOs being local and being entrepreneurs were important to overcome the barriers to innovation adoption and the development of new innovations.
   a. The personal relationships between VOs and community members enabled VOs to function as change aides who are closer to the community, in fact, VOs are members of the community, and are trusted more than external change agents with greater technical competence (Rogers, 2003). Masiero (2011:13) described telecentre entrepreneurs as being more than change agents as defined by Rogers (2005; 2003), since they guide a customer from the first innovation decision to an ongoing process of adapting and adopting ICTs to derive value. This role has been called an 'intelligent intermediary' (Gopakumar, 2007:22) or 'infomediary' (Mukerji, 2008:2) or 'social connector' (Díaz Andrade & Urquhart, 2010).
   b. The development of service innovations developed by VOs and their customers have the important capability of re-invention, i.e. users may alter an innovation while adopting and implementing it, which increases the diffusion of an innovation and the probability of sustained adoption (Rogers, 2003). Service innovations could be developed in an iterative fashion with customers to be relevant, cost-effective and flexible.
   c. The combination of an entrepreneurial attitude and the development of strong trust relationships with customers enhanced the diversity of the service innovations due to the willingness of customers to test and refine new services.

The VOs fulfilled the change aide role and were also participants in an ongoing process of customer adoption and adaption of ICT as well as service innovation.

Martin & Osberg (2007) propose that the crucial difference that distinguishes a social entrepreneur is that the value proposition is a focus on the creation of an enduring transformative benefit for an underserved, neglected market, via the creation of a new stable ecosystem, without the anticipation of substantial profit. This differentiates social entrepreneurship from other forms of social activity that deliver social benefit such as social service provision and activism. There are many hybrid forms of social activity that be described using the pure forms expressed in, for example, a typology of social activity, as the building blocks to describe the diversity of real life (Martin & Osberg, 2007).

There are very few social entrepreneurs that have addressed an unfortunate, unjust, stable equilibrium, by developing an alternative stable equilibrium that benefits the targeted group, and, over time grows to become a stable ecosystem around the new equilibrium. The development of the new stable ecosystem happens via sequential or parallel phases that can involve the combination of social entrepreneurs with other forms of social activity.

Zahra *et al*. (2009) avoided the complexities of developing a comprehensive definition of social entrepreneurship and identified differences and similarities among social entrepreneurship practitioners. Three different types of social entrepreneurs (social bricoleurs, social constructionists and social engineers) were described to highlight differences in the

identification and handling of social problems, use of resources and the social impact perspective adopted.

The approach followed in this research was to combine these approaches to describe the BB4All project and the VO model in terms of social entrepreneurship as follows:

2. Social entrepreneurship
    a. The achievement of a new equilibrium supported by an ecosystem is a long journey.
    b. The BB4All project is a first step on the journey since it was used to influence the status quo by demonstrating the VO model as a new equilibrium to improve rural broadband access.
    c. VOs were categorised in general as Social Bricoleurs (Zahra *et al*., 2009) since they focus on solving local problems using local resources by developing services for customers.
    d. All VOs represent a hybrid model of Social Service Providers with a degree of Social Activism, since they encourage internet adoption in the local context while also delivering services.
    e. The VOs deliver a variety of services, some of which are purely for financial benefit (e.g. photocopy services), while others deliver social benefit (e.g. relaying email messages to an NGO via use of SMS).

11.7 Summary of contributions

Simply put, the aim was to make the invisible resources that are available to participants in ICT4D projects, especially entrepreneurs, visible, so that these resources, which do not depend on the external resources provided by a project for a short period of time, can be used during and after a project to improve the probability of sustained long-term benefit.

The interpretivist research approach adopted was a good choice for the study of social capital, since personal relationships were explored from the perspective of the individual who made subjective choices as to how to derive value from each of the relationships.

A methodological contribution was the interview approach used. The influence mapping interview technique placed VOs in the centre of a network of relationships on a map. Seeing the many relationships stimulated acknowledgement of the amount of support they were receiving. The invisible was made visible. The interviews with VOs in their offices were valuable in showing their need for motivation (e.g. the slogans on their walls) and how the personal relationships with pastors and church members provided psychological and financial support. Observation of the nature of the relationships between a VO and the entrepreneurs who shared the VO office provided insight into how valuable these interactions and mutual support were.

The combination of deductive and inductive processes in the analysis process led to a rich and nuanced understanding of the VOs. The initial coding framework was based on two theoretical departure points which both included resource-based development combined with an

entrepreneurial framework. The first departure point was the Choice Framework that includes both the Sustainable Livelihoods Framework (DFID, 1999) and Sen's capability approach (Sen, 1999). The second theory base was sustainable development strategy based on human scale development (HSD) principles, where networks of relationships (social capital) are important means to achieve aligned interests to enable complementarity between bottom-up and top-down development (Chigona *et al.*, 2009).

An entrepreneurial model was combined with the two theoretical departure points to develop an initial coding framework via a deductive process. During the coding process new codes emerged via an inductive process as the researcher's notes from the interviews were analysed.

To ground the analyses in the role of social capital in the life of VOs, a summary for each VO was developed that described relationships and their contributions to business outcomes. An inductive process was used to identify the key topics in each summary and to cluster the topics, which finally led to the emergence of three major themes.

The social capital of the VOs of the BB4All project was described using a multi-level social capital model of micro, meso, and macro levels combined with three different forms of social capital, namely *bonding*, *bridging* and *linking* social capital. The richest and most diverse descriptions of social capital were found at the micro level where all three forms of social capital were well represented. The micro-level bonding capital, the relationships with family members, provided the most important and diverse source of support to VOs, with mothers being the single most influential source of support via actions such as: assisting to buy equipment, lending equipment, providing loans, buying services, giving business advice, distributing information about VO services and referring customers. The direct support by siblings and partners was vital in staffing the VOs' offices and expanding the VOs' business services.

The major contribution of social capital to the VOs' business growth was the trust the customers had in the VOs that enabled the VOs to provide personal, flexible and innovative services of which some were co-created with customers, thus unlocking the value of internet access for them. These services helped VOs to develop loyal customers that were willing to pay for the value received. Trust made *service innovation* possible.

Social capital also manifested in the quality of the relationships with customers that gave VOs in-depth knowledge of customers' needs and business, the VOs' use of networks of relationships to compete with other businesses, collaboration with other businesses, and the use of social capital to compensate for the lack of resources and skills.

The advantages of the VO social capital to the project BB4All were to foster the adoption of innovations by the customers, the co-creation of innovations with customers, and the adoption by VOs of social entrepreneurship roles that benefited the community as a whole.

The benefits of using a multi-level conceptual framework for social capital for the analysis of an initiative (BB4All) from the departure point of the sustainable development strategy of Escobar and colleagues, as crystallised in Roode's definition of sustainable development, were demonstrated. In particular, the role that social capital could and did play in supporting this

type of approach was explored. Social capital supported the alignment of interests that is essential to achieve the bottom-up driven complementarity in development activities that is a major feature of this sustainable development strategy. The findings led to the development of considerations for embedding of a social capital perspective in the conceptualisation, design, implementation and transfer or exit of a project or development initiative to further the achievement of the objectives, especially the short- and long-term sustainable development prospects of the participants. Similarly to Kleine's operationalisation of Sen's capability approach, this research developed considerations for how a sustainable development strategy could be executed in practice in ICT4D in particular, and in other types of development projects in general.

11.8 Suggestions for further research

This research has been conducted from the perspective of the VOs. To develop a multi-perspective view on the role of entrepreneurs such as VOs, the views of their customers are required. Similarly, the essence of the VO social capital needs to be researched from the perspective of the supporters of VOs.

Research should be done to compare an entrepreneurial model (e.g. the VO model) that provides internet access and services, with telecentres staffed by employees (local and non-local), to ascertain possible quantitative and qualitative differences such as customer adoption rates of internet access, customer service experience, and the variety and relevance of services that are developed over time.

Research should be done to compare the quality and cost-effectiveness of the technical support delivered via an entrepreneurial model (e.g. the VO model) for local technical support to that of commercial models such as the one adopted by the BB4All project in the other deployment area (the Northern Cape) where a company based in a large town in the region was contracted to support internet access to schools.

In general, a comprehensive mapping of the nature of the social capital of the key participants in a development initiative across the micro, meso, and macro levels, coupled with research to uncover the multiple influences on decision makers, would provide an understanding of the relative importance of social capital in decision-making.

Participatory Action Research on development initiatives that are conceptualised, planned, implemented and transferred using a social capital perspective would provide new knowledge on the practical uses, benefits and disadvantages of social capital in supporting local development and vertical complementarity in external higher level development activities that increase the likelihood of long-term benefit to participants.

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Appendix – Micro-level social capital

Table 16 Micro-level social capital

Micro-level social capital	Bonding social capital	Bridging social capital (Note that informal or very small businesses are considered to equals to the VO businesses and hence relationships with them are considered here)	Linking social capital (Note that larger, well established formal businesses are considered to be "powerful" and outside the community even if they are owned by members of the community)
Networks	**Parents, siblings, etc..** *Close family:* VO5 mentioned a direct source of support in terms of financial support from his family on an ad-hoc and small scale (VO5, 2013b). VO2's business is supported by business referrals via her family (VO2, 2013b). *Partners:* VO1's husband has a registered company and there is mutual exchange of value between the two businesses (VO1, 2013a). His contributions are: use of his company's name for procurement, being the night security guard, repairing printer	**Friends, VOs, community members, etc.** *Friends* VO11 referred to his "home boy" friends who did him a favour by referring their friends to him (VO11, 2013a). VO2's business was supported by information and business referrals via her friends (VO2, 2013b). VO6 shared a lot of business experience with his friends (VO6, 2013b). **Groups in the community** *Youth:* VO14 supported the unemployed youth and provided information about jobs and bursaries (VO14, 2013a). *Students:* Primary and Secondary school students did internet research at many VO offices with VO assistance. *Tertiary* *Local FET colleges:* An FET college was in the same complex as the office of VO6/VO7 and the students were frequent customers (VO6, 2013a).	**Links to the powerful, e.g. schools, landlords, the BB4All project** **Schools** *Direct relationships with Schools:* VO5 built a relationship with a high school by visiting the school often (VO5, 2013a). VO12 has good relationships with the three schools he attended (junior secondary, combined and high school) (VO12, 2013b). VO2 has limited relationships to schools and there are only a few individuals that she has close relationships with, of which one is an enthusiastic principal that she provided email services to (VO2,

toner cartridges, servicing schools while she stays in the office mostly, accounting skills that attract business wanting to do tenders, etc. VO1 markets his electrical and building skills to her customers (VO1 transcript notes, 2013b). This showed a mutual exchange of value between the two businesses. The FSM said that the other VOs refer to him as the "extra VO" (FSM interview notes, 2013).

VO5's girlfriend was a source of support (VO5, 2013b).

Mothers:
VO10's mother referred co-workers to her so that she can assist with their studies at a distance education university, for example assisting with assignments and the submission via the internet (VO10, 2013a).
VO10 and her daughter live with her mother (VO10, 2013a).

VO3's mother lent her a laptop as well as helping her to buy a printer (VO3, 2012a). VO3 types question papers for her mother. (VO3, 2013b).

VO6 is advised by and advises his

Distance education: Nurses and sisters at the local hospital doing further studies via distance education use the VO office to do their assignments (VO4, 2013b.)

VO6 had teachers and a principal from schools which were not located in VO6's cluster who were studying further and needed internet access, email and typing (VO6, 2013b). VO10's mother is a teacher and is also a distance learning student at UNISA and VO10 did typing on her mother's laptop which she does not really use (VO10, 2013b).

VO8 assisted police who were UNISA students (VO8, 2012b). VO11's tertiary students included a primary school principal, his older sister and employees of SASSA (VO11, 2013b).

VO11 has very limited business from teachers. VO 11 does business cards and quotes for a teacher who has a part time business. He also repaired a teacher's laptop at her home.

Soccer clubs
VO4 was the owner of a soccer club which he tried to run as a business (VO4 interview notes, 2012). VO16 was the team manager of a soccer club whose players were mostly still at school. VO16 also played for the team (VO16 transcript, 2013).

Senior citizens
VO1 had created a personal relationship with each person in a group of middle aged customers by providing her cell phone number in order to provide a personal service when they need it and she related: "You know these people, most of them they are the ones that give me a wake-up call in the morning and ask me where are you, we need you now." (VO1 interview transcript, 2013: 4).

Business Relationships
Relationships with business people:

2013b).

VO4 mentioned two schools as specific influences and mentioned that he exchanged technical advice with a maths and electronics teacher at a technical secondary school (VO4, 2013b).

The closest secondary school to VO6 and VO7's office did have internet access, but advised their students to come to the VO office to do their assignments, for example to do research on the internet (VO6 interview transcript, 2013).

VO15 had closer relationships with two of his schools via some teachers, principals and admin clerks (VO15 interview notes, 2012). VO15 had advised teachers that they can use internet at their schools and that they should ask the principal for access. (VO15 Interview transcript, 2012).

VO16, as many other VOs, has close links with only a few schools, which in his case is three schools, one of which is his old secondary school, out of a total of 15 (VO16, 2013).

mother (VO6, 2013b).

VO12's mother offered moral and financial support (VO12, 2013b).

Fathers:
VO1's father owns a large printing business and VO1 does designs for his business and they refer businesses to her (VO1, 2013b).

VO4's father used to own two tuck shops (spaza shops) and he used to work at these shops after school instead of playing and he credited this experience as developing his entrepreneurial skills (VO4, 2013b).

Siblings:
VO1's brother provides free assistance in her office on a part-time basis, (VO1, 2013). She semi-jokingly remarked that that real reason that he volunteers is to meet young ladies at the office and get dates with them!

VO2's brother assisted with resolving computer issues (VO2, 2013b).

VO4's sisters worked for him until they had gained enough skills and experience to find a job or start a

VO5 used his business friends as a network as well as the fact that people know him from school (VO5 interview notes, 2013). VO2's business was supported by business referrals via other businesses (VO2 interview transcript, 2013). VO3 considered that she had particularly close customer relationships with three of her business customers (VO3 interview transcript, 2013). VO9 provided financial services (bookkeeping) to a transport company that helped the owner to understand where his money was going (VO9 interview notes, 2013).

Relationships with larger businesses are considered to be linking capital.

VO to VO relationships – business only: VO9's business relations with other VOs were limited and he had contact with three VOs via email (VO8, VO10 and VO16). They shared information on the lowest prices of supplies such as printer toner cartridges.

VOs as business people and friends: Close-knit relationships existed between three VOs that were described as them being "anchors to each other" (VO12 interview notes, 2013:27). VO15 and VO11 and VO12 created a pricing sheet with their own credo "We are not a dying type" (VO15 interview notes, 2012). VO10 reported that she and VO3 were especially close and communicated almost on a daily basis about frustrations and business aspects such as prices. VO3 had built a good relationship with VO6 and VO7 who shared a VO business that is not far from her home. In addition to providing her with information they also assisted her with stationary and banking and she used their internet when her internet was down (VO3 interview transcript, 2013). VO3 had a close business relationship with VO4. VO4 reported that he had close links to especially VO3 and VO8 and also had relationships with VO13 and VO14 (VO4 transcript, 2012).

The proximity of VO offices played a big role. VO6 mentioned VO1, who is based in an adjacent area, as well as VO5 whose office was located in the same town (VO6 interview transcript, 2013b).

Linking via the school admin clerks: VO2 had a close relationship with an admin clerk at a high school to whom she acted as an outsourced office (VO2 interview transcript, 2013).

Links via family: VO10's mother was used by her fellow high school teachers to transfer personal service requests (e.g. university assignment related) to VO10 (VO10, 2013). V10 then responds via her mother. VO10 refers to this as "So my mother is in the middle" (VO10 Interview transcript, 2013:9).

Delivering services to schools: VO16 and VO9 (one of the three Siyabuswa VOs) had installed Wi-Fi at the high school that he attended and the school paid them.

VO5 did procurement of ICT equipment for the school that he visits frequently (VO5, 2013). VO6 mentioned that a school requested them to install computers for them (VO6 interview transcript, 2013).

Landlords
Landlords: The relationship with VO14's landlord, who is next door to the VO office, had grown to the

business (VO4, 2013b).

VO8 provides advice to his younger brother who is preparing to start a business (VO8, 2012b).

VO13's brother brought customers' colour photos from Pretoria to him (VO3, 2013b).

VO15 has a brother and he provided free services to him (VO15, 2012b).

Extended family:
VO2's uncle provides her with job information from a provincial Department of Justice (VO2, 2013b).

VO12 has an uncle who has a big business and he provides office type services to him (VO12, 2013a).

VO12 is very close to his nephew who also has a small business and they have discussed how to merge to the mutual benefit of both (VO12, 2013b).

VO11 and his younger brother live with his aunt and he provides financial support to her (VO11, 2013b).

Deep relationships have developed in a combined VO business:
VO14 shared information with VO13 and had a close relationship with VO13 due to the fact that they shared a VO office (VO14, 2013a). VO6 described his relationship with VO7 as consisting of: sharing everything (including clients), good communication (they let each know when they will not be in the office), and thinking together by, for example talking about ideas together (VO6, 2013a). VO12 described the relationship with VO11 as being very close and referred to it as a business relationship that grew into a close friendship (VO12, 2013a). VO11 is someone to talk to and it is good not to be alone (ibid.). While VO11 referred to them sharing all the clients, VO12 presented a more nuanced picture. He stated (VO12 transcript, 2013b:2): "We share a business yes, more or less." As mentioned in this table, they both have relationships with a large business, but VO11 focussed on the owner, while VO12 had a relationship with his son. This illustrated collaboration between them and a business without necessarily sharing exactly the same relationships.

VOs' personal links to entities

Schools:
Teachers: VO4 mentioned that he exchanged technical advice with a maths and electronics teacher at a technical secondary school (VO4, 2013b). VO15 found that, in general, secondary school teachers were not interested in computers (VO15, 2012a). Teachers did refer students to him to do research for assignments and the science expo (VO15, 2012b). Some teachers were just customers for VO services. VO11 referred to having very limited business from teachers which included repair of a teacher's laptop at her home and business cards and quotes for a teacher with a part time business (VO11, 2013b). Teachers did refer other teachers to VOs as well.

Admin clerks with a limited interest: VO15 had interactions with some admin clerks who were mostly not interested in learning new things and his relationship with them was about operational network related issues such

point where he called her a friend (VO14, 2013b). He had provided her with advice on how to use computers and the Internet. He stated that she is "always here" in his office (VO14, 2013b:15).

BB4All
Links to the BB4All project team: A project team member assisted VO5 to equip a school by configuring the router settings (VO5, 2013a).

The BB4All project technical manager had told VO1 that she can call him anytime (VO1, 2013a). He logged calls with the Service Desk on her behalf (and then she found that the Service Desk reacted very quickly). This is a good example of personal relationships having an impact on business efficiency.

The FSM advised VO1 to register a business (computer school) and that the first step is to do a plan that shows what you have and do not have (VO1, 2013).

Local government
Personal relationships: These relationships were built via personal relationships with officials.

	VO4 was involved in a business venture with his mother-in-law, a Zimbabwean, who bought goods in Johannesburg and sold them in Zimbabwe (VO4, 2014b). VO9 provided financial advice to his uncle who has a small transport business (VO9, 2013b).	as switching the power to the HPNs back on (VO15, 2012a). *NGOs:* VO2 was a Deputy Secretary of a Youth Care Centre NGO and administers their email for them. VO14 had links to two NGOs. He worked for a health and development information centre as an administrative secretary and they read their email at his office while an Early Childhood Development Centre used his phone (VO14, 2013b). VO13 was linked to many pre-school care centres, via his mother who was a principal of a pre-school care centre (VO13, 2012a). *Churches:* VO14 had a deep relationship with his church since he was an evangelist and second-in-command in his church and this relationship also led to business for him from the congregation (VO14, 2013b). VO9's church supported small businesses via sponsorships and business advice (VO9, 2013b). During the research interview VO8's pastor was busy in the VO office and they have a deep relationship (VO8, 2012a; VO8, 2012b).The pastor is also an entrepreneur who runs a business and also deals with many tenders as well (ibid.).	VO14 made contact with the local municipal ward councillor with a dual agenda: "Because I had an agenda that people must know this office" and "because I'm trying to reach out to the community where the counsellor cannot get to" (VO14, 2012b:44). VO8 knew a municipal ward councillor and Social Department Community Development Workers (CDWs). The ward councillor was a student at the University of Pretoria and thus was a customer of VO8 for researching and emailing of assignments (VO8, 2012b). **Large businesses** *Relationships with large businesses:* VO12 and VO11 collaborated with a large business. VO11 had a relationship with the owner of the business while VO12 was friends with his son (VO12, 2013b). VO2 stated that a printing company (owned by her father) was her closest business partner (VO2, 2013a).
Norms	**Services and the close family** Free services: VO2 provides free services to her family and does	**Generosity and appreciation from customer** After a burglary of the office of VO11 and VO12 they received the use of a new printer as a gift from a retired teacher (VO12, 2013a). A business customer of VO9 had lent money to him (VO9, 2013b).	**Schools** *Investment in a relationship is rewarded:* VO5 demonstrated an in-depth relationship building strategy

research for school projects as well (VO2, 2013b). As mentioned in Networks her brother assists her with IT problems. VO3 also provides free services (e.g. faxes) to her family and does research for her sisters' school projects (VO3, 2013b). VO15 supported his brother by providing him with free services (VO15, 2012b).

Some services to the family are not free: VO3's mother is a teacher and she pays for the typing of her school question paper (VO3, 2013b). This may relate to the time consuming nature of the job and the fact that this is for work and not a personal need.

Exchange of services instead of payment: VO13 provides free email to his brother in exchange for his courier services in printing colour photos for clients (VO3, 2013b).

Advice and information
Advice and information is freely offered: The mother of VO3 provided business advice, for example, to buy a larger printer to improve the business (VO3, 2013b).
VO2 received numerous business

Saying thank you:
Teachers referred students to VO15 to do research for assignments and the science expo and he reported that: "at the end they came and thanked me" (VO15, 2012b:18).

Advice and information is freely offered
Advice and information:
Community members have suggested services to VO3, e.g. providing a public phone and printing T-shirts, since they argue that it can bring in money (VO3, 2013b). VO3 also provides IT advice in general, but in particular to primary school teachers (VO3, 2013b). A very specific need in most communities served by VOs is to find jobs and according to VO3 people tell each other about websites where they can apply for jobs (VO3, 2013b).VO4 displays current job advertisements on the office wall (VO4, 2013b).

VO4 had advised an arts and crafts NGO to create a website so that people could order from them on-line (VO4, 2013b). VO4 reported a large and diverse exchange of advice between him and business people (VO4, 2013a).

Learning business lessons from customers: VO5 has learned a lot on project planning from a Vice Principal of a school who is also his friend now. His friend knows how to plan ahead and to set challenging targets so that VO5 gets to "perform at the highest level" (VO5, 2013b:15)

VO9 received business advice such as how to make a business telephone call from the owner of a transport company (VO9, 2013b).

Business referrals
Via friends: VO11 refers to his "home boy" friends who do him a favour by referring their friends to him (VO11 Interview notes, 2013). VO2's business is supported by business referrals via her friends (VO2 interview transcript, 2013). VO9 stated that friends referred their friends (VO9 interview

with a school. He stated that he checks in at the school each morning to deal with any problems and that this has led to him being seen as a staff member. This relationship has led to him being asked in 2012 to buy IT equipment to the value of R30 000 on their behalf (VO5, 2013a).

The "project effect" - some schools expect free services:
VO5 mentioned that the principals of his schools phone him to come and fix their internet and then expect free services: "Then they say you can just have a look at this thing before you go" (VO5 2013b:4). VO11 mentioned that teachers ask him for free advice regarding their personal computers when they see him at the school, but do not visit the office for services (VO11, 2013b).The expectation of free services does arise in most schools since they receive free internet access and free technical support for maintaining the access.

VOs being taken for granted:
The effort that VO16 had to put in to get to a school versus the cooperation and appreciation that

referrals from her family (VO2, 2013b).

Valuable business advice from family: VO13 had written a "business profile" based partly on an uncle's business plan (VO13, 2012a:1).

Select business services that the family knows: VO16 had started doing catering since his mother is already involved in this type of business (VO16, 2013a).

Material support from the family
Tangible and financial support from family: VO3's mother has invested in the business by lending her a laptop as well as helping her to buy a printer (VO3, 2012a). VO4 used his mother-in-law's laser printer (VO4, 2014a). VO5 mentioned financial support from his family on an ad-hoc and small scale (VO5, 2013b).

VOs investing in the family
VOs investing in their family's skills: VO14 had trained his wife to use a laptop and his daughter how to use the internet (VO14, 2013b).

The benefit to VO14 is that his wife

transcript, 2013). VO10 mentioned that the FSC and VO3 was referring business to her as well as her mother and brothers and community members (VO10 Interview transcript, 2013). Her landlord, who also has a guest house, refers customers to her.

Via customers: One of VO3's business customers has referred business to her (VO3 interview transcript, 2013). VO15 reported many word-of-mouth referrals by his customers. Individuals referred their friends, NGOs referred other NGOs, and students referred students (VO15 Interview transcript, 2012). Teachers refer red students to VO15 to do research for assignments and the science expo (ibid). A supermarket owner and VO9's landlord referred their churches to VO9 for typing services (VO9 interview transcript, 2013).

Via schools: VO9 stated that principals referred learners and learners referred their friends (VO9 interview transcript, 2013). VO15 reported that students referred other students and teachers referred students to VO15 to do research for assignments and the science expo (VO15 Interview transcript, 2012).

Via a church - a "captive market": VO14's relationship with his church led to the pastor being an active marketer of his video services to the community at large (e.g. taxi owners), but especially to the congregation (VO14 Interview transcript, 2012: 17):
"One of the church members will be hosting a wedding or a party so he will tell them about me and say there is a person who is doing videos and you don't have to go outside the community if you need someone to film a wedding or a party and we support this man and his business."

VO14 was also very well aware of the value of word-of-mouth marketing and friend-to-friend referrals by members of his church's congregation (VO14 Interview transcript, 2012.) VO9's church refers congregation members and small businesses to him (VO9 interview transcript, 2013).

he received in turn, played a vital role in the quality of the relationship (VO16 interview notes, 2013).

The alumni effect:
VO11 and VO12 are both local boys who went to a secondary school which falls into their clusters (VO11 interview notes, 2013). The personnel of this school expected labour intensive free services from the VO business such as editing the video that another alumnus of the school had made (VO11 Interview transcript, 2013). VO12, who also attended this school, also raised the issue that schools expected free services (VO12 interview transcript, 2013).

Reciprocal exchanges of assistance and favours: VOs and schools

VOs as a backup service:
VO2 had a close relationship with an administration clerk at a school and provided a backup email service if the internet is down VO2 interview transcript, 2013).

Project
Formal and informal support from the BB4All project team:

minded the office when he cannot be there (ibid.). VO4's two sisters worked for him until they had gained enough skills and experience to find a job or start a business (VO4, 2013).

Pride and responsibility
Being proud of taking responsibility: VO11 provides financial support to the mother of his son (VO11, 2013b). The ability to provide support to his son's mother is important to him at a personal level and he was proud that her family appreciated it (VO11, 2013b:23).

Via traditional leadership structures: The local traditional council (Makhoboko) told the community about his services (VO9, 2013).

Mutual referral of customers between VOs and other service providers: When the VOs 11 and 12's internet is down they refer customers to the library nearby. The library is also a source of customers since library users may only do three printouts each and hence they come to the VO office as well for printing and internet research services (VO12, 2013).

Connecting to a business network via a trusted member: The mother of VO13, a principal of a pre-school care centre, played an important role in marketing his business. People know and trust her and this has made the many pre-care centres trust him too (VO13, 2012). VO13 commented that they are good clients since they talk to each other and you only need talk to one of them! The pre-school care centres are an example of a close-knit business network.

Support
Support from a church for small businesses among church members: VO9's church supported small businesses via sponsorships and business advice (VO9, 2013b).

Doing business with friends: During the interview VO8 mentioned that he had a printer from a friend and that he was still bargaining with him regarding the price (VO8, 2012).

Mutual agreement to protect relationships among friends who run businesses: VO5 and his friends have agreed that they will only call on their friends for business assistance when it is really necessary (VO5, 2013b).

Small businesses collaborate for mutual benefit: During the interview with VO6 there were two businesses using the office: the young owner of a graphic design business, a young business man with a meat supply business (VO6, 2013). The business man with the meat supply business was assisting

A project team member assisted VO5 to equip a school by configuring the router settings (VO5 interview notes, 2013). VO12 received technical and business advice from the FSM who is also a key source of information about project (VO12 interview notes, 2013; VO12 transcript, 2013).

Procurement support: The FSM bought a printer and cartridges on behalf of VO8 since he travels to the VOs from the Johannesburg area on a regular basis (VO8 interview transcript, 2012). The FSM bought printer toner for VO15 (VO15 Interview transcript, 2012).

The project field support team advised VO3 regarding what is required to get a bank loan and to be cautious in accepting offers for partnering in business ventures (VO3 interview transcript, 2013).

Service Desk advice:
VO15 received support from the project in terms of technical advice from the Service Desk (VO15 Interview transcript, 2012). VO6 and other VOs referred to the Service Desk as providing advice not just on technical support issues,

customers on VO6's behalf and was also getting on the job IT skills training from VO6. He is also the son of the owner of a big construction business. VO6 said that the graphic designer was in the office every day and that money does not change hands, instead they help each other. VO6 can rely on him to be in the office to assist customers when he or VO7 is out of the office and VO6 is learning from him about software and graphic design (VO6, 2013b). The father of the young business man (meat supply business) owns a large construction business which at the time of the interview had just got a contract for R14.2M (VO6, 2013a). VO6 is teaching the son IT skills while, in turn, he is helping VO6 in the VO office. This arrangement can be described as a mutual exchange of favours in which VO6 has a strategic aim to build a relationship through the son with a large business man.

The fact that VO10's office is near her landlord's guest house is of benefit to him as well. VO10 said: "He actually tells them like, this, ja, we also have an internet café" (VO10, 2013b:40).

Reciprocal exchanges
Reciprocal exchanges of assistance and favours (VOs and customers): VO4 provided services and advice to the vegetable farmers and in exchange they gave him a discount on vegetables (VO4, 2013b). VO4 also provided services to his landlord and in return had received major support such as business advice and encouragement (VO4, 2012a).

Reciprocal exchanges of assistance and favours (VOs and friends): Friends are customers too but do receive a mixture of free services and provide some help in return (VO3, 2012a). One of VO3's friends has referred a filming business to her. Friends upgrade the software on their laptops using her internet access for free (ibid.).

VOs share technical advice and information about job opportunities and how to apply for university entrance with their friends (VO9 and VO11 Interview notes, 2013).

but also on where and how to buy equipment (VO6, 2013b)

Emotional support from the BB4All project team: The FSC encouraged VO12 (VO12 interview notes, 2013a)

Initiative and investment was rewarded: VO13 built his own office by saving enough money to convince the project manager to provide him with a loan from the project for the shortfall (PM, 2015). The loan was paid back by VO13 over the course of a year.

Do it yourself: VO6 related that the VOs fixed their project laptops themselves (e.g. removing computer viruses) since the CSIR project team took too long to do so (VO6, 2013b).

Expecting "the project" to provide: VO16's view on expanding his services was to connect the community to the internet in their homes (VO16, 2013a). VO16 expected the project to invest in expanding the network capacity to enable this. The researcher mentioned that an investor would need to know how many people

| | | During the interview VO8's assistant phoned VO8 since she could not help a customer and VO8 immediately phoned a friend to come and help her (VO8, 2012a). This illustrates the network of friends being called upon by VO8 as a just-in-time resource. VO2 had a friend who worked in Pretoria that sent her circulars regarding government jobs that she could pass on to her customers. He also brought her lower priced printer toner from Pretoria (VO2, 2013b).

Friends pay if direct costs are involved:
Some VOs are explicit that they do not offer free favours to friends, especially if running costs are involved (e.g. printing) (VO12, 2013a; VO2, 2013a).

VO-to-VO relationships: Reciprocal sharing of advice, free business services and small loans (only if a close-knit relationship exists). Most VOs who do not have such close relationships with other VOs and do not offer business services for free if there is cost involved.

Sharing a common interest
VOs and friends sharing a common interest: Some friends are bound together by a common interest such as music (VO12, 2013b). A shared interest may lead to business ideas being developed (e.g. running a talent agency for musicians) (ibid.)

The most common interest reported was being in business. In practice this plays out at the generic level of exchanging advice, but in many cases this has led to a practical entry point for friends to become part of a VO business on a part- or fulltime basis, (e.g. VO3 employing a friend (VO3, 2012a).

VO solidarity
VO solidarity - sharing a credo
A close-knit group of three VOs collaborated in business at many levels, | would be willing to pay how much money. VO16's response was that the VOs had done a market survey at the start of the project and therefore, by implication, they have done their bit already and now the project has to reciprocate (ibid.).

Unmet business growth expectations led to disillusionment:
VO5 and VO16 had moved to non ICT-based services. (VO5, 2012a; VO16, 2013a) Both ascribed this move to disillusionment and frustration that the VO ICT-based business was not meeting their expectations in terms of business growth opportunities.
VO5 was selling chickens and VO16 was doing catering.

VO relationships with businesses in general
Business Advice and information is freely offered:
Businesses: VO3 gets advice from other businesses. A business customer of hers has advised her on BEE (Black Economic Empowerment) certificates and the writing of proposals (VO3, 2013b).

A particular feature of VO4's interview was the disclosure of the |

from exchanging technical advice to exchanges of free business services such as printing, scanning and computer repairs, as well as small loans (VO12, 2013a; VO11, 2013a). VO12 and VO11 could use VO15's printer/scanner after a burglary until they had another (VO12, 2013a). Their relationship were described by them as being "anchors to each other" (VO12, 2013a:27) and they created a pricing sheet with their own credo "We are not a dying type" (VO15, 2012a).

General VO to VO links: VO14 stated that there were many free exchanges of services between fellow VOs (VO14, 2012a).

VO2 is friends with four VOs (VO6, VO7, VO8 and VO10) and they exchange technical and business advice and information. VO2 shares circulars about government jobs with them. When these VOs are in her area they use her printer and pay her for it. (VO2, 2013b). VO3 has a good relationship with VO6 and VO7, and In addition to providing her with information they assist her with stationary and banking and she accesses the internet at their office when her internet is down (VO3, 2013b). Small loans (around R200) were also provided to VO3 by VO10. Favours exchanged include collaborative buying (VO10, 2013b). VO4 reported that VO3 has used his fax service if her fax to mail pre-paid amount is finished (VO4 , 2012b).

The focus of VO6, VO5 and V1 is on exchanging technical computer information and business information such as pricing. VO6 and VO5 collaborate in fixing software and hardware problems.

VO14 exchanges business information with VO8 (e.g. regarding public phones) and also refers business to him (VO14, 2012a).

Emotional support: VO12 described VO11 as someone to talk to and that it is good not to be alone (VO12, 2013a). VO10 reported that she and VO3 are especially close and communicate almost on a daily basis about frustrations and business aspects such as prices (VO10, 2013b).

amount and diversity of advice that was being exchanged between him and business people (VO4, 2012a). An example was advice from a company about which company is the best provider of pre-paid cell phone airtime. VO4's landlord is a medical doctor and businessman and has discussed with him the challenges of having a business such as problems with customers and the need for bookkeeping (ibid.).

Competition
Direct competition: VO6 competed with two nearby internet cafés, of which one is within walking distance, and stated that, in order to compete, he had to make sure that he can offer all of the services that they do (VO6, 2013a). VO6 referred to the fact he can share an idea with the company, but they do not tell you how they do things, instead they will do it for you and charge you for the service (ibid.). VO6 did refer to the closest business as having a negative influence on their business (VO6, 2013b).

Competition, but there is a greater good: VO6 did refer customers to

VOs relationships regarding business

Developing VO relationships to grow business: As a business strategy VO2 wants to grow her relationship with VO8 because she sees his business growing (VO2, 2013b). VO10 reported that VO8 is a good friend to have since he is so connected. (VO10, 2013b).

VO3 would like to see VO4's business grow and he wants to help her business grow (VO3, 2013a).

VO- to-VO business referrals: VO14 used the VO network of relationships to get business. VO13 referred video business to him when he had a double booking (VO14 Interview notes, 2012a). He did video editing work for VO13, VO4 and VO5. VO13 referred a client who wanted to send a fax to VO1 as his pre-paid fax time had run out (VO13, 2012a).

Collaboration between VOs to deliver good services to customers: VO15 is very good with design and VO13 uses him for certificate design (VO13, 2012a).

Respect for business boundaries: Respect for each other's geographical business areas manifested in the practice of referring customers to their closest VO. VO10 and VO3 refer the customers who live closest to each other's offices to the relevant VO (VO10, 2013b). VO6 mentioned that he and VO7 refers people to VO1 and vice versa (VO6, 2013b). VO15 mentioned that VOs had referred students to him if they come from his cluster area (VO15, 2012b).

VOs supporting community development

Investing in the youth:
Unemployed: Information, skills development and employment: VO3 has created employment and have transferred skills to a young lady in the community who was unemployed (VO3, 2012a). During the interview, VO8's assistant was taking care of the office business (VO8, 2012a). VO8

them when the VO office did not have internet access (ibid.).
He had an interesting perspective on the future that included economic growth for his community as a whole. In this context he said: "I need xx to realise success…. Yes, I see their success actually" (VO6, 2013b:23). VO6 also expressed a need to keep a close eye on them:" Let my enemies be near to me" (ibid.).

Complementing each other: The owner of the computer business that was in the same building as the VO6/VO7 office was a good friend (VO6, 2013b). The relationship with this owner was interesting. They were assisting each other and had defined services that they will not compete with each other (ibid.). The computer business did faxes and the VO office provided internet access. The computer business referred his clients to the VO office for internet access and they referred clients to him for sending faxes. VO6 was clear that if they were to offer a faxing service there would be trouble with his friend the computer business owner.

VO6 collaborated by sharing

		said that that he had started teaching her how to provide the services. VO8 asked two women (one of which was his girlfriend) to take part in the learnerships supported by the Technology Innovation Agency (TIA) that was organised by the CSIR and the project team (FSM interview, 2013). This provides an opportunity to study and gain work experience while being paid a stipend. VO14 supported the unemployed youth and therefore getting information about jobs and bursaries for them was important to him (VO14, 2012a). *Soccer clubs:* Both VO4 and VO16 invested in soccer clubs. VO16 stated that the goal of the club was more than just soccer and included an educational aspect such as motivating learners to finish school and assisting them to go on to tertiary studies (VO16 transcript, 2013b). VO16 was therefore part of an organisation that has a development focus and built support networks in the community. Use of ICT to share information about the club: VO16 had built a Facebook page for the soccer team so that "Everyone who wants to know where we are playing can see there" (VO16, 2013b:4). *Senior citizens:* VO1 had created a personal relationship with each person in a group of middle aged customers by providing her cell phone number in order to provide a personal service when they needed it (VO1, 2013b). *Improving NGO to government communication via ICT:* (see *Collaboration with government to deliver services to citizens)* In addition to the basics such as providing government forms, VO14 used his skills to develop a spreadsheet so that an NGO can email required information to the Department of Social Development (VO14 2012b). **Expectation of reciprocal support and solidarity (VOs and community)** *From the VO perspective:* VO14 serves community interests and sells services. VO14 said: "Yes, I think the councillor should support me. And then I think the pastor and the church should support me. Because this is	information, advice and services while the computer business had information on the prices of equipment. The VOs also provided technical services such as computer operating system upgrades. *Collaboration* *Mutual referrals - Business people:* VO2's closest business partner, a printing company, refers clients to her for doing CVs as well as students who want to do assignments and she reciprocates by referring people to them for colour prints (VO2, 2013a). An FET college is in the same complex as the office of VO6/VO7 and the students refer a lot of business to the VO office (VO6, 2013a). VO6 reciprocates by referring his friends to the college for studies. *Collusion between businesses:* In some cases (e.g. VO8) businesses and VOs agreed upon the prices of common services such as printing in order to be able to increase prices when required without price wars (VO8, 2012a). *Investment in VOs by businesses:* VO2's closest business partner taught her to use graphical design

my immediate constituencies." (VO14, 2013b:47).

NGO perspectives: VO14 had learned lessons about NGOs and other people asking him for favours such as free Internet searching and free printing. "They (NGOs) have an agenda too, but the agenda is that they want to befriend me in order to get what they want from me, they want to exploit me" (VO14, 2013b:43).

Community member perspectives: Community members do have unrealistic expectations. VO14 recounted: "There is also an individual here that comes and sits the whole day here, and he asks me to do printouts and so on…" (VO14, 2012b:43). During the interview with VO6 one person loitered in the office because he wanted free internet access, and, on receiving no response from VO6, said to him that a little help goes a long way (VO6, 2013a). VO6 knew him well and said that one day he needs to pay (ibid.).

Trust is offered and then earned
Trust due to being associated with trustworthy business people: VO12 described many types of benefits due to his friendship with the son of the owner of a large business (VO12, 2013b:26): more clients, introductions to clients, clients trust him due to the trustworthiness of the son, and business information and advice. VO12 stated that due to the trust he feels "Then I must be worth something" (ibid: 26).

Customers' trust of VOs: Teachers asked VO3 to keep their email passwords for them (VO3, 2013b). VO14 described himself as a trusted source of advice to young boys and old grannies and that trust in him is the reason why people referred him to others (VO14, 2013b).

A concern about delivering a good service: VO2 is concerned about the speed of response to customers request for technical support and expressed the opinion that "When I call (FSM) or (FSC) they respond immediately, they call" the service desk process is seen by the VO as a "long process" (VO2, 2013b:17).

software and have also given her software so that she could edit photographs for them (VO2, 2013a).

VO11 had built a track record with a large local motor spares business by providing technical support such as PC repair and training in e-filing of tax returns (VO11, 2013a). The owner of this business had suggested to the VO business (VO11 and VO12) that he could buy a large capacity printer that they can lease from him in order to be able to increase their printing business.

Proposals of business ventures that combine ICT resources with other resources: VO3 had been approached by people who want her to partner in setting up an internet café using their personal computers and her business' internet bandwidth (VO3, 2013b).

VO6 had been approached by a senior businessman that wanted to build a service station in the main road (VO6, 2013a). The plan was for VO6 to offer internet access at the same location. VO6 referred to it as: "fill up, pick up email and go"

Pride in ability to deliver good services: VO2 edits photographs and stated that she does this since she is good at it. Her pride in her work was evident: a collage of photos is displayed on her office walls (VO2, 2013a).

VOs are all responsible for building a good brand (a collective responsibility): VO5 is very conscious that as a VO he is also building the overall VO brand and therefore must act correctly in order to protect the brand (VO5, 2013b).

Sensitivity to customers' constraints and special needs
Money constraints: Awareness of customers' money constraints is demonstrated by VO10 and VO3 who are good friends with VO8, but his office is too far to refer customers to (VO10, 2013b). It was observed during the interview visit that VO8 asked a girl who wanted a photo her school identification card   to bring her friends along so that he could charge them a better price, by printing all their photos on one page of photo paper (VO8, 2012a).

Lack of skills: The older school principals, even though they have access to both computers and internet do not have the skill to send email. VO3 creates email addresses and types emails for them in their offices (VO3, 2013b). VO16 mentioned providing free administrative services to a primary school since the administration clerk cannot really type and is not computer literate (VO16, 2013a). He stated that in general most of the administrative clerks are volunteers who are not computer literate.

Flexible office hours: In order to assist people who work VO5 stated that he sometimes stays at the office till 21h00 to assist people who work till 17h00 (VO5, 2013b).

Fairness
All VOs should get similar treatment from the project: VO10 was articulate and played a prominent role in the launch of the project by the Minister of

Collaboration between VOs and businesses (based on strong relationships): VO5 and a printer rental company owner that he had known for a long time identified the business opportunity to sell books of Grade 12 examination questions and they did so in December 2012 (VO5, 2013b).

VO5 did training for an accredited computer training company. The company sent customers to him and then the company did the assessment of the training (ibid.).

Special services for larger businesses: VO6 emphasised that he delivered special services for certain customers for different reasons (VO6, 2013a).These customers could call him anytime in the week (day and night) and he would open up the office for them to use internet, or for him to do typing. The special customers included: a big construction business, a construction projects business, a computer business, a senior businessman that wants to invest in businesses, and a programmer.

| | | Science and Technology. The other VOs asked why should she be "showcased" and not us? (VO5, 2013b). | There are different reasons for these people being special customers. For example, the programmer assisted VO6 with technical issues relating to computers and software while the senior businessman provided business advice (VO6, 2013a).

Government
Collaboration with government to deliver services to citizens: A friend at the Department of Social Development lent VO8 a printer and he extends the reach of their services by providing government forms for free (as VO14 also does). Citizens typically need copies of identity documents (IDs) as well which is income for VO8 This does lead to confusion since people see VO8 as being part of the government due to the free forms. He has had to explain that he is not part of government and have to charge for other services as a business (VO8, 2012a).

In the case of VO14, the community associated him with the ward councillor and complained to him about services. VO14 phoned the councillor to convey these |
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		complaints (VO14, 2013b).
Sanctions	**Withdrawal of affection** *Tough love:* Due to VO10's cluster being without internet access for seven weeks, she wanted to get a job (VO10, 2013a). Her mother advised her to get a job and get out of her house. She also said that her mother screams at her (ibid.). *Guarding against over-involvement:* In discussing the exchange of information in relationships VO12 stated that he does not give his mother much information as he does not want her to get too involved in the business (VO12, 2013a). The reason he gave was she made things too complex for him by wanting to know too much about the details of his business. He said: "Basically, keep her in the loop and not fully detailed ... Not to worry her and all that" (VO12, 2013b:22). The question might be asked if too much attention can be experienced as intrusive.	**Shame and reputation** **VOs** *Abuse of VO to VO relationships :* VO10 lent VO16 a laptop after he had broken his own laptop three times with disk jockey work (VO10, 2013a). VO10 was instructed by the FSM to stop assistance to VO16. VO4 has been perceived as misusing the VO network beyond the boundaries of mutual exchange of services. In his interview, VO14 mentioned his perception of misuse by VO4 of his free video editing services (VO14, 2012a). **VOs and customers** *VOs protecting customers against VOs:* VOs 3 and 10 do not refer customers to VO16, who is in close proximity, since he is considered to be absent from his office all the time (VO10, 2013b). *VO strategies for dealing with customers who expect free services:* VO14's response to an NGO is: "I just give them information and say I don't have ink", while a community member gets a more direct response "I will tell him that I am running an office" (VO14, 2013b:43). As mentioned in this table, VO6 reminded a person who wanted free internet access that he does need to pay at some point (VO6, 2013a). *Being taken for granted versus being appreciated:* VO16 felt that schools needed to pay for his services since they were taking advantage of him by calling him out unnecessarily, instead of learning to help themselves (VO16, 2013b). VO16 did mention one school that appreciates him and wants to pay him for his services (VO16, 2013a). It is a primary school with staff which is mostly elderly women and the principal there is described by him as having a heart. They understand that he is helping them. He does administrative services for them since the administration clerk cannot really type and is not very computer literate.	**Shaming and formal sanction** *Forced to apologise:* VO5 did a deal with a circuit manager to do a job for all of the schools in the circuit. The VOs whose schools were included was angry and the FSM forced him to apologise at a meeting, even though, in his mind, he had done nothing wrong (VO5, 2013b). *Abusing the goodwill of a landlord:* VO4's landlord had provided him with multiple chances to pay back his overdue rent (18 months), but in the end he was evicted (FSM, 2014b; FSM 2014c). *Do not break a deal:* A computer business referred his clients to the VO6/VO7 office for internet access and they referred clients to him for sending faxes (VO6, 2013a). VO6 was clear that if they were to offer a faxing service there would be trouble with his friend.

		Foreign businesses *VOs not supporting "foreigners" businesses:* VO1 referred to the fact that "the people within the community includes foreigners, like Nigerians and Pakistani's [sic]" and that "they influence me a lot." (VO1, 2013b:1).The NVC learnership teacher "convinced me to communicate with this Pakistan guys, these foreign guys, because they are the ones who know business much more" (ibid.:6). Therefore VO1 did not see them as foreigners anymore but as friends that she did business with and had learned from. During an interview, a VO preferred to not buy a cool drink from the nearby supermarket, owned by Pakistani's, and said that he supported the spaza that was a little further away since it was owned by a member of his community (VO13, 2012a).	