A Needs-ICTD Strategy Alignment Framework Foundation for the Measurement of ICTD Impact.

A thesis submitted in fulfilment of the requirements for the degree of

MASTER OF COMMERCE

RHODES UNIVERSITY

By

GUGULETHU QHAWEKAZI BADUZA

Department of Information Systems

April 2013

Abstract

Many Information and Communication Technologies for Development (ICTD) projects are established with the overall aim of positively developing the communities they are implemented in. However, the solutions that are provided are often commonly developed without the needs of these communities being sufficiently investigated beforehand. As a result the ICTD strategy of the project ends up not well aligned with the aims and targets of the needs of the community. As a result of this, an appropriate programme theory for the project and relevant impact indicators fail to be adequately developed. Consequently, when an impact assessment is conducted it is often found that the intended effects are not directly linked to the needs of the community or what the community had hoped to gain from the ICTD initiative.

The purpose of this research serves to develop a needs-ICTD strategy alignment foundation that supports the identification and formulation of impact assessment indicators. Through this research, a framework is developed to support the alignment of ICTD strategy, the development and the promotion of contextual needs of rural communities and other frequently marginalized areas. The Needs-ICTD strategy alignment framework is composed of eight main components that describe the process that can be used to align ICTD strategy with community needs. These components include: collaboration between the internal and external stakeholders, the development of the community, conducting baseline studies, the needs assessment, the ICTD strategy, linking of the needs-ICTD strategy, and lastly the identification of impact indicators.

An interpretive research approach is used to explore and inform the framework through a multi-case study investigation of the Siyakhula Living Lab and two projects in the Systems Application Products (SAP) Living Lab. Two main case study questions drive the exploration of the framework, that being: 1) How are the needs of the community elicited and how is the ICTD strategy aligned to the needs of the community? 2) And, why were the selected approaches chosen for aligning the needs of the community and ICTD strategy?

Data for this research was collected qualitatively through interviews, document analysis and participant observation. Key findings indicate that the involvement of internal (local)

stakeholders in the development and alignment of ICTD strategy to the needs of the community is still lacking. As a consequence, many community members end up not fully understanding the project objectives and how these objectives aims are to be achieved. The research also finds that 'solution specific' projects also fail communities as they focus specifically on *one* target group and repeatedly fail to assist the community *holistically* in supporting their information and their community development needs.

Acknowledgements

I would like to extend my thanks and appreciations to the following people:

To the maker of heaven and earth, thank God for giving me the opportunity, strength and courage to do this research. Thank for always renewing my belief that I can do all things through Christ who strengthens me.

To Dr. Caroline Pade-Khene, my supervisor, Thank you for your patience, guidance, inspiration and encouragement throughout the year and going the extra mile to help me with my research. Thank you for the enthusiasm you showed in my research even with the many commitments you had. Your knowledge, high standards and commitment to my research motivated me to finish my thesis.

To my mother, my sister and my family thank for believing in me and sacrificing so much for me and for praying for me. Thank you for the encouragement and having faith in me through this journey, even at the most trying times.

To my close friends who have helped me enjoy this journey and keep me focused on the end goal, thank you.

To the National Research Foundation thank you for the financial assistance towards my research.

Moreover, the support of the SAP Research in Pretoria and the Siyakhula Living Lab towards this research is hereby gratefully acknowledged. However, opinions expressed and conclusions arrived at are solely those of the author and should not necessarily be attributed to SAP Research Pretoria and the Siyakhula Living Lab.

Finally, I would like to thank all of those that are not mentioned above, that were involved one way or another in the process of this research.

I acknowledge that all the references used within this document are accurately recorded and that unless stated otherwise, all work contained herein is my own.

.....

Gugulethu Qhawekazi Baduza

Table of Contents

List of Tables

List of Figures

Chapter 1 : Research Introduction

Chapter 1 introduces the research study. The research context is described to provide background information to the research. The goals of the research and the research methodology adopted are presented. Finally, a summary of the results of the thesis is presented.

1.1 Introduction

The advent and use of Information and Communication Technologies (ICT) for development purposes presents new opportunities and exciting solutions to some pressing development challenges and offers users of these ICT's new avenues to contribute to human development in different and more equitable ways (Walton and Heeks, 2011). Despite the high expectations of Information and Communication Technologies for Development (ICTD), attempts to deliver such initiatives have been met with high levels of failure and it is difficult, if not impossible, to single out a sole reason for these failures. There have however, been many criticisms pointed towards the human side of ICT interventions especially in the main approach used by ICTD practitioners (Heeks, 2009). These include for example, an incomplete understanding of social context, holding a Western-rationalistic viewpoint and failing to incorporate the local population and communities in the development process (Walton and Heeks, 2011). These criticisms suggest that more needs to be done to align the ICTD strategy alongside the aspirations of projects that have planned and the larger needs of the community. This, therefore, negatively affects the impact of the project, as the needs of the community are not taken into account and in sync with the broader goals and objectives of the project. The aim of this chapter is to provide an introduction to the research study which will be undertaken and presented in this thesis. The background of the study, goals of the research, and a summary of the research methodology are presented. Finally, the chapter provides a summary of the key findings of the thesis and an overview of the organisation of the chapters.

1.2 Research Context

Rural areas in South Africa are characterized by high levels of poverty. This poverty is a result of other associated and interlinked challenges such as, low agricultural productivity, poor rural infrastructure, lack of access to markets and market information, and low levels of investment in people (Mwabu and Thorbecke, 2001:4). Kingsbury, McKay, and Hunt (2004: 43) define 'Development' as a participatory, people-centred process intended to reduce the incidence of poverty and achieve better livelihoods for all. Anríquez and Stamoulis (2007:2) go on to define 'rural development' as development that benefits rural populations; where development is understood as the sustained improvement of the population's standards of living and welfare. According to McConnell (1995:87), for any community to be able to function efficiently and productively, a basic minimum stock of usable information is

essential. Information according to McConnell (1995:195) is identified as that which reduces uncertainty; by reducing uncertainty allows us to be better able to predict the consequences of the actions we take. Harris (2004:14) indicates that we are then able to draw up an *information plan* when we are able to explicitly articulate our development strategies from the information collected. This allows us to set down and determine the information that is needed as well as information resources that are required to achieve a *development strategy*. There are many ways and tools from which this information can be obtained; one of the tools is information and communication technology.

Information and Communications Technologies (ICTs) are defined as tools that aid communication between people through 'electronic means of capturing, processing, storing, and communicating information' (Heeks, 1999: 3). Chapman and Slaymaker (2002:1) identify two types of ICTs: (1) the traditional ICT's, (2) and the modern ICTs. Traditional media examples of ICT's include radio (digital, satellite) and television (cable, digital, satellite), whereas the modern ICTs include computers, the Internet, mobile telephones, etc. Information and Communication Technology for Development (ICTD) is a general term referring to the application of ICT within the field of socio-economic and rural development (World Bank, 2006:3). Chapman and Slaymaker (2002:1) state that there re to forms in which ICTs can be applied either the "direct sense (where their use directly benefits the disadvantaged population in some manner), or in an indirect sense (where the ICTs assist aid organizations, non-governmental organisations or government, in order to improve socio-economic conditions)". McNamara (2003:6) stipulates that ICT does not create change in itself, but rather that it enables. This means that although communities might be faced with different challenges and needs, ICT is not necessarily there to solve these problems directly. Rather, ICT's are a supportive tool that attempts to enable people to find solutions to these problems. According to Pade, Mallinson and Sewry (2008:2), the main uses of ICT in rural areas include rural empowerment and participation, addressing health challenges, entrepreneurial support and market access, access to education and knowledge, and establishing community networks. Despite this, there are still a number of challenges that are faced by rural communities when it comes to implementing, using or adopting ICTs. These include, but are not limited to, problems associated with limited access to infrastructure, limited formal education, insufficient ICT training and capacity building, and financial, political, social and cultural constraints (Pade *et al*., 2008; Wakelin and Shadrach, 2001:9). These challenges contribute to what is called by Heeks (2009: 18) as the "Design-Reality

gap". This refers to a large gap that exists between ICTD design expectations and the actual realities of the project and its context in the community. The Design-Reality gap is based on the following dimensions: information, technology, processes, objectives and values, staffing and skills, management systems and structures, and other resources (Heeks, 2009:18). The design-reality gap model can be compared to the concept of Business-IT alignment, which is defined as 'cohesive and concurrent achievement of mutual goals between business and IT' (Garlan and Shanks, 2007:116). This means therefore, that an approach needs to be developed that supports the alignment of the needs of the community with ICTD strategies. This is an approach that will allow information and knowledge to be used to support development while at the same time being especially sensitive to the rural context and the environments most communities exist in. An ICTD strategy, therefore, contains the aims, vision, objectives and goals of the ICTD project (World Bank, 2006:86). It is important that the ICTD strategy objectives be tied to the community's overall development objectives which can include wider areas such as, education, health, government, business, and industry (World Bank, 2006: 88; Geldof, 2005:7). The 'Business-IT' alignment approach can consequently possibly inform ICTD stakeholders and act as a potential guideline as to how to align development needs with ICTD strategy.

Literature on the concept of 'Business-IT' alignment indicates that the following factors promote alignment between business and IT: company/firm wide active involvement, long term focus, open communication, the meeting of the minds, clarity of ideas and consistency (Luftman *et al.*, 1999: 4; Garlan and Shanks, 2007:118; Henderson and Venkatraman, 1996: 64). A case can then be made for similar alignment to be established between what the community needs and what the ICT project intends to achieve within the chosen community. For example, the business-IT alignment factor of 'communication' highlights the need for communication among *all* the stakeholders involved in the project; including local community members, project implementers, project directors and funders. This means that *all* opinions and perspectives are vital and must be heard to allow for the success and sustainability of such rural development interventions. Tarafdar and Qrunfleh (2009:338) highlight that if no business-IT alignment occurs then this leads to applications being wrongly configured or implemented and as a consequence the waste and duplication of resources, and failed projects. Communication between internal and external stakeholders has also been some of the reasons why projects fail. When applications are wrongly configured for communities who at times don't know how to use the applications leads to them being

reluctant to use the applications again. The same reasons why business-IT alignment at times fails are the same for communities and ICTD projects. This is an often cited reason as to why so many ICTD projects have failed in the past. Further explanations and reasons for the failures of ICTD projects include: the (inappropriate) technological approach used, not being developed in accordance with the available resources, mismatches of the Information Systems (IS) and local realities, uncompleted/abandoned projects; projects failing to meet objectives or which fail to satisfy key stakeholders; and projects which cannot be sustained (Heeks, 2002). This means that in the case of rural communities, ICTs would *not* be effective in supporting development activities in the conditions mentioned above. The business-IT alignment process has also experienced the same failures, however, they have found ways in which to overcome the failures and achieve the appropriate alignment of business needs and IT strategies. Therefore, communities and ICTD projects can learn lessons on how the alignment can be established.

A needs-ICTD strategy alignment framework should rely on two key domains of evaluation that inform the application of the framework: 1) A Baseline Study and, 2) A Needs Assessment. These are both based on the Rural ICT Comprehensive Evaluation Framework developed by Pade-Khene and Sewry (2011). According to Pade-Khene and Sewry (2011:15) a Baseline Study:

> "*aims to assess the existing status of a rural community, in terms of its socio-economic status and its readiness to uptake innovative development activities through the use of ICT*."

A baseline study contributes to knowledge generation for researchers, policymakers and other stakeholders on the general social status of the community which eventually informs the actions and decisions they make about the community (Rossi, Lipsey and Freeman, 2004: 36). The baseline study is an important contributing factor to an impact assessment as it identifies the 'before' status of a community prior to the implementation of the ICT program in the community (Pade-Khene and Sewry, 2011). A baseline study has to be conducted before a needs assessment, for a baseline study provides the general, observed and common needs of the community; while a needs assessment provides a more detailed investigation of each need identified in the baseline study. A Needs Assessment accordingly aims to identify and understand the social conditions of the community and their desired priorities of rural community development by assessing the community needs (Pade-Khene and Sewry, 2011; Rossi *et al.,* 2004: 130). With the needs of the community established and the ICTD strategy

developed, stakeholders will be better able to accordingly develop and contribute to a more sound Needs-ICTD strategy. When a Needs-ICTD alignment foundation has been established, stakeholders will be better enabled to identify and envision the key targets for positive impact in the community and the indicators of expected change.

An impact assessment aims to implement a monitoring and evaluation system in order to be able to identify whether the project fulfils its targeted development purpose for its clients and beneficiary communities (Batchelor and Norrish, 2006:11). This form of monitoring and evaluation system also provides concept evidence as to how the project has contributed to development priorities based on the social, economic, environmental factors which the programme is designed to affect in a community (Batchelor and Norrish, 2006:11; Wakelin and Shadrach, 2001:11). An impact assessment therefore, identifies the *before* and *after* effects of a programme. There are, therefore, a number of approaches that can be used to monitor and account for the before and after effects of a project. Rossi *et al* (2004: 236) note that determining the impact of a programme requires comparing the condition of the intended community that has experienced an intervention with the estimate of what their condition would have been had they not experienced the intervention. The Rural ICT Comprehensive Evaluation Framework (RICT-CEF) in Pade-Khene and Sewry (2011) identifies key outcomes and impacts to measure either directly or indirectly the effects of interventions that are linked to the ICT project. Heeks and Molla (2009:56) also indicate that impact indicators can be obtained based on a needs assessment, which can be used to map the needs against the impact indicators. However, Rossi *et al* (2004:236) further identified that there may be unexpected impacts that may emerge at a later stage thus space should be allowed to measure such impacts occurring at the later stage of project implementation.

Many ICTD projects are established with the aim of progressively developing a community, but without the needs of these communities being thoroughly investigated and aligned with the ICTD strategy. This has resulted in an appropriate programme theory and relevant impact indicators failing to be developed as of yet. This means that most of the time when an impact assessment is conducted, the effects are often not directly linked to the needs of the community or what the community had hoped to gain from the ICTD initiative because of the disjuncture between community needs and those of implementers. The purpose of this thesis, therefore, aims to bridge this disjuncture by developing through research a needs-ICTD focused strategy alignment foundation that supports the identification and formulation of impact assessment indicators.

1.3 Goals of the Research

The primary purpose of this research is to develop a needs-ICTD strategy alignment framework that will provide a foundation for the identification and formulation of impact indicators to assess the impact of ICTD programmes in rural communities and other communities on the margin. To achieve the overall purpose of this research, the following objectives are stated:

a) Develop a framework to support the alignment of ICTD strategy with the development and contextual needs of targeted rural communities.
b) Explore and inform the framework through the case study approach involving three case studies. These case studies include: Rustica and SmartEnergy which are part of the Systems Application Products (SAP) Living Lab Projects, and the Siyakhula Living Lab.
c) Explore the identification of impact indicators of ICTD programmes based on the application of the Needs-ICTD Strategy Alignment framework.

1.4 Research Methodology

An interpretive research approach is used to explore and inform the framework through a multi-case study investigation of the Siyakhula Living Lab and two projects in the Systems Application Products (SAP) Living Lab (Rustica and SmartEnergy). Two main case study questions drive the exploration of the framework, that is: 1) How are the needs of the community elicited and how is the ICTD strategy of the living lab aligned to these needs? (2) And, why were the selected approaches chosen for aligning the needs of the community and ICTD strategy? The following process was employed in answering the questions:

a) A multiple case study review of the Rustica, SmartEnergy and Siyakhula living lab explored and informed the Needs-ICTD alignment framework. The case studies are only limited to the South African Context in three provinces (the Eastern Cape, North West and Limpopo Provinces). These cases studies include the following:
    - **Rustica**: The aim of this project was to provide assistance to the shop owners in a small Limpopo Province village of Kgautswane. The assistance tool was a mobile application which aimed to assist the shop owners in ordering products from the nearest town (Burgersfort) without having to go there physically. The solution of the project was pre-empted

based on a C@R project. This project was operated by SAP research as one of their research projects.

- **SmartEnergy**: The main aim of the SmartEnergy project was to provide assistance to households on how to manage their usage of various energy sources efficiently. The community where the project is currently taking place is in the community of Kopela in the North-West Province. The application that was developed aimed to monitor the use of the various energy sources and at the same time linking them to the various appliances used in the application. This is also one of the projects that were operated by SAP research as one of their research projects.
- **Siyakhula Living Lab**: The aim of this project was to develop and field-test a distributed, multifunctional community communication platform for deploying in marginalised and semi marginalised communities in South Africa where the majority of people in South Africa live. This communication platform currently operates within the Mbashe municipality, a deep rural area located along the wild coast of the Eastern Cape Province of South Africa.
- **Data Collection and Analysis Approach**: Interviews, participant observation and document analysis were used to collect data from the three case studies. As the case study approach was used, through the application of the Needs-ICTD alignment framework in the Siyakhula and SAP living labs, explanation building is developed and built through the interactions, observations and experiences of the researcher. This also contributes to exploring the framework reacts in a real life context as lived and experienced by the participants under study.

The final result of this study is a guide to the alignment of community needs to ICTD strategy and for the identification of impact indicators for the measurement of impact.

1.5 Summary of Results

Results from this research have indicated the following:

- Information and knowledge is critical in supporting the development of rural areas and other marginalized communities. While rural development provides many benefits for the communities, it is also met by a number of challenges which at times

hinder the development process. The availability of information and knowledge can assist the communities and help them combat some of these challenges. ICTs can therefore, assist in assessing and interacting with relevant information that is needed by the communities to further their community development.

- The community needs must be *thoroughly* investigated in order to be able to provide the most appropriate and relevant information and knowledge to the community. The strategy developed for the ICTD must be linked to the needs of the community as expressed by them. The needs of the community and the ICTD strategy must be linked and aligned in order to achieve a mutual understanding in how development initiatives in the community may be supported by ICT access. Various strategies can be developed from the main strategy, the roadmap of the project or the lab.
- Business-IT alignment provides various approaches in which the community needs and the ICTD strategy can be aligned together. The process of the alignment provides enablers and inhibitors which can be used to assist in the alignment process. The process of aligning the needs and the ICTD strategy can learn from the Business-IT alignment model how business achieved its alignment with IT.
- The identification of impact indicators in ICTD projects needs to be linked to both the community needs and to the ICTD strategy. They cannot be linked only to the ICTD strategy *alone*.
- The Needs-ICTD strategy alignment framework was developed to facilitate the process of ICTD alignment to the needs of the community. The framework has seven components which include the collaboration between the internal (community members, leaders, groups) and external stakeholders (project directors, funders, academia, government, etc.), the exploration of the development plan of the community, conducting the baseline study, developing the ICTD strategy, linking the ICTD strategy to the needs of the community and lastly, the identification of impact indicators based on the alignment.
- The exploration of the framework in Rustica, SmartEnergy and Siyakhula Living Lab provided steps and processes which should be taken into consideration in the future. The results of the changes resulted in an enhanced Needs-ICTD strategy alignment framework.
- The Needs-ICTD alignment framework is explored and revised based on what was learned from the case studies. The review of the case studies has also affected the

addition and review of the various components of the framework. The revised framework that encapsulated the lessons learned from fieldwork, the experiences of the labs, and the review of the related literature. The revised framework now takes into account the literature, the lived experiences and how (based on the framework) ICTD strategy should be aligned to community needs so as to allow the relevant impact indicators to be developed based on the framework.

1.6 Thesis Organisation

The thesis is organised into the following 10 chapters.

Chapter 1: Introduction

Chapter 1 introduces the research problem and provides a general overview of its context. The research methodology is identified whilst a summary of the findings of the research are provided.

Chapter 2: Information and Knowledge Access for Rural Development

Chapter 2 explores the concept of development in rural communities. Rural development, the benefits and challenges of rural development are explored and how information and knowledge enhances rural development. The chapter also discusses ICTs and its uses and challenges in the rural development context.

Chapter 3: The Importance of Aligning Community Needs and ICTD Strategy

Chapter 3 discusses how community development needs can be identified and the importance of ICTD strategy development. The process involved in identifying needs and ICTD strategy is discussed and why it is important that ICTD strategy be linked to the needs of the community.

Chapter 4: The Case for Business-IT Alignment in ICTD

Chapter 4 provides information on the process of the alignment of business needs to IT strategy occurs, the enablers and inhibitors of this process and how it can be relayed to the Needs-ICTD strategy alignment.

Chapter 5: Impact Indicators and Assessment in ICTD Projects

Chapter 5 investigates how impact indicators can be developed and stresses the importance of monitoring and evaluation and the role of impact assessments based on the Needs-ICTD strategy alignment.

Chapter 6: The Needs-ICTD Alignment Framework

Chapter 6 presents the needs-ICTD strategy alignment framework which focuses on the needs of the community and how ICTD strategy should be aligned based primarily on the review of literature.

Chapter 7: Case Study Research Methodology

Chapter 7 will provide an analysis of the results of the case studies in which the framework was informed. Lessons learnt from the practical application at community level are provided which lead to a revised framework.

Chapter 8: Analysis of Results: Three Case studies Reviewed

Chapter 8 analyses the results obtained from the case studies, with an overview of the labs provided, and lessons learned from the field.

Chapter 9: An Enhanced Needs-ICTD Strategy Alignment framework

Chapter 9 provides a revised framework, which has incorporated the lessons learned in the previous chapter and the effect of these lessons on the original framework.

Chapter 10: Conclusion and Future Research

Finally, chapter 10 presents the conclusion of the research and recommendations for future research are suggested.

Chapter 2 : Information and Knowledge Access for Rural Development

The ensuing chapter describes in-depth the need for development especially in relation to rural and marginalised communities. The benefits and challenges and the significance of ICT in enhancing the rural development process is explored in relation to how ICT for development evaluation is fundamental. The uses of ICT and the various challenges of ICT usage for development are further explored and related to their importance in aiding rural development.

2.1 Introduction

The inequality gap between the rich and poor remains wide; whilst numerous countries and communities are still exposed to the effects of extreme poverty, diseases, ethnic conflicts and natural disasters (Casal, 2007: 3). These inequalities are part of a wider cycle of issues where one finds that the inefficiency of public institutions is often backed by high levels of corruption, and other matters that affect society such as, high debt burdens with low levels of resources and human capital make it difficult for people to transgress the inequality (Casal, 2007: 3). In order to change these situations, solid and conscious national strategies that aim to move towards a more sustainable development of communities are needed (Casal, 2007: 3). Casal (2007: 3) argues that one of the most important of the resources that have liberating power for people and helps them move from poverty to empowerment is *knowledge*. It is now widely accepted that any attempt that aims to improve the quality of life of people in developing countries would be incomplete if it does not progress towards the holistic empowerment of the community.

This chapter addresses information and knowledge access for rural development. In this light the first section investigates the term 'development' in relation to the millennium development goals. The chapter proceeds to further address the notion of 'rural development', its importance and its benefits and challenges for rural communities. The chapter also addresses the importance of information and knowledge in rural development and the role of ICTD in rural development. Thereafter the chapter proceeds to address the different uses and advantages of ICT in rural development and the subsequent challenges it presents. The chapter concludes by making the case that development is fundamental for the human population to be able to thrive and survive. Therefore, one of the approaches that can be adopted is to provide effective rural development programs that will be assisted by the provision of information and knowledge that can be provided by ICTs as supportive tools for rural development.

2.2 What is Development?

The Human Development Report (HDR) (2010:12) defines 'development' as creating an enabling environment by allowing for the expansion of people's freedoms to live long, healthy and creative lives. This entails allowing opportunity for people to advance in their valued goals so that they are able to engage actively in shaping development equitably and sustainably on our shared planet of earth. People, therefore, are both the drivers and

beneficiaries of human development as both individuals and in groups (HDR, 2010:25). This view is supported further by Kingsbury, McKay, and Hunt (2004: 43) who view development as a participatory, people-centred process that is intended to reduce the incidence of poverty alongside helping to achieve better livelihoods for *all*. Some authors argue that development must always have poverty reduction at the centre and the creation of the means by which poverty can be kept at bay (Kingsbury *et al.*, 2004: 44).

Human development however, concerns many various attributes, and as such, can also be viewed as multidimensional in nature in not limited merely to poverty, but interconnected with other issues (HDR, 2010:13). Sen (1993: 7) states that development is largely tied with economic growth and therefore, a large focus of development also looks at inequality between the rich and poor countries and the different coping strategies available between countries. When looking at development in this way therefore, it becomes important to also look at the indicators of wealth which reflect the quantity of resources available to a given society (Sen, 1993:8). This type of development is called 'economic development'. According to Sen (1993:8) economic development requires that the state possesses the power to use the financial incentive, political power, and influence over the developmental discussion to promote industrialization. It is not simply a matter of mere production of goods but rather involves a process of using industrialization and trading with other countries developmentally so as to advance a country's knowledge and intellectual creativity (Sen, 1993:9).

One of the ways to measure human development is through the Human Development Index (HDI). According to the HDR (2010: 15), HDI was initially aimed at measuring the progress of development in three primary dimensions: health, education and income. This has gradually been re-adapted and changed in order to incorporate other factors. One of the criterions that is now being used for instance for measuring whether a country is more or less developed is by looking at people's quality of life. Factors like access to education and health care, employment opportunities, availability of clean air and safe drinking water, the threat of crime, and so on are looked at to see whether they increase or reduce people's quality of life in a particular country (Sen, 1993: 7). In a much broader sense therefore, the notion of human development incorporates *all* aspects of individuals' well-being, from their health status to their economic and political freedom (Sen, 1993:9).

Sustainable development is a term that is not easily defined. The concept of sustainable development is still being developed and is constantly being revised, extended, and refined. For Sen (1993: 3) 'development' is sustainable if it "meets the needs of the present without compromising the ability of future generations to meet their own needs". The HDR (2010: 19) affirms this view by stating that human development is about enabling people to live long, healthy, educated and fulfilling lives. Sustainable human development is therefore, about making sure that future generations are afforded the same opportunity to enjoy the resources we have access to in trying lead productive and fully realised lives. According to this view human development, if it is *not* sustainable, is not true human development. This definition of sustainable development could be better understood as incorporating both the economic and human aspects of development. This means that sustainable development would currently be impossible to achieve in the absence of present-day social injustice, if the economic activities of some groups of people (who are largely rich and privileged) continue to jeopardize the well-being of people belonging to other groups or living in other (poor and disadvantaged) parts of the world (Sen, 1993:4).

However, there are many contesting definitions of the term 'development'; some ambiguities can be found in how the term is defined in different contexts and for different purposes. In other words for instance, if we look at the economic aspect of development we will find that it focuses primarily on economic growth, while if we look at development socially then we will find socially it focuses primarily on people's quality of life. Looking at the above, one can then make a case for three main types of development, these being: Economic Development, Human Development and Sustainable Development.

In summary, while many have noted the ambiguity of the term 'development' it is clear that in most definitions of development that it incorporates three main components. Firstly it incorporates the economic growth of a country, secondly the quality of people's lives, and lastly the sustenance of both economic growth and people's quality of life. This research study focuses on rural development, which although specifically focused on rural areas encompasses all aspects of development dealt with above.

2.2.1 Millennium Development Goals: A Guide and Measure of Development Efforts

As a means to measure and guide development efforts, the United Nations in the year 2000 adopted the Millennium Development Goals (MDGs) which cover a broad range of development concerns. These MDG concerns include issues such as, poverty and hunger, primary level education, gender equality, child mortality, maternal health, HIV/AIDS, malaria and other diseases, environmental sustainability, and global partnerships (World Bank, 2003:7). Table 2.1 shows each millennium development goal, and its associated targets. According to the UNDP (2010:4) many countries are moving forward towards the realisation of these MDG's including some of the poorest countries and therefore, demonstrating that setting bold, collective development goals yields results for countries. For every life that has benefited from the establishment of a quantitative, time-bound framework of accountability, the MDG's have made a real on the ground impact and difference. However, despite this progress, there are still unmet commitments, lack of focus and accountability, inadequate resources, and insufficient dedication to sustainable development which have created shortfalls in many areas of development and countries (UNDP, 2010:4). Some of these shortfalls are aggravated by current and recent global food, economic and financial crises (UNDP, 2010:4).

The MDG's promote rural development through an alignment with different goals such as, the goal to eradicate extreme poverty and hunger which is particularly high and relevant for the rural areas and other marginalised communities. Despite the positive gains and aims of the MDG's, there are still however, a number of criticisms that have been levelled again the MDGs. Attaran (2005) states that is it possible that despite the firm targets, deadlines, and focused urgency that accompany the MDG's, the MDGs are actually imprecise and possibly ineffective agents for development progress. This is because according to Attaran (2005) while progress on each of these goals is portrayed in time-limited and measurable terms, often the subject matter is so immeasurable, or the measurements are so inadequate, that one cannot know the baseline condition before the MDGs making it difficult to determine if the desired trend of improvement is actually occurring. Therefore, this means that although MDGs are helpful developmentally, they must be used with caution as means to measure the development efforts, bearing in mind always the advantages and disadvantages.

Table 2.1: Millennium Development Goals (World Bank, 2003: 2)

GOALS	TARGETS
1. Eradicate extreme poverty and hunger	1. Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day 2. Halve, between 1990 and 2015, the proportion of people who suffer from hunger
2. Achieve universal primary education	3. Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
3. Promote gender equality and empower women	4. Eliminate gender disparity in primary and secondary education preferably by 2005 and to all levels of education no later than 2015
4. Reduce child mortality	5. Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
5. Improve maternal health	6. Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio
6. Combat HIV/AIDS, malaria and other diseases	7. Have halted by 2015, and begun to reverse, the spread of HIV/AIDS 8. Have halted by 2015, and begun to reverse, the incidence of malaria and other major diseases
7. Ensure environmental sustainability	9. Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources 10. Halve, by 2015, the proportion of people without sustainable access to safe drinking water 11. By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers
8. Develop a Global Partnership for Development	12. Develop further an open, rule-based, predictable, non-discriminatory trading and financial system 13. Address the Special Needs of the Least Developed Countries 14. Address the Special Needs of landlocked countries and small island developing states 15. Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term 16. In co-operation with developing countries, develop and implement strategies for decent and productive work for youth 17. In co-operation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries 18. In co-operation with the private sector, make available the benefits of new technologies, especially information and communications

2.3 Rural Development

The South African Ministry Of Rural Development and Land Reform (MRDLR) (2009: 4) defines rural development as a process that enables the effective use *and* management of natural resources by rural people who take control of their destiny by dealing effectively with rural poverty. The process is a participatory process through which rural people armed with their own experiences and initiatives, adapt their indigenous knowledge to changing and developing their world. It can be established the that rural development can be realised through self-help initiatives as well as through co-ordinated and integrated broad-based rural transformation processes (MRDLR, 2009). MRDLR (2009:5) furthermore, notes that while community initiated development helps, strategic investment in economic and social

infrastructure also has great benefits for entire rural communities as economic infrastructure allows the social infrastructure to attain its goals. Rural community development on the other hand forms the basis of community participation, while the lack of it reflects a failure of the capacity or the will of government to meet the development needs of people in localized areas. It further also reflects the notion that development is about enhancement of the potential of people to emancipate themselves, and hence without development people are not able to free themselves from social ills like poverty (Remenyi *et al.,* 2004: 221).

According to Remenyi (*et al., 2004*) there are two primary principles for rural community development. The first principle indicates that rural development is about development of and for the community, while the second principle emphasises development through community decision-making processes. The South African Government (SAG) (2000: 45) elaborates on rural development as being multi-dimensional and much broader than just poverty alleviation. Through facilitating changing environments, social programmes allow poor people to earn more, invest in themselves and their communities, and to contribute toward the maintenance of key infrastructure (SAG, 2000: 45). A successful strategy therefore, will make people less poor, rather than more comfortable in their poverty as through rural development initiatives found different ways in which they can develop themselves (SAG, 2000: 46). Singh (1986:19) emphasises that rural development is designed to improve the economic and social wellbeing of a specific group of people – the rural poor. Social and economic changes therefore, have a transformative effect on rural and regional communities. How communities deal with these changes depends not only on the actual "delivery" of services, but is also largely reliant on the maintenance of infrastructure and economic development (Cavaye, 2001). It further also relies on local people using the assets in new ways, working cooperatively, improving networks, mobilising existing skills, and putting innovative ideas into action. The results of effective utilisation of rural development are not only the generation of new jobs, income and infrastructure, but also result in strong functioning communities being better able to manage and adapt to change (Cavaye, 2001). Rural development moreover also makes significant contributions in forging community solidarity; promoting togetherness, uplifting the human spirit, and helping to combat feelings of helplessness that poverty can induce into people (Opare, 2007).

According to Mwabu and Thorbecke (2001:4) rural areas are characterized by "high levels of poverty which are associated with the challenges of low agricultural productivity, poor rural infrastructure, lack of access to markets and market information, low levels of investment in

people", *etc.* These areas thus often need to be developed so that the lives of the people that reside in them can be improved for the better. Remenyi, McKay, and Hunt (2004: 221) support this view as they see development as improving the lives of people. SAG (2000:52) take this further to another characteristic of rural development being to ensure that any development that takes place in the area is encompasses a vision of growth in rural areas. While the main aim of rural development is to develop rural areas, the development still has to have a vision of growth so that developers can identify what they have to do, why that has to be done, and also how this growth will take place. SAG (2000: 40) note that another characteristic of rural development is that such development must be used as far as possible to be a mechanism for integrating existing programs, than the formation of new ones. This is because rural communities often already have their own programs in place, for example, a garden project to feed people who are sick or a community coming together to build a school for young people in the community. Rural development has the ability to provide a common vision so that the garden project and the school project can be integrated together to provide better opportunities for the community, rather than forming new projects independently of the new ones.

It is argued that development should have lasting effects on communities, therefore, another characteristic is that rural development provides for the sequencing of actions that should take place in the short, medium, and long term (SAG, 2000: 43). An irrigation scheme for instance which is predicted to provide sixty jobs in 5 years' time in a rural area must thus have a sequence of how such a goal will be attained through clear actions that should be done in the short, medium and long term (SAG, 2000: 43). The MRDLR (2009: 5) also lists the following objectives, activities that are characteristic of rural development: establish savings clubs and cooperatives for economic activities, social mobilization to enable rural communities to take initiative; participation of Non-Governmental Organisations including faith-based organizations; non-farm activities for strengthening of rural livelihoods; wealth creation and productive use of assets; access to resourced clinics; leadership training, democratization of rural development, participation and ownership of all processes, projects and programmes; social facilitation and socio-economic independence; Community Based Organisations and other organs of civil society; and social cohesion and access to human and social capital. There are many other characteristics of rural development, but very few of these characteristics are in actual practice realised although worth acknowledging that these characteristics also need to be assisted by capacity building.

To ensure that rural development programmes suit the local needs they must necessarily involve a capacity for modification according to local circumstances and (Remenyi *et al.*, 2004: 221). It is argued that if rural development programmes would focus on improving the mode of operation and capacity building this would positively impact the development of rural communities (Opare, 2007; Cavaye, 2001). A focus on rural development has been shown to produce real, tangible and appropriate benefits for local people, as well as the added benefits of providing a greater sense of self-worth and empowerment in rural communities (Remenyi *et al*. 2004: 222). In addition to this, because rural development works within the confines of the local community this helps to preserve aspects of local culture that give meaning to rural community life and which assist in maintaining and enhancing the social cohesion (which is necessary when engaging in a process of change) (Remenyi *et al.*, 2004: 222).

2.3.1 The Challenges of Rural Development

Despite the positive gains that rural development can bring, there are still many challenges that face rural development. Remenyi *et al* (2004: 222) for instance, argue that the failure of 'top-down' projects which are designed by the government for the people *without* consulting with people has been responsible for the failure of many rural development initiatives. Often governments in responding to the need to deliver decisive decision making and to deliver tangible benefits to many people including the most marginalized, decision makers as a result respond by adopting a 'top-down' approach for decision making about local needs. This means that while the intentions might be good, often these fail because there's no 'ground-up' consultation where the needs at the bottom of communities are heard and represented. Remenyi *et al* (2004: 222) moreover argue that many large scale projects fail to meet the needs and desires of ordinary people at the local level because, they are often not based on the lived local experience of communities and are frequently unsustainable once the provider has left. In these cases what this therefore, means is that aid often benefits the aid provider who is given a job and a social purpose but has little and sometimes negative, longer-term impact on the aid recipients. Evidently this means that rural community development should be based on a 'bottom-up' approach that allows for both the voices of the decision makers and the voices of the community at the local level. This is because the local people know better in terms of what they need than an 'outsider' who might not have the full picture of the

community needs, and consequently ends up compromising the local community at the expense of the local people.

Rural communities have initiatives that have defining characteristics that are similar to Non-Governmental Organisations (NGOs) (with regard to their voluntary nature and not-for profit orientation) and operate along informal lines to NGO's and are often stationed in the community where they were formed (Opare, 2007). More often than not their members reside in the community and the range of activities and services they offer are also usually limited to that of that particular community and not for external service. This further implies that they incur minimal to almost no overhead costs such as, transportation, accommodation and other out-of-station expenses in their service delivery and programme implementation activities (Opare, 2007). Because of this characteristic, they are therefore, uniquely positioned to support local level development activities that government agencies, donors and NGOs frequently undertake at higher cost and over a relatively longer period, and therefore, result in the initiatives being high risk in terms of investment (Opare, 2007).

It however, also been stated that not all decisions taken at a local level are always appropriate for the development of a community (Remenyi *et al.*, 2004: 223). Remenyi *et al* (2004: 223) argue that as a result of some decisions being based on a sense of desperation with communities responding to crisis, they are as a consequence very short term in nature while others are based on a limited understanding of opportunities available to the community. In some instances decisions can only be taken or limited by traditional elites who retain power in local settings (often in their own interest or personal gain) with a limited understanding of options or outcomes (Remenyi *et al.*, 2004: 223). However, it is noted that "when involving [the] entire communities in development, the social planner must be capable of using existing social relations advantageously" - that is a failure to recognize, engage and employ traditional leaders and others can lead to failure (Remenyi *et al.*, 2004: 223). Remenyi *et al* (2004: 223) indicate that another problem is associated with local decision making where in certain contexts that needs assistance, advice or information, external aid providers can shape local agendas or manipulate them into local decision-making processes, which may not be sustainable and which may destabilize local social relations. Consequently, in discussions about rural community development it must be noted that external factors from the environment, to government, and to broad economic conditions *will* have a constraining influence on what is or is not achievable within a local context (Remenyi *et al.*, 2004: 223). Therefore, an attempt to create an environment in which people can make decisions for

themselves; one will find that these decisions are often made for them by those who are more powerful than them (consequently limiting their input).

Moreover Hemson, Meyer and Mapunye (2004: 15) argue that spending on the rural population is considerably less than that on the urban population. This results in the rate of development of rural areas being slow and there being less or inadequate infrastructure and personnel to assist in development processes. This becomes another major challenge for state capacity is regarded as crucial to development as governments cannot meet development challenges if they are unable to absorb the funding provided to meet social objectives (Hemson *et al., 2004*: 16).

2.4 Importance of Information and Knowledge in Rural Development

According to McConnell *et al* (1995:87), for any community to function efficiently and productively a basic minimum stock of usable information is essential. Every society needs to acquire, store, and exchange this basic stock of information to allow it to survive and thrive. Information is one of the central and critical components to any society seeking solutions about its economic and social problems, and should as a result be regarded as an important factor of production (McConnell *et al.,* 1995:87). According to McConnell *et al* (1995:195) information is that which reduces uncertainty; and as an effect of reducing uncertainty allows us to better predict the consequences of our actions. Increasing our predictive accuracy eventually leads to increased benefits; and thus, the net value of any information can be calculated by determining the increased benefits it leads to, minus the costs of obtaining, storing, and distributing it (McConnell *et al.,* 1995:195).

Harris (2004:14) proposes that when we are able to expressly and explicitly articulate a development strategy, an information plan can be drawn from there onwards. This development strategy allows us to set down the information that is needed, as well as the information resources that are required to achieve the development strategy. Although information is recognized as an essential resource for social and economic development especially in the so-called countries of the ‘third world’ the fact that it is frequently accorded a low status is demonstrative of the fact that its potential value is not yet fully recognized (McConnell *et al.,* 1995:88). Meyer (2002: 93) emphasises that many other resources are needed in the development of people in rural communities with which information as a resource must compare favourably and be fully recognised at the same level as other resources. For example, farming practices in rural communities require a number of input

resources (seed and fertiliser), farming implements (tractors and ploughs), credit, markets, infrastructure and natural resources (soil, water and climatic conditions) Meyer, 2002: 94). At first glance when comparing information to these resources, it would appear that most of them are tangible while information is not, yet information leads them to become and translate from intangible to tangible resources. Consequently, devices and sources are needed to communicate information to the communities. One of the various instruments which can be used to access information could be information and communication technologies.

2.5 Information and Communication Technologies for Development

According to Chapman and Slaymaker (2002: 1), ICTs are technologies that can be used to interconnect information technology devices, such as, (but not limited to), personal computers, telephones and their telecommunication networks. The personal computer and laptop with e-mail and Internet provides the best example for this definition. Chapman and Slaymaker (2002: 1) further identify two types of ICTs, that being the traditional and modern ICTs. More traditional media examples include radio (digital, satellite) and television (cable, digital, satellite), whereas the modern ICTs include computers, Internet, mobile phones, *etc*. Herselman and Britton (2002: 270), suggest that ICTs are:

> *"a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyze, create, exchange and use data, information, and knowledge in ways that, until recently, were almost unimaginable. It refers to the infrastructure that brings together people, in different places and time zones, with multimedia tools for data, information, and knowledge management in order to expand the range of human capabilities".*

Heeks (1999: 3) also defines ICTs as 'electronic means of capturing, processing, storing, and communicating information.' From these definitions there exists a common understanding that ICTs are basically *technological devices* that are used for the manipulation and communication of data, information, and knowledge.

According to the World Bank (2006: 3), Information and Communication Technology for Development (ICTD) is a general term referring to the application of ICT within the field of socio-economic and rural development. Chapman and Slaymaker (2002: 1) indicate that ICTs can be applied either in the direct sense or in an indirect sense. Tlabela *et al* (2007: 4) also suggest that:

> *"ICT for development are initiatives of the international information technology, as well as, community focus on giving less developed areas access to ICTs and to train them and adapt to their purpose."*

ICT thus also create essential avenues for the interconnectivities between rural and more developed regions (Heeks, 2002: 2).

Herselman and Britton (2002: 271) state that ICTD is an initiative that is aimed at bridging the digital divide. Herselman and Britton (2002: 271) further explain the digital divide by providing an example of two groups in the same country. The first group is a certain percentage of people who have the best information and communication technology that is available to society. This group has access to computers and information sources, telephone and facsimile services, Internet services, as well as a wealth of content and training relevant to their lives. Then there is the second group of people. This group consists of the people who, for social or economic reasons, do not have access to computers or even relatively valuable information sources, reliable telephone services, let alone the wealth of information and convenience afforded to one via Internet services. The difference between these two groups of people is what is then referred to as the *digital divide*. Hence, there is a need for ICTD to emerge and help to bridge this digital divide through the different uses of ICT for development. However, this is not to naively suppose that that the mental and material access to information is enough to the extent that the problems of skill access and usage access will diminish through as the digital divide is bridged (Fuchs and Horak, 2008). This means, therefore, that ICTD should not necessarily focus on closing the digital divide, but rather focus on understanding how ICT can be used as an enabler for existing and emerging development activities.

2.6 Uses of ICT in Rural Development

The various ICTs can be used in rural areas to assist the process of development in the following examples:

2.6.1 ICT as a tool for Education

As Casal (2007: 3) correctly notes, education provides the knowledge base that enables the process of development to be eventually effective. ICTs can thus help by providing alternative possibilities for education. Casal (2007: 5) indicates that when ICT is deployed in rural development as an alternative for illiterate people they can become more educated through the use of these ICTs. Yusuf and Yusuf (2009: 228) suggest that the quality of

students' learning will be enhanced through their access to the needed content through ICT facilities (especially the Internet). Information and Communication Technology can enhance learning by increasing information available to learners, thereby bringing about collaborative learning. Ajayi and Ekundayo (2009: 283) also supports this view by elaborating further to state that ICT provides new frontiers for providing access to basic education for disadvantaged children and youth excluded from the formal school system. Because of the accessible nature of ICT, Ajayi and Ekundayo (2009: 283) further find that ICT can provide opportunities for individuals with disabilities to have access to quality education (which they are often marginalized and excluded from).

An example of the application of ICT for education in development is the Khanya Project which was established in 2001 (Isaacs, 2007: 12). It is one of the first dedicated provincial government programmes in South Africa that aims to address the shortage of educator capacity and the need to deliver curriculum to schools through the innovative use of ICTs. Its ambitious goal was to have every educator in every school of the Western Cape empowered to use appropriate and available technology to deliver curriculum, to each and every learner in 2012 (Isaacs, 2007: 12). This initiative allowed for the local communities to contribute to the establishment of technology facilities in the school premises so that education is a shared responsibility by the state, local community, and parents (Isaacs, 2007:12). At present, approximately 20% of all costs of this project are carried by the community. In turn, the facilities are made available to communities to enhance adult learning and, in particular improve computer literacy (Isaacs, 2007: 12).

2.6.2 ICT assisting in Health Care

The Millennium Development Goals place health at the heart of development and ICT is responding by changing how health care is delivered and how health systems are run. According to Moahi (2009: 199) ICT today is fundamental for health systems to meet obligations to deliver care, pursue research, educate students, treat patients and monitor public health. ICT in its many forms is essential for coordinating complex activities, ensuring quality, fostering collaboration and sharing the growing body of knowledge in health (Dzenowagis, 2005: 4). Dzenowagis (2005: 6) propose that advances in ICT have yielded substantial dividends to individual and public health, from the local level to the national level. Moahi (2009: 199) further proposes that there should be different types of interventions in order for ICTs to lead to improved child mortality, improved maternal health and combat the

spread of HIV/AIDS and malaria. These are the different types of interventions suggested by Moahi (2009: 200):

- Enhance the skills and knowledge base of health care providers through education,
- Enhance the skills and knowledge of health care providers through providing relevant information,
- Build capacity in health research,
- Improve communication amongst health care providers,
- Improve the reporting from facilities and different health programs to facilitate planning and resource allocation functions,
- Educate and create awareness of the public towards causes and prevention of different illnesses (consumer awareness and education),
- And improve the management of patient information.

Alemna and Sam (2006: 236) also indicate that ICTs contribute to improving the coverage of national health services in rural areas, through telemedicine which enables access to professional expertise irrespective of the geographical location of the patient or the doctor.

An example of the application of ICT in health for development is the telemedicine project that was launched in Uganda called the Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER) (Musoke, 2002: 1). The RESCUER project was designed to link up rural community health providers with the formal health system in a cost effective way. The effect of RESCUER was such that when an obstetric emergency occurs in a village, a TBA (Traditional Birth Attendants) uses a 'walkie talkie' to call for assistance from the nearest health unit. Advice on what to do is thus immediately relayed over the radio system for those on the scene. If the TBA cannot manage the case, transport is dispatched from the health unit with a midwife to collect the patient. If a case cannot be managed at the health centre level, the hospital is called and an ambulance is sent to transport the patient to the referral hospital (Musoke, 2002: 1).

2.6.3 ICT Enables Entrepreneurial Activities

The use of ICT helps entrepreneurs create an advantage by allowing him or her to be able to research and participate in the global world of business for technology transfer, training, and collaboration. This allows the entrepreneur with the opportunity to develop initiatives at the global level beyond the local level (Viju, 2010: 168). ICT has become an integral part of the

business world around the globe and therefore, the use of ICT increases capacities to share and access information and knowledge which becomes helpful in supporting the development of entrepreneurial business activities at the local level (Viju, 2010: 167). For example, ICT is currently being used by some rural areas to promote tourism. In Ghana, the promotion of rural tourism which is conducted better and more cheaply with the use of web pages than traditional advertising media, resulted in more people investing in development projects with funds generated at local level (Ajayi and Ekundayo, 2009: 283). Pade, Palmer and Kavhai (2010) also highlight that one of the information needs of the Dwesa region in the Eastern Cape, South Africa is tourism development, where heritage and cultural tourism could be promoted through supporting local arts and crafts and creating infrastructure for business development through ICT. Another way ICT is used for entrepreneurial activities is through establishing trading and creating markets networks (Viju, 2010: 169).

ICTs can also be used as an entrepreneurial intervention. The government of Peru promoted the deployment of cabinas (public telephones) through a universal access fund (Fillip and Foote, 2007). Beyond these cabinas, a number of micro-telco's which are small-scale telecom operators that combine local entrepreneurship assisted the government in expanding information and communication technology services to rural and underserved areas of Peru (Fillip and Foote, 2007).

2.6.4 ICT as a form of Rural Empowerment

According to Lennie (2002: 226) ICTs provide access to information that is beneficial and can be utilised for social, technological, political and psychological empowerment. The effective use of ICTs in community development projects has been argued to have many potentially empowering benefits and effects, such as, greater inclusion, cooperation, participation and wellbeing (Lennie, 2002: 226). Empowerment allows people who use ICT to obtain civil information and then apply it to the environment they live in to better their lives. Jain (2007:1) contends that one resource that liberates people from poverty and empowers them is knowledge. Moreover it is also now well understood that any attempt to improve the quality of life of people in developing countries would be incomplete without progress towards the empowerment of women who are often marginalised in both urban and rural areas.

An example of a women empowerment project is the "Networking Rural Women and Knowledge" UNESCO project in Nabanna, India. The project explores innovative uses of databases, intranet portals and web-based partnerships in the local language, for the benefit of poor women (Jain, 2007: 1). The project places high emphasis on building a framework for content creation, information sharing, off-line information dissemination and web-based partnership with organizations located outside the region. The purpose of the project is to build women's local information networks by providing simple facilities and training at five ICT centres in Baduria, Rudrapur, Taragunia, Arbelia and Punda (Jain, 2007: 1). Through the Nabanna Network women are able to share local indigenous information as well as information obtained at the information group meetings or newsletters. For example, women in Baduria though ICT have been able to exchange information on income-generating activities, specific education projects, microfinance and health (Jain, 2007:1).

2.7 Challenges of ICT in Rural Development

The uses and implementation of ICT for rural development is commonly met with a number of challenges and some of these include:

2.7.1 Inadequate Infrastructure

While things have evolved in the past few decades, Gomez and Pather (2012) inform us that the prices of using ICTs to build national information infrastructures which can contribute to innovative 'knowledge societies' are still very high for most governments and society to be able to fully roll out ICTs although they also warn that the costs of not doing so are likely to be much higher. However, it must necessarily be acknowledged that the development sector has seen a slow in meeting the dream of technology bringing about accelerated development, wealth, and opportunity to the majority of the world's poor (Gomez and Pather, 2012). Previously the main challenges that faced rural communities as indicated by Munyua (2000: 1) is that the electricity and telecommunication infrastructure in developing countries is often lacking or is poorly developed in rural areas. In some developing countries, satellite and wireless technologies are now in use, however, these are largely advanced around urban cities while the infrastructure even in these cases is still often insufficient to support the ICTs (with some having none or low electricity to supply to rural areas) (Munyua, 2000: 1). As Alemna and Sam (2006: 237) note, one of the main challenges that a person will be faced with in almost any village in Africa is the shortage or unavailability of electricity and unavailability

of finance to bring this infrastructure to these areas. Ajayi and Ekundayo (2009: 284) also indicate that one of the challenges that rural schools have is irregular power supply which hinders the use of computers and causes disruptions in schools. They ascertain that rural dwellers rarely have direct access to ICTs, and even in areas where they are available, they are still hardly affordable to the rural dweller (with most rural dwellers subsisting on less than USD1.00 per day) (Alemna and Sam, 2006: 237). It is expensive for most rural dwellers to have to pay USD0.30 per minute to make a telephone call from a communication Centre (Alemna and Sam, 2006:237). Choubisa (2012) provides ways that can mitigate the high costs and unsecure connections by suggesting the use of cloud computing (where overcoming the huge costs incurred the infrastructure and software is a major challenge). Chubisa (2012) indicates that cloud computing has been an emerging computing paradigm in which resources of the computing infrastructure are provided as services of the internet. This consequently, allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access.

2.7.2 Illiteracy

Alemna and Sam (2006: 237) state that reading and writing literacy rates are very low in rural areas. However, Heeks (2009: 9) counters this statement by indicating that “it is a common mistake to equate the poor in developing countries with illiteracy”. As Heeks (2009: 9) states in every community people will find that they have at least some literate members who then can act as "infomediaries", and can therefore, massively increasing the accessibility of written materials, online or otherwise. This means that learning does take place in rural settings and that there is evidence of a desire to learn, improve and increase steadily the literacy rates amongst the poor. Alemna and Sam (2006: 237) continue the argument by indicating that the situation of illiteracy is worse when it comes to computer literacy as there are fewer computer-literate individuals in rural areas.

Ajayi and Ekundayo (2009: 284) state that secondary schools often lack computer literate teachers. This makes ICT ineffective in these schools even if donors make donations for the communities to have these facilities, because of the illiteracy it is not uncommon to find that they are rarely being used. Munyua (2000: 6) argues that it is risky to exclude the illiterate from development projects as they are greater in number in the rural areas. Therefore, the challenge is to find technological solutions that can be directly used by rural people to improve their living conditions, as well as to participate fully in economic and social development in the context of the information economy.

2.7.3 Language and Local Content

Munyua (2000: 6) states that rural African economies are still in 'the pre-market' phase for most of the information available on the Internet does not necessarily correspond to the needs of rural communities, and at times the information is simply not presented in a format that is understandable and accessible to communities. Ajayi and Ekundayo (2009: 287) identify that some schools face problems when adapting and using Internet content. Even when the content is adaptable, its translation into understandable language requires skills that are not always available in the communities concerned. Jain (2007: 6) argues that content in local language is extremely important if ICTs are to make a meaningful difference in rural areas. Therefore, it is extremely important to develop content that addresses local, regional, and national needs in order to be able to provide information that is relevant to local, regional, national issues and disseminate that information in an appropriate language that is accessible to targeted residents.

2.7.4 High Cost of Access and Lack of Affordable Solutions

Telecenters have become the fashionable solution to universal ICT access, but even these projects do not guarantee affordable access. Most telecenters are implemented as business ventures that need to be sustainable and therefore, often charge for services based on their costs, which among other things reflect high communications tariffs, expensive equipment, and salaries (Jorge, 2002:4). Heeks (2009) however, also provides another argument about using what is already in communities and that being mobile phones. People who fall into the bottom of the pyramid are often people who have access to and use mobile phones and hence it is not surprising that the growth rates are increasing rapidly in the poorest regions when it comes to mobile phones because of their accessibility (Heeks, 2009). While sustainability and even increasing profitability is possible in some areas, it is not possible in many other areas. The main challenge lies in the ability of ICT advocates to influence the process and policy makers to establish policies that will improve access and lead to project success. An example of this for instance can be through discounted tariffs for a telecenter and community access projects and/or special subsidies to fund projects until demand is large enough to ensure sustainability (Munyua, 2000: 6).

2.7.5 Training and Capacity Building

According to Goulden and Msimang (2005) capacity building, training and human resource developments are imperative to the implementation of policies and programmes and to the development of communities. ICT projects and programmes in communities are met with

weak institutional capacity and insufficient co-ordination resulting in no training for the community members (Munyua, 2006). To combat these challenges, Zeitoun (2003) proposes that there needs to be: availability of appropriate financing, availability of an educational structure which produces "trained" trainers who can reach out to those with the greatest need and lastly in relation to ICTs, the availability of the content material of training through ICTs. Munyua (2006) therefore, proposes that there needs to be partnerships which could contribute with building the essential human and institutional capacities at national and regional level to deliver training and education to rural communities on how to achieve local knowledge and information using ICTs. Through capacity building and training, communities can acquire the necessary skills to manipulate the respective technology and master its practical applications. An example of this can be a farmers' co-op knowing how to obtain market prices for their crops before transporting them to markets, through telephony, fax or Internet, *etc*. (Zeitoun, 2003).

2.7.6 Social, Cultural, Political Challenges

According to UNDP (2001: 9) socio-cultural or political barriers refer to factors that can cause individuals or whole sectors of society to "self-exclude" themselves from participation in ICTD initiatives with the mentality that they are *not* intended for them. Munyua (2000: 6) identifies that women produce more than half of the food in the world, but are faced with challenges in rural development such as, non-involvement in decision and policy-making, weak extension services, poor access to credit, non-adoption of technologies, low status and therefore, varied and heavy workloads, and a lack of access to education and training. When new technologies are introduced, they are seen as a field for men, and women have often been left out or are not granted equal access to initiatives related to new ICTs (Munyua, 2000: 6, Mcnamara, 2003:75). McNamara (2003:76) states that even when women are allowed access to ICTs, cultural constraints on women such as, where, when and with whom they can appear in public with, limit their access to the ICTs. McNamara (2003:76) indicates that if ICT tools are to function as a tool of empowerment, social exclusion and economic opportunity for women, there needs to be efforts to provide access, tools, opportunities and content suited to the important needs of women. Technophobia is another social challenge which results in many people being fearful and suffering from feelings of inferiority when it comes to using technology (UNDP, 2001: 9). According to UNDP (2001: 9) technophobia leads people into feeling insecure and thus decreases the person's confidence in using the technology.

> *"Across the globe, people are prevented from full participation in their societies and economies on the basis of their race, gender, class, age, physical ability, HIV status, geographical location, sexual preference, religion and other socio-cultural factors"* (Bridges, 2006: 1).

Discrimination in rural communities limits the uptake of ICT through social exclusion leads to unequal participation in educational, political, educational, and digital arenas (Bridges, 2006). The introduction of ICT into a country paints the existing landscape of poverty, discrimination, and division onto the new canvas of technology use (Bridges, 2006).

Most governments have planned e-strategies however, due to the lack of public support at a practical level they lack the political will to drive change for an ICT-focused approach (Bridges, 2006). This is often because government officials fail to engage stakeholders in framing the e-strategies so they end up not public buy-in for their long-term plans (Bridges, 2006). There is also a need for public participation so that governments do not have to carry the problem for development alone. When citizens are informed and empowered to contribute in the policy-making processes that determine how ICT shapes their society, they will offer their support to government decisions and be more pro-active in improving their own lives (Bridges, 2006). In some cases the government has partnered with the country's business and civil society sectors to encourage ICT-enabled development at the ground level, but the various stakeholder groups lack the experience and resources to give effective input (Bridges, 2006). At times they do not understand the issues being addressed or they lack clear channels to express their concerns and acquire information (Bridges, 2006).

No matter what the uses and challenges faced, it is imperative to make technology work for the people. Jain (2007: 6) argues that the same information and knowledge obtained through ICTs should be used to find solutions to the challenges that are faced by communities. Munyua (2000: 6) also indicates that due to country specificity, the governments should invest in national and regional approaches that should be taken in light of ICT and the challenges they face.

2.8 Conclusion

Development is fundamental for the human race to be able to survive, and one of the approaches is to provide effective rural development programmes that will be assisted by information and knowledge that can be provided by ICTs as supportive tools. Information needs to be recognised as a resource and consequently that development cannot take place

without it. ICTs are vital for development as they provide communities with information and knowledge. The areas in which ICT can be used include education, health, entrepreneurial activities and rural empowerment benefit communities and thus provide local development through the services provided by ICT. However, the uses are met by challenges such as, inadequate infrastructure, illiteracy, inappropriate content, high cost of access and a lack of affordable solutions, and social cultural challenges. Unless appropriate development takes place, ICTs will always inherit problems that could have been solved had proper development initiatives taken place. However, more appropriate technology development is taking place which addresses some of the challenges that ICTD is faced with and incorporates the community into the development process. An alignment should exist between rural development needs and how ICT can support these needs. Obviously the challenge is to understand the appropriate community needs and to align appropriate ICTD strategy to these needs.

Chapter 3 : The Importance of Aligning Community Needs and ICTD Strategy

Chapter 2 described the importance of development in rural areas and how information can be accessed through the utilisation of ICTs. Chapter 3 goes on to provide more details as to how community development needs can be identified and the importance of ICTD strategy development.

3.1 Introduction

The needs of a community are the most important in the process of development. Identifying these needs in the process of development needs is imperative so that development initiatives can be aligned to these needs and not abstract ideas that have no significance for the community. The ICTD strategy outlines the plan of how the ICT project is to operate in the development context. The ICTD strategy should then be linked to the needs of the community in order to create effective community focused change in the environment. The aim of this chapter is to primarily identify why these needs are important, what needs should be fulfilled and how to align ICTD strategy to the needs of the community. This is achieved through first exploring what needs are and the process of determining these needs. Secondly, an investigation into what ICTD strategies are and how they should be developed is identified. Lastly, the chapter concludes by arguing that the needs of a community should be identified through an appropriate process such that the relevant ICTD strategy is developed and aligned to community needs.

3.2 Defining Importance of Needs and Information Needs

3.2.1 Defining Needs

Amos, Ristow, Ristow and Pearse (2008: 8) define a 'need' as something that is necessary for organisms to survive and live a healthy and productive life. A simple means to determine whether a thing is a need or a want is to determine whether the deficiency of a need would cause a clear negative outcome, such as, dysfunction or death. This is done through the process of identifying the current condition to a desired condition and thereafter proceeding to define and compare the problem(s) or deficiencies in needs (Gupta, Sleezer and Russ-Eft, 2007: 15; Altschuld and Witkin, 2000: 7). It also involves the process of understanding the behaviour and mechanisms that contribute to the current condition. This is then followed by a process of determining whether specific behaviours and mechanisms can be changed to produce the desired condition through the development of solution strategies and the building support for action. An example of this is provided in Figure 3.1.

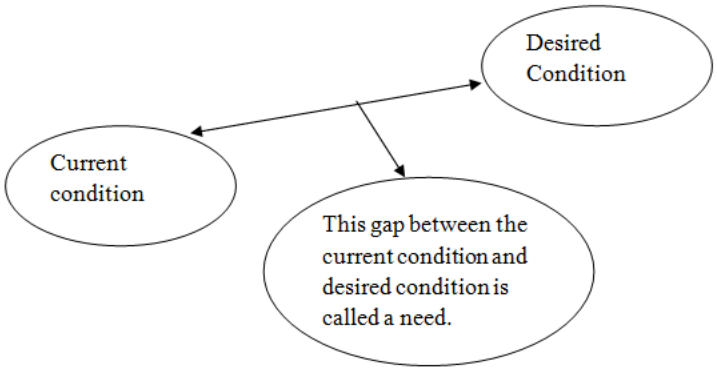

Figure 3.1: The need Identification (Gupta et al, 2000)

Gupta *et al.,* (2007: 30) provides the difference between a want and a need and state that a want is something that a person would *like* to have even though it does not contribute to the long-term learning or performance goal. By contract when a need has been addressed it contributes to achieving the desired learning or performance goal by closing the gaps between the current condition and the desired condition. It is evident therefore, that needs have to be satisfied in order to achieve a positive state, goal and outcome. There are different levels of needs as shown in Figure 3.2 below.

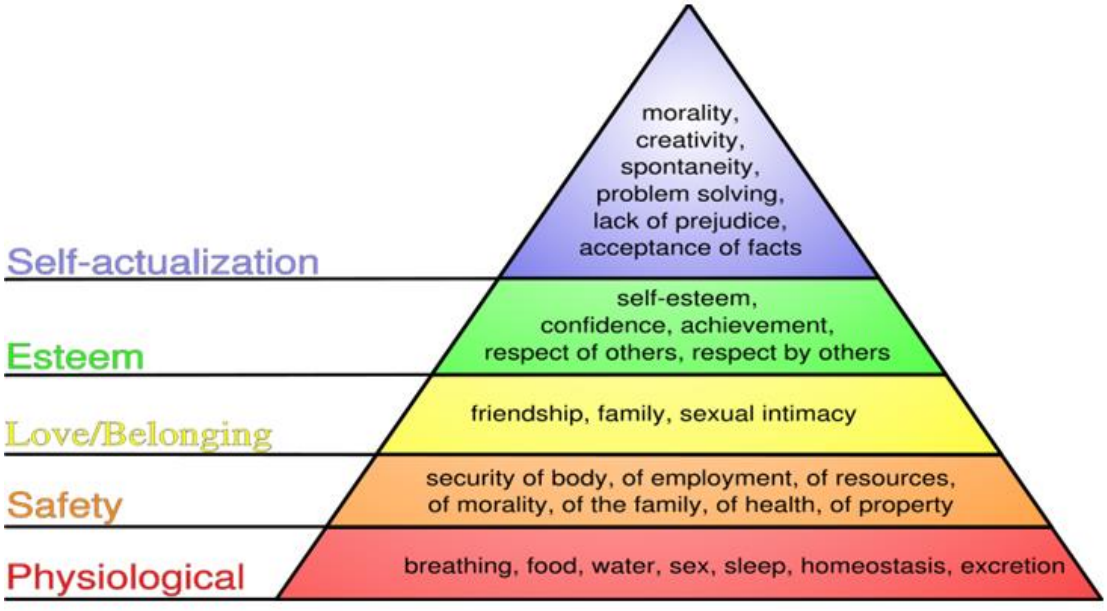

Figure 3.2: Maslow's Hierarchy of Needs (Amos et al, 2008)

Amos *et al.,* (2008: 250) describe the different levels of needs in terms of Maslow's hierarchy of needs. According to Maslow's hierarchy of needs humans are seen to have five basic

needs, these being: Physiological Needs, Security Needs, Social Needs, Esteem Needs and Self-actualizing Needs. As these needs are in different levels, each level of the needs should be satisfied *before* a higher level of needs can be satisfied and met. A person therefore, for example, must have the physiological needs met before the safety needs are also fulfilled. This is attested to by Herselman (2003: 4) who indicates that desires at the top of Maslow's hierarchy of needs are activated only when and if needs at the bottom have been fulfilled. Magnuson (2010: 2), further states that:

> *"a person must have food, shelter, clothing, water and oxygen, this is just common sense, this is not necessarily development, but the lack of these things guarantees lack of development".*

The availability of development enables a person to reach higher need levels as development provides resources such as, information, opportunities and many more for other need-levels to be reached. Magnuson (2010: 3) cautions and acknowledges that development *cannot* be forced upon a person but rather that it can only be brought about through a broader understanding of the wider world needs. Yawson, Armah and Pappoe (2009: 953) also state that in terms of development; information that seeks to satisfy the different levels of Maslow's hierarchy of needs are an important aid to development. These needs have to be satisfied in order for humans to survive and live fully realised lives. In order to identify the appropriate needs there has to be a *process* that needs to be followed to identify them and an example of this can be through a needs assessment.

3.3 Needs Assessments Processes

A needs assessment is a diagnostic process that relies on data collection, collaboration, and negotiation to identify and understand gaps in the current condition in a community compared to the desired condition. Through the diagnostic process decision makers are able to determine actions that need to be taken to reduce the gap (Gupta *et al.,* 2007). This process is also undertaken for the purpose of setting priorities and making decisions about programs or organisational improvement and allocation of resources (Gupta *et al.,* 2007: 16; Altschuld and Witkin, 2000:7; Kaufman and English, 1979:8). A needs assessment also frames the problems or opportunities of interest and builds relationships among the people and groups who have a stake in the issue (Gupta *et al.,* 2007:20; Dagenais, 2010:17). Bridges (2011:1) notes that in relation to ICT initiatives, a needs assessment should fully investigate current technology use in the area to be served. Some of the factors that have to be taken into account include the local capacity to use the technology; the availability of technical support; the kind

of services that people and organizations would be willing to pay for and what may need to be provided for free. Furthermore, the training needed to integrate technology use into daily routines of the target groups, the availability and reliability of electricity and phone lines; secure storage for technology; and many other factors also have to be accounted for. This view is different from the other views on needs assessments for this one starts by assessing and accessing what is *already* there in the community and what needs to be done according to the external stakeholders. A case can thus be levelled that this approach employs a top-down approach in terms of conducting a needs assessment as it is primarily focused on decision makers than the views of the community. Pade-Khene and Sewry (2011) provide a different view from that of Bridges (2011) as they indicate that needs are identified through investigating the livelihood resources that are essential for rural development such as, economic or financial capital, natural capital, human capital, social capital, and informational capital. Using Chapman and Slaymaker (2002: 8) each of these now explained in detail below:

- Financial capital relates to the support and strengthening of the local financial institutions including micro-credit organisations. This capital helps to improve information delivery on services and facilities available such as, loans and savings schemes.

- Natural capital relates to improved access to institutions dealing with different features of natural resource management. The can include administrative and legal information such as, land records.

- Human capital relates to improved access to education and training through distance learning programmes and education tools in a wide range of different formats.

- Social capital relates to improved ‘networking’ both at the community level with existing networks and can also potentially include a much wider community.

- Information capital refers to access to markets and market information which helps to improve choices for the sale of goods on local markets. Information capital can accordingly lead to improved information on prices, comparative supply and demand for products.

The needs assessment must give a comprehensive picture of local needs and conditions so that technology solutions can be adapted to the particular circumstances. This is especially important in developing countries where technology solutions that work in the United States, Europe and other "developed" environments cannot simply be transplanted to developing-country settings and expected to work as they do in western infrastructure (Bridges, 2011: 1). In order to conduct a needs assessment it is therefore, clear that a framework needs to be followed.

3.3.1 Tools, Methods and Procedures of Conducting Needs Assessments

Kaufman and English (1979: 8) emphasize the importance of using the correct needs assessment tools, methods, procedures, strategies, and techniques in trying to identify the gaps between current outputs or outcomes and the desired or required outcomes in a needs assessment. A collection of different data collection tools in a needs assessment allows people to get a view of the community needs in different forms. Most of these tools are not often in conflict but also often also complement each other as well. The tools, methods and procedures that can be used are for a needs assessment include the following:

- *Interviews*: Interviews allow selected internal and external stakeholders of the project to be interviewed in-depth views and opinions are collected on what they think are the needs of the community and the views on needs that relate specifically to areas within the community (Gupta *et al.*, 2007: 44; Pade-Khene and Sewry, 2011; Altschuld and Witkin, 2000: 11; Dagenais, 2010).

- *Focus groups:* Focus group interviews allow identified and selected target groups to be interviewed together and hence collect discussions conducted on what are their specific needs and those of the community at large. This set up of a focus group is in the form of a workshop, and hence allows for discussions where one can ascertain input from the target group. Focus groups also allow external stakeholders to establish a consensus of the community needs (Gupta *et al.*, 2007: 44).

- *Story telling*: We can also use stories to describe project experiences, activities in a formal or informal way, and hence also transmit tacit knowledge. Stories, as opposed to theories are a simple and accessible way to communicate complex ideas, key messages and lessons learned in a way that engages people’s minds, imaginations and emotions (Pade-Khene and Sewry, 2011).

- *Information needs mapping*: Information can also be assessed in a bottom-up, participatory, grounded manner which allows the identification and determination of thier own information needs by the user through information needs mapping (Heeks and Molla, 2009: 55; Dagenais, 2010).

- *Observations*: Observations allow for the user community to be viewed without interruption in their own natural setting. Through participant observation we are then given a window to view how the participants live, their problems and the challenges that they experience in their daily lives (Gupta *et al.*, 2007: 44; Brutschin *et al.*, 2006: 6; Robinson and Perkins, 2009: 39).

- *Multimedia techniques*: There are also a number of multimedia techniques that can be used such as, photography and video recording of the problem that people experience in their daily lives. Recoding events that take place in the community and analysing them is another way (Pade-Khene and Sewry, 2011).

These methods all aim to get an in-depth view of the needs of the community, their challenges and ideas of how their problems can be solved. All these methods are qualitative in nature as they allow comprehensive information that can be analysed further in a holistic manner. The whole process of conducting a needs assessment produces a base benefit to the community which is a foundation of planning and action to improve learning, training and performance in the community.

3.3.2 Benefits of Conducting Needs Assessments

As the base benefit of conducting a needs assessment is a foundation of planning and action, it allows other benefits to develop as well. The needs assessment provides data and information which is the most important benefit as action that can now be taken is based on the information and data that has been collected (Gupta *et al.*, 2007: 44, Pade-Khene and Sewry, 2011). Since action is also to be taken, it will be better taken on problems that have been clarified as well as opportunities that can be now easily identified from the data collected from the community. The other benefit of this therefore, is that actions can be prioritized to solve the most pressing problems according to the community first (Gupta *et al.*, 2007: 44; Altschuld and Witkin, 2000: 11).

Building relationships among those who have a stake in the situation on the ground in communities and also determining who must be involved in the solution process for it to be

successful is also one of the major benefits of a needs assessment (Gupta *et al.*, 2007: 44). Another benefit is that resources can also be allocated in a proper manner as well as aligning the resources to the strategy that has been developed based on the needs assessment. This also facilitates setting future goals for action and establishing objectives for the initiatives which will be taken (Gupta *et al.*, 2007: 44). Lastly other benefits include being able to provide baseline data for later evaluation of results of the progress of the project and also providing recommendations for potential ICT solutions to support and meet local information requirements with continuous attentiveness of emerging demand driven needs (Gupta *et al.*, 2007: 44, Pade-Khene and Sewry, 2011).

3.3.3 Types of Needs Relevant to Community Development

Since all communities need development, it is vital that the needs are known by the external project stakeholders. This is done so as to avoid the "design reality" gap that develops when the relevant needs of a community are not known and are not linked to the ICTD strategy. The rural ICTD professionals tend to develop ICT solutions based on their own perception of the end-users' requirements, rather than developing ICT through an exploration of the rural poor's information needs (Dhingra and Misra, 2004: 1). In order to provide information that is relevant to all people in the community is critical that we explore further three main types of needs for community development, and these being: information, community and target needs, and demand driven needs.

Information Needs

Rural communities have different needs for information depending upon their functions, responsibilities and duties. A number of different community information centres are meeting up these demands through the provision of information services (Islam, Mostak and Hoq, 2010: 109). The provision of these information services need to be accessible, usable and relate to the needs of the community. Rural communities generally require information that relates to agriculture, health, politics, education, economy, and community development (Dutta, 2009: 47). Dhingra and Misra (2004: 2) state that it is advisable to develop information *categories* representing the information needs of rural communities. An example of this process is communities needing information relating to government information. The information categories in this instance would be for example; forms, land records, employment opportunities, voter lists, government departments and offices and more (Dhingra and Misra, 2004: 2; Ndiwalana, Scott, Batchelor, and Sumner, 2010: 2). It is

therefore, imperative that these information needs are known so that the ICT project can be properly used and applied (Heeks and Molla, 2009: 56; Harris, 2004: 15). ICT greatly facilitates the flow of information and knowledge by offering the people who have been socially marginalized and uninformed community unprecedented opportunities to attain their own privileges (Harris, 2004). Applications allow for information to be supplied to user communities and allow them the change to devise and propose solutions to the problems that they have and to also communicate with other people who are not in the community (Islam *et al.*, 2010: 110). Accordingly, these needs that the community has also develop further on as more information will also be needed. It is important to note that the method that the information is relayed in to the community also has to be at a communication level and medium that the community understands. Dutta (2009: 47) states that illiteracy is the primary barrier to fulfilling information needs of communities as the information is usually in reading format and in some communities reading levels are low. ICT projects therefore, *must* provide information in all forms so as to accommodate all people irrespective of literacy levels. However, in communities there also needs to be a supply of information that is more specific, hence we also need to ascertain community and target group needs (which are explained below).

Community and Target groups needs

Community needs are those needs that are identified through a participatory process involving the community (Alkire, 2002: 181). These needs are needs that are relevant, contextualized and accepted by the majority of the people in the community to be reflective of their desires for development needs (Bailur, 2007). In addressing the appropriate community needs ICT is able to play a key role in meeting the socio-economic objectives of rural communities by positively addressing the "eight Cs" of success in the digital age. These "eight Cs" are: connectivity, content, community, commerce, capacity, culture, co-operation and capital (Islam *et al.*, 2010: 113). In the community, people have different ages, genders, occupations and roles, and thus when people are then grouped into these groups we are able to start establishing target groups. These groups can be the youth, the elderly, schoolchildren, business groups, teachers and the wider community at large. ICT projects should assess whether such projects are consistent with the preferences of target groups. This includes making sure that the projects are better designed and constructed, and are more sustainable in improving the delivery of services (Mansuri, 2004: 19). It is vital that needs relating to these specific groups are identified to provide information that is appropriate to their needs. Clearly

therefore, the key element in identifying community and target group needs is applying a bottom-up community participation approach to this process. Bailur (2007: 4) states that one criticism of community participation is that it can be a top-down notion imposed by the organization implementing the project and thus ends up neglecting what the community needs to say.

Demand Driven Needs

Demand driven needs occur when the "users play significant roles by identifying needs and formulating demands" of the services and information that they require and thereby shaping solutions as to how they can solve their own problems (Mulder, Bohle, Boshoman, Morris, Tempelman and Velthausz, 2008: 8). According to Pade-Khene and Sewry (2011) demand driven needs start to materialize when ICT services have been implemented and are being used in the community and local individuals or telecentre staff are empowered to evaluate demand driven needs that have arisen. This is because ICT services now become a part of the community and thus the users can observe and report on changing usage patterns or community requests especially in the absence of the project team or evaluator. Chapman and Slaymaker (2002: 15) also indicate that consumers who are given a choice often also facilitate demand driven and consumer specific programming with regards to the type of information they need. Demand driven needs also allow for progressive adaption's to be made as to what the ICT project offers. Mulder *et al*., (2008) provide an example of the importance of community needs revaluated. They state that Information needs should be maintained and new information needs require constant revaluation. It is interesting to note that rapid development of driven demand lowers the investment risks entailed by the telecommunications service providers who provide access, among which may be local governments and rural co-ops (Hollifield, 2003: 137). A community, therefore, needs to engage and adopt the information that is first there and then be able to develop more community driven needs.

The identification of these needs therefore, provides external project stakeholders with vital information that should contribute to the development of an appropriate ICTD strategy that is tailored to suit the needs of the community and enhance development.

3.4 Defining Strategy and ICTD Strategy

3.4.1 What is Strategy?

While developing countries are slowly beginning to join the global information infrastructure, they still need to establish effective ways to maximize the benefits and control the risks associated with ICTs. This means coordinated action, encompassing the technologies and services, as well as many aspects of the institutional environment can be used to contribute to an effective strategy (Credé and Mansell, 1998:1). Strategies are needed to establish the necessary needs, engineering knowledge, and management techniques to build the social and economic institutions needed to reap the potential social and economic benefit of ICTs (Credé and Mansell, 1998: 1). Luftman and Brier (1999: 102) identify a strategy as:

"The direction and scope of an organisation over the long-term, which achieves advantage for the organisation through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfil stakeholder expectations".

Strategies will need to be flexible and open to the requirements of a wide variety of stakeholders (Credé and Mansell, 1998: 1). The implementation of the strategy also needs to be monitored closely as there is no point in developing a strategy that will not be implemented effectively. Li, Guohui and Eppler (2008: 4) define strategy implementation as a dynamic, iterative and complex process, which is comprised of a series of decisions and activities by managers and employees. Therefore, the strategy is affected by a number of interrelated internal and external factors and thus a number of stakeholders have to work together, to turn strategic plans into reality and consequently achieve strategic objectives. Strategy implementation is integral to any organisation for without it the goals that were planned and identified in the strategy will not materialize. It is advisable that ICTD community strategies comprise of development, information, and technology strategy, which when combined work together to contribute to the holistic strategy of the ICTD (Harris, 2004).

3.4.1.1 Development Strategy

According to Harris (2004: 16), a development strategy provides bottom-up, demand-driven development objectives that are usually better to top-down, supply-driven objectives, so that goals arise with an appreciation of the needs of the development recipients as they would themselves express them. A development strategy also provides for the building of enabling environments through support for policy and a regulatory framework for advice and development that promotes local capacity development (Canadian International Development

Agency, 2005). It provides a plan on what needs to be *done* to create employment, eradicate poverty, improve the socio-economic conditions, and much more (Inter-American Development Bank, 2004). A development strategy that is well grounded within a business and environmental context and that matches a local need with a local opportunity will allow for strategy to be effective (Harris, 2004). However, in order for the development strategy to be realised, the appropriate information should be obtained and hence the need for an information strategy to be drawn up.

3.4.1.2 Information Strategy

According to the Canadian International Development Agency (CIDA) (2005), an information strategy allows communities to expand their choices and improve their livelihoods through the availability of information this then contributes to the reduction of poverty by providing individuals and communities with different opportunities. Harris (2004) adds that the information strategy should set down the information resources that are required to achieve the development strategy. This information may range from the availability of government services and issues of governance to financially viable markets and income generating opportunities. This information strategy may further provide information on education, health care and delivery, skills development programs and HIV/AIDS care/prevention. An investigation then needs to be conducted into how this information can be accessed. This process then necessarily gives rise to the development of an ICTD strategy.

3.4.1.3 ICTD Strategy

Harris (2004:15) states that an ICTD strategy should always begin with a development strategy, from which an information strategy will be developed and this can be followed by the development of a technology plan. An ICTD strategy like any other strategy contains the aims, vision, objectives and goals for the ICTD project. An ICTD strategy would then be a strategy that would be used to effectively plan over the long term how the ICT will operate in terms of development, and how the ICT resource/s will be used to achieve this strategy in the rural environment to meet the information needs of the community. The ICTD strategy objectives are tied to the communities overall development objectives, which include education, health, government, business, and industry (World Bank, 2006: 88; Geldof, 2005: 7). ICTD is intended not as an end in itself but as a means to fulfilling the larger development needs of a country (World Bank, 2006: 88; Geldof, 2005: 7).

Ideally implementation should be an interactive process that will evaluate the outcomes and follow-up its own progress. Monitoring and evaluation are thus crucial for the successful implementation of projects or programmes (Geldof, 2005: 7). The usual cycle in implementing ICT in developing countries is first to provide infrastructure and equipment, then provide training and finally to scale up and create sustainability (Geldof, 2005: 7). Geldof (2005: 7) states that there are several factors that are critically important for successful implementation of an ICTD strategy that includes visionary leadership, truly multi-stakeholder partnerships, innovative solutions adopting different models, setting up expert task forces, and winning the support funders like the government in order to promote and receive funding. The next example illustrates how a project integrated the lessons learned into developing their ICTD strategy and also contributing to the success of a project.

The International Institute for Communication and Development (IICD) reports on a project was initiated for the development of an ICT strategy for the Agriculture sector in Bolivia, with a focus on small-scale farmers and indigenous groups (IICD, 2010: 1). The objective of the project according to the IICD was 'To coordinate and promote the introduction, access, uses and application of ICT in order to improve rural development in a more sustainable and participative way, with particular attention to impoverished sectors' (IICD, 2010: 1). Lessons learned from this case study, which are associated with the implementation of an ICTD strategy, indicate that there has to be participation at local sector level. This means therefore, that while the government must be involved in the process, it must still work with the community (IICD, 2010:1).

In addition to this moreover, there has to be external support for the strategy formulation and implementation process requires long-term support from advisors outside the ministry/government (IICD, 2010: 1). A development-oriented ICT strategy therefore, is vital for the success of an ICTD project. Often ICT strategies have a built-in lean towards relatively complex information that is particularly relevant to big business and not to ICT for development (IICD, 2010: 1). Coordination versus implementation is another lesson from this study. Governments generally aspire to centralise information using complex databases and information systems. As a result of this the focus is often on the development of software and large-scale systems rather than on understanding information processes at the Ministry and in the sector as a whole (IICD, 2010: 1). Moreover another lesson from this case study relates to the sustainability of the project. The focus on coordinating existing information sources and the exploitation of existing communication channels in the community is conducive to the

implementation of a viable and cost-effective ICT strategy at sector level (IICD, 2010: 1). These lessons potentially contribute to practices that can be applied when aligning local needs with ICTD strategy. They are useful ICTD strategy models that can be used to provide a direction for the ICTD projects.

3.4.1.4 The Relationship between Development, Information and ICT

The framework shown in Figure 3.3 provides a general rule that states that the application of ICTs for development should always begin with a development strategy. The development strategy encompasses development decisions, objectives and directions, change orientation and priorities of development (Harris, 2004: 15). From there onwards an information plan (which should provide development based information) is developed and should be demand based and application focused (Harris, 2004: 15). The plan for implementing the development strategy can be derived and only out of that should a technology plan then emerge. The technology plan following the development strategy should be activity based, supply oriented and technology focused (Harris, 2004:15). The arrows in the Figure 3.3 illustrate how the development strategy provides a direction for development.

This direction allows and influences the needs and priorities that are identified through an information strategy that can be supplied by the technology strategy. From the technology strategy, the infrastructure and services needed are identified which can support the information and development strategy. Figure 3.3 also contributes positively to the understanding that IT should be proactive and collaborative. This allows for the initiative in the community to be more sustainable and effective. Collaboration between the community and external stakeholders will allow for more joint solutions to be developed as it will include what the community would like to see happen in the community. The vision will also be clear to the IT stakeholders how proactively they can help develop the solutions of the community with their input.

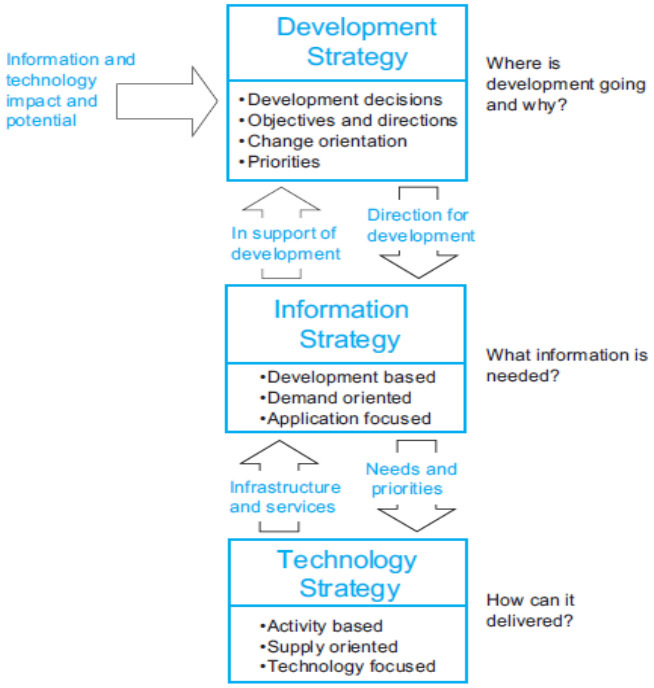

Figure 3.3: The Relationship between Development, Information and ICTs (Harris 2004:15.)

The CIDA (2005) also indicates significant opportunities for learning can be created by ICTs which offer new ways of providing access to information and knowledge. These opportunities include new ways of networking, social organization and participation. They further help to improve transparency and accountability. The information and knowledge at times carried by ICTs are increasingly becoming integral factors in the political, institutional, and international processes. The divide created by the lack of access to such sources impacts opportunities for developing countries' wealth distribution, economic growth, social empowerment, and development (CIDA, 2005). Equal access to ICT's as one of the lessons learned by CIDA (2005) is imperative to positive development impact on the various social groups. This is particularly important for disadvantaged and marginalised groups such as, the poor, children, and indigenous peoples. In each of these cases it becomes important, therefore, that gender patterns, roles and relations of resource access should be considered of each of these groups. If a country's policies and development strategies do not account for these issues, ICTs can worsen inequalities by, for example, catering to the literate people in the community only and leaving disadvantaged groups lagging further behind. Therefore, an inclusive framework as indicated in Figure 3.3 should be developed with the various social groups and all these factors in mind. The linkage then affects the implementation of the

strategy, which is based on how ICTD strategy is linked to the needs of the community. When this is not the case then a design-reality gap arises.

3.4.2 The Effect of the Design-Reality Gap

Heeks (2009: 18) identifies that ICTD 2.0 is about *Closing Design—Reality Gaps*. The analysis of ICTD 1.0 project failures has shown that a single fundamental model can be used to explain the failures and this model is the design—reality gap model. The model reveals that failures are linked with a large gap between design prospects and the actual realities of the project and its context (Heeks, 2009: 18). This further links also to why many ICTD projects fail. For example, it is not uncommon to find that the skills available in the community are not what the ICTD project thought and expected they would be (especially if they did not thoroughly investigate the community's capabilities). Dhingra and Misra (2004: 1) also indicate that the rural ICTD professionals tend to develop ICT solutions based on their own perception of the end-users' requirements, rather than exploring the rural poor's information needs. This, therefore, results in the design reality gap. Figure 3.4 demonstrates how this works out for challenging projects where such large gaps are found on one or more of a set of dimensions. This is summarised by the ITPOSMO acronym, as shown in Figure 3.4.

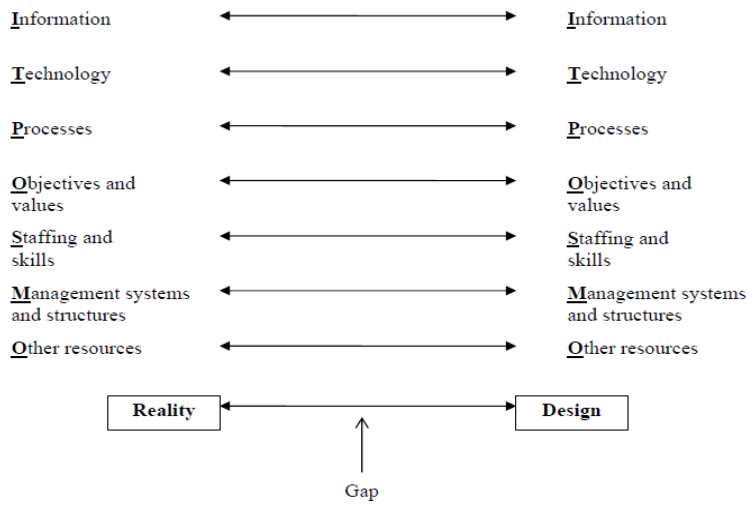

Figure 3.4: Design-Reality Gaps in ICTD Projects. (Heeks 2009:19)

Drawing from the model in Figure 3.4, techniques to identify ICTD project risks can be applied before, during and after the project. During these three mentioned periods of the project, the scores obtained can be utilised for risk identification (Heeks, 2009: 18). These two periods (before and after) could be used to envisage the likely project outcomes, and

assist in identifying risk mitigation actions. These actions may be dimension-specific; for example, to change the technology design, or to improve the reality of current skills (Heeks, 2009: 18). However, these actions could also be more common therefore acting as a more general guide to ICTD 2.0 good practice (Heeks, 2009). Examples of these would comprise of mapping project realities and finding methods to expose the true situation within the project context and then integrating that into implementation processes. An example would be the use of soft systems techniques such as, "rich pictures", which have been known to mapping realities in a good way (Heeks, 2009: 18).

From the design-reality gap, generic and general guide, something very similar to the guidance for ICTD project strategy illustrated in Figure 3.4 is discovered, which draws together lessons from ICTD 1.0. Figure 3.5 draws from these design-reality gaps that are evident in ICTD project failures and produces a model that can be used to ensure a successful ICTD project. Figure 3.5 identifies that a successful ICTD project is composed of actors and governance which includes maintaining stakeholder partnerships and producing an open and competitive environment. CIDA (2005) suggests developing more active collaborations with other international organizations, government partners, in ICT programming and delivery. This model is also composed of sustaining projects, which include financial and social sustainability through the provision of local ownership. Lastly, the model is also composed of aligned and contingent design techniques which promote the participation of local users by providing appropriate technology combination to match local realities and thus aligning local development goals and the consideration of project risks (Heeks, 2009). According to Heeks (2009) all these components promote successful ICTD projects. The CIDA (2005) also state that for the successful implementation of an ICT project, practical information about key success factors should be provided and provision should further be made for best practices and examples of how to integrate results-based management into particular areas of ICT programming and then to develop an evaluation mechanism for measuring results of programming in ICTs.

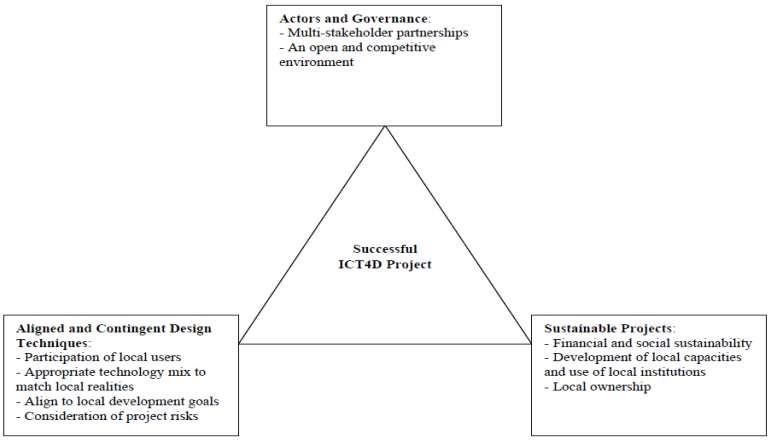

Figure 3.5: Good Practice for ICTD 2.0 Implementation (Heeks, 2009:20).

3.5 Conclusion

There has been a growing urgency for ICTD programmes to provide valuable and appropriate services and applications to the communities they serve. There are many ways in which this can be done. The first step should be investigating the needs of the community through which one is able to get highlights to the general and information needs of the community. They should be conducted using the appropriate tools, methods and processes in order to elicit the needs. A starting point could be a diagnostic process that identifies the gaps between the current conditions to those of a desired condition. There are many benefits which emanate from conducting needs assessments such as, providing appropriate services that will actually contribute to the community development. Within community needs there are however, different types of needs such as, information, community and target group, and demand driven needs. The needs should serve as a base in aligning ICTD strategy and the needs of the community.

Harris (2004) proposes an approach to avoid the gap through finding the relationship between the development strategy, information and technology strategy. The development strategy develops from the base of the needs assessment of the community. This is so as to identify a direction that needs to be taken in developing the needs of the community. With the development strategy identified relevant information thereafter is to be provided. This is vital for if this is not done a gap develops between the relevant information required by the community and information that the ICTD project can deliver. An aligned ICTD strategy to the needs of the community will also provide relevant technologies, appropriate language, appropriate services and more (CIDA, 2005). A project therefore, needs to be aligned to the needs of the community as it needs to be locally relevant for it to survive in the long term.

Lessons can be learned from the field of business-IT alignment, which provides factors and approaches to align the IT systems and operations with the needs and operations of business.

Chapter 4 : The Case for Business-IT Alignment in ICTD

Chapter 3 described the importance of needs assessments in communities and their linkage to ICTD strategy. This involved investigating the ways in which the needs of the community can be identified and the process involved in identifying these needs and ICTD strategy. Chapter 4 presents the process of the alignment of business needs to IT strategy. The chapter further looks at the enablers and inhibitors of this process and a discussion follows as to how it can be relayed to the Needs-ICTD strategy alignment.

4.1 Introduction

The lack of alignment between community needs and the ICTD strategy results in inappropriate services being provided to communities. The Business-IT alignment can provide some lessons on how this alignment can be achieved in the ICTD strategy. The dynamic environment that businesses find themselves in requires they always stay competitive and get successful returns at the same time. This requires that they fully understand the environment they are faced with and also know how to manage their Information Technology (IT) strategically for them to be successful. This also goes for community needs as they have to be fully understood, in order for them to be fulfilled through the products and services of the business. IT is changing the way companies organize their business processes in a number of ways that include a change in the ways businesses communicate with their customers and potential customers and the delivery of their services. A key factor in this for a successful company therefore, is an effective and efficient alignment of the way IT supports business needs, strategies and processes. It is important that the human aspect of the alignment must not be forgotten as it also provides the basis of the alignment process.

The aim of this chapter is to provide an understanding of business-IT alignment and how it functions. The first section provides definitions of what business-IT alignment is, what it entails and its role in the organisation. The second section presents the value and benefits of the business-IT alignment process. The enablers and inhibitors of the alignment process and the methodologies and approaches taken to achieve business-IT alignment are also further explored in detail. Lastly, the chapter proceeds to discuss how the business-IT relationship impacts the organisation. The Chapter concludes that the appropriate impact in community projects will be better and properly assessed based on the appropriate linkage of the community needs *with* ICTD strategy based on lessons learned in business-IT alignment.

4.2 Business IT Alignment

Business-IT alignment is defined as the extent of where the Information Technology (IT) function of the business supports and is supported by the business strategy through the alignment of the mission, objectives, structure, technology, personnel, processes and plans of both functions working towards the same goal (Chan, 2002; Gartlan and Shanks, 2007; Luftman, 2003a; Reich and Benbasat, 2000). Chan (2002) refers to business-IT alignment as the “bringing in line” of the Information System (IS) function’s strategy, to the IT strategy for

the business to function effectively. Alignment can also mean the correlation between the plans that the business has to achieve its goals and the plans that IT has for the business to be able to achieve its business goals (Gartlan and Shanks, 2007).

The alignment of the IT strategy with the organisation's business strategy is a fundamental principle that has been advocated for over a decade (Luftman, 2003). The investment of IT has been escalating for years as managers try to find ways to manage IT successfully and to integrate it into the organisation's strategies. As a result Luftman (2000) details a number of things that IT managers need to do in managing IT in organisations:

- Know how the new IT technologies are going to be incorporated into the business as well as the different technologies and architectures required,
- Be aware of senior management's tactical and strategic plans,
- Be in attendance when corporate strategies are deliberated,
- Understand the strengths and weaknesses of the technologies in question,
- And lastly, the corporate-wide implications.

Maes, Rijsenbril, Truijiens and Goedvolk (2000) also emphasise that in the plight of companies trying to achieve alignment, alignment needs to be seen as a practical tool and with the following factors to be taken into consideration as well:

- The company needs to establish an unambiguous definition of alignment and what it means for their business. Alignment should be thus seen and considered as a dynamic process with multiple different levels ranging from strategy to implementation.
- The company should further attempt to formulate some measurements that will measure the level of alignment that the company has achieved, and the areas of lack.
- The companies should be focused to take the relevant business and technological contexts into account and further pay clear attention to the human factors.
- Lastly the companies should also be well balanced. This requires taking the practical limitations of management seriously on all components and showing leadership.

As alignment remains in importance today and companies struggle to link technology and business, it is critical that alignment pay attention to both doing the right things (effectiveness), and doing things right (efficiency) (Luftman, 2003a). Converse to the approach of the IT planning methodologies, aligning IT to business is not just a methodological process as alignment requires processes, structures, capabilities, relationships and strategies (Silvius, Waal and Smit, 2009).

Alignment enables organisations to work together towards a common goal that the organisation has. Tarafdar and Qrunfles (2004) reaffirm this view that it is important that IT plans and business plans are coordinated and that the organisational plans to adopt applications which support its strategic goals. Operational or tactical alignment is also required for ensuring that the planned applications are successfully implemented, maintained and used. This means that only goals which support the strategic goals of the business will be implemented. It is, therefore, important that all these efforts of business IT alignment are directed towards achieving the strategic goals of the business. For this to be executed the people who work in IT need to know the business strategy well so that there are no gaps between the business and IT strategies. Gartlan and Shanks (2007: 117) emphasise that the successful alignment between business and IT strategy is evident where both IT and business strategy can demonstrate a planned alliance which then leads to tangible, successful, business-focused outcomes. Strategic alignment is thus needed as businesses mainly align with different departments in order to achieve a common goal. Tarafdar and Qrunfles (2004) also refer to alignment as the degree to which strategies are facilitated, supported and encouraged by information strategies. Therefore, it is important for alignment to function effectively between IT and business. The IT section must provide technology that will enable the business side and support the business to be able to function. Mutual goals have to also exist between IT and business for the alignment to be effective (Reich and Benbasat, 2000). The business side also has to provide enough information for the IT section to perform the work that is needed to support the business. Almajali and Dahalin (2011) further state that IT-business alignment also concerns the degree of communication of an organisation's IT strategy and IT infrastructure with the organisation's strategic business objectives and infrastructure. In addition to the focussing on business objectives and infrastructure, Bartenschlager and Goeken (2009) suggest that alignment needs to be investigated in terms of formulating and implementing IT strategy on lower levels of abstraction in order to analyse, monitor and control the desired results.

Addressing *how* business can be aligned to IT and *how* IT can be aligned to business, are where the results of the alignment can be (Luftman, 2003a: 2). An evolved alignment connection between business and IT is when they adapt their strategies in conjunction with each other. The overall objective is to guarantee that the organisational strategies adapt harmoniously whether one considers business-IT alignment or IT-business alignment (Luftman, 2003b). It is also evident that alignment clearly needs to exist between other

spheres of the organisation for business-IT alignment to work properly (Henderson and Venkatraman, 1996: 8). Henderson and Venkatraman (1996: 34) emphasise that a cross-domain relationship has to occur among the business structures, IT strategy, business infrastructure and process, along with the IT infrastructure and process. It is critical that consequently, the infrastructure and processes should match up to the business strategy. A business will not be able to properly perform its tasks and operations well enough to achieve its goals and strategies if it does not have the proper infrastructure and process. The same can thus be said for the IT strategy and IT infrastructure and process. An alignment of all these areas therefore, needs to exist *before* the business-IT alignment partnership can work.

According to Johnson and Lederer (2010) alignment should be viewed as realised rather than planned. They define it as suitable between each of the eight business and IT strategy dimensions which are described as follows:

- *Aggressiveness* - refers the degree of which an organisation attempts to advance its market situation and outdo competitors, an increase in the market share in the environment the firm competes is following an aggressiveness strategy.
- *Analysis* – the degree to which an organisation necessitates factual, comprehensive information for decision-making.
- *Internal defensiveness* – refers to the degree to which an organisation is involved in activities to increase its effectiveness of business operations in an effort to preserve its prospective domain.
- *External defensiveness* – refers to the market or environmental activities that help a firm preserve its domain. Competing by establishing and maintaining strong relationships with customers is externally defensive.
- *Futurity* – refers to the degree to which an organisation's decisions or activities reflect long-term considerations. Competing through extensive forecasting and tracking environmental trends exemplifies futurity.
- *Proactiveness* – refers to the degree an organisation searches for new market prospects and business ventures. A firm that responds to a changing environment and its competitors practices is adopting proactiveness.
- *Riskiness* – refers to an organisation's willingness to engage in business practices with an uncertain outcome but potentially high return.

- *Innovativeness* – refers to the extent to which a firm applies creative and imaginative solutions to business problems.

In all these definitions and explanations of what Business–IT alignment is and how it should be, many authors fail to account for the role of humans in this alignment. In redefining business-IT alignment, Reich and Benbasat (1998: 25) emphasise the view that too often the interpreters of business-IT alignment are seen as merely developing IT strategy and designing infrastructures and by doing this they consequently ignore the social dimension of this alignment. Lee, Kim, Paulson and Pork (2008: 169) elaborate that the social dimensions of business-IT alignment concentrate on the people in the organisation and their level of functional integration of the business and IS process to achieve an organisation's goal. Therefore, it is evident from the above discussion that business-IT alignment should encompass all relevant spheres that make up organisation and its work. This includes the people, infrastructure and the process. Business and IT strategies and an alignment should exist between all these relevant elements so that a clear understanding of why business-IT alignment exists is understood clearly.

4.3 The Value of Business-IT Alignment to Business

Gomez and Pather (2012: 4) state that "the value placed in IT is seen to become higher as its use in the organisation progresses from being just a facility to that of an enabler". This view is concurred by Ullah and Lai (2011) who indicate that business and IT become interrelated through the alignment process, where services are provided at all levels of a business organisation to achieve their goals and objectives effectively. According to Silvius (2006) the value of IT can be viewed through the process in Figure 4.1. Figure 4.1 illustrates this process and the value that the business-IT alignment can have through a process of linking IT expenditure to IT assets to IT impacts and finally to organisational performance. This process serves as the link between IT management conversion activities along with the appropriate use of IT and how it has contributed to the companies competitive positioning and industry dynamics (Silvius, 2006). This model also illustrates how efficiency and the effectiveness of IT can be viewed.

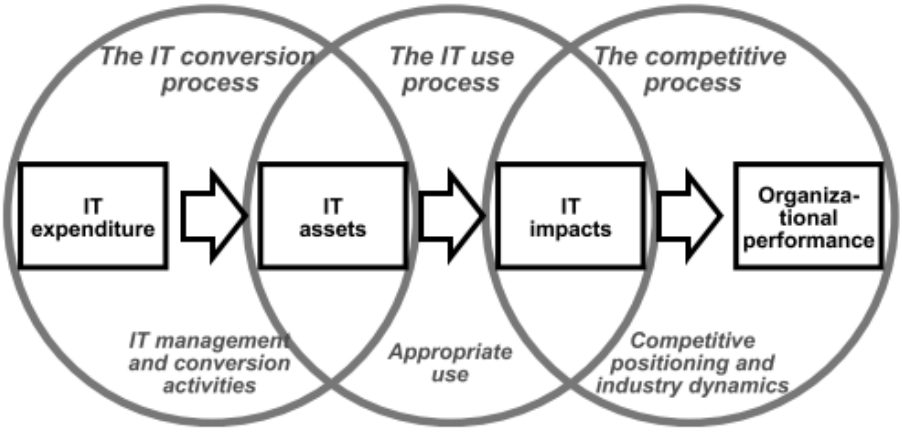

Figure 4.1: The process approach to understanding IT value (Silvius, 2006).

According to Irani, Themistocleous, Gunasekran, Love and Khalifa (2001) there has also been a neutral view on whether IT has provided improvement for the company. A survey highlighted that many of the benefits achieved through adopting IT/IS were limited to improvements in productivity and cost alone. These results have been surprising given the emphasis the normative literature has placed on the strategic benefits achievable from IT/IS (Irani *et al.,* 2001). As a result of this, many organisations have begun to question the scope and depth of IT-enabled businesses and the benefits that have *not* been achieved by companies that have proactively adopted IT (Irani *et al.,* 2001). Some authors have also questioned the numerous missing links which include experience of the IT-business strategic alignment and the sustainable competitive advantage (Almajali and Dahalin, 2001). Despite the limitations, there are still a lot of benefits and perceived benefits that business-IT alignment provides, it is vital to note that business-IT alignment can possess tangible and intangible benefits.

Gomez and Pather (2012) argue that the value and benefits which are perceived to develop from the business-IT relationship can be tangible and intangible, but can also be quantifiable and unquantifiable. Intangible benefits are those which are the most difficult to measure when we assume that various forms of measurement are the objective of management and other decision makers (Gomez and Pather, 2012). Typical examples of tangible and quantifiable benefits of business-IT alignment are the increases in revenue or a reduction in costs when measured objectively (Gomez and Pather, 2012). On the other hand an intangible unquantifiable benefit can be for example, better information or improved security. Other intangible quantifiable benefits which are difficult to measure can, for example, include obtaining information faster or getting improved customer satisfaction (Gomez and Pather,

2012). Lastly, an intangible unquantifiable benefit which is difficult measure or to put a financial measure of the benefits would be for instance increased customer confidence or customers or employees perception of the firms product (Gomez and Pather, 2012). Whether the value of the business is positive or negative from that which they receive from IT, it is still vital for business to know then what enables and inhibits business-IT alignment.

4.4 Enablers and Inhibitors of Business-IT Relationship

As the business-IT alignment process aims to be successful, there are a number of factors which promote the process and just like any other process there are also inhibitors to the process. Luftman, Papp and Brier (1999) describe these factors as the activities that management must go through in order to achieve cohesive goals across the organisation. These activities which favour the process are then termed enablers, while the inhibitors are the factors that hinder the business-IT alignment process. The ultimate goal is for managers to work toward decreasing activities that prevent alignment and take full advantage of activities that strengthen it. At the end of each enabler and inhibitor a translation of how the various enablers and inhibitors apply to the alignment of community needs and ICTD strategy is provided.

4.4.1 Enablers

4.4.1.1 Top Management Support for IT

The first enabler is in relation to the support of the top management for IT. Support by the top management means that at the strategic level IT is incorporated into their vision of the organisation and that its value is the same as other departments. This is thus seen as the enabler for the company for IT is put on the agenda by the top management. This includes management recognising the value of IT, defining and communicating the vision and strategies that incorporate the role of IT and also providing funding for IT projects (Luftman *et al.*, 1999; Teo and Ang, 1999). For IT to be an enabler, top management also needs to demonstrate commitment to the execution of the IT division. This entails IT being strategically positioned by top management in order for IT to be used as a strategic tool for competitive advantage (Teo and Ang, 1999). There are therefore, a number of ways that top management can demonstrate their commitment to IT, and some of the ways that have been suggested include the following ways: The Chief Information Officer (CIO) or top IS executive reporting directly to the Chief Executive Officer (CEO). Doing this will thus elevate the status of IT for a close relationship will then be established with the CEO and the

heads of the various departments (Teo and Ang, 1999). Secondly, with the CIO being at the decision making level they can influence and lobby for more funds. If this does not happen then the link between business-IT alignment is weakened.

When this has been followed, the top management can then allocate appropriate and adequate resources for the further development of strategic IT applications. The enabling advantage of this is that it will thus minimise delays in the execution of IT projects (Teo and Ang, 1999). Thirdly, the presence of the CEO in committees and project meetings sends a clear message to the IS department and other departments about the importance of IT in the organisation (Luftman *et al.*, 1999; Teo and Ang, 1999). Lastly, top management also needs to provide *directions* for strategic IS initiatives rather than attempting to control them for this this will have an influence on the details of the plans and activities of the IS function (Teo and Ang, 1999). Top management therefore, needs to also assist IS management in formulating their plans, this will go a long way in asserting effective communication between business and IT executives and ultimately provide stronger leadership between business and IT managers and greater manager's commitment in strategic alignment (Almajali and Dahalin, 2011; Gutierrez, Orozco and Serrano, 2009). It is also vital for top management to possess the skill and ability to drive and provide direction for the alignment process. Gartlan and Shanks (2007) further state that both IT and business managers need to facilitate alignment with the appropriate skill and capability to do so. This means that for example, the skill of understanding technology is not just needed at the upper management level but is also central to business thinking at all levels. The need for IT managers to understand business needs is therefore, particularly important (Gartlan and Shanks, 2007). However, top management support for IT in the alignment process should not focus solely on the internal business affairs but also needs to have a social aspect. The level of involvement between business and IT executives will confidently impact the level of alignment (Luftman *et al.*, 1999; Reich and Benbasat, 2000; Schlosser and Coltman, 2012).

Translation into ICTD:

In relation to the needs of the community, the top management could be viewed as the leaders of the community. They need to show that they support involvement of the external stakeholders in the community and provide resources in the community to support the project, such as local information and knowledge and so forth. The community leaders should ensure that the project is also incorporated into their broader vision for the growth of the

community. This requires that the top management of the external stakeholders needs to liaison not only with the community but also regularly with the leaders of the community. The leaders of the external stakeholders also need to realise that the skills and the knowledge to use the ICTD might not be there in the community hence, they need to provide information and skills training that is appropriate for the community to be functional in the ICTD. The top management also needs to incorporate the external stakeholders in developing a development strategy of the community, so that they are able to show as much support to the external stakeholders. This will also allow for the external stakeholders to fully include the community in the development of the ICTD strategy. Involving the top management of the external stakeholders in community meetings and decisions will also send a clear message to the community that the input and assistance of the external stakeholders is valued.

4.4.1.2 The Involvement of IT in Strategy Development

It is critical that when IT is involved in the development of business strategies, that it is aware of what it needs to do in order for the business to achieve its set goals and targets. When top management and IT see the need for mutual cooperation and collaboration, a close working relationship is established through a strategy formulation process (Luftman *et al.,* 1999). With IT and other departments included in strategy development this will achieve cross-functional teams and effective strategy development. This is as a result of the departments and teams being better able to communicate more effectively with each other. This allows IT to have a clear view of how they need to spread their resources across the company in order to build the competitive advantage of the company (Almajali and Dahalin, 2011; Luftman *et al.,* 1999). IT also needs to be aware of the structures, processes and activities that need to occur for the business to gain competitive advantage. Almajali and Dahalin (2011) state that traditionally, structures in relation to IT have been planned around the concept of technology delivery with a reactive IT organisation developing products (that is applications) in response to business requests or around what it thinks the business requires. Therefore, IT needs to adopt a proactive stance towards business rather than a reactive one. However, to facilitate IT/business integration, appropriate structures, processes and activities are necessary to achieve this accomplishment.

Translation into ICTD:

The external stakeholders need to be involved in the planning process of the community

where they can offer support to the initiatives of the community. As the external stakeholders have access to more information and knowledge, they can advise and develop their systems to the needs of the community as they have been involved in the process from the start. The internal stakeholders however, can only contribute when they understand what processes are involved in detailing a strategy. Therefore, they will be able to make valuable contributions to the aligning the strategy to the needs of the community. The external stakeholders with the help of the community will not only take a proactive stance but also in collaboration with the efforts of the community will enable a more effective alignment and greater impact.

4.4.1.3 IT Understands the Needs and Requirements of Business

In order for IT to produce effective results we need to first understand the needs and requirements of business. Luftman *et al.*, (1999) describes this process by identifying the following factors to consider in order for this to happen: IT should understand business and business should understand IT; IT should communicate in business terms to business and IT focusing on applying technical understanding to classify business opportunities. If IT management is not knowledgeable about the business, it becomes very challenging for them to recommend appropriate IT applications to upkeep business strategies (Teo and Ang, 1999). This leads to a lack of knowledge about business which is likely to be a significant hindrance to the firm's ability to take advantage of IT strategically. In getting to know the business, IT has to know the following business strategies: organisational work processes, products and services, industry's recipes for success, and competitors' strengths, weaknesses and potential actions (Teo and Ang, 1999). Gartlan and Shanks (2007) term the process that IT applies to know business as the meeting of the minds. This occurs when a clear understanding of key strategies and needs is communicated throughout the organisation. An agreement is best achieved when both top management and the CIO share a clear vision and focus and thus communicate in a common language (Gartlan and Shanks, 2007). Another dimension to this enabler is that business expectations also need to be known by IT. In doing so IT knows what business expects from them, and business also know ITs expectations. In developing solutions for the business, there are tasks that need to be done prior to designing and implementing a solution. These tasks include: requirements elicitation, requirements negotiation, requirements specification, and requirements validation. In each of these tasks, IT needs to clearly understand what their role is. Requirements elicitation will enable IT developers to understand better the organisational goals that the system under consideration targets to develop and the goals that describe the needs and constraints regarding the system

under implementation (Ullah and Lai, 2011). Requirements negotiation enables IT to identify business goals and establishes an agreement between business and IT as to the system requirements (Ullah and Lai, 2011). Requirements specification is used to describe the system behaviour that needs to be implemented and describes the context of the organisation which uses the system (Ullah and Lai, 2011). Lastly, requirements validation aims to ensure the final system requirements meet the stakeholders' needs and that these requirements fulfil the internal and external constraints set by the organisation (Ullah and Lai, 2011). It is also vital to note that goal modelling should be conducted before commencing the development of a system and requirements elicitation stage.

Translation into ICTD:

It is critical that the external stakeholders understand the needs and requirements of the community at large thoroughly. The external stakeholder can do this through identifying, communicating and focusing on the needs of the community and how they can assist them. However, there also needs to be a meeting of the vision of the community and that of the ICTD strategy. The process of requirements elicitation from the community members should be conducted in a simple and understandable manner in which the internal stakeholders will understand. This will lead to the appropriate needs being fully investigated and by them providing sufficient information. The goals and objectives of both the stakeholders need to be clear and understandable as well to each of the stakeholders. This will allow for a common understanding and promote efforts of achieving the alignment and the attainment of their goals respectively. Therefore, a clear and thorough needs assessment needs to be conducted in order for the external stakeholders to fully understand the requirements and needs of the community.

4.4.1.4 Effective and Reliable Services from IT to User Departments

The business needs to know that IT will provide services that are vital at all times. This translates to efficiency and reliability of services provided by the IT department. This plays a significant role in determining the user department's perception of the IT department (Teo and Ang, 199). For the IT to progress to the level of being highly regarded they need to provide adequate and effective services to the business. When the user departments do not have a clear understanding and indication of what and how the IT department works then they will lose the opportunity to be known as efficient, effective and reliable by user departments (Luftman *et al.,* 1999; Teo and Ang, 199). On the other hand if IT does not provide appropriate services it will be perceived in an undesirable way. When user

departments do not have good perceptions of the IT department due to poor efficiency and reliability of services provided it becomes more challenging for user departments to share and formulate business strategies jointly with the IT department. This is for instance evident in the following quote from a respondent: "There is a lack of IT reliability among users and this has significantly hindered IS planning efforts" (Teo and Ang, 199). Poor performance by the IS department may moreover also lead top management to assign minimal resources to the IS function or outsource a major portion of IS activities to an external vendor (Teo and Ang, 199). The IT department also needs to provide the level of quality and service to their internal staff that they would provide to their external customer. A way of assessing the quality of service provided therefore, can entail having internal service level agreements that the performance of the department can be measured by (Almajali and Dahalin, 2011). This will allow for the recognition of IT managers and their departments when they provide efficient services both internally and to the community. They will then be regarded as the vital component of the business and will be more strategically aligned to business goals (Almajali and Dahalin, 2011).

Translation into ICTD:

Community members must also be able to require efficient services from the ICTD, although this at times is hard to achieve as most members have not been fully exposed to ICTD projects. This means that internal stakeholders need to understand how the ICTD works and how they can know that they are not being provided with sufficient services or poor services. An agreement should then be in place to link what the community should expect from the ICTD, and how they can complain or give suggestions should there be something that they are not satisfied with. The external stakeholders should also have an agreement with their communities on how they can support the availability of services to the communities. The external stakeholders will also have to provide reliable and efficient services to the community. This will allow for the building of relationships so that the community can build a trust with the service providers and also understand what kinds of services are provided to assist their development processes.

4.4.1.5 Successful IT History

When the IT department has implemented projects successfully and provided efficient support to the business, this offers reliability and confidence in to the business that IT can deliver. Successful history of IT unit gives reliability to the IT unit and creates

complimentary perceptions of the IT in top management (Almajali and Dahalin, 2011). This provides an assurance to top management of the business that efficient and reliable services are provided by IT and its departments. This further also influences the amount that IT receives from the budget. As IT has a successful history this will contribute to a higher level of strategic alignment between the business and IT for confidence will be higher that they can deliver (Almajali and Dahalin, 2011). A prosperous history of IT involvement is also anticipated to escalate the interest of business executives to communicate with IT executives. This further permits them to have IT involved more fully and carefully in business planning, because of the high value expected from IT consumption (Reich and Benbasat, 2000). Clearly therefore, the level of IT implementation achievement will positively impact the level of communication between business and IT executives and the links between business and IT planning practices (Reich and Benbasat, 2000).

Translation into ICTD:

External stakeholders should share with the communities on how ICTs have assisted other communities and how it can assist them. This can be done through indicating how they can work together to achieve the successful history they want to build. When the external stakeholders provide evidence to the community that they are able to provide services, this will assist the communities development process and show cases where the ICTs have been successful. Furthermore as a result the stakeholders in the community will understand how ICT can help them and can thus contribute to them becoming motivated to participate.

4.4.2 Inhibitors

4.4.2.1 The Lack of Close Relationships between IT and Business

Providing direction on IT initiatives should be the subject of the business executives of the company. They have to set policies, budgets and more for the information assets of the business. This means, therefore, that priorities have to be set as to the value that is expected to be realised from IT (Luftman *et al.,* 1999). The policies that are set by business executives drive the realization of what priorities and projects IT must do. This means therefore that if a close working relationship is not present between business and IT, a view might develop where IT see's business as forcing down projects on them and can therefore, contribute negatively on the working relationship with business (Luftman *et al.,* 1999; Singh and Woo, 2009). Clearly therefore, there needs to be a joint cooperation between steering committees,

IT-business liaisons, budget and human resource allocation processes, IT organisation, and value assessments for IT and business to be able to work together in harmony with each other (Luftman *et al.,* 1999).

Translation into ICTD:

A close relationship between the people that the lead the community and between those that lead the external stakeholders is vital. The life of that relationship will either enhance or destroy the development that will happen in the community. It is, therefore, vital that a balance and close relationship is maintained between the stakeholders in the community.

4.4.2.2 IT does Not Prioritize Well

The IT department needs to prioritise in order for them to play their part in the alignment process. This was ranked as the top inhibitor by non-IT executives. The IT department therefore, needs to know what business has envisioned for the business and the business also needs to be aware of what IT has envisioned for them in return as well (Luftman *et al.,* 1999; Tan, 1999).

Translation into ICTD:

The external stakeholders needs to prioritise what kind of services they will provide to the community first in order to keep the community member knowledgeable of what is important to them. This allows for the magnification of the voices of the external stakeholders in the internal departments of the organisations.

4.4.2.3 IT Fails to Meet its Commitments

The difficulty of IT's inability to encounter its obligations has overwhelmed businesses since the introduction of the modern computer. Many have reported that because of all that is reliant on it; often IT is overwhelmed by all it has to do (Luftman *et al.,* 1999). This results in business executives and end-users becoming increasingly disappointed that projects are late and often above budget. Most of these problems are not technical in their nature but still have a significant impact on the credibility of IT as a whole. They are at times the result of not following to basic project management principles or not possessing a business–IT relationship that enables business participation in all aspects of the project (Luftman *et al.,* 1999; Tan, 1999). Deliberation can be given to Luftman *et al* (1999) points on this issue which include the following:

- defining change management procedures,
- providing smaller projects,
- And, IT sharing project threats with the business.

Translation into ICTD:

The internal stakeholders in the community must not lose their hope that the external stakeholders will provide services to them. In meeting their commitments the external stakeholders, therefore, need to provide reliable services to the community.

4.4.2.4 IT does not Understand Business

The event where business understands information technology and IT does *not* understand business can have many negative effects for IT. Organisations are providing sufficient training and support to create and support a growing rank of empowered, computer-literate knowledge workers (Luftman *et al.,* 1999). The innovative use of IT is only possible when senior business management understands and supports IT endeavours. Until recently, IT did not understand business well until they were forced to do so (Luftman *et al.,* 1999). The inability to appreciate the changing business atmosphere is another barrier to the alignment for both IT and non-IT executives. Firms that do not keep their customers happy by investing in technological improvements to increase customer fulfilment fall behind their competitors and, therefore, lose their competitive advantage (Luftman *et al.,* 1999).

Translation into ICTD:

The risks involved in external stakeholders not understanding the needs of the community could have disastrous consequences for the community. The likely result would be inappropriate services being provided to the community. This would indicate that the needs of the community were not fully understood by the designers of the system or solution. The end result would therefore, be no appropriate support given to the community for the needs they have, and as a result doing more harm than good.

4.5 The Business-IT Alignment Process

There are numerous approaches and methodologies that are used to achieve business-IT alignment. These methodologies and approaches provide direction on how the alignment can be achieved effectively. However, here focus will be primarily on the social dimension

business-IT alignment model, which is more appropriate in assisting ICTDs in achieving alignment to the needs of the community.

As mentioned there are still other models that can be used to align business and IT. One of these models is the social dimension model which is depicted in Figure 4.2. This model proposes that the alignment of business and IT should also be viewed from the social dimension side. A social dimension of alignment refers to the state in which business and IT executives understand and are committed to the business and IT mission, plans and activities (Reich and Benbasat, 2000).

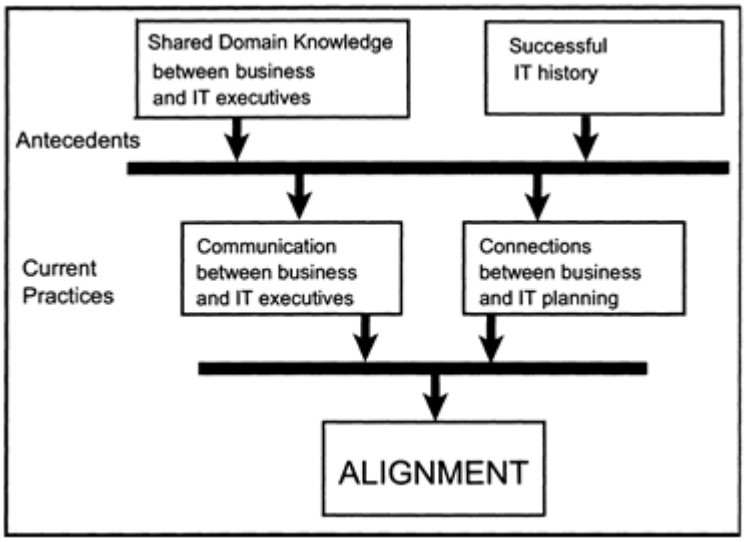

Figure 4.2: Social Dimension Business-IT Alignment Model (Reich and Benbasat, 2000)

The model in Figure 4.2 illustrates how the social dimension of the alignment process should occur in four processes. The first process is the shared domain knowledge between business and IT executives. This means that there needs to be a deep level of understanding between business and IT executives which will enable them to contribute to each other's processes and respect their contribution and challenges (Reich and Benbasat, 2000). The second process is the successful IT history. This means that the IT department needs to share with the entire company of their successes. This entails the IT department sharing their implementation success and how it has impacted the business. This will also positively influence the level of communication and connections between the business and IT executives (Reich and Benbasat, 2000).

The third process is the communication between business and IT executives. This process entails them sharing information with each other in order to reach mutual understanding. This

can however, over time also contribute to them disagreeing and but also can lead to them agreeing on topics of mutual understanding (Reich and Benbasat, 2000). This will also consequently positively affect the level of communication between business and IT executives, as it will greatly influence the level of alignment. The last process to achieve the alignment is connections between business and IT planning. This entails a better understanding of what business envisions for IT and what IT envisions for business (Reich and Benbasat, 2000). It can then be stated that the level of connection amongst business and IT planning processes will positively impact the level of alignment (Reich and Benbasat, 2000).

The application of the social dimension alignment model can be applied to the needs-ICTD strategy alignment framework as well. The community and the external ICTD stakeholders can apply practices from this model to enhance the connections and communication in their relationship. For example, this means that the ICTD external stakeholders can share with the community how IT can help their needs and also sharing how IT has helped other communities with their needs. The community can also communicate their needs to the ICTD external stakeholders effectively so that they also have a clear understanding of what the community needs.

4.6 The Effects and Impacts of Business-IT Alignment

In order for business managers to appreciate the value that the business-IT alignment provides they clearly need a better understanding of the impact of IT investment on organisational strategic and economic performance (Almajali and Dahalin, 2011; Teo and Ang, 1999). During a study that was conducted it was revealed that companies that aligned business and IT plans outperformed those who had not aligned their business and IT plans (Teo and Ang, 1999). Figure 4.3 provides a topology of IT strategies which distinguishes how management perceive the impact of IT on the organisation. There are two broad perceptions from which the impact of business-IT can be viewed from. These perceptions relate to the internally and externally felt impact of IT. From which ever perception the model is viewed, it can either be high or low impact. When the perception of IT impact is low, both internally and externally, it indicates that the IT department in its service to the business saves costs, proves technology ability, and is more efficiency oriented. From this view therefore, the impact of IT is viewed restrictively as conservative (Silvius *et al.*, 2009). However, when the business-IT alignment relationship is effective and innovative the perception of IT externally and internally is high. This translates into IT providing an

innovative impact on the organisation. This includes IT being viewed as on the competitive edge of the organisation. Experimental technologies are tested out and the IT provides an innovative orientation. Therefore, any organisation must aim to achieve a point where the impact that business-IT alignment provides internally and externally is high and provides an organisation with competitive advantage.

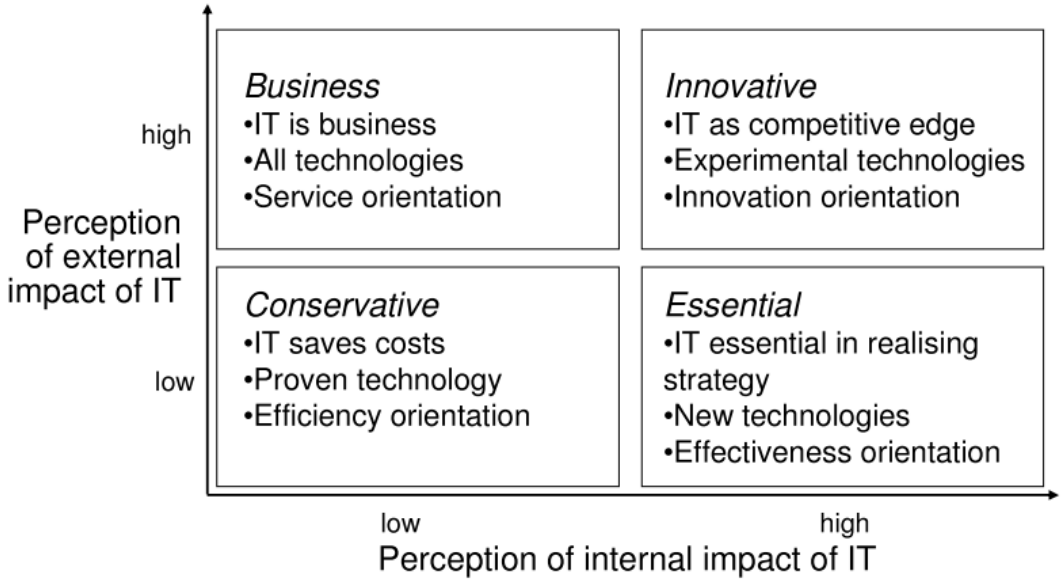

Figure 4.3: A Topology of IT Strategies and their Impacts (Silvius et al., 2009)

4.7 Relating Business-IT Alignment to the Needs-ICTD Strategy Alignment

The previous sections have discussed and indicated how through the business-IT alignment relationship the needs of the business are met by IT. This is done through various ways which include getting to know the business environment, context, business requirements and more. With business-IT alignment as the model that can be used to align community needs and ICTD strategy it provides structures and processes of how this can be done. The needs of the community can be related to the needs of the business. The business for instance aims to achieve innovation and value for money from IT, but the community aims to achieve sustainability. The community aims to achieve this through, an improvement in the socio-economic status of the community, connectivity to the world, and to have their development needs being supported. Furthermore what IT provides to the business to achieve its goals could be related to how the ICTD strategy in the community should aim to provide avenues to achieve these goals.

The business-IT relationship cannot be possible without business and IT looking to each other on how they can improve the capability and stand of the business in the environment and the market they are faced with. Therefore, IT starts by knowing the what, how, why, and when of the business environment and market before they can align their strategy to business. Applying this to ICTD this means that the external stakeholders of the ICTD, therefore, need to know the developmental, informational and technological needs, the strategies and the environment and the context of the community. As much as there are enablers and inhibitors of the alignment relationship, there are also enablers for the community needs-ICTD relationship. The top enabler of the business-IT relationship is top management support of the endeavours of IT. In the community there needs to be support from the community leaders, whether it is the municipal leader, church leader, the chief or an elected community leader. The community leaders also need to show support for the ICTD initiative. The support of community leaders needs to be attained through the provision examples of how IT has helped other communities, what their ICTD vision entails for the community and more. If the community leaders support the ICTD vision for supporting development in the community, the community leaders can also in the future recommend that the ICTD external stakeholder be incorporated when decisions are to be taken about the state of the community. The methodologies and approaches that are used to align business and IT can be adapted to align community needs and ICTD strategy. It is vital to note that the social dimension of business-IT alignment relationship applies more to the needs-ICTD strategy as community members are more sceptical and cautious about how IT can help them.

4.8 Conclusion

Business-IT alignment is an unending process that the business needs to be continuously involved in. The goals and timelines of businesses change from time to time depending on the state of the market they operate in. Even though the environment and market changes, IT should be up to date with how the business is operating and how IT can provide a competitive edge to the business. This is the same for rural communities as their needs also continuously change, through being exposed to ICT development and would like to find out more on how other ICT's can assist them. Therefore, they have to be accounted for and changed according to the changing landscape of the community. As stated earlier in the chapter, business-IT alignment is about aligning every aspect of the business with IT. This means that aligning the mission, objectives, structure, technology, personnel, processes and plans of both functions. The same goes for community needs where they have to be met by the ICTD projects,

however, taking into consideration further the needs of the community, the goals of the community, skill, process, and so forth. The alignment of business and IT should also incorporate the eight dimensions for it to have a robust and innovative relationship. These aspects which are aggressiveness, analysis, internal defensiveness, pro-activeness, riskiness and external defensiveness are some of the aspects which need to be present in the relationship. The alignment process should incorporate every function in the business; every department needs to know what IT is doing and how they can assist each department to attain competitive advantage throughout the business. The alignment process has to contain processes and goals that each level of the business needs to follow, whether it is at the strategic or operational level, in order to achieve alignment. The value and benefits of the business-IT alignment relationship should relate to revenue generation for the business. The role of IT should not only be seen on the costs side but also from the income side. Whether the benefits are tangible or intangible, IT does provide some massive value for the business. Enablers and inhibitors affect the success of the relationship. Top management support has been the number one enabler that has been identified by various authors because without it the function of IT would be seen as a cost and no value could be seen from it. The methodologies and approaches that are discussed in the chapter provide guidelines for how alignment can be achieved. The models should however, be adapted to suit the context in which businesses find themselves in. The impact of business-IT alignment will be known throughout the business, whether positive or negative IT should provide value for the business and also aim to be the innovator in relation to the business needs, vision and goals. The appropriate impact in community projects will, therefore, be properly assessed based on the appropriate linkage of the community needs with ICTD strategy based on lessons learned in business-IT alignment.

Chapter 5 : Impact Indicators and Assessment in ICTD Projects

Chapter 4 provided the different processes that are used to align the business needs to IT strategy. The enablers and inhibitors of this process and how it can be relayed to the Needs-ICTD strategy alignment were further discussed. Chapter 5 provides how impact indicators can be developed and the importance of monitoring and evaluation. The various roles of impact assessments based on the Needs-ICTD strategy are further discussed.

5.1 Introduction

The use of the lessons learned from the business-IT alignment can contribute greatly to understanding how the alignment of community needs and ICTD strategy may occur. The occurrence of such alignment can provide a base from which the appropriate impact indicators can be identified. The evaluation of an ICTD project should therefore, be based on the needs of the community and then on the project goals. If a society does not know where it stands, it is difficult to decide where to go. According to the United Nations (2009) Statisticians and social scientists can here have a key role to play in helping policymakers, businesses and citizens understand facts and design strategies. Impact Assessments in community projects provide the internal and external stakeholders with evidence of what has been done in ICTD projects. They provide information on the outcomes of whether the objectives, vision, and goals of the project were achieved or not. The primary aim of this chapter is to identify the role of monitoring and evaluation of ICTD projects by identifying the appropriate impact indicators based on the needs of the community, the goals, vision and objectives of the ICTD project. The chapter does this by first exploring the accountability of ICTD projects, therefore, emphasis on the need for monitoring and evaluation systems in ICTD projects. Secondly, the chapter highlights the importance of impact assessments in ICTD projects and why they are vital for their sustainability. Thirdly, this chapter discusses the impact indicators in conducting impact assessment and also identifies the processes involved in identifying these indicators. Lastly, the theory of impact assessments and how the theory defines, proposes impact assessments should be conducted is discussed. This chapter concludes by indicating the importance of impact assessments being based on the needs of the community and its context, and then on the projects goals, aim and objectives.

5.2 Monitoring and Evaluation of ICTD projects

According to Batchelor and Norrish (2005: 11) ICT projects over the past few years the projects that have been given much funding have been primarily aimed at poverty reduction and sustainable development. However, there have been calls for a rigorous assessment of these projects in the past few years and the critical examination of their effectiveness. This is because if we look at a global issue such as, poverty, it is evident that it is an extremely complex issue with multiple layers. This means that we need to examine the limitations of whether ICTs can help alleviate it. McNamara (2003: 3) reminds us that numerous amounts of resources and energy have been devoted in efforts to improve access to ICTs in developing countries and among the poor. These resources have been channelled primarily to adjust these

tools to the specific priority needs of the poor; and to promote awareness, effective policy, and institutional and regulatory capacity in developing countries (McNamara, 2003: 3). This allows developing countries to take full benefit of these technologies and their economic and social potential. However, as McNamara (2003: 3) notes the results of these efforts are thus far for the most part, inconclusive, as monitoring and evaluation in the international community has been not been conducted well its ICT for development efforts. Heeks and Molla (2009) indicate that there is far too little impact assessment of ICTD projects. This therefore, indicates a lack of knowledge and a lack of will and motivation to undertake impact assessment of ICTD (Heeks and Molla, 2009). It is, therefore, essential to address what is meant by monitoring and evaluation in ICTD projects.

Monitoring is defined as a continuous day-to-day process of collecting and reviewing information that reveals how an operation is proceeding. This involves the tracking of activities, the review of the flow of services and activities provided by the programme. This allows us to reveal the progress and achievement of results in the use of allocated funds (International Federation of Red Cross and Red Crescent Societies, 2002; Wagner *et al.*, 2005). The aim of monitoring is to provide stakeholders with regular (and real-time) feedback on progress in implementation results and the early indicators of problems that need to be corrected. It usually reports on actual performance against what was planned or is expected (Ministry of Performance Monitoring Evaluation and Administration, 2011). Monitoring also involves the continuous collecting, analysis and reporting of data in a way that supports effective management (European Union, 2006; Ministry of Performance Monitoring Evaluation and Administration, 2011).

Evaluation on the other hand is defined as the systematic and objective assessment of an on-going or completed operation, programme or policy. The focus of an evaluation is on the programme, its design, implementation and results (International Federation of Red Cross and Red Crescent Societies, 2002; Wagner *et al.*, 2005). Worthen, Sanders and Fitzpatrick (1997) elaborate further that an evaluation also entails determining the identification, clarification, and application of defensible criteria to determine an evaluation object's value (quality, utility, effectiveness or significance) in relation to those criteria. Evaluation goes more in depth, exploring the (expected) results, impact of the programme and analysing reasons for disparities between expected results and final results (European Union, 2006). The aim of evaluation therefore, is to determine the relevance and fulfilment of objectives, as

well as efficiency, effectiveness, impact (overall goal) and sustainability (International Federation of Red Cross and Red Crescent Societies, 2002). An evaluation should provide information that is credible and useful therefore, enabling the incorporation of lessons from the programme/project into management decision-making. At the most elementary level the evaluation research is aimed at determining whether a program was actually carried out successfully or not. At a more complex level evaluation research is concerned with the effectiveness and/or the economic attributes of a programme. Ideally such information should contribute to decisions about whether to expand, curtail, or modify a programme (Gordon and Morse, 1975: 339).

ICTD projects need to establish value and credibility for the technology and projects they bring to communities more importantly, however, they also need to confirm the statement that technology can and will play a central role in bridging technology divides (Rothenbergy-Aalami and Pal, 2005: 8). The evaluation of ICTD projects is very important as it demonstrates good management and provides important lessons learned that can be used for future projects. Some of these lessons can include: greater accountability in the use of resources, greater focus on the achievement of results and clearer basis for decision making. These results can further serve to promote the re-design to suit environments and generate new knowledge on what works and does not work (Ministry of Performance Monitoring Evaluation and Administration, 2011; International Federation of Red Cross and Red Crescent Societies, 2002; Wagner *et al*., 2005; Licona, 2008).

One framework that encompasses the full evaluation process of ICTD projects is the Rural ICT Comprehensive Evaluation Framework (RICT-CEF) by Pade-Khene and Sewry (2012). The framework provides a comprehensive evaluation framework, which includes eight components applied in an iterative manner. The framework was selected as it provided a comprehensive approach which would make sure that the appropriate components need to be there when evaluating an initiative or project in rural areas. It would also allow for the relevant impact and effectiveness of the project to be evaluated. As the domains are interlinked, this allows for each domain to be evaluated every time when it is applied. This contributes positively to the alignment of community and the ICTD strategy, as it makes sure that the various domains need to be applied and evaluated properly. This will allow for the intended and unintended impact to be evaluated, and for the alignment of the community needs and ICTD strategy is closely monitored. The framework as shown in Figure 5.1 starts

with the 'Construct the Overall Evaluation Plan' which facilitates the coming together of the various stakeholders to plan the process, determine the attributes of the plan and decide on the evaluation guidelines (Pade-Khene and Sewry, 2012).

The second component is the baseline study, which needs to be conducted in order to ascertain the socioeconomic status and the readiness of the community to uptake the ICT project. The baseline study contributes to the evaluation of an ICTD project by asking questions that are tailored around the goal of understanding the status of the rural community where the ICT project or programme will potentially be implemented (Pade-Khene and Sewry, 2012). In conducting the evaluation of the project evaluation indicators should be developed based on the questions proposed in the baseline study (Pade-Khene and Sewry, 2012). The next component of the framework is the needs assessment of the community, where the purpose of the needs assessment is to understand, elaborate and set the desired priorities of the rural community for development, and propose appropriate solutions that can be supported by ICT (Pade-Khene and Sewry, 2012). The needs assessment is the most vital tool in community development which focuses on what is needed in the community. It is important therefore, that the development of the impact indicators be linked to the needs of the community as developed in the needs assessment.

The next component is the programme theory assessment which deals with assessing whether the conception of an ICTD project is actually designed to support development programmes or address the poverty challenges in a rural community (Pade-Khene and Sewry, 2012). Programme theory assessment in the evaluation of the project is made up of questions that are tailored around the ICT interventions rationale and conception or what must be done to bring about intended rural development in accordance with the needs of the community (Pade-Khene and Sewry, 2012). The process assessment of the framework assesses how well the ICT project is operating to implement its intended functions in the intended way stipulated in its project plan (Pade-Khene and Sewry, 2012). The process assessment is personalised around the three key themes of ICT project performance. These key three themes are: service utilisation, organisational functions, and flexibility (Pade-Khene and Sewry, 2012). Therefore, it is clear that the needs of the community are viewed as important, but also what mechanisms have been done to aid the process of achieving those needs and further how they were linked to the needs of the community.

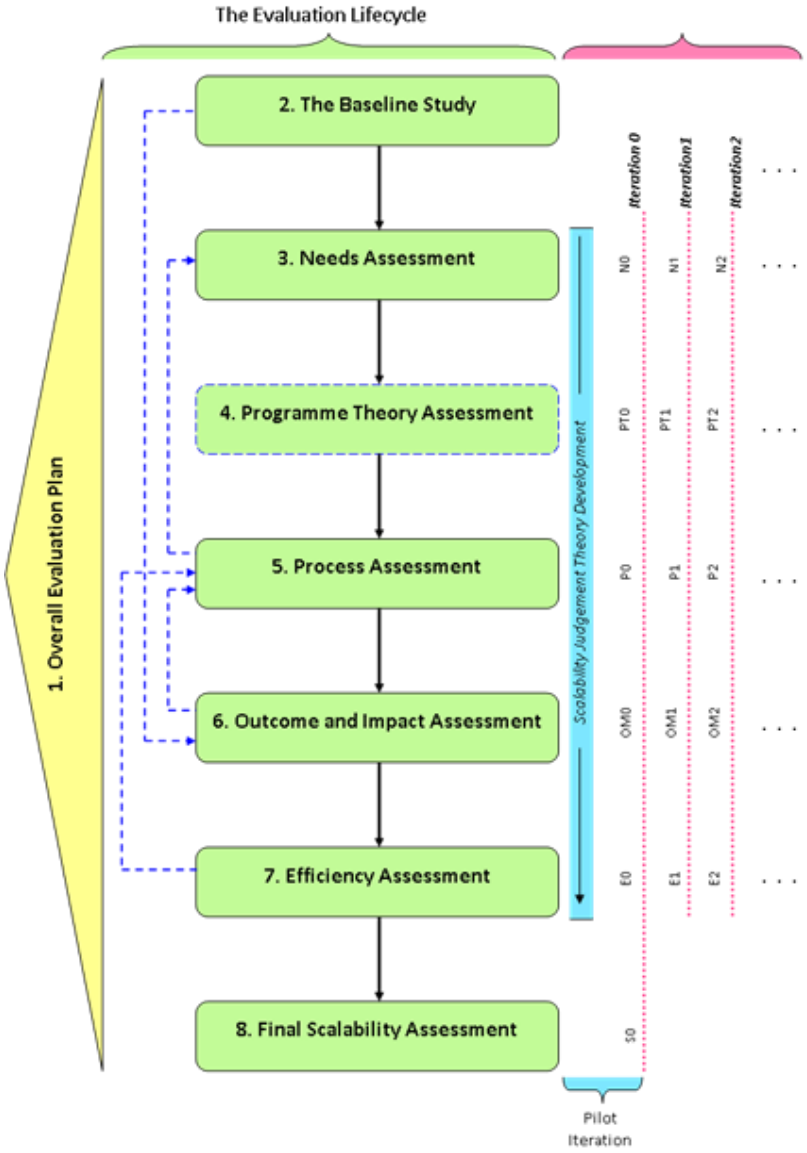

Figure 5.1: The RICT-CEF Framework (Pade-Khene and Sewry, 2012)

The outcome and impact assessment component is built on all the preceding components. The outcome and impact assessment process is divided into two stages, where Stage 1 focuses on assessing outcome, and Stage 2 which results from Stage 1, focuses on assessing impact. These various stages are distinguished mainly by short-term and long-term findings (Pade-Khene and Sewry, 2012). In the evaluation process outcome and impact measurement should be based on the strengthening of informational capabilities, human capabilities, and social capabilities that encompass rural development (Pade-Khene and Sewry, 2012). The last components of the framework (the efficiency assessment and the final scalability assessment) focus more on the management side of the project and are important in the evaluation of the project.

Monitoring and evaluation systems also have their own limitations and are met with challenges. Some of these challenges include:

- Difficulties in defining a specific target audience for initiatives that have an effect over a wide area (For example: broadcast campaigns) (Wagner, *et al*., 2005).
- In some communities, change happens slowly, so it is hard to measure impact over a short period (Wagner, *et al*., 2005).
- It is not always clear that an ICTD programme rather than political, social or economic factors has been responsible for change (International Federation of Red Cross and Red Crescent Societies, 2002).
- Some communication goals, good governance, social gain, and empowerment are difficult to measure objectively or put a value on (International Federation of Red Cross and Red Crescent Societies, 2002).
- There is also too much emphasis on the Techno-centric approach which focuses too little on societal perspective (United Nations, 2009).
- The increased complexity of ICTs combined with the uncertainty and unpredictability associated with its benefits and costs (Gomez and Pather, 2012).
- Existing ICTD evaluations are still confronted with challenges such as, influencing the accuracy and reliability of evaluation conclusions (Pade-Khene and Sewry, 2012).
- If the developing world audiences have little media choice, it can be hard to find out their opinions on the quality of ICTD programmes (Wagner, *et al*., 2005).
- It is difficult to evaluate communications in highly politicised areas or places of conflict (Wagner, *et al*., 2005).
- Time is another challenge in impact assessment because in order to sufficiently assess indicators like outcomes and particularly impacts, then months or even years of telecentre operation need to occur (Heeks and Molla, 2009).
- Finally, the fast-changing nature of new technologies makes it difficult to measure their impact (Wagner, *et al*., 2005).

Therefore, these challenges influence how monitoring and evaluation systems work in ICTD projects. This requires that, therefore, they need to be attended to effectively in order to have a sound monitoring and evaluation process. The continuous and proper use of these systems will result in the impact of the project being clearly understood and measured. The Ministry of Performance Monitoring Evaluation and Administration (2011) indicates that there are six specific monitoring and evaluation types. These monitoring and evaluation types: are

diagnosis, design evaluation, implementation evaluation, impact assessment, economic evaluation and evaluation synthesis. The type of monitoring and evaluation that this research will be focusing on is the impact assessment.

5.3 Impact Theory and Impact Assessments

Impact theory is made up of the beliefs, assumptions, and expectations inherent in a programme about the nature of the change brought about by programme action, and how it results in the intended improvement in social conditions (Rossi *et al.*, 2004: 234). Impact theory is causal theory. This means that it describes a cause-and-effect sequence in which certain program activities are the instigating causes and certain social benefits are the effects they eventually produce (Rossi *et al.,* 2004: 234). Impact refers to a change in the target population or social conditions that have been brought about by the program, which is a change that would have not occurred had the problem been absent (Rossi *et al.*, 2004: 234). Impact also includes establishing the social, cultural, economic, political, environmental, and other benefits that are associated with the significances of making effective use of the programme in question and in not using the programme as well (McConnell, 1995). The challenge however, arises when we have to establish the cause that the programme is the specific effect of (Rossi *et al.*, 2004: 234; McConell, 1995; Grossmann, 2005). Figure 5.2 provides a clear picture of what impact is based on, and what would have happened with and without the intervention.

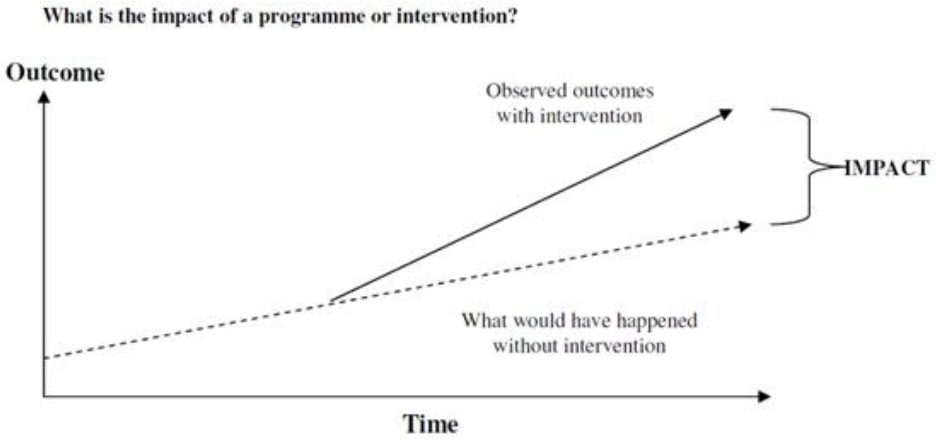

Figure 5.2: What is the impact of a programme or intervention? (Grossmann, 2005).

Grossmann (2005: 4) indicates that the major difficulty is to separate programme factors from external factors. This meaning that an accurate causality needs to be established between the programme activities and the potential outcomes/ impacts. Amongst the reasons is that causality chains are seldom linear for to a large extent it is often contextual factors influence

outcomes (which makes it also difficult to compare programmes in different country contexts) (Grossmann, 2005; Rossi *et al.*, 2004). Above all, however, there is limited knowledge of the programme logic and the implied causality chains. The programme logic is often only revealed and properly understood over the course of an intervention. In the best case scenarios the existing monitoring and evaluation systems are established that have an 'inbuilt' learning component where the programme is continuously adapted over time as the programme logic unfolds (Grossmann, 2005: 4).

Impact assessments are undertaken to find out whether programmes produce the intended benefits, outcomes, and effects, and whether there are important unintended effects (Rossi *et al.*, 2004: 234). Impact assessment is defined as:

> *"the process of identifying the anticipated or actual impacts of a development intervention, on those social, economic and environmental factors which the intervention is designed to affect or may inadvertently affect" (Duncombe, 2009: 4; Rossi et al., 2004).*

Duncombe (2009: 6) states that impact assessments assess the difference in the values of key variables between the outcomes on agents (such as, individuals, enterprises, households, populations, policy makers) which have experienced an intervention against the values of those variables that would have occurred had there been no intervention. Figure 5.3 displays the conventional model of the impact chain (Duncombe, 2009; Hulme, 2002). As seen in figure 5.3 the difference between the variables which have experienced change with those that have not experienced change by the intervention, is how impact is assessed, more especially the change on key variables or agents such as population, households, individuals, enterprises, policy makers and so forth (Duncombe, 2009; Hulme, 2002). Whether change occurs on the agents based or not, on the programme or intervention, presents methodological problems. However, the process involved in the changes of the variables, it is hard to forecast the outcome of the agent (Duncombe, 2009). Figure 5.3 also illustrates the gap and impact that is experienced by the introduction of a mobile intervention where change is experienced.

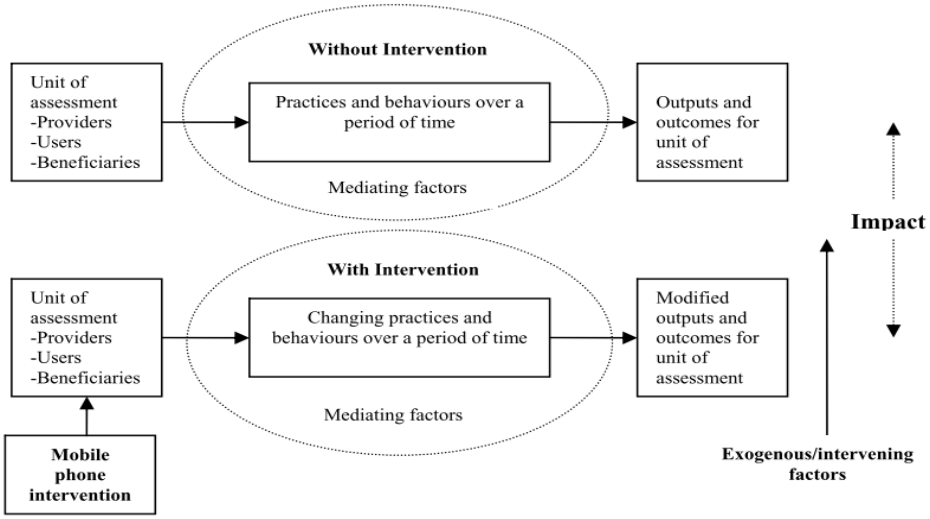

Figure 5.3: Conventional Model of the Impact Chain. (Duncombe, 2009; Hulme, 2002)

It is worth emphasizing that this is a conventional model which highlights the factors that contribute to the impact chain. Pade-Khene and Sewry (2012) explain that there are differences between outcome and impact assessments. The main difference between outcome assessment and impact assessment is the type of benefits measured, where the former concentrates on immediate ICT intervention benefits or outcomes. The outcome assessment is usually focused on the short-term goals of the ICT project (for example, access to health information, basic computer literacy), and the latter concentrates on subsequent benefits in the long-term on the wider society as a result of ICT project outcomes (for example, better disease control) (Pade-Khene and Sewry, 2012). This process too is also divided into different stages with stage 1 focusing on the outcome and stage 2 focusing on the impact assessment of the project as shown in Figure 5.4 (Pade-Khene and Sewry, 2012). Stage 1 and stage 2 encompass the engagement of the external and local stakeholders, the identification of outcomes/impacts to measure, the planning of the outcome/impact assessment, gathering credible evidence, the interpretation of data regarding evaluation questions and lastly the dissemination of the outcome/impact results (Pade-Khene and Sewry, 2012). There are a number of outputs therefore, that the process should yield and these include: outcomes of the ICT project, both expected and unexpected; the impact (expected and unexpected) of the ICT project (both positive and negative) and lastly, the lessons learned for ICT project implementations, to achieve or avoid certain levels of impact or outcomes (Pade-Khene and Sewry, 2012).

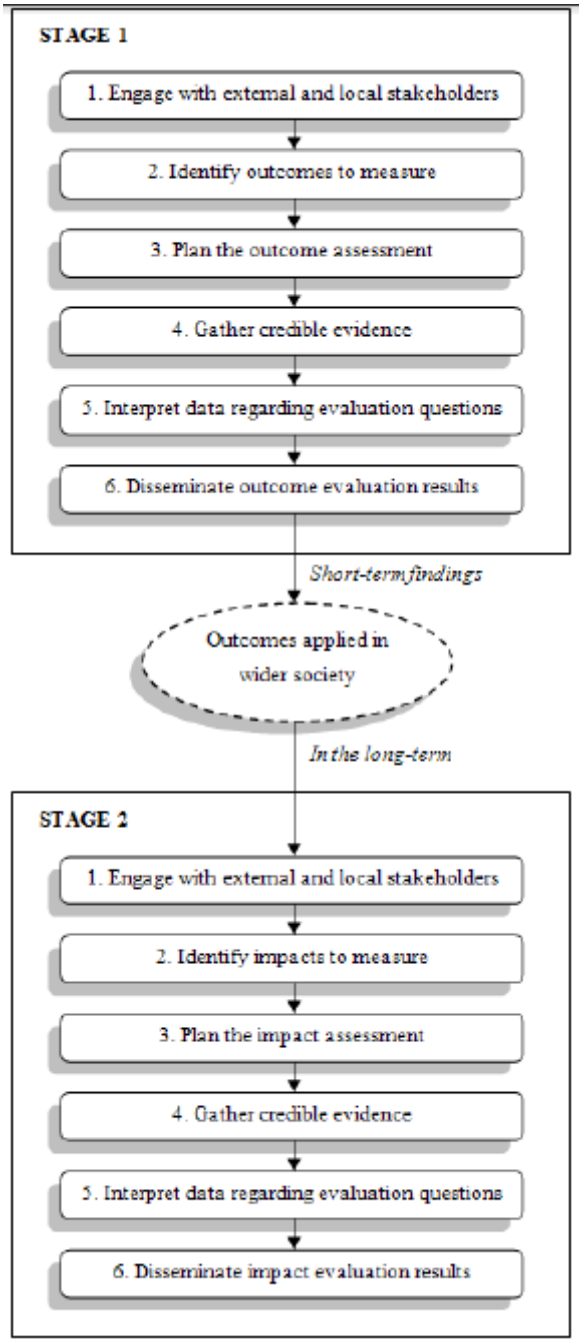

Figure 5.4: The Outcome and Impact Assessment Process (Pade-Khene and Sewry, 2012)

According to Heeks (2010: 627) impact can be divided into three sub-elements:

- "*Outputs: the micro-level behavioural changes associated with technology use.*
- *Outcomes: the wider costs and benefits associated with ICT.*
- *Development Impacts: the contribution of the ICT to broader development goals*".

Batchelor and Norrish (2005: 12) further indicate that there is a need to understand the broader enabling conditions and to assess what the impact might be at scale. Impact assessment can measure many things one of which is the sustainability of the ICT project. This takes into account of whether or not the technology is being used to support rural activities that advantage the rural population in that certain area (Pade-Khene and Sewery, 2011). The UNCTAD Secretariat (2010) further notes that many studies have categorized ICT impacts as economic, social or (less frequently) environmental. However, this is difficult to distinguish as some direct impacts of ICT use can also be described as economic. There may be indirect impacts that are social or environmental while also in addition the direct impacts may be both economic and social (related through human capital). This means therefore, that ICT usage can enhance human capital in a number of ways. This includes through its roles in education, literacy, acquisition of knowledge and skills. ICT further plays an important role in the development of human networks and thus economic and social benefits will usually accrue to individuals who are gaining skills and knowledge by using ICT (UNCTAD Secretariat 2010: 7).

An impact assessment can be relevant at different points in the life course of a social program (Rossi *et al.,* 2004: 235). Impact assessments can also be relevant in pilot projects indicating the perceived intended benefits (Rossi *et al.,* 2004: 235). However, Rossi *et al* (2004: 235) indicate that whenever impact assessments are conducted there are certain prerequisite conditions that need to be met for the assessment to be of value. Prior to conducting an impact assessment this means that there are certain steps that need to be followed. These steps are the prerequisites that need to be followed, they have been commonly grouped (as can be seen below) into 'knowing the community' (which is more about knowing the people, development projects, leaders, what the people would like to achieve, etc.). There is also 'the environment and methods' step which includes detailing the community structures, understand how the community works, and detailing the different methods that can be used in the community. Lastly, we also have the 'planning and identification of indicators' step which focuses of what the project has set out to achieve, what it should measure and the effect of the project before and after, etc. The different groups are explained as follows:

Know the community:

- Define and understand the user community (Grossmann, 2005; Heeks and Molla, 2009; McConnell, 1995).

- Define the development issue and programme to which the information activity or project is contributing (Grossmann, 2005).
- The identification of the main patterns of operation of the information life cycle and the factors that influence its efficiency for the defined user community and development issue (Grossmann, 2005).
- Describe the target audience to whom the findings will be directed (Grossmann, 2005; Heeks and Molla, 2009).

The environment and methods:

- Describe the information use environments (lUEs) of the user community and the target audience (Grossmann, 2005).
- Set up standard guidelines for collecting, analysing, interpreting, and presenting anecdotes and other data (McConnell, 1995).
- Assemble baseline data then work collaboratively with representatives of the various groups of beneficiaries (including end-users and target audiences). Further determine the perceived or expected benefits of their work that might be linked to information activities and products (Grossmann, 2005; Heeks and Molla, 2009).

Planning and identification of indicators:

- Determine which primary objectives are being served and their outcomes (Heeks and Molla, 2009).
- Develop a hierarchy of the objectives or outcomes (Mcconell, 1995).
- Define corresponding outputs and the required inputs (Grossmann, 2005).
- At each level of the hierarchy identify the critical factors that are either "informational" in nature or are information-dependent (Grossmann, 2005).
- Define the indicators in the framework that would show that the appropriate information input is secured and improved (Heeks and Molla, 2009).

After these steps, the impact assessment process can continue with measuring indicators and assess goal achievements. Duncombe (2009: 3) further adds that there are different levels at which impact can be assessed:

- Macro-level (analysing country level data or making international comparisons);
- Meso-level (impact on intermediary level organisations);
- And micro-level (impact on recipients, clients or final end users).

This research focuses on the micro-level which focuses on the impacts on recipients, clients and final end users. However, according to the International Federation of Red Cross and Red

Crescent Societies (2002: 12) at any level that the assessment is conducted, the following issues should be taken into account:

- Direct effects – these are the immediate costs and benefit of both the contribution to and the results of a project without taking into consideration their effect on the economic effects;
- Indirect effects – these are the cost and benefits which are unleashed by the contributions to a project and its results;
- Multiplier effects – these are the special indirect effects that deal with the increase in the use of the economy's capacity by the aid programmes generating a rise in demand.

These issues should also be vital in establishing technical, economic and socio-cultural, institutional and environmental factors.

An impact assessment also plays a leading role in answering if and how contact to ICTs creates benefits to the individuals and communities they are exposed too. Like most development projects measuring the impact of an ICTD project is highly contextual and not easily quantifiable (Grossmann, 2005). The main focus of most current and previous telecentre projects has been the implementation of the ICT side of the project, rather than understanding the impact of ICTs on the targeted communities (United Nations, 2009: 28). A number of development projects have failed to achieve their set objectives due to the lack of this key understanding. Understanding the impact of telecentre projects must be done in the local context, by considering the perspectives of participants at the community level. Impact assessments are also conducted to improve the match between implementation and the project design or plan (Rossi *et al*., 2004: 57). For instance, if the level of service utilisation is insignificant for a targeted development activity, it is less likely to show signs of impact in the community. Furthermore, an impact assessment indicates whether the ICT project has been implemented well enough to produce the intended outcomes and effects (United Nations, 2009: 46).

An impact assessment in an ICTD project or telecentre must be able to answer a number of questions which include questions around the state of the community, the pro-activeness of the community and the socio-economic state of the community. These states are identified more in-depth below:

Community State:

- Is the telecenter a positive force for community development? (European Union, 2006; InfoDev, 2010).

- Does it benefit some people more than others? (European Union, 2006; InfoDev, 2010).
- "For every user who comes to the telecenter, how many others are indirect beneficiaries?" (European Union, 2006)
- "Are there drawbacks to the telecenters, and who suffers as a result?" (European Union, 2006).

Pro-activeness state:

- Does it act as a catalyst for other positive initiatives and innovations at the local level? (European Union, 2006; InfoDev, 2010; Rothenbergy-Aalami and Pal, 2005).
- Does it help people to help themselves? (Rothenbergy-Aalami and Pal, 2005)
- What features of the telecenter are responsible for the greatest number of benefits and their most equitable distribution? (Rothenbergy-Aalami and Pal, 2005)
- How can these features be strengthened and replicated? (Rothenbergy-Aalami and Pal, 2005).

Socio-economic state:

- Is a telecenter more beneficial to some economic sectors than to others? (InfoDev, 2010)
- In setting the policy agenda: how did ICTs growth political participation? (Heeks and Molla, 2009).
- In gaining access to different economic resources: how did ICTs help users of the ICT to obtain access (Heeks and Molla, 2009).
- In intensifying access to social opportunities such as information, justice, health, education? (Heeks and Molla, 2009).
- Transparency Guarantees: how did ICTs improve transparency of citizen dealings with government? (Heeks and Molla, 2009).
- Protective Security: how did ICTs enable security against natural disasters? (Heeks and Molla, 2009).

Promoter and funders of the telecentres convey these questions, assumptions and vision of the telecentre and ICTD programmes. Other questions are narrower and more practical and context specific. A critical problem though in conducting impact assessments is the lack of uniformity in terms of the kind of issues analysed, methods and approaches amongst other issues (Rothenbergy-Aalami and Pal, 2005: 9). At times most of the questions and indicators

mentioned here are either not easily measured without context, or simply impossible to measure (Rothenbergy-Aalami and Pal, 2005: 9).

In conducting assessment of a program it is vital to also observe whether the outcome or the impact of the program will be evaluated. According to Pade-Khene and Sewry (2011: 46) an outcome assessment "aims to measure a change in the state or social conditions of the targeted population which the ICT project is expected to change" whilst an impact assessment "assesses the effect or consequences of the ICT project on the wider society". Rothenbergy-Aalami and Pal (2005: 10) state that outputs are generated for the duration of the project, and can be collected with certainty over a defined period of time if and when the proper systems are in place. Impacts may not be visible or measurable for a certain period of time after the project has ended. Examples of outcomes include the number people helped, number of services offered, improved knowledge or education, skills, access to health information, improved knowledge on governmental and political information (Pade-Sewry, 2011; Rothenbergy-Aalami and Pal, 2005). As the impact of a project is not immediately visible, it is vital to note that assessing the impact of an ICT program will be helped by having a clear set of objectives and key performance/impact indicators, in particular by identifying in advance why a specific activity is being undertaken, how it is intended to improve the livelihoods of people, and how this improvement will be measured (Rothenbergy-Aalami and Pal, 2005: 10). Pade-Khene and Sewry (2012) for instance note that an example of impact would better disease control.

The process of conducting impact assessments on ICTD projects is met with many challenges such that there are a number of different ICTs, with different impacts in different contexts and countries. These include:

- *Technological Challenges*: they include goods (such as, mobile phone handsets) telecommunications services) which change rapidly over time (UNCTAD Secretariat, 2010: 7). Another challenge is that many ICTs are general purpose technologies, which facilitate change and thereby have indirect impacts. A further challenge being that it is also difficult to determine what is meant by 'impact' as there are for example a diversity of impacts that differ in terms of intensity, directness, scope, stage, timeframe and characterization (economic/social/environmental, positive/negative, intended/unintended, subjective/objective) (UNCTAD Secretariat, 2010: 7).

- *Data Gathering and Methodology Challenges*: Data are also often poorly collected, and therefore, projections are frequently based on inadequate information which is often isolated and not systematically collected and therefore, lacks validity checks (Burdge and Vanclay, 1996; Parkisnson and Ramirez, 2007). Estimates about the consequences to human communities of likely future events should be based on conceptual relationships developed from theory and previous research supported by data collected utilising the appropriate methods and subject to empirical verification (Burdge and Vanclay, 1996). A uniform methodology is also one of the major challenges. The methodologies for assessing social impacts are numerous and complex, and exist as a process as much as a discrete entity. This means that consequently they are difficult to document and to evaluate (Burdge and Vanclay, 1996; Grossmann, 2005; Hulme, 2002; Siau and Rossi, 2011).
- *Cause-Effect Cahllenges*: The major challenge of impact assessments is one of the major reasons for a lack of proper impact assessments which is to link the programme activities to specific outcomes (Gordon and Morse, 1975; Grossmann, 2005). Parkison and Ramirez (2007) also indicate that the lack of linking activities to outcomes necessarily leads to significant practical challenges in particular those that are concerning the resources required to capture all of the required information, and the availability of skilled personnel to follow through and manage the data and ultimately link them to specific outcomes. Lastly, determining causality is difficult for there may be a demonstrable relationship and a positive correlation between dependent and independent variables (UNCTAD Secretariat, 2010: 7). However, such a relationship cannot be readily proven to be causal.

5.4 Impact Assessments in community ICTD projects

According to Rothenberg-Aalami and Pal (2005: 6) large resources have been pumped into community ICTD projects. Supporters invest into these projects as they identify more benefits to access of ICTD projects which is why impact assessment has become increasingly important. An impact assessment aims to implement a monitoring and evaluation system to identify whether the project fulfils its development purpose for its clients and beneficiaries (Batchelor and Norrish, 2006: 11). According to Heeks and Molla (2009: 2) an impact assessment is driven by the following questions:

> *"what do we not know, that we need to know and how are we going to find that out?". Impact assessments also answer the question of "how access to ICTs produces*

> *benefits to the individuals and communities they serve"* (Rothenberg-Aalami and Pal, 2005: 7).

Therefore, an impact assessment should also question whether the ICTD project responds to the communication and information needs of the communities it intends to serve and what impact that it will have on local equity and economic development (Baliur, 2007: 63). It is vital that impact assessments are conducted as they also provide proof of concept of how the project has contributed to development priorities based on the social, economic, environmental factors which the programme is designed to affect (Batchelor and Norrish, 2006: 11; Wakelin and Shadrach, 2001: 11; Ashraf, Swatman, Hanisch, and Golden, 2008: 2).

According to Ashraf *et al.,* (2008: 2) there is a need for impact assessments to be better understood and conducted at a micro level so as to ensure that they provide better input into policy and strategic levels. Impact assessments will also provide researchers with the ability to understand the extent to which activities reach the people and the magnitude of their effects on people's welfare (Ashraf *et al.,* 2008). Furthermore, Bailur (2007: 63) states that:

> *"ICTD projects lack both a detailed objectivity and appropriate consideration of stakeholder groupings despite this being arguably an essential first step—one must first identify who is impacted before one can ask what the impact has been".*

Ultimately, an impact assessment should as far as possible also reveal changes in behaviour, economic structure and performance, as an effect of the use of the ICTD project (Franklin *et al.,* 2008: 3).

5.5 Impact indicators

Indicators are central to any impact assessment. This is because as measuring devices they define what data to collect and at what time intervals (Rothenbergy-Aalami and Pal, 2005). Prennushi, Rubio and Subbarao (2002) also state that to measure the progress towards the goals indicators are the variables used. An example of the progress towards eliminating hunger in families could be measured by at those who indicate that they are able to have in all 12 months of the year, three meals a day. It is, therefore, necessary to decide on which poverty reduction goals the plan wants to achieve and subsequently select key indicators and set targets for such indicators, before any evaluation system can be set up to evaluate whether a poverty reduction strategy is effective in reducing poverty (Prennushi *et al.,* 2002). Khosa (1996) defines indicators as a piece of information which communicates a certain state, trend,

warning or progress to the audience. Core indicators are simply the ways we come to understand the inputs and outcomes of a program or project that we may or may not be able to observe directly. The United Nations (2009: 10) suggests that broader areas of impact need to be identified first such as, economic, social, and political factors before indicators are developed. Moreover, when indicators are identified based on their impact areas they need to possess the following characteristics (Licona, 2008; Prennushi *et al.*, 2002):

- Indicators needs to be clear which means they have to be precise and an unambiguous measure of progress.
- They need to be relevant meaning they need to be appropriate to the subjects matter and reflect their shared objectives.
- They need to be monitor-able which means it must be amenable to independent validation.
- And lastly, it must not be easily distracted by unrelated developments and should not be easily influenced to show success where none exists.

Furthermore indicators need to be context-specific and ideally indicators should also assess the direct issue that is to be solved (InfoDev, 2010). Both the selection and acceptance of an indicator depends on values, indicators often work best and sometimes only in combination, a single indicator does not necessarily tell a person enough (InfoDev, 2010). Indicators are transitory or sometimes seasonal and hence, they need to be reviewed and adjusted accordingly (Licona, 2008). Over the course of the program as conditions change the objectives are also altered or better indicators may be discovered. In these instances it may be appropriate to change the indicators that are being monitored (InfoDev, 2010).

Taylor and Zhang (2007) indicate that there are two types of indicators:

1. *Composite Indicators* which aggregate "sectorial" indicators using weights and aim to provide a comprehensive picture of a country, comparable over time and between countries.
2. *Subjective Indicators* which are based on the assumption that well-being depends on the degree of utility that individuals perceive in their social environment, which is how people react to and experience the events and situations in their lives.

The type of indicator that is applicable to this research is the subjective indictors, which will provide how people react to development initiatives particularly and in particular the ICTD projects. The need for impact indicators in conducting impact assessments is vital as many challenges are experienced in this process. Taylor and Zhang (2007: 7) suggest that indicators

that are required should obviously capture the consequences for living conditions and lifestyles, for wealth creation, income distribution, earning inequalities, education and training, social protection and social cohesion (including the risks of the emergence of an information underclass), demographic dynamics, individual empowerment, new communities, changing cultural norms, and much more. Ashraf *et al* (2008: 3) also suggests that impact indicators should be identified by participants within a particular community who can themselves describe or decide what constitutes development. This is because the community members are the ones who are more likely to be conscious of their own well-being and can thus offer useful suggestions on the impact of changes resulting from the ICTD intervention. This allows for development information to come and be easily understood directly from the participants themselves. It is also imperative that the goal of the project is understood before any indicators can be constructed (United Nations, 2009: 10). According to Rothenbergy-Aalami and Pal (2005: 8) impact indicators should be of a qualitative and quantitative nature as impact can occur across all scales. The various process of identifying impact indicators are discussed next.

5.5.1 The Process of Identifying Indicators

There are many approaches that are used to identify impact indicators. One approach suggested by Heeks and Molla (2009) is the CARTA approach. This approach is where indicators that are identified are based on the ICTD impact can be measured according to the extent to which it improves information delivery on the following "CARTA" criteria:

- *"Completeness: How much more complete is the information produced by the ICTD system compared to the pre-system situation?*
- *Accuracy: How much more accurate is the information produced by the ICTD system compared to the pre-system situation?*
- *Relevance: How much more relevant is the information produced by the ICTD system compared to the pre-system situation?*
- *Timeliness: How much more timely is the information produced by the ICTD system compared to the pre-system situation?*
- *Appropriateness of presentation: How much more appropriately presented is the information produced by the ICTD system compared to the pre-system situation?"*

A more practical approach that utilises the CARTA approach is information needs mapping, where it puts the two elements of the needs and indicators together in a matrix that is Table 5.1.

Table 5.1: Information Mapping – (Heeks and Molla, 2009).

Information Needs	*ICT4D Impact Indicators*				
	Completeness	Accuracy	Relevance	Timeliness	Appropriateness of Presentation
Housing information					
Water/sanitation information					
Health information					
Transport information					
…					

The CARTA approach therefore, provides a linkage between the needs of the community and how they can be evaluated and identified. The impact indicators are not only therefore, based on the goals of the project but also on the needs of the community and the relation to the information they will receive in order to achieve those impact indicators. This also relates to this research by linking the needs of the community to what has been provided to fulfil those needs in the community.

Another approach that is suggested by the United Nations (2009:36), is shown in Table 5.2 below.

Table 5.2: Steps in developing indicators for evaluation. (United Nations, 2009)

STEPS IN DEVELOPING INDICATORS FOR EVALUATION

Step	Action
1. Identify all concepts to be measured, especially project objectives and outputs	• Review all concepts, objectives, results, and output statements to clarify them and reach an agreement • Be clear about what type of change is implied (a situation, state, condition, attitude, behaviour) • Clarify whether the outcome sought is an absolute change, a relative change, or no change • Specify where and when the change is expected (what target group, what location, and in what time frame – this identifies the appropriate unit of analysis) • Determine the relationship between project activities and their outputs or objectives (are these outputs or objectives direct or indirect?)
2. Develop a list of trial indicators	• Think of possible alternative indicators for each concept, objective, and output, without being too restrictive • Conduct internal brainstorming sessions • Consult stakeholders and other experts • Try to borrow from other projects and studies
3. Assess each trial indicator against criteria	• Establish an agreed set of criteria for indicators (see table 7) • Use a scoring scale (1-5) to determine the usefulness of each trial indicator (but be flexible and use your own judgment)
4. Select the best indicators for this project	• Consider each indicator on its merits against the criteria • Consider the mix of indicators to construct a robust set that is consistent and complementary in terms of data-collection methods and time frames • Avoid having too many indicators (it may indicate that the objectives and outputs are not clearly defined) • Be prepared to update your indicators — the best indicators may change as projects develop

It sets the pace that indicators should be context specific so that can be used to frame data collection of the ICTD projects. Essentially, good indicators should be able to measure impact and also require that a clear vision of what a telecentre is trying to achieve and what an evaluation is trying to measure be defined (United Nations, 2009: 36). Accordingly, the first requirement in the development of indicators is to identify the objectives, outputs, and projected results associated with the impact assessment framework of the project. The basic approach to creating indicators involves four steps as described in Table 5.1. Developing indicators is a carefully considered process requiring the collective efforts of all stakeholders especially because it is associated with costs. Having many indicators does not necessary lead to better assessment as each indicator comes with an intrinsic cost in terms of data collection, monitoring and evaluation activities (United Nations, 2009: 36). In addition to this, the issues related to reliability and availability of data must be carefully taken into consideration in this stage. These steps also involve developing a list of trail indicators which outline possible alternative indicators for each concept, objective and output, and also researching how other projects and studies have developed impact indicators in the past/present (United Nations, 2009: 36). The set of trial indicators also need to be assessed by the indicators criteria which states that impact indicators need to be objective, a direct measure, adequate, quantitative, qualitatitive, practical, disagrregated and reliable (United Nations, 2009: 37).

Another approach that can be used which seems to have consensus between many authors is the approach of the community identifying their own impact indicators and, therefore, use of a bottom up approach to identifying impact indicators (Heeks and Molla, 2009; United Nations, 2009; Taylor and Zhang, 2007, Ashraf *et al.,* 2008; Parkinson and Ramirez, 2007; Bailur, 2007; Yuan, 2003). ICT projects that involve the community in planning, implementation and follow-up tend to produce significantly better results than those which are developed far away and implemented on a franchise basis. Therefore, by focusing on the community level, specific strengths, weaknesses and opportunities can be identified and appropriately addressed. While this approach requires greater inputs of time and resources to create a locally customized approach; the higher levels of success it creates makes it more worthwhile to pursue (United Nations, 2009: 41). Indicators of community projects should be centred on people, the aim being to help stakeholders with different perspectives to engage in structured and coherent debate about the many factors that affect livelihoods, their relative importance and the way in which they interact (Parkinson and Ramirez, 2007: 8). Community level indicators need to be related closely to local people's awareness and understanding of

their locality and their aspirations relating to sustainable development. Public participation is, therefore, one of the most effective methods to develop these kinds of indicators (Yuan, 2003: 254).

Another method of identifying impact indictors through a participatory way is to measure progress toward project goals as in Figure 5.5.

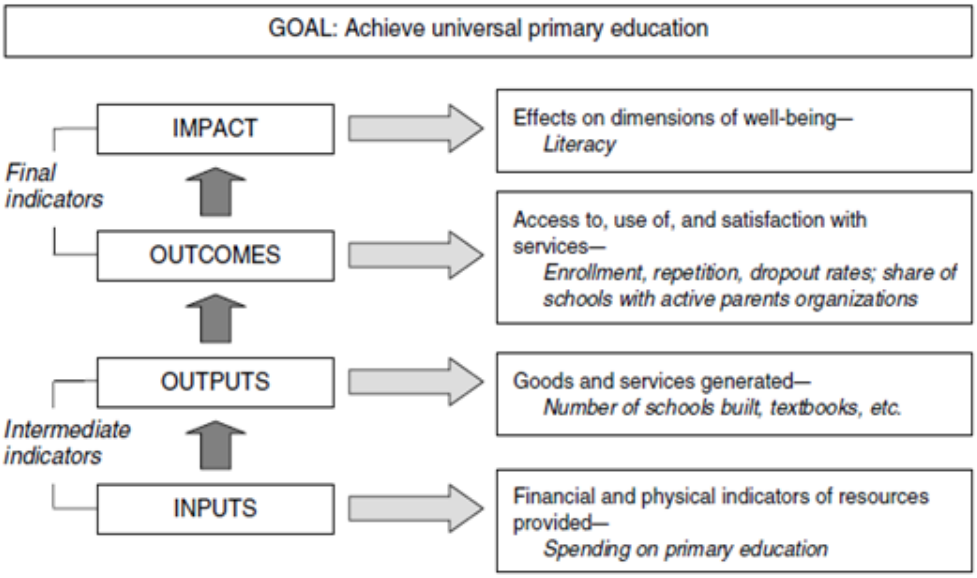

Figure 5.5: An example of identifying indicators based on goals. (Prennushi et al., 2002)

There are two categories in which indicators could be distinguished intermediate indicators and final indicators. Final indicators are evident when an indicator measures the outcome of an intervention on individuals' well-being. An example could be when literacy may be considered one of the scopes of well-being, so an indicator measuring it would be the number of people of a certain age who are able to read a simple text and write their name (Prennushi *et al.*, 2002). At times final indicators could be divided into outcome and impact indicators. The aim of this method is, therefore, to identify indicators at every level of a goal in the project. The participatory manner in which the impact indicators are identified means that the evaluator works with the project team and local stakeholders to design questionnaires, specify topics of local importance, suggesting culturally acceptable questions, identifying potential user groups to be included in focus groups, etc. (Pade-Khene and Sewry, 2012). This model also emphasis the notion that what has contributed to the project must have an impact or an outcome. The input must however, be based on the needs of the community and what has been contributed in order to yield the desired effects.

Another approach in identifying impact indicators is that of the European Union (2006) by which states that impact indicators need to be based on baseline indicators (reflects the main goal and objectives). The relation between baseline indicators and impact indicators is illustrated in Figure 5.6, which shows the relation between baseline indicators, output, result and impact indicators.

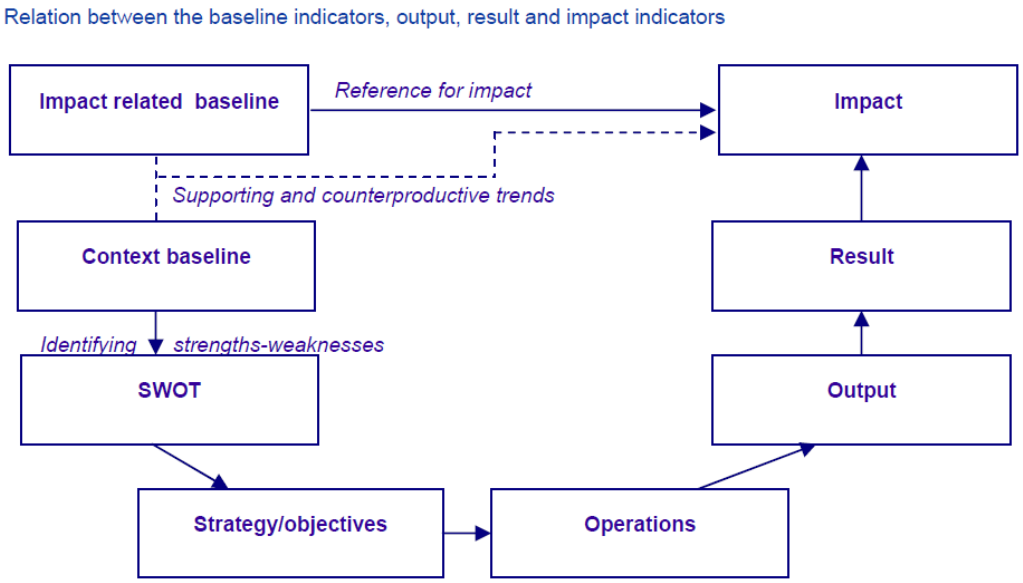

Figure 5.6: Relation between the baseline indicators, output, result and impact indicators. (InfoDev, 2010)

In Figure 5.6 an impact related baseline needs thought, thereafter, the context baseline is conducted. Through a context baseline a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis is then conducted to further identify strategy or objectives. The operations of the project then occur to produce an output, therefore, impacting the results and then the impact is conducted based on indicators that are in relation to the baseline indicators (InfoDev, 2010). The United Nations (2009: 10) identifies many obstacles, which include the difficulty of quantifying the economic impact in developing economies where baseline economic data is almost never sufficiently robust. Furthermore, such investments such as, training and education are typically long-term undertakings which make accurately assessing the impact of training on the participants typically quite difficult within the comparatively short evaluation periods used in most project timelines. This approach also focuses on therefore, linking the data that has been gathered from the baseline to the envisioned impact. In this research the baseline could be used to refer to the baseline study which would provide the state of the community, but also the indictors that must be developed in order to appropriately develop linkable indicators to the initial study.

5.6 Conclusion

As more and more funds have been directed to ICTD projects, there has been a need to provide the impact that those invested funds have been returned. The availability of monitoring and evaluation provides that benefit of identifying whether the project goal, vision and objectives have been achieved or not. Monitoring and evaluation systems also provide proof of whether the project(s) has been successful or not. With instruments like impact assessment, we are able to see if the intended benefits have been realised and also observe the unintended benefits. Impact assessments in ICTD projects are vital as they drive the questions of how, why, for whom, when and what happened in ICT projects. Impact assessments also reveal what has changed and why, they provide evidence of a change in behaviour of economic, social, and political factors. These factors are then measured through impact indicators which show what change has occurred or not within the ICTD project. Many models can be used to identify these impact indicators but it is vital that whatever model that is utilised, it must link to the environment of the projects and reflects the context of the environment. However, it is also vital that impact assessments be based on the plan of the project first, which is the projects goals, aim, objectives, and then on context.

Chapter 6 : The Needs-ICTD Strategy Alignment Framework

Chapter 5 discussed how impact indicators can be developed, the importance of monitoring and evaluation and the importance of impact assessments based on the context of the community. Chapter 6 provides the Needs-ICTD strategy alignment framework, where the contributions of the previous chapters are discussed, tied together and the details of the framework further explored.

6.1 Introduction

The information needs of a community must be established so that they are aligned to the ICTD objectives of the community. The preceding literature review contributes to the development of the Needs-ICTD Alignment framework. The aim of this chapter is to show how the previous chapters link to each other and how they have contributed to this framework. In addition, the discussion in the chapter intends to show how the framework is structured to align the ICTD strategy that has been developed by the external stakeholders to the community development goals and needs. This chapter is divided into three main sections. The first section addresses the literature review and how the chapters potentially contribute to the framework. The second section provides an overview of the framework. Finally, the individual components of the framework and how they link together are presented.

6.2 Literature Review Chapter Contribution to Conceptual Framework

This section illustrates how the preceding literature review chapters have influenced the framework that has been developed. As seen in Figure 6.1 all the chapters have links that ultimately contribute to the framework. Figure 6.2 also illustrates how each chapter has contributed to the components of the framework.

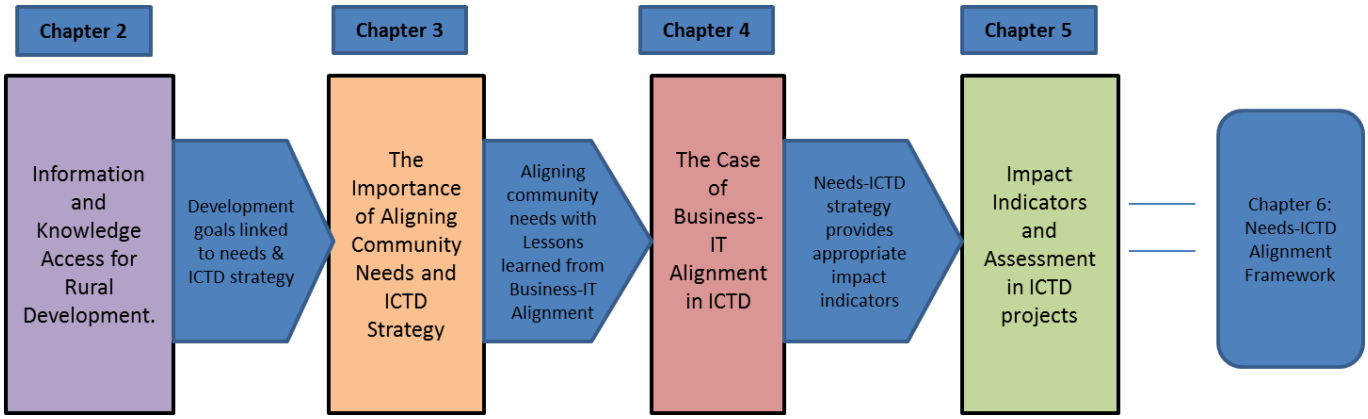

Figure 6.1: Chapter Contributions to Conceptual Framework

Contribution of Chapter 2: Information and Knowledge Access for Rural Development

The chapter's primary intent was to highlight the aims of rural development, indicate the importance of information, and reveal how ICTs can assist the process of rural and community development. Chapter 2 indicated the importance of communities understanding their role in the development process and how they can aid the process by being informed

about how information and knowledge accessed through ICTs can assist them. Chapter 2 influenced chapter 3 which emphasized the need for a needs assessment and linking it to ICTD strategy. It has achieved this by linking the development goals of the community with the needs of the community and by showing how an effective needs-ICTD strategy can assist in meeting those needs and goals. Chapter 2 influenced the components of the framework through indicating how the development plan of the community and baseline study components are vital to understanding the base of the community needs. The components are a vital part of the framework as they are the starting point of the framework and provide direction in which the framework progresses.

Contribution of Chapter 3: The Importance of Aligning Community Needs and ICTD Strategy

The aim of chapter 3 was to identify why needs are important, the different types of needs that should be fulfilled, and the importance of aligning ICTD strategy and the needs of the community based on the development goals of the community. Chapter 2 provided a base for chapter 3 through highlighting the importance of development goals within the community as a starting point for a needs assessment. The chapter also indicated the lack of projects regularly linking the ICTD strategy to the needs of the community and also emphasized the fact that this problem needed to be addressed. Chapter 3 assisted the framework in realising the importance of a need(s) assessment and ICTD strategy developed with the community in mind (which, therefore, affects the linkage of the needs and ICTD strategy).

Contribution of Chapter 4: The Case of Business-IT Alignment in ICTD

The aim of this chapter was to provide an understanding of business-IT alignment, how it functions, and how it may be linked and assist the needs-ICTD strategy alignment. This chapter was aimed at indicating the social alignment model and approach that has been used to align business and IT and what lessons can be learned in the attempt to align the needs and ICTD strategy. This was vital in assisting external and internal stakeholders to close the gap that usually exists between the design of the project and the reality in which the community exists in. The chapter also incorporated how enablers and inhibitors of business-IT alignment can be used in aligning the ICTD strategy to the needs of the community. The chapter contributed highly to the needs-ICTD linkage component of the framework through providing mechanisms that can be used to close the gap between the development goals and

needs of the community and the strategy that can be developed by the external stakeholders to meet those needs.

Contribution of Chapter 5: Impact Indicators and Assessment in ICTD projects

The aim of this chapter was to address the importance of developing impact indicators from the beginning of the project and how that positively affects the process of conducting the impact assessment. Through the alignment of needs and ICTD strategy it is possible to identify the impact indicators that can be used in conducting impact assessments. Impact indicators provide us with a number of indicators as to what needs to be measured, how and why those indicators need to be measured. Therefore, from the development goals, to the baseline study, to the needs assessment and the needs-ICTD strategy, it is vital that the indicators are clearly visible. This is evident in the framework as the link works from the development plan to the impact indicators that should be linked to the baseline indicators and show how they all contribute to the impact assessment.

Figure 6.2 provides a diagram which indicates where each chapter contributes to each component of the framework. The framework will now be presented further.

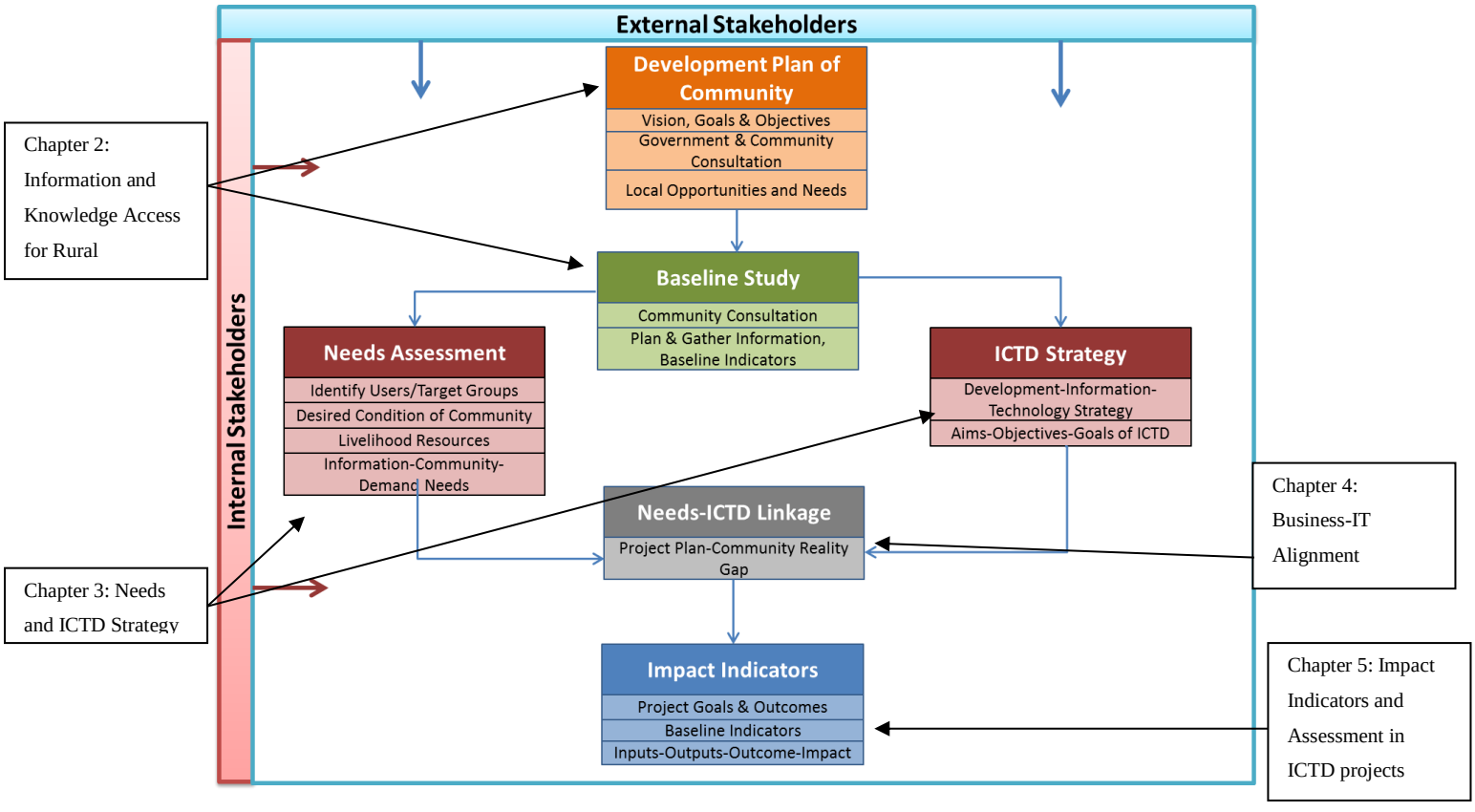

Figure 6.2: Chapter contributions to each framework component.

6.3 An Overview of the Needs-ICTD Strategy Alignment Framework

The Needs-ICTD strategy alignment framework is vital in the process of linking the ICTD strategy to community needs and in providing a foundation for the identification of impact indicators. The framework is important as it shows ways of firstly interacting with the internal stakeholders (which would then lead to how the development of the community should be investigated) to the needs collection and alignment. Without the framework it will be difficult to identify the appropriate community information and the needs of the community. No alignment will exist between the strategy and the community needs. This would result in the project providing solutions which are not suited to the problems and the needs of the community and leave the programmes developed unused in the communities. This will also affect the impact assessment of the projects and lead to the inappropriate impact indicators which will provide a link to the intended and the unintended impacts.

The framework is divided into nine components which facilitate the alignment of needs and ICTD strategy in order to measure impact as demonstrated in Figure 6.3. The framework is dependent on rigorous interaction with external stakeholders and internal stakeholders. The consultation of these stakeholders influences the success rate of applying this framework in the community. Each component also affects the success of the application of the framework. Since each component affects the execution of the following component, therefore, each component cannot be executed without the results of the previous component. Thorough completion of the components also contributes to the success of the application of the framework. Mutual understanding of how the framework works from the external and internal stakeholders is vital as it affects the understanding and execution of the framework to benefit the community and ICTD project. This framework facilitates the reduction of the gap between the community needs and what the ICTD project can facilitate. The reduction of the gap, therefore, enhances the sustainability of the ICTD project within the community by being connected at all times with what the community needs and how the ICTD strategy can provide results that will have an impact.

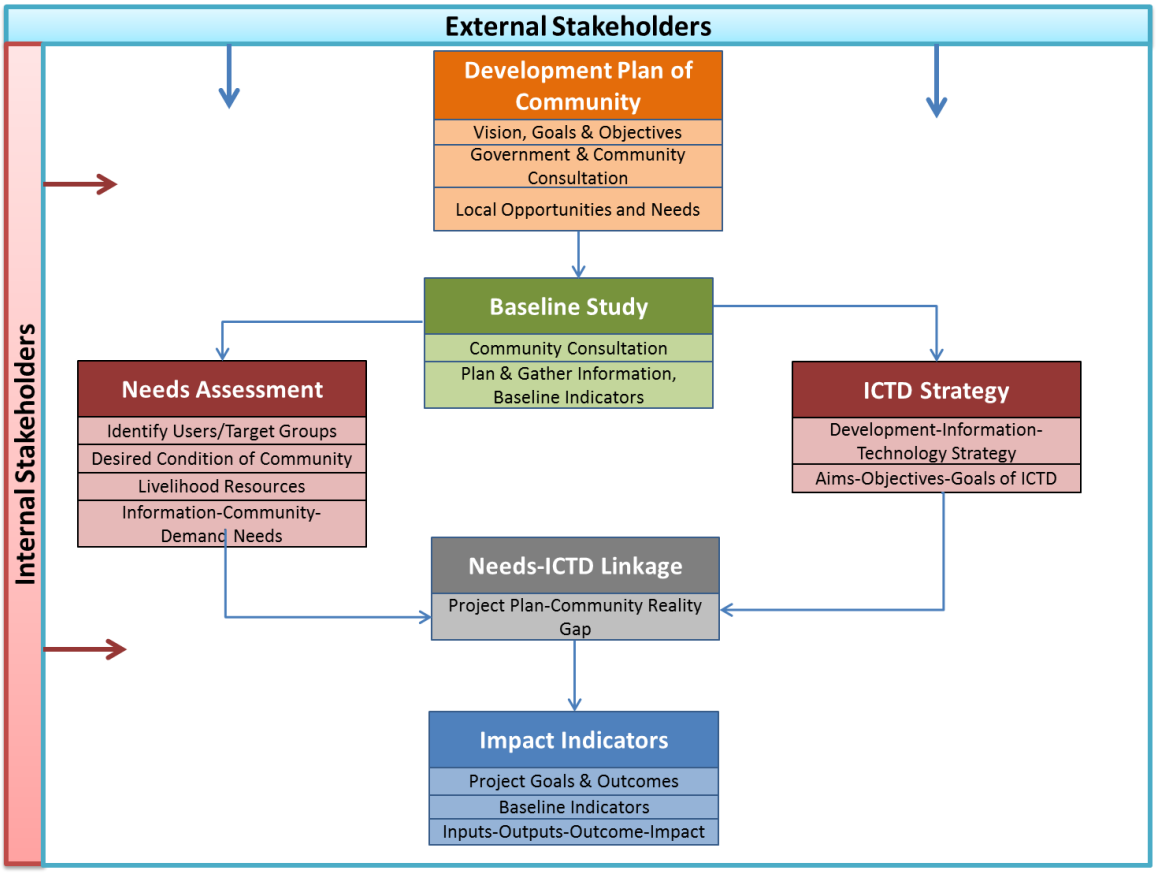

Figure 6.3: Needs-ICTD Alignment Framework for Impact Measurement

6.4 Components of the Framework

6.4.1 External and Internal Stakeholders

When development is initiated it cannot occur without the involvement of the community or the key stakeholders involved. Human and rural development are a participatory, people-centred process intended to reduce the incidence of poverty and achieve better livelihoods for all (Kingsbury *et al*. 2004: 44). Therefore, the involvement of the community is central to the development process. The involvement of the community is reiterated by the principals of development. There are two primary principles for rural community development. The first principle indicates that rural development is about development of and for the community. The second principle emphasises development through community decision-making processes. This therefore, means that any development cannot occur effectively without the participation of the community. The external stakeholders possess some knowledge of how to assist the community. This can be through ICTs being implemented in communities or it can be parties possibly supporting the community's development initiatives. External stakeholders may know the ICT uses and challenges based on the environment of the

community. This signifies that they therefore, provide a higher level of understanding about the community and how ICT can provide mechanisms to improve the quality of life of the community.

Internal stakeholders are the community at large. They are made up of target groups within the community which can for example, include; the youth, elderly people, business groups and school children. The community also includes the community leaders, project champions and other representatives in the community. The internal stakeholders know their needs and what kind of development needs to occur for the community to move forward and develop. It is important therefore, that any development should occur through a consultative process with the people involved. If this is not the case, communities often reject and are not enthusiastic of any development that occurs in their community without their involvement. The decisions that are taken by external stakeholders should be clearly communicated to the community leaders and members. When these members are not involved in this process, this questions the validity of the project and its intention to bring about real change to the community. Therefore, the process of making decisions needs to be participatory and people-centred. External stakeholders are the people that bring about most of the resources to facilitate the development of the community. Examples of external stakeholders would be the researchers, project partners and funders, project leads, trainers and technicians. It is important that external stakeholders provide avenues to assist the development transition. The internal stakeholders should also further assist in driving the projects to channel development through the right paths. The external stakeholders direct and assist in driving the technology to solve the community problem. External stakeholders should provide clear direction in terms of providing valuable information and technology to internal stakeholders. More so internal stakeholders should, therefore, be consulted at all times through the life of the project. The first step in consulting the community should be throughout the Development Plan of the Community to understand the community as it is, the development efforts that have already occurred in the community, and its vision for the future.

6.4.2 The Development Plan of Community

According to Harris (2004), each community should possess a development plan which provides a direction for development in the community. The development strategy should include development decisions, objectives and direction, community priorities, and it should also be change oriented (focusing on areas that need further improvement). A development strategy that is well grounded within a business and environmental context that matches a

local need with a local opportunity will allow for a strategy to be effective (Harris, 2004). A development strategy also provides enabling environments through support for policy and regulatory framework advice and the development and promotion of local capacity development (Canadian International Development Agency, 2005). The development strategy further provides a plan for creating employment, eradicating poverty and improving the socio-economic state in the community (Inter-American Development Bank, 2004).

The development plan of the community is based on the community's needs to develop into a more self-sufficient society. The development plan of the community should be driven by the community members and through consultation with all internal stakeholders of the community. It should also be driven by the leaders of the community, which can include the chiefs, respected people, and other members of the community. The component as seen in Figure 6.4 is divided into three parts, which encompass the vision, goals and objectives; government and community consultation; and local opportunities and needs.

Figure 6.4: Development Plan of Community Component

Vision, goals and objectives are what the community aims to achieve in order to better the lives of their people developmentally (Remenyi *et al.*, 2004). It is driven by the need for the community to develop further and provide people with opportunities to grow and progress. The vision, goals and objectives clearly state the direction in which the community will develop and what the aim of development is. The process of creating the vision, goals and objectives of the community should be a bottom-up approach so as to include all the stakeholders of the community. When the community stakeholders set what they would like to achieve they are more likely to be cooperative and interested in the development of the community then when this has been dictated in a top down fashion. The local needs of the community should also drive the initiative of creating the selected goals and objectives of the community.

The external organisations (such as, government, academia, NGO's, and other private organisations) and community should consult each other on what is best for the community. The government should always be in contact with the community and its leaders to know the needs and development aspirations of the community entail. The government itself should have a development plan for the community which is commonly referred to as the IDP (Integrated Development Plan) that indicates the plan that government will follow to address the development needs of the community (McEwan, 2003). The IDP is commonly developed with the assistance of community leaders and not government officials alone. This means therefore, that the vision, goals and objectives of the community should be visible in the IDP. Frequent consultation with the community will assist the government in knowing which development needs and services should be provided urgently to the community. When government wants to implement its plans for the community, the plans should also be linked to the local needs of the community.

Local opportunities and needs should drive the need for development in the community. A gap should exist that identifies why development has to take place in the community. This can occur through the locals informing community leaders and the community at large of their needs and how they would like to progress as a community. Formalising the development plan of the community should be a process that involves all members of the community, and therefore, should reflect the community holistically. The process should be driven by the community as they have a say in the process of how development should unfold since their lives are going to be affected by the outcomes of the projects.

When the development plan has been drawn up, the direction in which development will progress will be clearer as there will be goals and objectives to drive the development. When external stakeholders become involved in the community they arrive knowing fully what the community aims to achieve and how they can assist in driving development.

6.4.3 Baseline Study

The baseline study is aimed at investigating and assessing the current status of the community and its readiness to uptake innovative development activities through the use of ICT (Pade *et al.*, 2010). A baseline study should be put in place at the start of the ICT project to capture the existing state of the community (Batchelor and Norris, 2006). The baseline study also reflects the socio-economic status of the community. The baseline study can be directed and guided by research questions such as (Pade *et al.*, 2010):

1) The position of the local economy and what guidelines can it take?

2) What is the quality of life in the communities?

3) How ready are the communities to form part or become partners in the initiative?

The baseline study does not focus on issues linked with the new ICT project's technology, but aims to know the existing position of the community (Pade-Khene and Sewry, 2012). The characteristics of rural communities are diverse and unique and therefore, the evaluator should operate closely with each community to understand their prevailing challenges or priorities and discuss possible resolutions through a participatory process that includes all key stakeholders in the development program (Pade-Khene and Sewry, 2012). The following are some examples of the aspects that should be assessed, and these include: socio-economic conditions, demographics, cultural context, political context, existing ICT diffusion (both modern and traditional ICT), the way of life in the community and traditional information and communication channels, existing politics of information and information flows, and the extent to which an enabling environment exists for ICTs to empower poor communities (Pade-Khene and Sewry, 2012). The baseline study should be designed to assist in gathering and providing information that will aid in the evaluation of the intended projects positively (Batchelor and Norris, 2006).

The baseline study is the second component of the framework and should be conducted when the community has a clear development plan in place. This is because the development plan will provide some direction in which the current state of the community is progressing in. The baseline study should be driven by the external stakeholders in consultation with the internal stakeholders. This component is divided into two parts which together makeup the baseline study. As shown in Figure 6.5, the baseline study is made up of community consultation and the identification of baseline indicators which should be planned and information gathered on these baseline indicators.

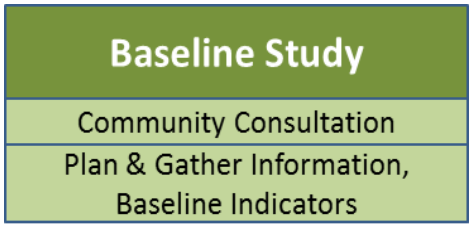

Figure 6.5: Baseline Study Component

Community consultation is vital to obtaining correct information from the internal stakeholders. Through interacting with the community and observing it, vital information can be gathered to see the community as it is. This consultation serves also to inform the community of the baseline study and provide information on how it will occur and how it will affect the community. Community consultation should go hand in hand with the participatory process and should include all stakeholders. Through community consultation it can be discovered whether the community is actually ready to be involved in the project and be involved in the change that will occur. Suggested means of consulting the community include firstly meeting the heads of the community. Secondly, a community meeting can be called to provide overall clarity of the project, while thirdly, meeting with the community members informally with people in their natural environments (such as, when people are fetching water from the river) can also provide invaluable information on the desires for development of the people in the community.

Planning and gathering information is a process of knowing what, how and which information must be gathered for the baseline study and this therefore, requires rigorous interaction between the external and internal stakeholders. From the gathered information appropriate baseline indicators need to be identified so as to measure the involvement of the project in the community and track the development of the community. The end point of the baseline study should reveal the way of life of the community as it is. The baseline study will then contribute to the needs assessment of the community, as a baseline study provides a high-level overview of the status and needs of the community. A needs assessment therefore, investigates specific needs in-depth from the baseline study. Pade-Khene and Sewry (2012) suggest the following steps in conducting a baseline study as shown in Figure 6.6:

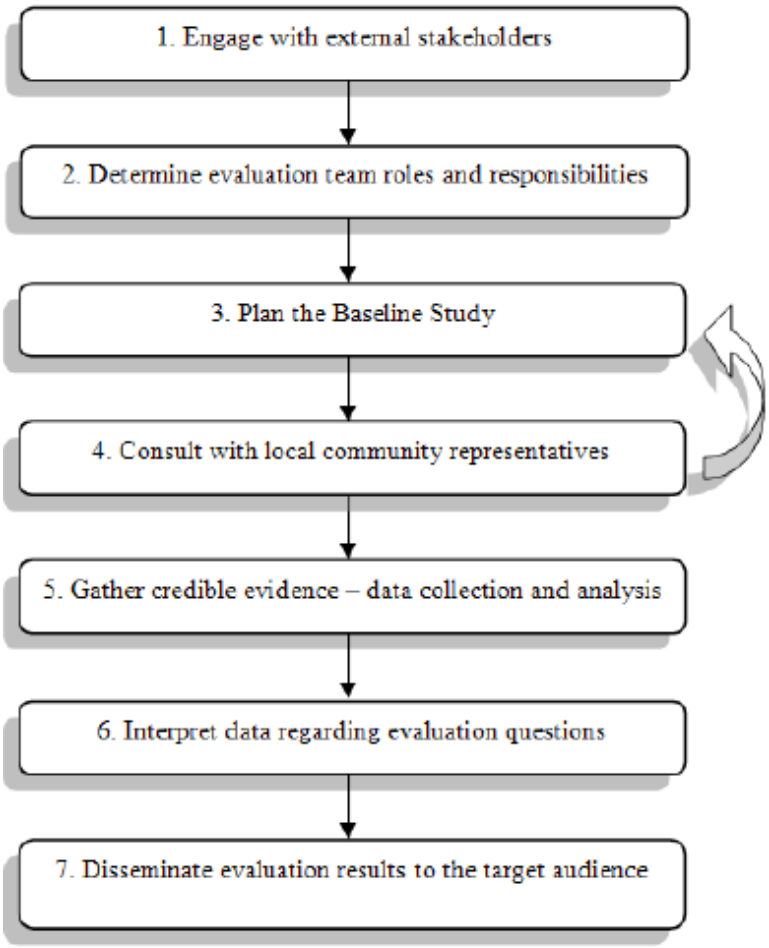

Figure 6.6: Baseline Study Process (Pade-Khene and Sewry, 2012)

6.4.4 Needs Assessment

A need is identified as the difference between a current condition and a desired condition (Gupta *et al.,* 2007: 30). Maslow's hierarchy of needs provides the needs that should be satisfied for humans to survive. A needs assessment is a process that identifies the needs of the community or target group needs. A needs assessment also frames the problems or opportunities of interest and builds relationships among the people and groups who have a stake in the issue (Gupta *et al.,* 2007: 20; Dagenais, 2010: 17). As indicated by Bridges (2011) a needs assessment should fully investigate current technology use in the area to be served including the local capacity to use the technology; the availability of technical support; the kind of services that people and organizations would be willing to pay for and what they may need to be provided for free, the training needed to integrate technology use into daily routines of the target groups, the availability and reliability of electricity and phone lines; secure storage for technology; and many other factors. If the needs assessment is not taken from the technology perspective, Pade-Khene and Sewry (2011) provide us with a

different view from Bridges (2011) as they indicate that needs are identified through a needs assessment of livelihood resources essential for rural development such as, economic or financial capital, natural capital, human capital, social capital, and informational capital. A needs assessment should also provide a view from the different stakeholders within the community. This means therefore, that information, community, target and demand driven needs have to be explored. This view is reiterated by Dhingra and Misra (2004: 1) as they state that the rural ICTD professionals tend to develop ICT solutions based on their own perception of the end-users' requirements rather than exploring the rural poor's information needs.

The needs assessment component can only proceed once the development plan and baseline study of the community has been developed. The needs assessment relies on the general needs and priorities of the community. This information is gathered during the baseline study and the development plan of the community. The needs assessment component, as seen in Figure 6.7 is divided into four parts, which are: the desired condition, Identify user/target groups, Livelihood resources and Information-Community-Demands Needs. This process is driven by the external stakeholders but through a consultative process with internal stakeholders in the community.

Figure 6.7: Needs Assessment Component

The first part of this component is identifying user/target groups within the community. In identifying these groups of the community one is therefore, able to identify their different needs. This can be done through reviewing the baseline and development plans of the community in order to get an indication of the groups that exist in the community. The next step is then to confirm these groups through identifying and communicating with them. Potential examples of groups include the youth, school learners, entrepreneurs, health

workers, and teachers. When the users and target groups are identified then an in-depth desired condition of the community can be explored.

The second part of this component is identifying and exploring an in-depth desired condition of the community. The current condition of the community can be viewed through the baseline study as it provides the existence of the community as it stands. The development plan of the community identifies the plans that the community would like to achieve in order to develop the community. Most needs of the community, therefore, become evident through the comparison of the baseline study and the development plan of the community. In knowing the in-depth desired condition of the community, an indication of the different development needs of the community can be explored. A specific need of the community is then selected and investigated in-depth, in order to explore what are the needs in relation to the main need of the community. This provides background information for the third part of the needs assessment component. This component is informed by the baseline and development plan of the community. The aim, therefore, is to interrogate the desired conditions of the community, at a deeper level and through the interrogation of target groups and the community at large.

The third part of this component is identifying and exploring the needs of the community through the livelihood resources approach. Livelihood resources view the needs of the community through the resources that are needed for rural development to occur (Pade and Sewry, 2011). Therefore, in order for the development plan of the community to move forward, the resources needed for development should exist (if they do not then this could be seen as the need(s) of the community). The resources essential for rural development, such as, economic or financial capital, natural capital, human capital, social capital, and informational capital indicate most of the needs of the community. This process gives a clear understanding of what the community needs to survive and, therefore, contributes to attaining these resources to fulfil the needs. When basic needs of the community are identified, then other specific needs can be addressed. These include information needs, community and target group needs and lastly demand driven needs.

The last part of this component is identifying and exploring the Information-Community-Demands Needs of the community. Information needs address the type of information the community would like to be exposed to in order to aid their own development. This means identifying the type of information needs of the community. If the community is focused

more on agriculture or farming, a need that they may have is to know more about how to keep their land fertile through all seasons. Then it would be beneficial to the community to provide information channels that provide this type of information. Community and target group needs are needs of specific groups or the community as a whole. Breaking down community and target group needs assists in clearly understanding what each group needs to develop and how ICTD can assist them. An example would be a target group of entrepreneurs that need access to markets. The ICTD could provide platforms which assist in linking customers to the sellers, for instance, through a website which facilitates the buying and selling process for both sides. Demand driven needs only arise when the users are already exposed to ICT services which have supported their basic needs. An example for instance, would be the sellers wanting access to international chain store buyers to carry their items in the shops. More information, resources and platforms would be needed to facilitate this process through the involvement of external stakeholders.

The needs assessment component contains a number of processes that are needed collectively to produce adequate information to contribute to the next section of the framework. The needs assessment process is a continuous process and therefore, cannot be done and completed all at once. Overtime the needs of the community change and, therefore, sustainability needs to be achieved through continuous assessment of the community. The steps in this process can be sequenced or not although they work well together if they are sequenced as the information can flow orderly and link to each other.

6.4.5 ICTD Strategy

An ICTD strategy according to Harris (2004) should contain an information strategy, development strategy and a technology strategy. The different strategies are interrelated and build-up the ICTD strategy. They provide a link to how information, development and the technology strategy link up. The application of ICTs for development should always begin with a development strategy, which includes development decisions, objectives and directions, change orientation and priorities of the development (Harris, 2004: 15). This will result in an information plan that must be developed, in order to provide information that can be used in supporting development of the community. A technology strategy then indicates the various platforms that are available to access the information to support development of the community. The importance of having all three components is iterated by the Canadian International Development Agency (2005) which also indicates that ICTs offer new ways of providing access to information and knowledge, and thereby creating significant

opportunities for learning; networking, social organization and participation. They further work to improving transparency and accountability and hence the link between information and ICT. However, as with any strategy, an ICTD strategy should contain an aim, vision, objectives and goals that are envisioned by the community. An ICTD strategy would then be a strategy that would be used to effectively plan over the long term things such as, how the ICT supports development initiatives, and how ICT resource/s will be used to implement this strategy in the rural environment to meet the information needs for development in the community. An ICTD strategy contains the aim, vision, objective and goals for the ICTD project. The ICTD strategy objectives are tied to the community's overall development objectives which include topics such as, education, health, government, business, and industry (World Bank, 2006: 88; Geldof, 2005: 7). ICTD is intended not as an end in itself but as a means to fulfilling the larger development needs of a community (World Bank, 2006: 88; Geldof, 2005: 7). Therefore, linking the development-information-technology strategy with the aims and goal of the project contributes to a sound ICTD strategy. An ICTD strategy is beneficial to all stakeholders, because as it is developed, it illustrates the goals and objectives that are developed and how they relate in a reasonable way to the social conditions that the programme is intended to improve (Rossi *et al.,* 2004: 135).

The development of ICTD strategy is based on the baseline study and development plan of the community and provides the state of the community and the direction development is progressing and therefore, contributes to the Needs-ICTD Alignment component. As with the needs assessment component, the ICTD strategy component cannot occur without the baseline study and the development plan of the community. This component as illustrated in Figure 6.8 is divided into two themes and these being: the development-information-technology strategy and the aims-objectives-goals of the ICTD.

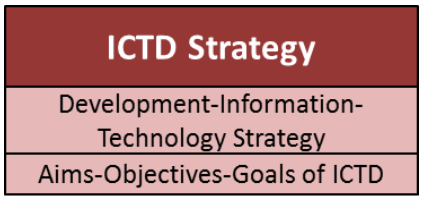

Figure 6.8: ICTD Strategy Component

The first sub-component which is the development-information-technology strategy addresses the different types of strategies that are needed to provide a sound ICTD strategy. The development strategy highlights the development needs of the community. It addresses

the areas that need to be developed for the community to progress forward. The development plan should indicate why there is a need for development within the community and how it will occur. It should be based on the baseline study and needs assessment of the community and should as far as possible also be in line with the overall development goals of the community at large. As indicated earlier, information is needed to aid the development strategy and, therefore, an information strategy needs to be developed. The information strategy should be equipped to provide appropriate information to the community so that the community can take advantage of the information they receive. An example of this would be when calls for funding from various departments are issued. If the community has been aiming for these types of calls then they can submit their applications within the stipulated time. The technology strategy should then address how the required information for development can be delivered. This means investigating the possible means available to the community for delivering the information in convenient and accessible avenues. The way the technology is delivered should provide information that is timely, accurate, in the right language and appropriately. Linking these three parts should also be driven by the external stakeholders and in consultation with internal stakeholders, so as to see if the development plans link to the information provided and are in line with the technology they use and could be accustomed to.

The second sub-component which is the aims-objectives-goals of ICTD can then be established when there is a clear indication of the development plans of the community and the type of information that is needed to develop the community further. Formulating the aims, objectives and goals of the ICTD should be a collective effort between the external and internal stakeholders. The external stakeholders clearly indicate to the community what technology can do and achieve when used in the correct ways. The external stakeholders could then indicate to the community their strategy and therefore, also share aims for the community, the objectives they wish to aim for and lastly the goals that they would like to achieve.

The combination of the two parts of this component which is the development-information-technology strategy and the aims-objectives-goals of the ICTD all positively contribute to the development of a sound ICTD strategy. The involvement of internal stakeholders cannot be neglected at any part of the framework. Therefore, it is also vital that they are involved in the development of the ICTD strategy. A sound ICTD strategy also contributes to developing the

alignment between the needs and ICTD strategy more effectively than an ICTD strategy that is fully developed without community participation.

6.4.6 Needs-ICTD Linkage

The Needs-ICTD linkage component of the framework cannot transpire without the needs assessment and the developed ICTD strategy. Therefore, the component is dependent on the needs and ICT strategy components because they determine what needs to be linked and the goals of both the external and internal stakeholders. As indicated in Figure 6.9 the needs-ICTD linkage component contains one section which is the project plan-community reality gap.

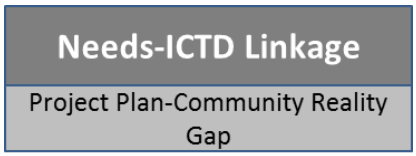

Figure 6.9: Needs-ICTD Linkage Component

The project plan-community reality gap is aimed at reducing the gap between the design of the ICTD strategy and the reality of the community in which the ICTD operates in (Heeks, 2009). The project plan is the strategy in which external stakeholders aim to develop the community. The community plan is that which emanates from the development plan of the community. The first part of the component implies that the community needs to understand the external stakeholders plan including the ICT strategy. The external stakeholders also need to understand the community: the needs and requirements of the community and the reality in which the community exists in. When the internal and external stakeholders understand each other then they will have a clear idea of what will work for both the community and the project. With the needs also clearly articulated to all parties then the external stakeholders will have a clear idea on how they can meet the needs of the community. In order to meet these needs the external stakeholder can use the ITPOSMO as a guiding to tool to lessen the gap between the needs and ICTD strategy (Heeks, 2009). For example, the management structure of the external stakeholders and the management of the community should always meet and discuss about how each of them run their communities and how they can work together. The leaders of the community need to show their commitment to the value of this project. This will lead to the community at large valuing the assistance provided to them

through the project. This commitment will also influence the level of commitment the external stakeholders will have towards the community and lessen the gap. The involvement of the internal stakeholders in the development of the ICTD strategy will provide a positive reflection of the external stakeholders to the internal stakeholders in order to show how much they value their input. Clear communication between the internal and external stakeholders can reduce the gap as there will be no implied and mixed messages between them. When the community members know how ICT (sharing successful IT history) has helped other communities they become more enthusiastic about how the technology can assist them in solving their own problems, developing the community and therefore, lessening the gap. The external stakeholders also need to show commitment to the project by meeting its promised deliverables and meet the deadlines set with the community and therefore, lessening the gap. When the gap is closed or reduced the community finds trust with the external stakeholders and their capabilities because their needs would have been given priority as to how they can be solved with the ICTD strategy in place. The implementation of the strategy should also be given thought and outlined in the process of linking the needs and ICTD strategy.

The needs-ICTD linkage component is one of the critical elements of the framework. If the needs and ICTD strategy are not linked then a wider gap develops which could ultimately lead to the failure of the project. The impact indicators cannot be clearly articulated to reflect the needs of the community when this component is not applied.

6.4.7 Impact Indicators

As indicated by Prennushi *et al* (2002) "it is necessary to agree on which poverty reduction goals the strategy wants to achieve, select key indicators, and set targets for such indicators". Impact indicators are pieces of information that communicate a certain state, trend, warning or progress to the audience (Khosa, 1996). One approach in identifying the impact indicators is through the CARTRA approach where indicators identified based on ICTD impact can be measured according to the level to which it improves information delivery (Heeks and Molla, 2009). In the CARTA approach the development of impact indicators is based on the Completeness, Accuracy, Relevance, Timeless and Appropriateness (CARTA). Another approach is through identifying the indicators based on the goals that are meant to be achieved (Prennushi *et al.,* 2002). This approach focuses on identifying the input, output, outcome and then impact based on the specific goal that was meant to be achieved. Literacy as an example could be considered one of the scopes of well-being and so an indicator measuring it would be the number of people of a particular age who can read a simple text

and write their name (Prennushi *et al.*, 2002). Another approach highlights the importance of developing baseline impact indicators from the beginning through the baseline study from which the goals are identified from. The operations of the project then occur to produce an output therefore, impacting the results and then the impact is conducted based on indicators that are in relation to the baseline indicators (InfoDev, 2010). This is done through viewing the baseline study and developing baseline indicators which would show the state of the community. Then, the results and outputs of the project are compared to the baseline indicators from which the impact indicators can be developed. All these approaches can therefore, be applied together to develop impact indicators based on inputs and goals and lastly, on linking them to baseline indicators.

The impact indicators component occurs when the needs and ICTD strategy have been linked. The component as seen in Figure 6.10 is divided into three parts which are the project goals and outcomes, baseline indicators and inputs-outputs-outcome-impact.

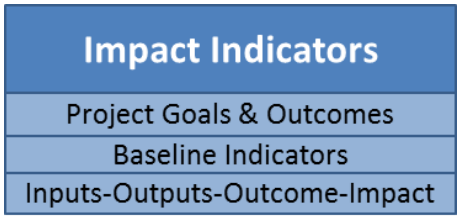

Figure 6.10: Impact Indicators Component

The project goals and outcomes should be reiterated throughout the lifecycle of the project and if they change, all stakeholders should be informed. The project goals should have a link to the overall community development goals and the needs of the community. The goals will provide direction as to what the project aims to achieve and how it will go about doing that. The goals will also be used to provide direction on what was achieved and what impact the goals had on the community and on the project itself. The presence of project goals also gives direction on the type of impact that could occur for the community based on these goals. The presence of goals and outcomes in a project also assists in identifying the impact indicators that can be measured based on the goals and the context of the project.

Baseline indicators should be identified based on the baseline study, community development plan, project goals and outcomes, and the needs assessment. The comparison between the baseline study and the community development plan can clearly bring out the impact which the development plan aims to achieve, as well as looking at the needs-ICTD alignment

strategy to see how the needs of the community will be achieved and the perceived impact this will have on the community.

Inputs, outputs, outcome, and impact should be the line of linking what was done (input) to what was achieved (impact). Therefore, indicators could be identified through linking the needs that were there, the inputs that were used to achieve a positive outcome of the need and what was the outcome linking to impact. The goals of the project can provide a clear connection through linking inputs to impacts. An example would be if the goal of the project was to provide health information to chronic patients, that goal would be based on a need of the community. The input there would be health information accessed through mobile phone for example; whereas the output would be people being more aware of their health, whilst the impact might be people being healthier as a result of this information. Impact indicators are, therefore, a collection of linking the project goals, to baseline indicators, to inputs and ultimately impact. The impact indicators then pave the way in actually conducting an impact assessment which will evaluate the impact the project has had on the community and their development efforts.

6.5 Conclusion

The aim of this chapter was to present the Needs-ICTD strategy alignment framework. The discussion intends to show how the framework is structured to align the ICTD strategy to the development goals and needs of the community that has been developed by the external stakeholders. The goal of the framework was to facilitate the reduction of the design-reality gap between the community needs and ICTD strategy. The reduction of the gap, therefore, supports the sustainability of the ICTD project within the community by being in contact at all times to what the community needs and how the ICTD can provide results that will have an impact. The different components all contribute to the success of the framework. Community consultation is vital as the community are the owners of the project and should assist the external stakeholders in driving the project. When the framework is implemented successfully it will lead to co-ordinated efforts between the community and the external stakeholders to achieve the needs of the community and its development goals. This framework however, needs to be applied to a real-life setting to explore its suitability and shortcomings.

Chapter 7 : Case Study Research Methodology

Chapter 6 provided the how and the why of the process of the Needs-ICTD strategy alignment process which would be informed based on the research methodology undertaken. Chapter 7 will present an overview of the research strategy, the scope of the study, the case study description, the analysis of the data and lastly, the ethical considerations that should be taken into account in this research.

7.1 Introduction

The aim of the chapter is to discuss the approach that will be adopted in this research and its research methodology. A research methodology is presented to propose an approach to the framework in a real life ICTD project case. This chapter firstly discusses the research paradigm that is adopted. Secondly, the chapter discusses the research strategy and further explains the details of how and where the data is collected. The chapter also highlights how the data collected will be analysed using specific tools. The chapter also discusses the ethical considerations that were taken into account in conducting this research. In conclusion the chapter views the case study method taken in this research as effective enough to explore the alignment of community needs and ICTD strategy.

7.2 Research Paradigm

This research applies a qualitative interpretivist approach as it applies an inductive approach for identifying, exploring and explaining the application of a Needs-ICTD Strategy Alignment Framework (Oates, 2006: 293; Gomm, 2004: 7). Interpretive researchers are viewed as qualitative researchers as they are primarily interested in investigating how people experience the world and/or how they make sense of it (Cornford and Smithson, 1996: 125; Gomm, 2004: 7). In an interpretive research paradigm, reality is understood to be socially situated and the investigator and the participant to be engaged in a mutual process of constituting knowledge (Jacobsen, Gewurtz, and Haydon, 2007). Investigations are to be flexible and iterative, aiming to produce either a rich description or theory. Although contested, the criteria for judging the quality of interpretive research include concepts such as, credibility, relevance, and complexity, which locate accuracy not in fixed procedure but in a defensible research strategy and a product that demonstrates depth and resonance (Jacobsen *et al.,* 2007). Walsham (2006) also provides a view that interpretive methods of research start from the position that our knowledge of reality, including the domain of human action, is a social construction by human actors, and our theories concerning reality are ways of making sense of the world This means that shared meanings are a form of inter-subjectivity rather than objectivity. Interpretivism is formed based on phenomenology and hermeneutics which encompasses interpreting information and structure of subjective experience and consciousness (Travis 1999; Walsham, 2006 and Klein and Meyers, 1999).

7.3 Research Strategy

The research strategy used to answer the research question and provide a case for this research is the case study approach method through qualitative research. Qualitative Research is an inquiry approach useful for exploring and understanding a central occurrence (Creswell, 2009). Qualitative research enables this research to apply the devised framework in a real life ICTD project case. Qualitative methods are essentially descriptive and inferential in character. Qualitative methods focus primarily on the kind of evidence that will enable one to understand the meaning of what is going on (Gilliam, 2000). A qualitative approach to research is likely to be associated with an inductive approach to generating theory, often using an interpretivist model allowing the existence of multiple subjective perspectives and constructing knowledge rather than seeking to "find" it in "reality" (Greener, 2008: 17). In qualitative research the inquirer asks participants broad and general questions, collects the detailed views of participants in the form of words or images, and analyses the information for description and themes (Creswell, 2009). From this data the researcher interprets the meaning of the information drawing on personal reflections and past research (Creswell, 2009).

The qualitative research approach has been selected to inform the Needs-ICTD Strategy Alignment Framework because it is of an exploratory nature which assists the framework in being explored and informed through real-life cases of the SAP and Siyakhula Living Labs. The framework needs to be explored in the living labs through the qualitative approach because the nature of the research requires an *in-depth* analysis of how practices were applied to align the needs of the community to the ICTD Strategy, and why these specific practices were applied in the Living Lab. This analysis will also investigate whether the alignment approach in the living lab was conducted through engaging the community with the designers of the ICTD strategy.

This research will use participant observation, interviews and document analysis to collect data. According to Yin (2003: 13) a case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context when the boundaries between phenomenon and context are not clearly evident. The purpose of a case study is to clarify a set of decisions which indicate *why* they were taken, *how* they were implemented and with what result (Yin, 2003: 12). According to Gillham (2000) a case could be a unit of human activity which is embedded in the real world, which could only be studied or understood in

context, and merges in with its context so that precise boundaries are difficult to draw. The case that can be studied could be an individual, a group or a large-scale community (Gillham, 2000: 1). A case study is one which investigates an individual, group or community to answer an existing research question and which seeks a range of different kinds of evidence: evidence which is there in the case setting, and which has to be abstracted and collated to get the best possible answers to the research questions (Gillham, 2000: 1).

To explore the proposed framework the case study is used to identify how practices were applied to align the ICTD Strategy to the needs of the community and why these specific practices were applied in the Living Lab, which will form a base for the measurement of impact. Yin (2003: 48) defines a multiple case study as a study that replicates more than one unit of analyses. The Siyakhula and SAP Living Labs are the case studies that are explored. The first case study is the Siyakhula Living Lab (SLL), which is situated in the Dwesa area on the former Transkei coast, within the Mbashe municipality of the Eastern Cape Province in South Africa (Pade *et al*., 2010: 6). The reason why this ICTD project has been chosen as a case study is because the lab was established in a rural community, and has been operating for five years, with lessons to learn from its approach. The second and third case studies that are explored are the SAP living labs that are situated in the Limpopo and Northwest provinces. These have also been situated in rural communities which operate for specific projects which are intended for the communities. These case studies are the Rustica and Smart Energy.

7.4 Scope of the study

This study is conducted in the Siyakhula and SAP Living Labs. The focus of this study is on the residents of the Dwesa community who are involved with the operations of the lab and the community at large. It also includes the management unit of the Siyakhula living Lab. This research aims to explore how the living lab attempts to align the ICTD strategy with the needs of the community by the external stakeholders and what the process of the alignment is or was. This study also observes how the results of the alignment and the impact indicators which can be assessed in order to measure impact in the future are based on the alignment conducted.

The SAP Living Labs are situated in various provinces in South Africa which are Limpopo and North West provinces. The purpose of the SAP Living Labs is to implement projects that are developed to assist the lives of the communities. They are designed and developed with

the communities in mind. The projects of the lab are aimed at emerging economies and have primarily been focused on the small business enterprise. Within the lab various projects are conducted although this research will focus on two projects which have involved the communities on a large scale. These projects are the Rustica Project which was aimed at small business enterprises and the Smart Energy Project which is aimed at households that use various energy sources.

The three case studies were selected based on how they would inform the framework. The case studies were evaluated on how they would influence the framework with their various practices. The good practices will positively inform the framework, as they will provide practices and methods of how they have achieved or attempted to achieve the alignment in the respective case studies. The bad practices will also inform the framework of how the inappropriate practices of the case study might have caused the lack of alignment between the community and the ICTD strategy. The positive and the bad practices will therefore, provide lessons on how the alignment could be achieved.

7.5 The Case Study Design

The case study design provides a conceptual framework that links the empirical data to be collected and conclusions to be drawn to the preliminary research questions proposed for the study (Yin, 2003: 19). The design of the case study is as follows:

7.5.1 The Case Study Research Questions

The research questions that guide the case study investigation aim to explore how the practices were applied to align the ICTD Strategy to the needs of the community and why these specific practices were applied in the Living Lab. This analysis also investigates whether the alignment approach in the living labs is conducted through engaging the community with the designers of the ICTD strategy:

1. How the needs of the community are elicited and how is the ICTD strategy aligned to the needs of the community?
2. Why were the selected approaches chosen for aligning ICTD strategy and the needs of the community?

7.5.2 The Unit of Analysis

This research explores the *process and practices* used to align information needs with the ICTD strategy. It explores how these practices support the identification of impact indicators to assess impact, directly linked to the ICTD project.

7.5.3 The Research Instruments

The research instruments that are used include interviews, participant observations and document analysis.

7.5.3.1 Interviews

The interviews used in the case study are designed as follows (adapted from Creswell, 2009: 123):

a) The type of Interview: A semi-structured interview is used. Welman and Kruger (2002: 161) explain that semi-structured interviews are a versatile way of collecting data. The reasons for this method of data collection are that subjects of different levels and backgrounds may be accommodated. This method is appropriate because vague responses could be probed for elaboration or clarification (Welman and Kruger, 2002: 162).

   The people that are interviewed are the Siyakhula Living Lab external stakeholders, including the Siyakhula living lab director at Fort Hare University and at Rhodes University, and the project lead. Internal stakeholders are also interviewed, which includes two project champions, two teachers, two community members and two youths who use the lab and are being trained again by a project champion. These participants have been chosen according to the available target groups and according to their level of involvement in the lab and the role which they play.

   At the SAP living lab the senior researchers are interviewed including the external stakeholders who conceptualised the projects and monitored them. The internal stakeholders that are interviewed include two project champions and four community members (which are from the two projects). The people selected are based on their level of involvement in the lab and the role which they play.

b) The interviews that are conducted are face to face, one on one, in-person interviews and telephonic interviews as well.

c) The interview equipment that is used includes a tape recorder, writing pads, pens, and pencils.

d) Consent to interview the interviewees is obtained through asking them before hand or before the interview if they would like to be interviewed. When asking the interviewees for permission for them to be interviewed information about the research is given to them and the purpose of the research explained to them. Confidentiality of who and what role the interviewee plays will not be mentioned.

e) The interview schedule: A list of questions are provided for the interview, which considers the following factors (Welman and Kruger, 2002: 165):

- The questions were open-ended, whereby respondents formulate their own responses.
- The level of knowledge of the respondents is also taken into consideration, by formulating questions using words with which the respondent is familiar with.
- The interview questions are aimed at maintaining neutrality in data collection, in that they do not suggest a particular response or intimidate a respondent into giving a specific answer (for example, "Do you agree that…").
- The sequence of the questions is set appropriately. Earlier questions are on simple aspects of the project to make the respondent feel at ease. Later on, more in-depth questions are asked.

f) A list from the 3 projects in Table 7.1 provides a list of the interviewee's, their role in the project and their demographics.

Table 7.1: Interviewee Demographics List

Interview	Role in project	Occupation	Gender	Location
Siyakhula LL				
Interviewee 1	External Stakeholder	Researcher	Male	Grahamstown, Eastern Cape
Interviewee 2	External Stakeholder	Researcher	Female	Grahamstown, Eastern Cape
Interviewee 3	Internal Stakeholder	Student	Male	Dwesa, Willowvale, Eastern Cape
Interviewee 4	Internal Stakeholder	Teacher	Female	Dwesa, Willowvale, Eastern Cape
Interviewee 5	Internal Stakeholder	Teacher	Female	Dwesa, Willowvale, Eastern Cape
Interviewee 6	Internal Stakeholder	Unemployed	Female	Dwesa, Willowvale, Eastern Cape
Interviewee 7	Internal Stakeholder	Unemployed	Female	Dwesa, Willowvale, Eastern Cape
Interviewee 8	Internal Stakeholder	Unemployed	Female	Dwesa, Willowvale, Eastern Cape
SAP-Smart energy				
Interviewee 1	External Stakeholder	Researcher	Female	Pretoria, Gauteng
Interviewee 2	Internal Stakeholder	Home based car worker	Female	Kopela, Northwest

Interviewee 3	Internal Stakeholder	Student	Male	Kopela, Northwest
Interviewee 4	Internal Stakeholder	Teacher	Male	Kopela, Northwest
Interviewee 5	Internal Stakeholder	Unemployed	Female	Kopela, Northwest
SAP-Rustica				
Interviewee 1	External Stakeholder	Researcher	Male	Pretoria, Gauteng
Interviewee 2	Internal Stakeholder	Sociopreneur	Male	Kgawutswane, Limpopo
Interviewee 3	Internal Stakeholder	Sociopreneur	Male	Kgawutswane, Limpopo
Interviewee 4	Internal Stakeholder	Unemployed	Female	Kgawutswane, Limpopo

7.5.3.2 Participant Observation

According to Gillham (2000) observations include viewing the current social situation. It has elements such as, 'watching what people do', 'listening to what they say' and 'sometimes asking them to clarify some questions'. This is conducted through observing the activities of the Dwesa community and through assisting in literacy training workshops. According to Oates (2006) participant observation also includes the researchers taking part in the selected situation under study which provides an experience from the point of view of the others in that setting. Participant observation also includes gaining the trust of the people so that they can accept your presence, and are able to act and do things naturally in their setting (Oates, 2006: 209).

The following factors are considered in the approach to participatory observation and observation of the participant (adapted from Creswell, 2009: 134):

a) **Identification of who or what to observe, when, and for how long**: the steps of the evaluation process are observed, especially in terms of how the process is implemented, and why the needs were identified in a particular way and how ICTD strategy is aligned to the needs. In addition, the response of the project team, the community, and the researcher to the evaluation process is observed and recorded.

b) **Role as observer**: The role of the observer is ultimately participatory, as the researcher plays a significant role in gathering the needs and baseline information and conducting evaluation of the projects. The perspectives and decisions of the different team members (including the researcher) contribute to shaping observations of the projects. The researcher also observes her actions and tasks applied to conduct the various projects.

c) **Observation equipment**: The following equipment is used to observe the processes:

- Writing pad, pens, pencils, and highlighters for taking notes throughout the evaluation process.
- Emails to review comments and responses by the project team.
- A digital camera to photograph evaluation activities.
- An audio recorder to record informal discussions.

Observation protocol for recording notes: Notes are recorded throughout the field trips, consisting of descriptive and reflective notes. Key events for recording notes include project team and local community meetings (related to the projects), field trips, email discussions, informal discussions among evaluation participants (the project team, and leaders and local community members). The participant/researcher also occasionally conducts informal interviews during the field trips to understand the response and perspectives of individuals involved in the Rustica and Smart energy field trips. Various reports are compiled from the notes to track the progress of the evaluation of the projects and observation of the process.

At SAP the participant observation has happened through the capacity of being involved with the two projects as research associate at different levels of the project. The initial data collection of the project provides what was observed and how. The Rustica project observations have showed how the community is situated, why they use the system and how it has benefited them. The Smart energy project was observed from the inception to the end of the project and the effects of how the project was perceived in the community and how it assists people in monitoring their energy consumption.

7.5.3.3 Document Analysis

At the Siyakhula living lab the documentation is used to provide historical and current information on the case study through a Baseline Study report, Needs Assessment report, Community development documents, living lab strategy planning documentation, THRIP report and past research papers on the case study.

At the SAP living lab, the documentation is used to provide historical and current information on the case study through project documentation, published papers, project planning documentation, needs assessments and baseline reports, strategy/objective documents, process documents, status report of the community, and assessment conducted on the project.

7.6 Analysis of data

The technique that is used for analysing the case study is the explanation building technique, which is relevant to explanatory case studies in order to “explain” a phenomenon (Yin, 2003:

120). Through the application of the Needs-ICTD alignment framework in the Siyakhula and SAP living labs, explanation building is developed and built through the interactions, observations and experiences of the researcher. This also contributes to exploring the framework reacts in a real life context. Explanation building is an iterative process which allows the framework to be compared to the findings of the data collection and revised based on the data collected. This iterative process allows the framework to be refined further; this also accommodates the comparison of the three cases identified. Data also analysed through the use of coding, as it enables patterns and common trends to be identified. Relationships can thus be identified between these patterns and trends. In the use of coding, themes can also be identified that have been present in the data that was collected. The selected methods allow interviews, researcher's diaries, project documentation, video, pictures and more to be analysed to develop these themes, patterns and trends to be identified (Oates, 2006).

7.7 Ethical Considerations

This research fulfils the ethical requirements of the Department of Information Systems Ethics Committee. Confidentiality is maintained throughout the research process. The participants selected in the research remain anonymous and their participation is of a voluntary nature. The results gathered in the research are only used for research purposes.
The following ethical considerations are taken into account:

- **Informed Consent:** Prior to the interview, the person to be interviewed is provided with information about the research, and then they are asked if they would be interested in being interviewed for purposes of the research.
- **Anonymity and Confidentiality:** The participant is informed prior to obtaining their consent that the interview is going to be confidential, and that anonymity will be maintained throughout the interview and throughout the research. This is because they are sharing their thoughts, attitudes and experiences (Kimmel, 1988: 85).
- **Protection against Harmful Perceptions:** The research is explained to participants, so as to avoid high expectations of the community and other stakeholders. They are informed that the research is at an experimental stage.

7.8 Conclusion

This chapter has highlighted the research paradigm that this research uses, which is the interpretivist research approach. This approach benefits this research by assisting in developing a theory that is inductive in nature and which can be 'built up'. Through this

approach the framework is informed through the Siyakhula and SAP Living Labs. Following from the chosen paradigm, this research is conducted from a qualitative research strategy which provides an understanding of the community of Dwesa, Kgautswane, and Kopela. The case study approach is the strategy that assists in building theory based on the Siyakhula and SAP Living Labs. Participant observation of the SAP Living Lab will also assist in building up the case for this research. To assist in this research strategy the data is collected through interviews, observations and document analysis. Therefore, the case study approach taken in this chapter assists in informing how community needs are aligned to ICTD strategy in real life contexts and why particular approaches are applied to support alignment.

Chapter 8 : An Analysis of Three Case Studies

Chapter 7 provided the research strategy and methodology of how the case studies would be explored to inform the framework. Chapter 8 will provide an analysis of the results of the case studies in which the framework was informed, lessons learned from the application are provided which would lead eventually to a revised framework.

8.1 Introduction

Rural communities accept projects into their communities with the hope of their lives being improved. However, it is often a struggle to align the needs of the communities and the ICTD strategies which these labs develop hence the aims of this study to bridge this. Case studies could provide how and why the needs are aligned to ICTD strategy and impact indicators developed on that alignment. Three case studies are interrogated in order to explore the Needs-ICTD alignment framework. Two of the case studies are from the SAP living lab, which are project Rustica and Smart Energy. The third case study is the Siyakhula living lab in Dwesa in the Eastern Cape. The aim of this chapter is to provide an exploration of the framework in these cases studies. The case studies provide the context in which the lab or project exists in and an analysis of the project according to the components of the framework. The components include the development of the community, a baseline study, the needs assessment, the ICTD strategy, the needs-ICTD linkage and the identification of impact indicators. The similarities and the differences of the projects are identified in terms of the lessons learned which also contribute to an enhancement of the Needs-ICTD strategy alignment framework developed. The chapter then concludes that the community needs to be involved from the beginning of the project to document the appropriate needs and thus develop ICTD strategies that are aligned to the benefit of the community needs. The sharing of knowledge can also contribute to community members being able to contribute to the alignment process.

8.2 Living Labs in South Africa

Living Labs (LL) are commonly defined as systemic initiatives which focus on creating multi-stakeholder partnership in different stages of the research, development and innovation process (Herselman, Marias, Pitse-Boshomane and Roux, 2009). It is a concept which refers to a research and development methodology where innovations of such services as products and application enhancements are created and validated in collective, multi-contextual empirical real-world settings (Herselman *et al.,* 2009). LL environments or platforms have been created for a range of ICT-related topics from e-commerce to transport, tourism development, healthcare, energy production, agriculture and governance as well as specific ICT focus areas like mobile ICT, computing and cognitive systems engineering (Coetzee, du Toit and Herselman, 2012; Herselman *et al.,* 2009). In an African or at least Southern African context the focus is on the application of ICT-related products and services as facilitators for capacity building and community development or empowerment (Coetzee *et al.,* 2012). “LLs

are typically established to understand what can ultimately be described as human behavioural responses to ICT and IT" (Coetzee *et al.*, 2012: 2).

A LL brings together stakeholders such as, end-users, researchers, industrialists, policy makers, and so on at the earlier stage of the innovation process in order to experiment breakthrough concepts and potential value for both the society (citizens) and users that will lead to breakthrough innovations (Van der Walt, Buitendag, Zaaiman and van Vuuren, 2009). A LL should, therefore, encompass the following elements: it should be user-centred, open innovation real environment based on a multi-stakeholder partnership (public-private-people) which enables real-life end users to take an active role in the research, development and innovation process (Smit, Herselman, Eloff, Ngassam, Venter, Ntawanga, Chuang and Van Greunen, 2011). Therefore, it is vital to note that the success can be measured or identified broadly in terms of the following four elements (Herselman*et al.*, 2009):

- Innovation
- Collaboration
- Contextuality and
- Sustainability in terms of employment creation, Inclusion and equality issues and competitiveness.

It is, therefore, important to emphasize again that the context is of great importance, but in this case it is the LL's context, the region and society, that must be considered and in which the Living Lab must fit.

In South African there is a network of LL's which are under the Living Labs in Southern Africa (LLiSA) network. The purpose of the LLiSA network is to create ability for understanding, establishing and developing Living Lab activities, support pilot projects in SA and to facilitate local and international collaboration and linkages (Herselman *et al.*, 2009). The LLiSA network has connected interested developers, research organizations, and industry and government bodies together for advancing regional ICTD initiatives. The LLiSA network mainly focuses on the following strategic themes (Herselman *et al.*, 2009):

- Defining what worth user-driven open innovation and Living Lab activities could provide in South Africa at different levels of activity (system, policy), in the economy (especially local economic development) and in society in general;

- Supporting the development of suitable Living Lab models for different South African contexts (e.g. rural, urban);
- Research activities on different facets of Living Labs or associated Research and Development Initiatives (RDI) activities. This can for instance include Monitoring and Evaluation, action research, user involvement or design methodologies, consortium development, sustainability models;
- Open, participative, user-driven innovation – definitions, awareness, mainstreaming of ideas;
- Development of user-friendly services and applications of ICT in different sectors of society, for instance in government service delivery practices;
- International collaboration and partnership, creating contacts with e.g. other African initiatives, ENoLL, Nordic stakeholders and Brazil;
- Impact of Living Labs on local and regional economic development and rural revitalisation;
- Sectorial issues: health, education, tourism, agriculture, rural development;
- Bottom-of-the-Pyramid-business models / market-based solutions for poverty reduction; and
- Multidisciplinary collaboration, social sciences, ICT, engineering, business and economics, etc.

Living Labs in South Africa are therefore, well guided and supported by LLiSA, which provides guidelines and methods in which LL in South Africa should be conducted. The question is whether the labs that fall under the LLiSA network follow these guidelines in order to operate effectively and ethically to assist in developing communities.

8.2.1 SAP Living Labs

SAP Research has multiple LLs for different projects with the overall focus on the development and testing of technologies for emerging economies. More specifically these LLs' main focus is on research and the development of new ICT solutions whilst enumerating and corroborating the social and economic impact of technologies aimed at addressing the challenges of small, midsize and micro-enterprises in developing countries (Coetzee *et al.*, 2012). SAP LL makes use of a user-centred approach that combines a number of processes and designs, including use-case and process design, co-identified use cases reflecting expressed priorities and feasibility considerations, participatory design user experience, usability and user experience (e.g. SMS versus mobile web application), functional design

(UI elements and functional requirements, e.g. GIS navigation pattern) and scoping of real life implementation (impact) (Coetzee *et al.*, 2012).

In all LLs the main idea is to address the needs of emerging economies in different contexts through the use of different data collection instruments in order to get constant feedback from users in an open innovation environment which can improve their operations through the application of specific technology platform. This allows for each LL to support the research objectives of SAP research but also to support the LL dimensions each in their own unique way (Smit *et al.*, 2011). SAP LL are also firmly rooted in a representative rural African context which concentrates on incubation mechanisms to support Small Medium and Micro Enterprises (SMMEs) which could support socio-economic development in South Africa (Van Greunen, De Louw, Dörflinger, Friedland and Merz, 2009). The LL's in SAP are explored below. At the end of each case study section, a summary table is provided that summarizes the stance of each case study in relation to the Needs-ICTD framework components.

8.3 Case Study 1 - Rustica

8.3.1 Context

The Rustica project is based in the Sekhukhune District Municipality in the Limpopo Province of South Africa, in a small village called Kgautswane. The Rustica project was originally based on a previous project named Collaboration @Rural (C@R). The C@R project was part of the European Union funded C@R project which aimed at promoting the introduction of Collaborative Working Environments (CWE) as key enablers of sustainable development in rural areas. One component of the C@R approach is to use Rural Living Labs (RLL) as innovative research instruments involving rural users. The RLL set up in Sekhukhune intervenes on the level of informal small and micro enterprises to stimulate local economic development utilizing information and communication technologies (ICTs). In a pilot implementation in 2006, SAP (Africa), DEG KFW Bankengruppe and the Council for Scientific and Industrial Research (CSIR) of South Africa in particular the Meraka Unit started a collaborative procurement initiative amongst 'spaza' shops. 'Spaza' shops are small convenience stores that are often, operating out of people's homes or backyards and providing a vital service to people living in under resourced communities using the infopreneurs, which are self-employed individuals trained to provide technical ICT support and services in the community concept developed and trademarked by CSIR (Rensburg *et al.*,

2008). By sending a structured text message (SMS) to the infopreneur via mobile phones, the shops can order fresh bread to be delivered at the shop. The incoming SMSes are tracked, validated, aggregated and submitted to the supplier "Sasko Bakeries" (Pioneer Food) by the Infopreneurs. The pilot implementation established the technical feasibility of the system in a challenging environment with limited bandwidth, erratic power supply and computer illiterate end users. It also started a collaborative e-business between micro and small enterprises in order to run business transactions with efficiency gains far beyond previous practice. However, the pilot project had a very limited scope by only targeting 'spaza' shops and only supplying bread to the shops and the impact of introducing ICT to the community could not be measured in detail. SAP therefore, proposed the Public Private Partnership (PPP)-Project "Rustica" which will inter alia measure the effect of introducing a large set of ICT solutions to a community.

The targeted area Kgautswane consists of 19 villages with a population of about 120,000 people. The villages are mostly situated along a central dirt road. These were only connected to the national electricity grid in 2003. Fixed communication is virtually non-existent and there are no municipal services such as, job creation services, sanitation, housing, and more available. Local economic activity focuses on subsistence farming, small-scale trading, and slate mining. There are about 130 'spaza' shops in the area which are the only conveniently situated suppliers of essential foodstuff.

8.3.2 Development of the Community

Before the arrival of 'Rustica' in the community there were other projects operating in the community. These projects include a crèche that was started by members of the community and a resource centre which is situated centrally amongst all the small villages in Kgautswane. The resource centre housed a sewing project that was run by the elderly in the community. The community therefore, took advantage of some of the local opportunities that existed in the community. The external stakeholders were aware of the project that had happened before they arrived in the community, but had primarily focused on the C@R project and therefore, leveraged on that project to start up their own. As one interviewee revealed there were many initiatives,

> *"Yes, there were many projects and plans that were happening, for example, leadership courses run in the community with Technikon SA, computer literacy, sewing, harvesting chicken, fencing, childcare, old age activities and more".*

A few people knew the actual developmental objectives of the community. This was also the case with the external stakeholders as they never really investigated the developmental efforts of the community, as they knew what they were aiming for which were the 'spaza' shops. As one interviewee revealed; there were many development projects such as, the Multi-purpose community centre (MPCC) project, and other projects which were operating in the community. It was clear that they got to know the projects happening in their vicinity as the MPCC, because that is where they held community forums and training workshops. The community's vision, goals and objectives were, therefore, not formalised but the community knew what they wanted to achieve, based on the problems and areas of lack in the community.

Most of the development projects were driven by the leaders in the community, such as, the ward or traditional council, and also through one individual that was mentioned a lot, who was Ms Clara Masinga. The above mentioned community members were the more educated people in the community and thus supported most development projects that were happening in the community. However, people in the community knew the problems that they were faced with and wanted solutions and strategies on how they would address them. One interviewee indicated that the people knew that illiteracy was quite high, so they came up with strategies of combating this through a number of initiatives such as, crèches, day-care centres, old age homes, reading and writing clubs. It was unclear which interventions had been brought by the government in the community. Also most of the initiatives were driven by the community with the assistance of external funders.

8.3.3 Baseline Study

As the project was based on the C@R project they leveraged on the relationships that were built by the project and, therefore, the community consultation process was easier as they had ties with the local chief and the community leaders. In the process of the lab getting to know the community, a socio-economic study was conducted by the lab which revealed many findings. The Objectives of the study were (Greunen and Veldsman, 2010):

- To understand the socio-economic circumstances of Kgautswane with respect to households, small traders, youth, employed and unemployed groups, educators, etc.
- To determine the main requirements of the community in order to assist the development of viable solutions.

- To develop candidate business models based on the sociological factors in areas such as, Kgautswane.

Surveys, questionnaires and interviews were used to determine the target ecosystem where the solution will be deployed in order to drive system development strategically and technically. Table 8.1 indicates the people that were involved in the study.

Table 8.1: Number of survey participants in different categories (Greunen and Veldsman, 2010)

Category	N	Male	Female
Small traders	25	11	14
Households	42	10	32
Students and scholars	43	24	19
Health workers	5	0	5
Educators	10	3	7
Total	**125**	**48**	**77**

However, it was interesting to note that the socio-economic study was conducted to follow research principals and not to find the actual needs and problems of the community at large. As one external interviewee responded:

> *"the study was divided into two which firstly viewed and understood the environment and then the socio-economic state of the community (identifying household needs) even though they had a pre-empted solution based on C@R".*

This therefore, led to them ascertaining that if the procurement problem was a big problem after which the task was then to look at how ICT could assist the community, and also assist in capacitating the needs of the infopreneurs that would later run their own co-operative.

From the community side, the project was well received in the beginning as people felt great and enjoyed it, as they were really excited about it. However, they got discouraged when it had to stop. The researchers' efforts to understand the community were shown through their visibility and activeness with the shop owners as this was their target group from the beginning and not to the entire community. One respondent indicated that the external stakeholders were going to each and every shop, where they would ask questions of how the business was doing and require more information of how they would order the stock of the business.

In terms of how and why the study was conducted, it was based on qualitative research conducted by C@R and through questionnaires that they did before they provided an in depth analysis of the community and also studied the environment. The planning involved in conducting the study mainly involved the external stakeholders. The interesting part was that they wanted to collect the needs of the community even though they had an idea of what they wanted to do based on what they previously finalised. However, based on conforming to research standards they then conducted a needs assessment looking at health, socio-economic, school, youth, and community, with the use of questionnaires. No scientific approach was used but the aim was to get a glimpse of the community.

8.3.4 Needs Assessment

Evidence from the data collected indicates that the baseline study and the needs assessment were conducted simultaneously through the socio-economic study that was conducted. This means that there was no separation of the two studies by Rustica. The needs or socio-economic study of the community were collected through questionnaires and observations which were conducted by the researchers at Rustica and through the assistance of the infopreneurs. The particular approach used to collect these needs was motivated as stated by an external stakeholder 'based on the research problem that they had', which was determined by the research conduct on C@R. Therefore, it became clear that there were no particular research principals followed to obtain the needs of the community, even though sound tools were used to collect the data, such as, questionnaires, observation, interviews and surveys. The internal stakeholders' concur with the process that was followed of them being interviewed and answering questionnaires. The external stakeholders felt it was important that the needs of the community be investigated as stated in the socio-economic landscape report in order to understand the socio-economic conditions of Kgautswane with respect to households, small traders, youth, employed and unemployed groups, educators, etc. and to determine the main requirements of the community in order to enable the development of viable solutions' (Greunen and Veldsman, 2010). Rustica conducted the needs assessment to get a view of the landscape they were going to be operating in and the challenges that existed in that particular environment. As evident from the interview with an external stakeholder, the reason for conducting the study was because of the problem they were trying to solve, which was providing an e-procurement solution for the 'spaza' shop owners (more than

directly meeting/seeking out the needs of the community). Hence they wanted to know what these traders were faced with in their environment.

Based on the research done by the C@R project the external stakeholders already knew the groups that they were going to target were the 'spaza' shops and the sociopreneurs or infopreneurs. They therefore, identified the users and the target groups based on the C@R project. The socio-economic study was then conducted on the community involving the most active groups of the community; this included small traders, teachers, scholars, etc. However, it was still interesting to note that from the data generated, the lab still took on the groups that they were aiming for. The results of the socio-economic report indicated that the groups surveyed also had their various needs and challenges that they were facing, however, the lab chose to look at the groups that they were interested in. Interviews with the project champions indicate that the lab really did not change their lives as they have more problems as before and some have not changed. The question then arises was the method chosen by the lab to target those particular groups beneficial to them and to the community as a whole.

8.3.5 ICTD Strategy

Rustica first developed a roadmap which would drive the direction of the project. The roadmap discussed the environment in which the lab was operating in, the challenges in the community, the various stages of the project, the evaluation of the project, the business model and finally a generic roadmap for ICT interventions (SAP, 2012). The roadmap of Rustica detailed out the aims, objectives and goals of the ICTD project. Based on the roadmap various strategies where developed by the lab. An example of one strategy was the communication strategy which stipulated how the lab would communicate to its external and internal stakeholders and who was responsible for which section in terms of communication. Other strategies that were developed include the stakeholder's strategy, implementation strategy, etc. Even though many strategies were developed, there is no clear indication of how the community was involved in the process of developing those strategies, but as an interview with an external stakeholders revealed the community was not involved, as the strategy is an intellectual plan drawn up separately from them. However, there were aspects of what the community needed that were inputted into the document. The stakeholder elaborated on those statements by indicating that, due to the level of knowledge and the kind of intellectual ability needed to device the document they could not be included as they usually agreed to everything presented to them. The plan was communicated during community meetings and workshops. It is also not evident whether the development plan of

the community was taken into consideration when the overall strategy was taken into account.

The internal stakeholders had an idea of what the lab was doing, as they knew the lab was aimed at assisting them and as one internal stakeholder indicated, that the plan of the external stakeholders was to try and help the growth of the business and save money and not spend money to go to Burgersfort (which is the town where supplies are bought). It is evident from the results that the internal stakeholders knew how the lab would help them but not exactly the plan of the lab and how the decisions and other factors work. This was communicated to the community through community meetings that they had held at the early stages of the project. However, there were mixed reactions as well to the labs strategy, as one project champion responded that some people partly understood the strategy, because some people still do not understand what Rustica was doing in the community. If the project aims were complete then everyone should have understood Rustica's strategy. Questions should then be raised on whether they understood what was communicated to them, and did they understand the strategy formulation process and was it presented in a format which they could easily understand and contribute to. Another question which might be raised is whether the whole process was perhaps also intellectually intimidating to them, which led to them agreeing to everything and not contesting anything that was being said.

8.3.6 Needs-ICTD Linkage

Rustica was a solution specific driven project and thus was aimed at addressing the challenges of the small traders and sociopreneurs as indicated by the C@R project. Therefore, the project was faced with two problems, namely transportation of stock and crime. The transportation issue was going to affect them in terms of profit, because it meant the owner has to close the 'spaza' shop and go buy stock. Then only after coming back from stock purchasing, can the business resume, and most of the time one would find the business broken into while they were away. Through this, opportunities were created for the sociopreneurs as they could then assist the 'spaza' shops in ordering and the delivering of goods in the community. However, the solution was linked to a specific need of a group of people and hence the project was not tailored in a way in which the whole community could benefit from the project. No particular process was used to link the needs of the community and the problem had already driven the solution that would be provided. There was also no clear evidence on why no approach was used even though the socio-economic study revealed

other challenges in other fields. From the aspect of informing and sharing how ICT could assist the community, no workshops or information sessions were held dedicated to informing the internal stakeholders of the benefits and possibilities of ICT working for the community. However, in passing, during the training sessions that occurred in the community the people being trained would be shown how they can browse the Internet on the cell phones that were provided for and had the mobile application. This then prompted the people to find other means of how ICT can be used to their advantage beyond the project.

The internal stakeholders also still question whether the solution provided was linked to the challenges of the community. From the 'spaza' shop owners side they are of the view that the appropriate solution was provided to them as the solution catered to their needs and also came with training from other parties which helped them run their businesses better. In one interview a 'spaza' shop owner indicates that 'yes they understood too much, according to me they wanted to help us, you can tell when somebody really wants to help you, that's why they provided us with mobile phones to order our stock'. However, even though the lab understood the challenges and provided a solution to the community, the community was not involved in the actual linking of the solution to the challenges faced. One respondent states that 'they did include us in some of the things because they would ask us what they could include to improve the project'. However, the question then that arises was if the community members had been educated on the possibilities of using ICTs to better their lives, would they have been more equipped to contribute to the linking of the ICTD strategy to the needs of the community?

8.3.7 Impact Indicators

The goals and outcomes of the project were communicated to the community through community forums or meetings. Moreover, the goals and objectives were communicated by interpreters in order to accommodate the language barrier between the community and the external stakeholders. In selecting the impact indicators the external stakeholders, compared the information that was generated and produced before the deployment, during and after the deployment. What contributed to the identification of these indicators were the objectives of the project, which is what they had aimed to achieve and also the challenges that were faced by the different stakeholders in the community, which was termed stakeholder analysis. The project had an idea of what it wanted to achieve and therefore, envisioned the impact it wanted to achieve rather than identifying baseline indicators. Therefore, no baseline

indicators where developed. This then led to perhaps not linking the inputs of the project to the outputs which would have then affected the outcome and impact of the project.

The Rustica project is a project that could have had greater impact if it had been sustainable by itself in the community. The needs of the community could have been interrogated more to ascertain what would have been the most appropriate solution for the community rather than relying on the outputs of the C@R project which paved the way for Rustica. Rustica can be commended on the approach it took in developing the ICTD strategy of the project although a better approach could have used to align the strategy to the needs of the community. A summary of the case study with the effects of the components is provided in Table 8.2.

Table 8.2: Summary Table of Rustica

Component	***SAP Rustica***
Internal and External Stakeholders	Based in Kgawustwane in Limpopo. Involved the community at first then the Spaza shops as a collective community. Many different external stakeholders were involved, including SAP, CSIR, etc.
Development Plan of the Community	The community was very active, involved in various development projects to develop the community. Community knew what needed to be done to advance the community, but did not document their aims. A MPCC was set up to house the development initiatives of the community.
Baseline Study	A socio-economic study was conducted to understand the state of the community, and the environment of the community. The requirements and viable business models were also evaluated.
Needs Assessment	The needs assessment was conducted through the socio-economic study; however there was already a pre-empted solution. The solution was aimed at the spaza shop owners and not at the community as a whole.
ICTD Strategy	A road map was developed from which various other strategies were developed from. This provided a direction of the project; however the involvement of the community was minimal.
Needs-ICTD Linkage	As the solution was pre-empted, the gap between the community needs and ICTD strategy was widened. Therefore, the solution provided would not be appropriate to all the needs of the community
Impact Indicators	The goals and intended outcomes of the project were communicated to the community. There is no clear evidence of how the impact indicators were developed.

8.4 Case Study 2 - Smart Energy

8.4.1 Context

The Smart Energy project was a pilot project that was based on a call for funding for a project that would assist households to save energy through the use of a mobile application. The premise for this project was the observation that rural and low-income households in South Africa are characterised by usage of a mix of energy sources such as, wood, electricity, gas and paraffin for their daily heating, cooking and lighting needs. Thus, by gathering

information about the patterns of energy consumption in such households, insights could be gained about where to improve energy consumption behaviour and how to stimulate shifts towards usage of desirable energy sources (such as, renewable sources within an existing paradigm of mixed energy sources). The project was initially going to be based in KwaZulu Natal Province in the village of Mkuze. However, due to political interference and communication breakdown the project was then moved to the North West Province in the community of Kopela, Delareyville.

The interaction with the community was initiated by the North-West living lab, which had conducted a needs-assessment on the community and had been trying to source funding for the various needs of the community. Through interactions with the community ten households and ten field workers were selected from which the data would be collected by and from. This was done through consultations between the community liaison who organised the people selected. An application was developed which would assist the households to monitor their usage of the energy sources that they use. Based on the results it was advised by the management at SAP Research that the sample size be increased and this was done through involving a school, named Thebeyame Primary School. From the school, sixty five households were selected, and the data was collected with the assistance of the field workers that were selected from the start of the project.

8.4.2 Development of the Community

Before the arrival of Smart Energy in the community, there had been various initiatives for development. These initiatives where supported by the traditional council and the chief of the area. These initiatives included activities in the farming, health, and education sectors. The community of Kopela however, knew the problems that they were faced with and had initiated programmes to fight these problems. It was very questionable however, if the community knew the vision, goals and the objectives of the entire community, or where these only known by the community leaders. There were external stakeholders from other organisations that were getting involved with the community since the Kopela community was a community that had large amount of land available for both farming and agriculture. The community was one of the communities that had been part of the land restitution programme under the Department of Rural Development and Land Reform. Therefore, most of the people in the community had access to and owned most of the land in Kopela. The community was also approached by organisations such as, the National Development Agency

where they were asked by the agency to come up with twenty five projects that the agency could assist them with, but out of the twenty five only three were selected because most of the projects were agriculture and they were looking for manufacturing projects to assist the community with. The developmental efforts were going to be addressed by asking for assistance from the local municipality, but when external agents such as, the National Development Agency, SAP, CSIR, and others came to do projects in the community they were more the drivers of the development rather that the community members themselves. However, community members also wanted to learn and get skills from these interventions so that they can develop the community of Kopela further. When SAP arrived in the community there were thus several community projects that were operating. The community, therefore, was involved with the government in some aspects, however, the local opportunities were not fully taken advantage of.

8.4.3 Baseline Study

A baseline study was conducted by the external stakeholders on the state of the community, households and their electricity usage. The project was also solution specific driven, because it was aiming at the use of different energy sources by the households in the community. All of the planning of how to collect the data was done by the external stakeholders. Therefore, interviews and observations were conducted by researchers and also through the assistance of the fieldworkers who collected the initial data on what each household was using, how, when, etc. The fieldworkers conducted observations at the household level where they observed through the use of an observation guide on the use of the different energy sources in the household. Interviews were conducted by the researchers on every household that was involved in the project, where the topic of conversation was about 'a day in the life of the household'. The process of selecting the approach used was based on previous techniques that the lab had used in its previous project. An external stakeholder indicated that:

> *"due to lack of resources (no knowledge of language and community), they had that option to use and, therefore, create some employment for the youth in the community".*

However, it is worth noting again the disadvantage of solution specific projects which are aimed at individual groups in the community, and therefore, provide no change to other community members. The state of the household does not reflect the state of the community

as a whole and therefore, the impact assessed at the end will be only at the household level and also may be on how other households that are not part of the project have contributed to the change in the behaviour of the households in the project. The sample of the ten initial households and sixty households from the school, were not a representative sample of the community of Kopela, as the community had more than 500 households.

8.4.4 Needs Assessment

The needs assessment of the community was conducted by the North-West Living lab (NWLL). This means therefore, that Smart Energy also did not conduct the needs assessment of the community. They relied on the results that were generated by the NWLL; meaning therefore, that they never interrogated the results and re-evaluated the needs of the community. As a solution driven project they were aiming for one area of focus, which was Energy. This area of focus was identified as a need in the community. Based on the NWLL needs assessment many needs of the community also appeared with the various groups in the community that needed certain services.

8.4.5 ICTD Strategy

The objectives of Smart Energy were developed based on funding that was received from the Department of Science and Technology (DST) to conduct the project. The objectives were as follows (Moshapo, 2010):

1) To gain understanding of energy usage patterns in households that utilise a mixture of energy sources for their daily living (includes quantifying usage of non-electrified energy sources).
2) To develop and implement a mobile phone based software console for gathering information about energy usage in households and disseminating incentives for fostering change in energy usage patterns.
3) To develop exemplary incentive schemes for fostering desired changes in the energy usage behaviour of households and, evaluate the impact thereof.

The objectives provide direction to how the plan would conduct the project, gather data and implement a solution that can bring out the objectives. It is therefore, important to note that the strategy of the project was not developed with the community. The selection of the community started after the project was funded by DST. There clearly was no community participation and input into how the project would be implemented into the community. The external stakeholders developed the plan and the objectives by themselves. The development strategy of the community was, therefore, not taken into consideration.

From the responses given by the internal stakeholders it should be emphasized that there is a difference between telling people why there is a project like this in their community and how it can benefit them, from actually telling them the goals, objectives and aims of the project. The responses from the internal stakeholders were very different. For instance, when asked if they know the strategy of the lab, one responded said:

> "*Yes it was to help the community as a whole and not get behind with information on how to save electricity, for instance you need to only switch on the appliances you are using and only switch on lights where you are sitting, and the geyser in summer you don't need it too much as in winter*".

The response given clearly shows what the lab wanted to do when the message was relayed to community members; however, this is different from the objectives stated above.

8.4.6 Needs-ICTD Linkage

In sharing how the lab would assist the community in terms of the needs identified in the needs assessment conducted by the NWLL, Smart Energy firstly shared what they wanted to do in the community and that they would execute their plan through developing a mobile application that they could use to monitor their energy usage. Therefore, there was no education on how ICT in general could assist the community in assisting them in developing further. Whether the solution provided was suited to the challenges the community was facing, is another question, as the community had greater challenges to face such as, unemployment, illiteracy, *etc*. However, the solution provided was also a monitoring device provided to households to monitor and measure the amount of energy purchased and consumed, which would in turn affect the disposable income of the household. The particular process followed to align the community needs and ICTD strategy was not clear as an interview with an external stakeholder revealed that the application was developed based on the responses that were acquired from the daily monitoring records, interviews and questionnaires to the households. This means therefore, that there is no proven process that was used to align the needs of the community and the ICTD strategy. An internal stakeholder also indicated that instead of using a mobile phone the households could have been taught to monitor their usage by using booklets if technology was too advanced for them.

8.4.7 Impact Indicators

In conducting the impact assessment there were eight questions that were directed to the households which included the following:

1) *Did you remember to use the application?*
2) *How many times did you remember to use the application?*
3) *Did you learn anything from the use of the application?*
4) *Were the energy tips provided useful?*
5) *Did the application help you to be cautious of the amount of energy you use?*
6) *Did the use of the smart energy application contribute to you using less energy?*
7) *Which data monitoring tool did you prefer?*
8) *Did the usage patterns change from day 1 to the last day of the application usage?*

The process followed in obtaining the above questions was based on linking the objectives of the project to obtaining the desired effect. The driver of the questions identified above includes the overall goal of lowered usage of energy and monitoring the use of energy to use it efficiently, with reduced costs. The goals of the project were according to an external stakeholder partially communicated as people knew the overall idea, however, not objectives were clearly articulated to the community. It was also important to note that no project inputs were identified in order to develop the questions used for the impact assessment. No baseline indicators were developed that would assist in conducting the impact assessment. There was no clear link between the inputs of the project to the outcome and impact of the project.

Smart Energy was a project that had good intentions for the community. The community was underdeveloped and therefore, people needed jobs to support their families and development efforts that would better the lives of the community. The project was well received by the community although the community had hoped more could have come from the project, as this would have led to development in the community. The project did teach the community how to handle and monitor their energy use, the question that remains is whether the project had affected the patterns of the households and if it did, what was the real impact? A summary of the case study with the effects of the components is provided in Table 8.3.

Table 8.3: Summary Table of Smart Energy

Component	***SAP Smart Energy***
Internal and External Stakeholders	Based in Kopela, in the North West. Involved the community and heads of the community as a whole, and the school. An external which was SAP was involved.
Development Plan of the Community	Various projects have been initiated by the community with the input of other external stakeholders including government and NGO's.
Baseline Study	A baseline study was conducted on the ten households and not on the entire community.
Needs Assessment	The needs assessment was conducted by another stakeholder, which was research logistics.
ICTD Strategy	The goals and objectives were set by DST; therefore, the community was

	not involved. They were thus translated in a top down approach to the community,
Needs-ICTD Linkage	A linkage could not exist because the goals and objectives were not set on the needs of the community. Thus an alignment could not be possible.
Impact Indicators	Assessment based on eight questions that directed the impact assessment.

8.5 Case Study 3 – Siyakhula Living Lab.

8.5.1 Context

The Siyakhula Living Lab (SLL) was initiated in 2005 as a joint collaboration between the University of Fort Hare and Rhodes University, operating within the Telkom Centres of Excellence in the Computer Science department at both the universities (Pade, Sieborger, Thinyane and Dalvit, 2009b: 4). The SLL is situated in the Mbashe municipality in the Eastern Cape. It is present in five villages which are adjacent to the Dwesa-Cweba which comprises the nature reserve and frontline communities. The local schools in the area have been targeted as venues for the SLL due to the following reasons:

- They have the necessary infrastructure for housing computer labs, such as, electricity and appropriate venues to contain computer labs,
- Schools are educational centres and are thus in a position to be able to train both local learners and local community members, and
- The schools are open to all community members, allowing access to all, but at specified times.

The schools involved in the project are Mpume Junior Secondary School, Ngwane School, Mthokwane Junior Secondary School, Nondobo Junior Secondary School, and Nqabara Secondary School (Pade *et al*., 2009b: 5). The objectives of the SLL project are the following (Pade *et al*., 2010: 7; Pade *et al*., 2009b: 5; THRIP, 2010: 4):

- The primary objective is to develop and field-test a distributed, multifunctional community communication platform, to deploy in marginalised and semi-marginalised communities in South Africa.
- The second objective of this project is to equip people with technical skills in the field of e-commerce particularly but not only to support e-commerce activities.
- Contextualized user-driven e-services development and extensions for the Dwesa community for the specific needs that have been identified in the previous project, and to extend the currently deployed e-services by implementing increased contextualization features.

The SLL platform was originally designed to support the marketing of local arts, craft and eco-tourism through e-commerce. It now includes a number of additional features pointing to new sub-projects. Local wireless connectivity and connection to the Internet are good supports for e-health, e-government and e-learning. Within the SLL, active participation of the local community is supposed to drive the development and implementation of the system and shape the related projects, through active participation. The community is anticipated to take ownership of the project rather than depend on external input (Pade, *et al*. 2009b: 8). In order for the project to become sustainable, both the economic potential of the region and of its human capital needs to be developed (Pade, *et al*. 2009b: 8). Thus it is evident that the needs of the community should be aligned with the objectives of the ICTD project as evident in the SLL.

8.5.2 Development of the Community

When the SLL had arrived in the community, there were various developments initiatives in the community already. These developments included projects around the fields of tourism development, a water sustainability and subsistence farming project. Some of the projects which seemed to have been more visible in the community were the Dwesa-Cweba game reserves and the Nqabara trust, which were established to benefit the whole community. One other project that had also existed in the community was the art and crafts project which was aimed at developing the community through promoting the selling artefacts to the public. Most of the development efforts which had happened in the community seemed to be externally driven, but with high cooperation from the community. An example of this was the 'Siyazondla', which was done by the Department of Agriculture which gave the community members seedlings for them to start their own subsistence farming project, and they were also given tanks for water storage and tools to assist them in growing their own produce. Even though there were plans to develop the community it was unclear how this was going to be done. It had seemed as though more external stakeholders initiated with the cooperation of the community and funded most project that were occurring in the community. The community members also knew that development needed to occur as most of what they needed had to be obtained from the nearest town which is a long distance from the villages. What was also evident from the interviews conducted was that there were many other opportunities that could have been exploited to also develop the community. Most common examples of these opportunities emanated from the tourism aspect, where stakeholders indicated that ecotourism, promotion of the heritage, traditional entertainment for tourists,

promotion of crafts, sewing of shoes and bags, and more involvement of the youth at Dwesa-Cweba to create employment for them. The most common question that arises is why the community has not taken advantage of these opportunities that exists in the community. Is it due to lack of information or another problem?

8.5.3 Baseline Study

The baseline study of the SLL was conducted two years into the project, because through the involvement of the leaders, it was suggested that every single household in the community be interviewed in order to get the status of the whole community. The aim of the study was:

1) To find the status of the local economy and what directions can it take?
2) What is the quality of life in the communities?
3) How ready are the communities to be or become partners?

Before this study was conducted a community meeting was held to inform the community about the initiative and the envisioned plan. This meeting included the headman, the School Governing Body (SGB)'s, directly with the community. In planning for the baseline study, the lab was working with other stakeholders (COFISA and Nokia Siemens Network) where they had a meeting to discuss what they needed to know from the community in order to initiate a new application which was going to provide a free service, but they needed to know the kind of community they will be dealing with. They discussed what the objectives of the evaluation would be and it comprised of different people. They discussed potential questions that could be asked in relation what needed to be achieved, and then they also conducted a pilot study which was then revised based on the feedback from the community for a more comprehensive study. The external stakeholders also needed to understand the community, so input was sourced from people who had done similar surveys. So, for instance input was sourced from an anthropologist who had a background of the community and then also interviewed the target groups to get an understanding of how they needed help and to also understand the environment they were dealing with.

The main problem of the initiative was the fact that the study occurred two years into the project. This could have affected the data that could have been generated from the beginning of the project as compared to the time it was conducted. Some of the people that were involved in the study had already been involved in the training programmes which had been conducted by the SLL. However, it is also important to note that the consultation of the community was beneficial as most people in the community would then cooperate when they

have been informed about what will happen and how it will happen. There were baseline indicators linked to the evaluation of the project that were identified and which could affect the evaluation of the project at the end.

8.5.4 Needs Assessment

Prior to the community needs assessment another target group specific needs assessment was conducted by the SLL. The aim of that study was to identify the needs of the arts and crafts group as they were the most active when the nature reserve was opened. The particular process involved in that needs assessment was not interrogated, as only one group of users were selected. The second needs assessment was conducted in order to get an idea of the general needs, and a more in-depth study on education. The various target groups selected in the SLL to elicit needs from what was vast. This included the arts and crafts people because of the tourism, the teachers because of the school, youth because of the unemployment in the area, health because there is a clinic in the area. These groups then provided what needed to be known about the community in terms of the needs assessments. According to an interview with an external stakeholder, the approach used was more top down, because the community members were not fully aware of the possibilities of technology, but they could get the requirements from the community (for example, schools wanting to communicate over VOIP). The stakeholder continued to give a reason for using this approach. The explanation was because the people were not aware of what technology can offer and hence it was difficult to plan with them and also hear how they are going to implement their proposed plan. In gathering the needs assessment various tools where used to collect the information such as, interviews, focus groups, narrative discussions, photography and audio recordings. In the baseline study, the lab had to evaluate the livelihood resources that the community had. The demand driven needs of the community were not evaluated on a study level, but rather on an informal level as notice was taken of what people would like to learn and how. However, this route has also not been successful as the suggestions are not followed up.

8.5.5 ICTD Strategy

The SLL did not have a documented ICTD strategy in place for a long time until it was documented by a researcher through the programme theory document. The strategy expanded more through it being documented with funding applications which were submitted to external stakeholders. However, with the SLL many stakeholders are involved in the lab, and therefore, it was difficult for the lab to come up with one strategy, because each stakeholder has its own plan and strategy. An example of this given by an external stakeholder was that

the Centre of Excellence (COE) has its own plan and strategy which is mainly to produce qualified students and research. The community would also have its own plans and strategy; the same would go for the other stakeholders in the project. It was, therefore, very difficult to understand what the strategy and plan of the SLL was. It had also seemed that there was very little communication to the community about what the strategy of the SLL was. It seemed that the community also had an idea of what the lab was going to do, however, no actual plan or strategy was given to them, so that they can understand how the lab will work and how the lab could also be held accountable if it does not meet its goals. In an interview with an external stakeholder it also emanated that 'Every stakeholders has their own goals and there are different goals, what matters is how to fulfil those goals and balancing them, the community is viewed as the partner and not recipients, so they had driven the goals of what they want to achieve'. It was not clear as to how the objectives of the community, if they are partners, were going to be addressed with the involvement of the other stakeholders. The role which the community played in developing the strategy was also a grey area, as no clear answer was given in terms of when and how were they involved in the process. This also raised the question of how their development objectives are going to be addressed if they are not involved in the process.

8.5.6 Needs-ICTD Linkage

There were efforts by the SLL to assist the community in understanding how ICTs could assist the community in developing further. The effectiveness of these efforts is questionable according to one stakeholder, because if these efforts were effective initiatives of how ICT could assist the community they would have been seen. On the solutions provided to the community it was also unclear whether they had been suited to the challenges the community was faced with. An external stakeholder also commented on the solutions provided to the community challenges. The comment was that indicated in regards to the solution provide linked to the challenges, that "Yes, for example, the e-commerce solution, training to give them ICT skills cause there had not been any interactions with ICT, but new needs were created". The particular process that was used to align the needs of the community and the ICTD strategy was unclear, as one responded indicated that:

> *"The alignment was made due to being aware of the challenges on the ground and shaping the solutions to the needs of the community. They then used these factors to obtain funding based on what was happening on the ground in the community".*

A contradictory statement was indicated by another responded who indicated that "there was no process used to align the needs with ICTD strategy". This might have been the case as then the question arises; since all stakeholders had different goals to achieve, each one of them fulfilled their own strategy and no common strategy was developed, how were the needs of the community then aligned to all of these external stakeholders. From the lack of alignment that existed, a question that arises was how are the solutions provided linked to the needs of the community if no alignment was made?

8.5.7 Impact Indicators

The goals of the SLL were communicated through community meetings to indicate what the lab would be doing and how it will do that. It appeared as if no formal evaluation had occurred in the SLL. Evaluations have occurred but not on an informal level, but through things happening in the community. This became the feedback used to ascertain what is going on in the SLL. Indicating the success of the project one external stakeholder indicated that it would be when:

> *"the goals of the COE are achieved, and when the community has developed that would be the main indicators, and for example, a school which was a primary of the community was boosted to become a secondary school".*

In answering how the impact indicators had been developed, an external stakeholder indicated that, "they are more incidental and not pre-empted and some matrix has been based on what research has said and how they measure things". A summary of the case study with the effects of the components is provided in Table 8.4.

Table 8.4: Summary Table of the SLL

Component	***Siyakhula Living Lab (SLL)***
Internal and External Stakeholders	Based in Dwesa, in the Eastern Cape. Involved the community but became more focused at schools. The stakeholders met together at the various schools.
Development Plan of the Community	The community had been involved in various projects that were at times initiated by them, also through the involvement of external stakeholders.
Baseline Study	A baseline study was conducted for the community. To find the status of the local community, readiness of the community and the quality of life in the community.
Needs Assessment	The needs assessment was conducted in order to further investigate the needs identified in the baseline study and provide a more in-depth study.
ICTD Strategy	No documented strategy, the external stakeholders had their own strategies and no common one strategy. The strategies were therefore implied.
Needs-ICTD Linkage	No linkage existed as there were many strategies of the various external stakeholders and the community. There were efforts made though to achieve the alignment.
Impact Indicators	The goals and intended outcomes of the project were communicated to the community. There is no clear evidence of how the impact indicators were

	developed.

8.6 Overall Lessons Learned from Case Studies

The following section provides a cross-case analysis section as illustrated in Table…, which provides a table that indicates the stance of each case study based on components of the framework. An overview of all the lessons learned from the three case studies, which inform the Needs-ICTD framework is then provided. This section is divided into the various components of the framework, and a discussion of the lessons that have been learned under each component.

Table 8.5: Cross-Case Analysis of the Case Studies

Component	***SAP Rustica***	***SAP Smart energy***	***SLL***
Internal and External Stakeholders	Regular meetings conducted between the two.	Regular meetings conducted between the two.	Regular meetings conducted between the two.
Development Plan of the Community	Not documented initiatives were made by the community.	Not documented initiatives were made by the community.	Not documented initiatives were made by the community.
Baseline Study	A socio-economic study conducted on most of the community.	Small scale study was conducted on only ten households.	A baseline study was conducted on most of the community.
Needs Assessment	Was evident through the socio-economic study but not too in-depth.	Conducted by an external stakeholder from the projects.	Conducted based on the findings of the baseline study for a more in-depth view.
ICTD Strategy	A roadmap was developed from were various strategies emerged.	Developed before the start of the project, not with the community.	No documented strategy but implied.
Needs-ICTD Linkage	No linkage, pre-empted solution.	No linkage pre-empted solution.	No linkage, though effort was made.
Impact Indicators	No clear indication of impact indicators.	No clear indication of impact indicators. But based on eight evaluation questions.	No clear indication of impact indicators.

8.6.1 Internal and External Stakeholders

Lesson 1: Stakeholder interaction could have increased to insure linkage between the stakeholders.

In all the interactions of the internal and external stakeholders, more could have been done to increase the level of interaction and the consultation of the external to the internal stakeholders. Commonly in all three projects the leaders or chiefs of the various communities were consulted specifically at the beginning of the project, where the external stakeholders

intended to start initiatives in the community. After this initial process they consulted the leaders or chiefs as and when needed by them. This did not allow for much interaction between the people that led the communities and the external stakeholders. Most of the planning in the various components was conducted by the external stakeholders and at times they involved the community in the minor details of the planning. This process then led to internal stakeholders only being informed of what would happen, without their involvement.

8.6.2 Development of Community

Lesson 2: Communities realise the need for development which can be aided by external stakeholders, however, external stakeholders also need to realise that the community has its own development agenda.

In all three of the case studies evaluated, the communities had begun their own community development initiatives which were in response to some of the challenges the community was facing. In some cases the development was also through the assistance of external stakeholders such as, the government, NGO's, educational institutions and other various organisations. In the three communities there had been people who were drivers of the initiatives, and they were also able to lobby the interest of external stakeholders. External stakeholders came to the communities in hope of assisting the communities. Whether it was a pre-empted solution of general solutions, the aim overall aim was to better the communities in the respective field. What was very common of the three cases is that the projects paid little attention to finding out what the previous projects had done in the community and to also find out what were the development goals and objectives of the communities. Even though all the communities had realised that they needed specific development in certain areas, the projects did not take notice of the 'burning issues' in the community and how they could be addressed. In all of the projects no interest was shown in identifying why previous projects had failed in the communities and how this had this affected the community and what potential they saw in the next project without considering why they failed. It was also interesting to note that in the three projects all the communities had various opportunities that could be exploited. This was common knowledge to the internal and external stakeholders. However, no actions were taken by both parties.

Lesson 3: Communities rarely know the overall community development goals and vision; however, they know their challenges and initiatives that will assist in combating the challenges.

In all three of the communities there were initiatives that had been started to combat the challenges that these communities were faced with. Communities had realised the need for development in their communities and hence they started-up these initiatives which are most of the time driven by leaders in the communities. There had however, been many initiatives that had involved external stakeholders in the community, in order to assist them in their efforts. One example from the projects includes Rustica, in which the community had identified that the community had a challenge of unemployment and, therefore, they started up projects like sewing, harvesting chicken, etc. to create employment in the community. It is evident in the previous statement that the community had a challenge which they were facing and managed found ways to overcome the challenge. The overall goal and vision was not clear to all community members but it was also clear what they wanted to achieve and how they would achieve it. However, the available local opportunities and needs might not have been taken advantage of, as at times information and knowledge could have assisted the community in taking advantage of these opportunities. Government support was also available at times in various initiatives started by the communities although more could have been done by government in these communities.

8.6.3 Baseline Study

Lesson 4: In the planning process, communities need to be engaged and involved at every step to ensure the appropriate information is gathered.

Communities possess vast amount of people in their communities and know the community more than the researchers which come to the community. On a higher level most of the planning in the baseline study involved the external stakeholders with little or no involvement from the internal stakeholders. Internal stakeholders were only on the receiving end at most occasions and they would be asked to fill in questionnaire, agree to interviews, etc. For instance, in one case study which is the SLL, a pilot study was conducted before the main baseline study to asserting if the questions posed would be relevant. If the solution of the project was not pre-empted, more value would have been derived for the various projects. This would allow the questions directed to the community to be re-evaluated and better questions derived.

Lesson 5: A baseline study is detailed enough to find all aspects of the community and how the various groups operate in the community.

In the case studies, either a baseline or a socio-economic study is conducted. This would ascertain the condition of the community before the involvement of the project. However, a baseline study provides a clear picture of how the people in the community operate and the current condition of the entire community. A socio-economic study was conducted in the Rustica project which focused on one area and that being mainly the socio-economic aspect of the community. It did not view how other factors such as, the quality of life, communication patterns, information needs, local political economy and so forth; affect the condition of the community. In the baseline study conducted by the SLL, sections came together as various areas where identified and evaluated. These included the quality of life experienced by the people of Dwesa, their readiness for the uptake of technology in their community and more. A socio-economic study was conducted although it was not detailed enough to find out other aspects of the community. The idea is the same as baseline for it identifies aspects of what can be exploited in the community and how communities used technology before (which the study can leverage on). What is beneficial about the socio-economic study is that it provides a clear picture of the social and economic state of the community and how the people have survived and how they make ends meet. At the same time it also provides the social activities of the community which can identify gaps and opportunities which can be exploited.

8.6.4 Needs Assessment

Lesson 6: Projects should first benefit the community and fulfil the greater community needs rather than satisfying only specific target groups.

Solution specific projects such as, Rustica and SmartEnergy were aimed at solving challenges for some people in the community and not for the greater good of the community. This then meant that the needs of the other groups had been disregarded as they would not benefit from the project. This also does not contribute to the greater development objectives of the community. When looking at Rustica, for example, it is evident that, it targeted specific groups in the community which were the ‘spaza’ shops and the sociopreneurs. The needs of the community were evaluated, which revealed that other groups in the community also had needs which needed to be fulfilled but were often ignored. If a common solution to the needs of the community was provided was the initiative going to bring change in the community?

There might have been a change but it would have been at a larger scale than the effects provided only from the 'spaza' shops and the sociopreneurs. Therefore, projects should be viewed holistically in how they can benefit the community. The project should not focus excessively on its immediate and narrow concerns, but rather the project initiators must consider the specific needs of the rural community at large, in relation to the capability and sustainability of the technology for an enduring impact (Pade, *et al*., 2008).

Lesson 7: Needs assessments should be related to the livelihoods resources that are essential to survive in the rural communities.

Since most of the projects reviewed possessed pre-empted solutions, it was difficult to link the solutions provided to how they would affect the living conditions of the communities. This was not to the benefit of the community in the long term. There are many lessons that can be learned from the Rustica case, such as, that, pre-empted solutions for specific groups are not the best when they do not benefit the community as a whole. Therefore, the socio-economic study may assist in knowing not only the landscape of the community but how would the problems identified also be linked to the pre-empted solution to be provided. The resources essential for rural development, such as, economic or financial capital, natural capital, human capital, social capital, and informational capital indicate most of the needs the community as they are the livelihood resources needed in communities. There might have been some linkages as the projects might have affected a certain area in the livelihood capitals, but the solution should have linkages to a certain capital which would have affected the other capitals and meet the community's needs.

Lesson 8: Community needs must be re-evaluated to keep up with the current needs of the community.

The lack of re-evaluation of the needs of the community leads to the labour project not to be up to date with the needs of the community, and therefore, no development linked to the updated needs of the community is conducted. As the world evolves the communities also evolve and they change but at a different pace and consequently so will their needs change too. Communities might need different kinds of information which could not be accommodated by the lab or project as they have not been re-evaluated. In all the case studies none of the needs where re-evaluated to change what was being offered to the communities. The information or community needs change all the time, which gives rise to demand driven needs. These were not accommodated in the operations of the various labs and projects.

8.6.5 ICTD Strategy

Lesson 9: Perceptions of what the project will do versus the strategy that will be undertaken affects the level of expectations from the community of the project.

In all three of the projects, community members had perceptions about how the project was going to work in the community. Community members knew the basic idea of what the project was going to do, for example, in one project a community member said 'the plan of the lab was to teach us how to use energy'. If the strategy or plan of the project is viewed, one will find that the project had aimed to do more than what the community member was iterating. In communicating how the lab will work, there needs to be clear and regular updates on how the lab is working, what it has achieved so far, and if it intends to work in the future. This also affects the impact assessment of the project as community members are manipulated into thinking the lab was only supposed to do one activity (when in actual reality it was supposed to achieve many other activities). Now the community members will end up assessing the lab based on that one activity which the lab might have done well or not. This means then that the community members will think that the lab has worked well not knowing that other activities were left undone. Clearly therefore, the ICTD should be clear to all parties involved, and aligned appropriately with the needs of the community.

Lesson 10: A roadmap provides the direction in which the ICTD project will take, from which various strategies can be developed from.

A project can have more than one strategy addressing each topic within the lab guided by the direction in which the lab aims to take. The roadmap that was produced for the Rustica project provided the direction in which the lab would take. Based on the direction of the project a number of various strategies were developed to link the direction of the project. An example of a strategy that was produced was the communication strategy which identified how communication would be directed and to whom (both internally and external) it will be directed. This would benefit many stakeholders as they would be involved in developing strategies which they might have knowledge about taking into account the context of the community. However, this was not the case at all in actual effect. Community members are excluded from this process and as seen in the case studies, the strategy was not communicated well to the internal stakeholders at all.

Lesson 11: The ICTD strategy should be communicated in simple and understandable terms to the community as to ensure participation from the community members.

If the community was not involved in the development of the strategy, and the strategy was developed by funders and external stakeholders, then it is important that the plan should be clearly articulated to the community members and that it should clearly show why the project is in the community and how it will benefit the community along with how this will be achieved. When the external stakeholders and funders develop the strategy on their own they are not fully aware of the challenges the community is faced with and how the developed objectives and goals will affect the community. Communities need to know and fully understand how their needs are going to be addressed and how this will affect them. The ICTD strategies also need to be fully communicated to the communities so that they can understand how that particular strategy will assist them and also be involved in the development of the strategy in order for common goals to be achieved instead of the achievement of one sided goals. When the strategy is communicated in a simple manner, it is less intellectually intimidating to the community members and maybe they could contribute more to the strategy.

8.6.6 Needs-ICTD Linkage

Lesson 12: The ICTD strategy should be developed with the community in mind based on the challenges the community is faced with.

When the Smart Energy project was developed, an appropriate community had not been identified; while the objectives and the goals of the project were not developed with the community in mind. The challenges of the community were not taken into account and hence the plan of how the project would work was not developed with the community. The community of Kopela had greater challenges than the application that was provided. The community was faced with very high levels of unemployment, illiteracy, and no opportunities existed for development opportunities. An application was needed therefore, that could have been centred around the problems of the community. Presumably an application that was going to assist the community within the challenges the community was faced with would have been more advantageous. This was not only the case of Kopela, but also the case with Kgautswane and Dwesa. What was advantageous in the case of Dwesa was that the platform provided information on how people could access opportunities that were far from them, such available job opportunities in their vicinity and the programmes which are running in the vicinity which might assist them in getting a certain skill.

Lesson 13: When many stakeholders are involved in an ICTD strategy, a common strategy should be developed in order to promote the cause of developing the community.

In the interviews of the SLL it was expressed that the community was seen as partner rather than a recipient of the products produced by the SLL. If that was the case then a common strategy should have been developed that would see all the parties interests addressed in a common strategy. It was also evident that the strategies of the other stakeholders were fully addressed as compared to the needs of the community because they have achieved more and they understood what they needed to do to achieve their goals. As a partner the community needed to come as well with their own strategy of how the development was going to be addressed and a plan needed to be made to see how these plans could be addressed with the other strategies in mind.

Lesson 14: The solutions provided to the community should be driven by the linkage of the ICTD strategy to the needs of the community.

Pre-empted solutions are not driven by the needs of the communities, but rather by identified opportunities from one angle that being the angle of the external stakeholders. This means that the solution provided has not taken into account the developmental plan of the community or the target groups into consideration, and how the project aims to address the plans of the community with its strategy. The solution then partly addresses the needs of those groups and has no effect on the community as a whole. When the ICTD strategy is linked to needs, more community appropriate solutions are developed and are linked to the needs of the community. With this link, appropriate ICTD strategies are thus developed and this providing appropriate technologies and context relevant solutions to the community.

Lesson 15: Programmes should be developed that will reduce the knowledge gap that exists between internal and external stakeholders which will affect the level of contribution that exists between the stakeholders.

In the cases studied, it was evident that no training on the advantages and uses of ICT was given to the communities. The training that was provided was in relation to the operation of the applications that were provided. The uses were however, shared in passing with the community members, such as, when in training sessions, community members would for instance ask questions of how they could use the technologies provided to do certain things. This would have also affected the level of involvement of the community members in contributing to the alignment of the ICTD strategy of the project to the needs of the

community. If more knowledge had been shared with the community members on how technology can assist them in their daily lives, then they would have contributed more inputs into the solutions that are being developed so that they have a vested interest to see how the technology will work with their contribution in their community.

8.6.7 Impact Indicators

Lesson 16: Impact indicators that rely on project goals and objectives may not reveal the true nature of impact.

In the projects that conducted their impact assessments, they aimed to assess the before and after situation of the communities. They therefore, identified what they had set out to achieve which entailed the goals and objectives of the project and then evaluated them against the baseline condition of the community. There was however, no impact indicators that were identified and they, therefore, compared the evaluation of the project to the baseline study or socio-economic study that was conducted. This then led to impact indicators being identified based on the goals and objectives, which the project had set out to achieve. This method would have left out how the project fulfilled the needs of the community because the needs of the community would not be accounted for. The impact indicators also need to be relayed to the needs of the community, and be able to determine whether the objectives and goals were related to the needs of the community. With reference to all the case studies, the goals and objectives of the project were not often linked to the needs of the community. Pre-empted solutions were the most vulnerable of this trap, since what needed to be achieved was already in place before the needs of the community.

Lesson 17: As demand driven needs emerge, the needs-ICTD linkage needs to be updated to account for unintended impact indicators, which cannot be easily identified from goals and objectives.

When the needs of the communities' change, new demand driven needs emerge which would affect the needs-ICTD linkage and therefore, the balance is not achieved. As the needs of the case studies changed the projects did not change their operations to meet these new needs, because they were *not* evaluated in the first place. The intended and unintended impact indicators will not be properly identified if they are only linked to the objectives and goals and therefore, missing the demand driven needs which will have changed what was needed by the communities.

8.7 Conclusion

Since the newly proposed model were explored in the case studies factors and aspects that support the alignment of community development needs and ICTD strategy were discovered. The SLL and the SAPLL have provided insight into how the objectives of the ICTD can be aligned to community development needs. The interviews conducted and the document analysis has also provided insights of how the community, needs alignment, information and ICTD impact indicators should be handled, and have thus have provided lessons learned. The lessons learned have contributed to the development of the revised new framework in chapter 9. The revised framework takes into account the lessons learned and with added practices and some eliminated steps that were irrelevant. Therefore, it can be concluded that the community needs to be involved from the beginning of the project to document the appropriate needs and thus develop ICTD strategies that will be to the benefit of the community. The sharing of knowledge on ICTs can also contribute to community members being able to contribute to the alignment process.

Chapter 9 : An Enhanced Needs-ICTD Strategy Alignment Framework

Chapter 8 provided an analysis of three case studies and the results of these case studies which were generated based on informing the needs-ICTD strategy alignment framework and reflecting on the lessons learned. Chapter 9 provides a revised framework which has incorporated the lessons learned in the previous chapter and the effect of these lessons on the original framework.

9.1 Introduction

Since the needs-ICTD strategy alignment framework was developed and informed by three case studies which were, Rustica, SmartEnergy and the SLL. The analysis of the studies in relation to the framework has confirmed most of the components of the framework and challenged some of the components. The effect of these challenges has led to an enhanced needs-ICTD strategy alignment framework which will be provided in this chapter. The aim of this chapter is then to review the original framework, incorporate the changes advised from the lessons learned based on the review and analysis of the case studies. The chapter first provides the view of the framework before the proposed changes. Secondly, the chapter provides information on the lessons learned provided in tabular form by linking the effect to a change in the framework. The revised components of the framework are discussed and the changes which affect them. The enhanced framework is then explored with the changes incorporated. Finally, the chapter findings are summarised and it is concluded that the revised model takes into account the literature versus the experiences and how based on the framework the needs should be aligned to the ICTD strategy to allow the relevant impact indicators to be developed based on the framework.

9.2 The Framework before Results

The original needs-ICTD strategy alignment framework is shown in Figure 9.1. It consisted of 9 components which would contribute to the needs of the community be aligned to ICTD strategy. These components were affected by the results which emanated from informing the framework by the case studies. The effects of these lessons are explored in table 9.1 from which the components will change and an enhanced needs-ICTD strategy alignment framework is provided.

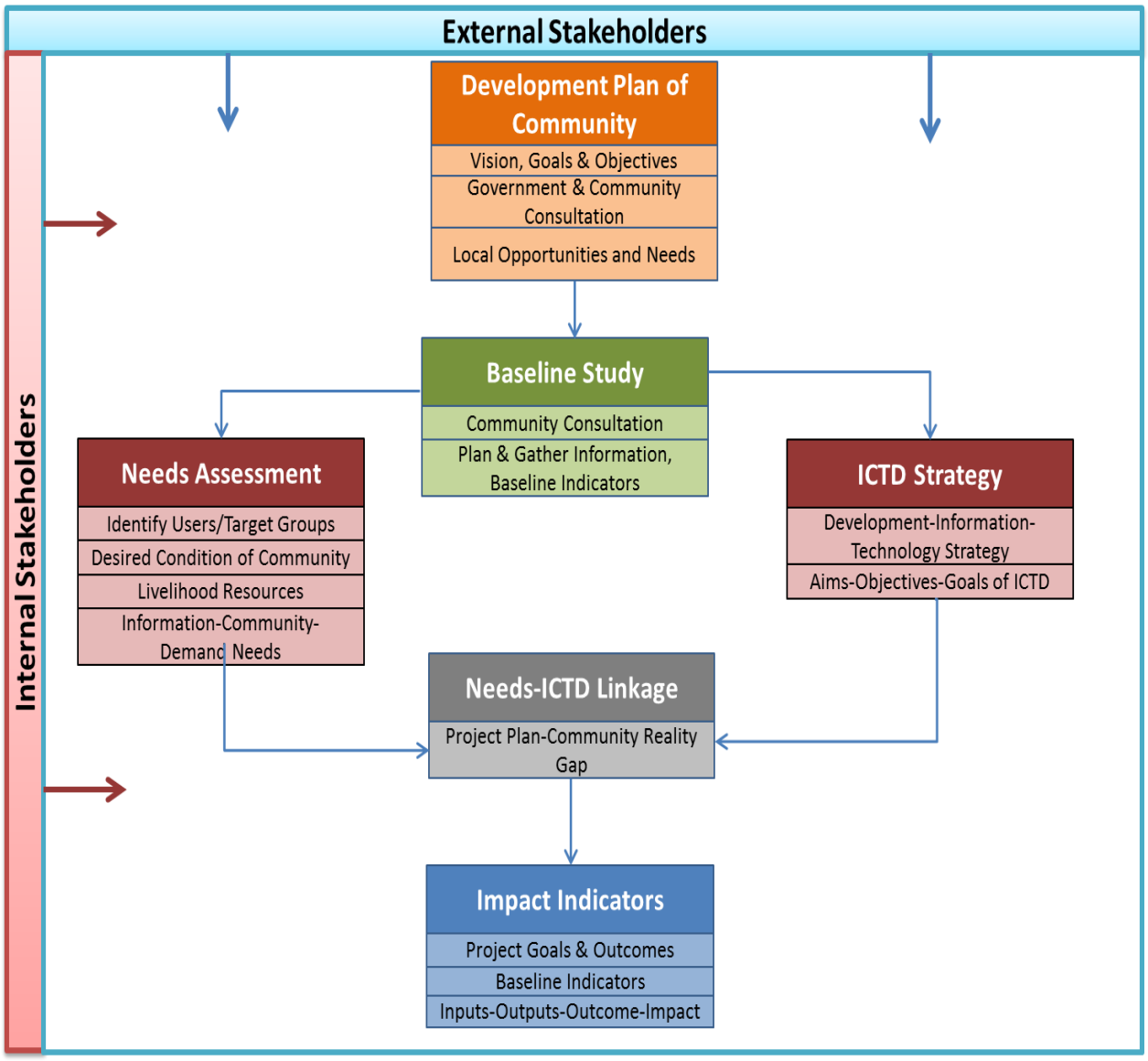

Figure 9.1: Original Framework

9.3 Revised Components of the Framework

The various components which have been affected by the analysis of the case studies are now discussed below in the order in which they appear in the framework.

9.3.1 Internal and External Stakeholders

In the previous model there was no area that would accommodate interaction between the stakeholders. During the data analyses it became clear that not many interactions were occurring between the stakeholders. Community members would only be contacted at the start of the project as the various project external stakeholders would be seeking approval from internal stakeholders. Therefore, interaction between the internal and external stakeholders which will affect the interactions of the stakeholders in order to ensure viable mutually beneficial relationships needs to be clearly emphasized. The table below summarises the changes of this component.

Table 9.1: Lesson Learned Internal and External Stakeholders

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
1. Stakeholder interaction could have increased to insure linkage between the stakeholders.	Internal and external stakeholder	More interaction needs to occur between the various stakeholders to ensure more interaction between them.	More emphasis with in the stakeholders component of the importance of clear interaction between them.

9.3.2 Development Plan of the Community

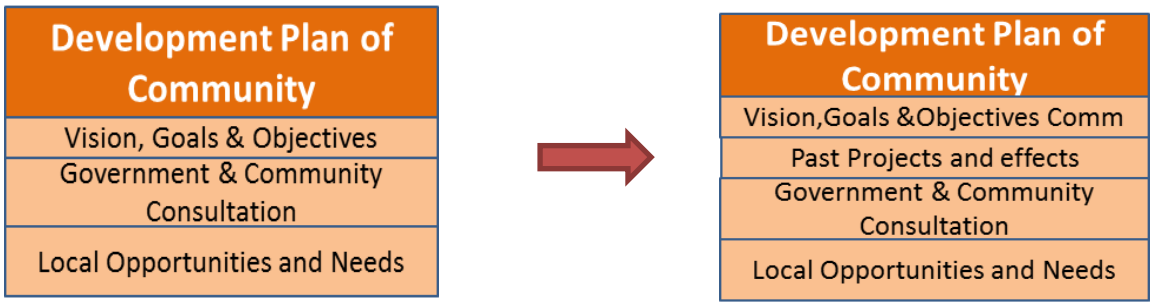

Figure 9.2: Development Plan of the Community Component.

This component has changed to include the communication of the vision, goals and objectives to the community members. These have to be articulated to everyone in the community so that the community can be able to critically assess why particular programmes are in their communities and how these will contribute to the overall community objectives,

vision and goals. Another section that has been added to the component is the 'past project and effects'. This section details out the previous projects the community has been involved in and how they have impacted the community and as well as how they have been received by the community. This will also be valuable to the external stakeholders as they will be able to know how to work with the community and the people which will positively affect the success of the project and the community expectation of the project. All the steps included in the component should be viewed holistically in deriving a clear picture of the community and its capabilities. The table below summarises the changes of this component.

Table 9.2: Lessons Learned Development of the Community

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
2. Communities realise the need for development which can be aided by external stakeholders, however, they need to realise that the community has its own development agenda.	Development Plan of the Community	This means that the framework needs to accommodate the knowledge of past projects and what effect they have had in the community. What has been the level of involvement of external stakeholders and that communities know and realise the need for development, and at times they can initiate their own development with the assistance of external stakeholders.	There should be a block that accommodates the acknowledgement of the initiatives the community has done and what the other projects have done and their effects.
3. Communities rarely know the overall community development goals and vision, however, they know their challenges and programmes that will assist in combating the challenges.	Development Plan of the Community	There needs to be more effective communication from the leaders on what the vision, goals and objectives of the community are.	The vision, goals and objectives bar should include the word communication at the end.

9.3.3 Baseline Study

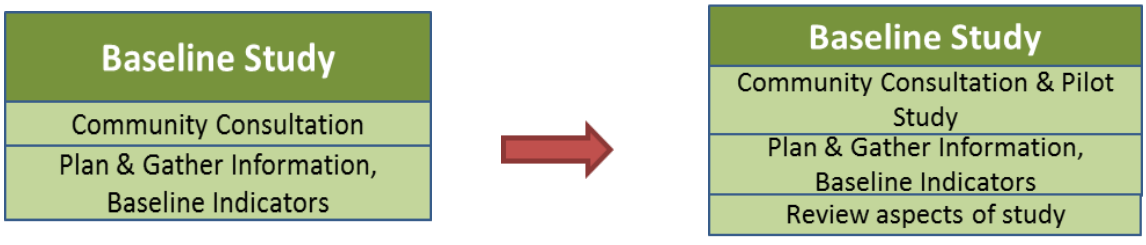

Figure 9.3: Baseline Study Component.

There has not been much change with this component. The main aim of this component is to understand the condition of the community prior to the beginning of the project and identify the readiness of the community to uptake the technology and the quality of life in the community. The study provides a holistic view of the community and how the various factors work together to achieve the state of the community. Therefore, a baseline pilot study needs to be conducted to make sure that the state of the community is sufficiently addressed and documented by the main baseline study which will impact the various decisions which will be taken by external stakeholders. The table below summarises the changes of this component.

Table 9.3: Lessons Learned Baseline Study

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
4. In the planning process, communities need to be engaged and involved at every step to ensure the appropriate information is gathered.	Baseline Study	A pilot study needs to be accommodated which will link what is known by the internal stakeholders to what intends to be known by the external stakeholder.	The community consultation bar should include and conduct a pilot study (PS).
5. A baseline study is detailed enough to find all aspects of the community and how the various groups operate in the community.	Baseline Study	The content of a baseline study should be fully reviewed in order to view the community holistically in the condition it is in, and view how segments of the community operate.	A block named review aspects of study needs to be added in the baseline component.

9.3.4 Needs Assessment

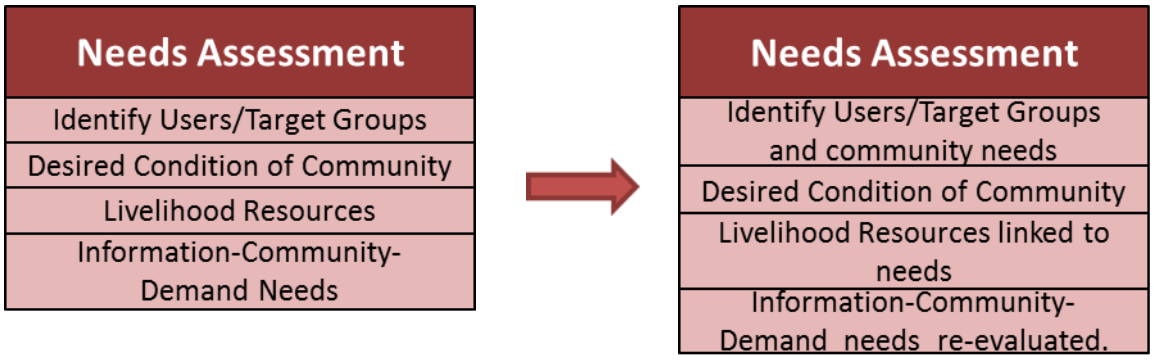

Figure 9.4: Needs Assessment Component.

The needs assessment is usually conducted after the baseline study which affects how in the state the community is in, what are the needs of the community. The first change that has

occurred on the needs assessment component is not only identifying the needs of the users and target group needs, but also the community needs. Identifying the community needs requires the observation of all the needs of the community holistically and also figuring out how the needs affect the community as a whole. The second change has been linking the livelihood resources to the needs of the community. This allows the livelihood resources identified earlier to be linked to the needs of the community. Therefore, identifying needs that really pertain to how the people will live aided with the appropriate resources is the goal. The last effect of the component is the re-evaluation of the information, community and demand driven needs which indicate the changing environment of the community. This shows the significance of this component as it was in the framework and the importance of it has been reaffirmed. This will also affect the measuring of the unintended impact which will arise due to the changing needs of the community and how they need to be accommodated. The table below summarises the changes of this component.

Table 9.4: Lessons Learned Needs Assessment

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
6. Projects should first benefit the community and fulfil the greater community needs rather than specific target groups.	Needs Assessment	The target group needs must be evaluated on all the community members, from where the best possible case which will benefit the community is selected, and not only cases which will benefit certain specific groups. The results should also provide an indication of the type of solution that should be provided.	The first block of the needs assessment component must be renamed to include community needs.
7. Needs assessments need to be related to the livelihoods resources required to survive in the rural communities.	Needs Assessment	The livelihood resources should not only be just reviewed but they should be linked to the needs of the community as to provide a link of how could these resource affect needs.	The livelihood block needs to be renamed to include livelihood resources linked to needs.
8. Community needs must be re-evaluated to keep up with the needs of the community.	Needs Assessment	The re-evaluation of information, community and demand needs provide an update on what the community requires based on	No Change to the framework.

		reviewing their needs over time.	

9.3.5 ICTD Strategy

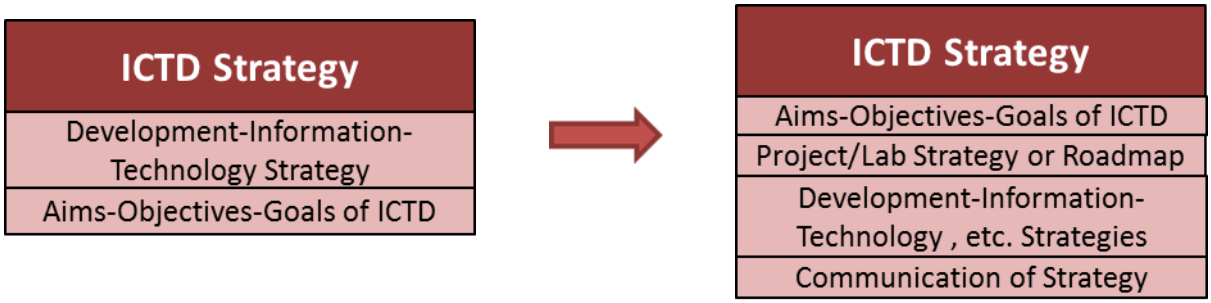

Figure 9.5: ICTD Strategy Component.

Since the ICTD strategy deals with the strategy of the external stakeholders it needs to be transparent and must be based on the aims, objectives and goals of the project. The first section that has been added to this component is the overall project strategy or roadmap. This will provide the projects overall strategy and roadmap which need to be followed. Additionally it will also provide the direction in which the lab or project will follow. This is another section that has been renamed from development, information and technology strategy to include all other strategies which might be developed by the external stakeholders to support the overall strategy of the lab. However, every plan developed here needs to be communicated to the community in clear, simple and understandable terms. Therefore, the communication of the strategy is included as a component in the ICTD strategy, where it has to be clearly communicated to the community in a way that will not be intellectually intimidating for them. One of way of doing this for example, is through presenting in the own language and terms which they understand. This will then affect the linkage of the needs and the ICTD strategy. The table below summarises the changes of this component.

Table 9.5: Lessons Learned ICTD Strategy

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
9. Perceptions of what the project will do versus the strategy that will be undertaken affects the level of expectations from	ICTD Strategy	When community members have low confidence in the project due to the way the project has been handled, they also affect the impact which	There should be a section where the perceptions and intended outcomes of the project are communicated to the community and

the community of the project.		the solutions will have on the community. This also affects the level of impact the project will have on the community.	clear understanding of the strategy is achieved between the stakeholders.
10. A roadmap provides the direction in which the ICTD project will take, from which various strategies can be developed from.	ICTD strategy	An ICTD project does not need to have only one strategy, it can have many strategies which emanate from one direction which would be for example, a roadmap, from which many strategies are developed from.	The framework already accommodated the linkage of three strategies, which were the development, information and technology strategy. The framework now needs to accommodate one central strategy or roadmap and various others which stem from the central strategy.
11. The ICTD strategy should be communicated in simple and understandable terms to the community as to ensure participation from the community members.	ICTD strategy	In communicating the strategy in a simple and understandable manner to the community then more participation can be achieved, therefore, more suggestion and input might be received from the community.	A block needs to be added to the framework which should accommodate the communication of the strategy to the community.

9.3.6 Needs-ICTD Linkage

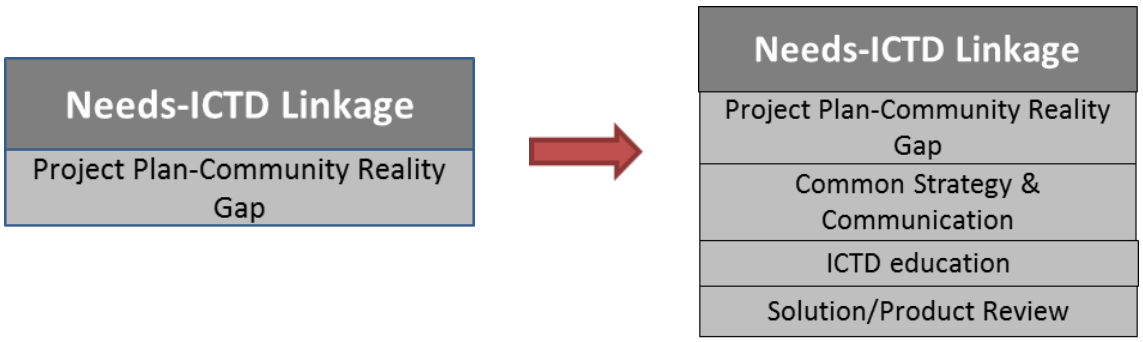

Figure 9.6: Needs-ICTD Linkage Component.

The needs-ICTD linkage component has been mostly affected by the results which emanated from the case studies analyses. The first change which also links to the ICTD strategy component is the common strategy and communication. In this section a common strategy needs to be developed which will address the needs of the community in a holistic manner and make sure the interests of the various stakeholders involved in the project are addressed. This will provide protection for neglected parties in the partnership and also provide accountability on what is common to all parties and how it will be achieved. The second section focuses on the accommodation of ICTD education where the various parties share

specifically with the community on ICTD and how it can support development and have livelihood initiative. The last section that has been added is the solution/product review section which aims to address whether the solution provided is linked to community needs and how it fulfils these needs. This is the most crucial part of the framework where a balance is obtained between the community and the external stakeholders. This can be conducted through reviewing with the community if the product fits their lives and meets their needs. The table below summarises the changes of this component.

Table 9.6: Lessons Learned Needs-ICTD Linkage

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
12. The ICTD strategy should be developed with the community in mind based on the challenges the community is faced with.	Needs-ICTD linkage	This is already embedded in the framework as the needs-ICTD linkage deals with the 'Project Plan-Community Reality Gap' so whatever is designed for the community, needs to be contextually aware of the activities happenings in the community and the challenges that the community is faced with and whether the solution provided is relevant to the community.	Arrows are emphasized to highlight the importance of the linking the two components of needs assessment and ICTD strategy into the needs-ICTD linkage.
13. When many stakeholders are involved in an ICTD strategy, a common strategy should be developed in order to promote the cause of developing the community.	Needs-ICTD linkage	This means that a common strategy needs to be developed when many partners are involved in the project. This will allow all parties to achieve their goals, and to the benefit of the main stakeholder which is the community. This common strategy, therefore, needs to be communicated to every stakeholder that is involved and they have to understand it clearly.	There needs to be a block named common strategy and communication which will address the achievement of goals between the stakeholders and also the communication of these goals.
14. The solutions provided to the community should be driven by the linkage of the Needs to ICTD strategy.	Needs-ICTD linkage	This means that the solution needs to be reviewed back again to check if it fits into the model. This will allow the solution to be validated if it fits into the identified needs, can it be handled by the ICTD strategy and is it viable in the baseline condition of the community.	In the needs-ICTD linkage component, there needs to be a section that must be added, which reviews the solution the alignment of the needs and ICTD strategy.
15. Programmes should be developed that will reduce the knowledge gap that exists between internal and external stakeholders which will affect the level of contribution that	Needs-ICTD linkage	This will assist the members in being able to contribute to what is being said in community meetings and forums and will thus allow for community members to also get skills that will also assist them in using the application and knowing how the app was built.	There needs to be a component that must address the training and sharing of programmes so that the gaps can be reduced and the Needs-ICTD linkage achieved.

exists between the stakeholders.			

9.3.7 Impact Indicators

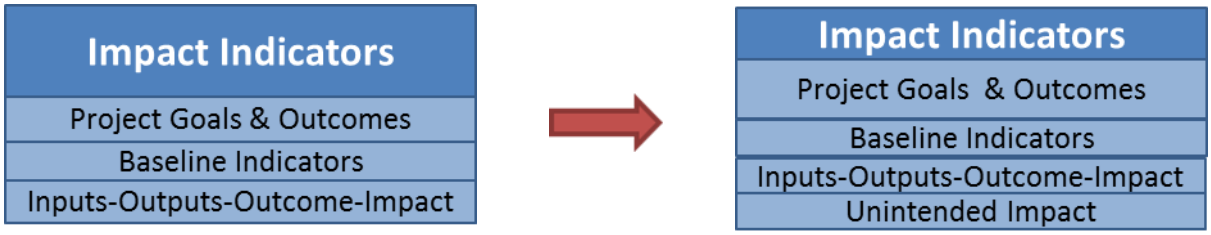

Figure 9.7: Impact Indicator Component.

The impact indicator component is the last component that affects the monitoring and evaluation of the project. The only change that has been implemented in this component is the emphasis of the needs-ICTD linkage shown by arrows as in Figure 9.7. Another change has been the addition of the unintended impact indicators. The table below summarises the changes of this component.

Table 9.7: Lessons Learned Impact Indicators

Lesson Learned	Section Of Framework Affected	Effect on Framework	Change to Component
16. Impact indicators that rely on project goals and objectives may not reveal the true nature of impact	Impact Indicators	Impact indicators then need to be developed from the needs-ICTD linkage which will allow for the needs to be linked to the projects goals and objectives.	The previous component feeds in the impact indicators section which has been illustrated by three bright arrows to indicate the importance of linking the two.
17. As demand driven needs emerge, the needs-ICTD linkage needs to be updated to account for unintended impact indicators, which cannot be easily identified from goals and objectives.	Impact Indicators	Unintended impact indicators need to be developed as to be able to link to the needs-ICTD linkage and link to changed demand driven needs.	A block which accommodates intended and unintended impact indicators has been added to the component.

9.4 Revised Framework Summary

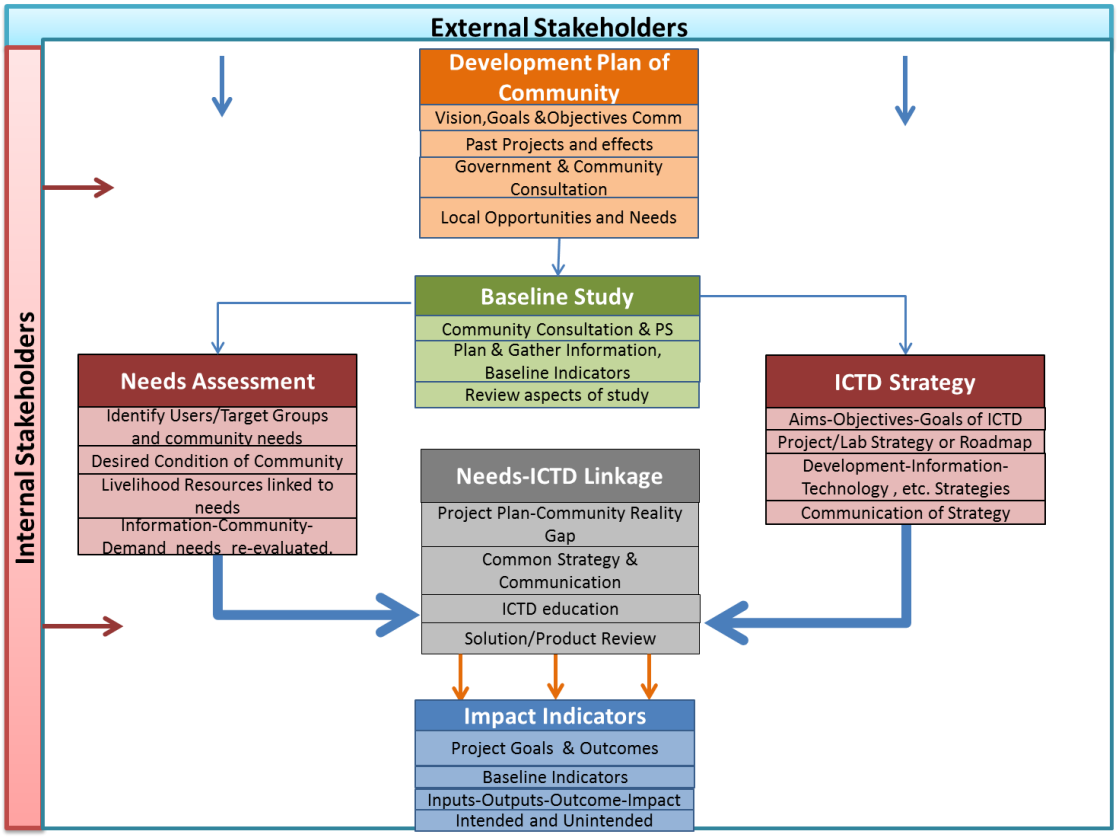

Figure 9.8: Revised Needs-ICTD Alignment Framework

The framework has not changed dramatically from the first version of it. The external and internal stakeholders were kept as is since it was evident from the analysis that communities might be interpreted as partners in the projects but rarely have input into the solution that is developed. Their input is seen as contributing to the baseline and needs assessment only and is not seen elsewhere. In some areas sections have been added to components which have expanded components of the framework. The other change in the framework is the emphasised arrows illustrated in the framework which indicate the importance of the components from which they emanate.

9.5 Conclusion

As much as communities have changed over time, they however, value the process of development which will aid them in fighting poverty and also assist communities to access to information and knowledge. The process informing the framework was vital to real life case studies which have adequately informed this framework. Key lessons were learned and contributed to the process of informing the framework. The lessons learnt also contributed to the enhanced needs-ICTD strategy alignment framework which took into account the

experiences and review of the case studies. The review of the case studies has also affected the addition and review of the various components of the framework. The revised framework encapsulated the lessons learned, the experiences of the labs, and the review of the related literature. The revised model now takes into account the literature versus the experiences and how based on the framework ICTD should be aligned to community needs to allow the relevant impact indicators to be developed based on the framework.

Chapter 10 : Conclusion and Future Research

Chapter 9 explored three case studies providing a real-life setting to inform the application of the needs-ICTD framework and enhancements to the framework based on real-life experiences. Chapter 10 concludes the research on aligning community development needs with ICTD strategy and developing impact indicators based on the framework. To achieve this, case studies of Rustica, SmartEnergy, SLL outcomes were used for recommendations of future research.

10.1 Introduction

Rural communities realise their need for development and that it should occur in their communities. They welcome the assistance of external stakeholders. However, at times this is short lived as most of the time the help and support they ought to receive is not provided. The research finds that the ICTD strategy is not aligned to the needs of the community and therefore, the identification of the impact indicators is dependent only on goals and objectives of the external stakeholders and not the community. A needs-ICTD strategy alignment framework was developed and was explored through three case studies. The data generated in informing the framework was analysed and produced results which enhanced dimensions of the framework. Therefore, this chapter concludes the overall research investigation of aligning community needs with ICTD strategy to support the development of appropriate impact indicators for the measurement of impact. The contributions of the research are presented, after which areas for future research are proposed.

10.2 Contributions of the Research

The research study contributes to the knowledge of information systems and ICT for rural development as follows:

A Review of ICTs for Development and Evaluation:

- Development in rural areas is a need which cannot be ignored. The services provided in these areas are at times none existent and hence there is a need to discover other means of developing these communities further and for the better. Government, NGO's, and other private organisations usually drive initiatives to the people. However, these initiatives are not enough to assist in developing rural areas. The need therefore, arises for effective rural development which develops the areas and the people in these areas. Rural development therefore, needs to be accelerated to meet the needs of the people and develop their lives.
- The importance of information and knowledge cannot be underestimated. Information and knowledge provide assistance to people in rural areas in order to help them with the development process. It can help the community expand their capabilities and provide assistance in community development.
- ICTs can therefore, aid the process of rural development by providing the information and knowledge in the most appropriate manner. These ICTs can, therefore, be used for development in the following ways: in addressing health challenges, in access to

education and knowledge, rural empowerment and participation, entrepreneurial activity and market access, addressing environmental sustainability, and establishing community networks.

- However, these uses are met with ICTs challenges in rural areas which affect the usage of these ICTs. These challenges include inappropriate infrastructure, illiteracy, inappropriate content, insufficient training and capacity building, high cost of access and lack of affordable solutions, social, cultural and political challenges.
- A knowledge gap, therefore, exists between community needs and ICTD Strategy. This therefore, does not assist in using ICTs to combat rural development and processes involved. The strategy is not aligned to the community needs, therefore, the expectations and deliverables of what the community needs fail.
- A shortfall of evaluation frameworks that focus only goals and objectives and not link the needs of the communities also does not assist in evaluating the impact that the project has had on the community and their aim to accelerate rural development.

A Review of ICT for Development Alignment and Evaluation Frameworks:

- The problem of not linking of community needs to ICTD strategy affects the core of ICTD projects successes. Rural ICT projects often fail since they might know the needs of the community but may however, only have little effort in aligning the ICTD strategy to the needs of the community. They therefore, also fail in accounting for the unintended impacts.
- The shortcomings of identifying the appropriate impact indicators and the intended and unintended impacts are not evaluated in a proper manner. When the identification of impact indicators is only based on goals and objectives of the external stakeholders, then it does not account for the needs of the community. The impact indicators, therefore, are not in line with what was meant to be achieved in the project in relation to the needs of the community.
- The Needs-ICTD framework, therefore, focuses on linking the ICTD strategy with the needs of the community and as a result the case studies have indicated that products that are not aligned to community needs and those products that are pre-empted from beginning are not successful in linking to ICTD strategy. This results in communities not using ICTs effectively to support their livelihood and development activities in their communities because they don’t know how to operate them.

The Needs-ICTD Strategy Alignment Framework:

- The proposed needs-ICTD strategy alignment framework suggests that the project in rural areas should consider the needs of the community before the ICTD strategy is developed and impact is assessed. The needs-ICTD strategy alignment framework focuses on aligning community needs with ICTD strategy, which in turn affect the effectiveness of the community. In the process of the needs being aligned to ICTD strategy, more context relevant and community relevant solutions and products can be developed to assist the community in their quest for development. When the needs are aligned to ICTD strategy relevant impact indicators can be developed which not only focus on the vision, goals and objectives of the projects, but also on the needs of the community.
- A case study of the Rustica, SmartEnergy and Siyakhula living lab indicates the suitability and shortcomings of the framework. The review of the case studies revealed that most of the components in the framework had been considered in applying projects to the various communities. Various features of the needs-ICTD strategy alignment framework were revised to incorporate the experiences of the case studies and some features of the framework were kept through the support of existing literature.
- Enhancements to the framework are summarised as follows:
    a) The inclusion of the ‘interaction’ section between the internal and external stakeholders affects the level of communication between the stakeholders.
    b) There were changes that were made to the components of the framework, which include addition of sections and practices to the ‘development of the community’, ‘baseline study’, ‘needs assessments’, ‘ICTD strategy’, ‘Needs-ICTD Linkage’ and the ‘impact indicator’ section.
    c) Sections of the framework were emphasised to include the more visible arrows that highlight the importance of certain components the framework cannot function without.

10.3 Future Research

10.3.1 Implementing the Needs-ICTD Strategy Alignment Framework

The Needs-ICTD strategy alignment framework was only explored in the case studies of Rustica, SmartEnergy and Siyakhula living lab. The framework was developed with the emphasis on aligning community needs and ICTD strategy. In addition, it was further developed based on the review of literature, exploration of the case studies and revision of the framework which emanated from the review of the results. The application of the framework in a project that has just started and in its early stages would be interesting to explore in that project, because a new project would be able to implement the framework from the beginning. Further exploration of other rural ICT project case studies can reveal additional characteristics, components and practices that can further enhance and confirm the Needs-ICTD strategy alignment framework.

10.3.2 Applying and adapting the Needs-ICTD Strategy Alignment Framework for other Rural ICT projects or Programmes

The needs-ICTD strategy alignment framework can be applied to other rural ICT for development projects. Every ICT project is different, however, each one needs to thoroughly investigate the needs of the community and align ICTD strategy to them. The application of the framework to more rural ICT for development projects could result in more lessons learned. Lessons learned have revealed the suitability and the shortcomings of the framework, and it has contributed to further improvements to the framework. The more the framework is applied more results will be obtained. An increase in the lessons learnt will increase the applicability of the framework over different types of rural projects even if they are not strictly ICT projects. As in all projects the needs of the community should be first and any strategy aligned to the needs. This will increase the success of the rural projects, which would result in the acceleration of the rural development process and the provision of better lives for the communities. The impact assessment of the projects would be more effective since it would be linked to the needs of the community, and not just the goals and objectives of the projects.

10.4 In Closing

There is a growing frustration of community members which is caused by the ICT projects' lack of delivery on what is expected of them. The provision of ICT services for development in communities is often not linked to community needs, and therefore, does not provide value to the community. ICTs have the potential to really change the lives of people in rural areas. However, without the needs being thoroughly investigated and properly aligned to the ICTD strategy, ICTD initiatives are not positively effective in communities. It is therefore, essential that the Needs-ICTD strategy alignment framework be used to provide guidelines in aligning the ICTD strategy to the community needs as a foundation for assessing impact. The application of this framework in existing and proposed rural ICT projects will contribute effectively to the proper alignment of ICTD strategy to the needs of the community and also in the identification of the relevant impact indicators for the measurement of impact.

List of References

AJAYI, A. I. and EKUNDAYO, H.T. (2009). The application of information and communication technology in Nigerian secondary schools. **International NGO Journal**. 4(5), 281-286.

ALEMNA, A. A. And SAM, J. (2006). Critical Issues in Information and Communication Technologies for Rural development in Ghana. **Information Development.** 22(4), 236-241.

ALKIRE, S. (2002). Dimensions of Human Development. **World Development**, *30*(2), 181-205.

ALMAJALI, D., and DAHALIN, Z. (2011). **Factors Influencing IT-Business Strategic Alignment and Sustainable Competitive Advantage: A Structural Equation Modelling Approach**. Communications of the IBIMA. [Online] Available: http://www.ibimapublishing.com/journals/CIBIMA/2011/261315/261315.pdf [Accessed: 31/07/2012]

ALTSCHULD, J.W. and WITKIN, B.R. (2000). **From Needs Assessment to Action: Transforming needs into solution strategies**. Sage Publication. London

AMOS, T.L., RISTOW, A., RISTOW, L., and PEARSE, N.J. (2008). **Human Resource Management** (3e). Kenwyn: Juta.

ASHRAF, M. M., SWATMAN, P., HANISCH, J., and GOLDEN, W. (2008). An extended framework to investigate ICT impact on development at the micro (community) level. ***Proceedings of the 16th European Conference on Information Systems*** (pp. 1-12)

BAILUR, S. (2007). The Complexities Of Community Participation In ICT For Development Projects: The Case Of "Our Voices". ***9th International Conference on Social Implications of Computers in Developing Countries***, (pp. 3-17).

BAILUR, S. (2007). Using Stakeholder Theory to Analyze Telecenter Projects. **Information Technologies and International Development**, 3(3), 61-80

BARTENSCHLAGER, J., and GOEKEN, M. (2009). Designing Artifacts of IT Strategy for Achieving Business / IT Alignment. ***AMCIS 2009 Proceedings***. Paper 494. [Online] Available: http://aisel.aisnet.org/amcis2009/494 [Accessed: 24/01/2012]

BATCHELOR, S., and NORRISH, P. (2005). **Framework for the assessment of ICT pilot projects. InfoDev**. [Online] Available: http://wwww.infodev.org/en/Publication.4.html [Accessed: 03/08/2011]

BRIDGES (2006). **Real Access / Real Impact criteria**. Bridges.Org. [Online]. Available: http://www.bridges.org/Real_Access [Accessed: 08/01/2013].

BRIDGES., 2011. **12 Habits of Highly Effective ICT-Enabled Development Initiatives.** [ORG Online]. Available: http://www.bridges.org/12_habits [Accessed: 01/08/2011].

BRUTSCHIN, J., COLTON, S. and WARD, V. (2006). **Story Guide: Building Bridges Using Narrative Techniques.** [Online] Available: http://www.kstoolkit.org/Storytelling [Accessed: 29/07/2010].

BURDGE, R. J., and VANCLAY, F. (1996). Social Impact Assessment. **Environmental and Social Impact Assessment**, 14(1), 59-86

CANADIAN INTERNATIONAL DEVELOPMENT AGENCY. (2005). **CIDA's Strategy on Knowledge for Development through Information and Communication Technologies.** [Online] Available: http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/pdf/$file/ICT.pdf. [Accessed: 04/03/2011].

CASAL, R. D. (2007). ICT for Education and Development. **Info.** 9(4), 3-9.

CAVAYE, J. (2001). Rural Community Development: New Challenges and Enduring Dilemmas. **The Journal of Regional Policy Analysis**. 31(2), 109-124.

CHAN, Y. (2002). Why haven't we mastered alignment? The importance of the informal organizational structure. **MIS Quarterly**, *1*(2), 97-112.

CHAPMAN, R. and SLAYMAKER, T. (2002). **ICTs and Rural Development: Review of the literature Current Interventions and Opportunities for Action**. [Online] Available:

http://www.odi.org.uk/resources/download/1985.pdf [Accessed: 02/03/2010].

COETZEE, H., DU TOIT, I. and HERSELMAN, M. (2012) Living Labs In South Africa: An Analysis Based On Five Case Studies. **The Electronic Journal for Virtual Organizations and Networks**, 14(1), 1-29.

CONFORD, T. and SMITHSON, S. (1996). **Project Research in Information Systems: A Students Guide.** New York, Palgrave. 1996.

CREDÉ A. and MANSELL R. (1998). **Knowledge Societies In A Nutshell: Information Technology for Sustainable Development**. [Online] Available: http://www.idrc.ca/en/ev-9366-201-1-DO_TOPIC.html [Accessed: 29/07/2011].

CRESWELL, J.W. (2009).**Research design: qualitative, quantitative, and mixed methods approaches** (3e). SAGE Publications: Los Angeles.

DAGENAIS, C. (2010). Knowledge transfer in community-based organizations: A needs assessment study. **Global Journal of Community Psychology Practice**, 1(2), 13-30.

DHINGRA, A., and MISRA, D. C. (2004). Information Needs Assessment Model for Identifying Information Needs of Rural Communities. **Information Technologies and International Development**, *2*(2), 77-78.

DUNCOMBE, R. (2009). **Impact Assessment of Mobile Phones on Development: Concepts, Methods and Lessons for Practice**. Working paper 39 [Online] Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp39.pdf [Accessed: 10/03/2012]

DUTTA, R. (2009). Information needs and information-seeking behaviour in developing countries: A review of the research. **The International Information and Library Review**, *41*(1), 44-51.

DZENOWAGIS, J. (2005). **Connecting for Health Global Vision, Local Insight Report for the World Summit on the Information Society.** [Online] Available: http://www.who.int/kms/resources/WSISReport_Connecting_for_Health.pdf [Accessed: 29/06/2010].

EUROPEAN UNION. (2006). **Impact analysis: study on baseline and impact indicators for RDP 2007-2013**. [Online] Available: http://ec.europa.eu/agriculture/publi/reports/indicator_rd/sum_en.pdf [Accessed: 09/10/2011]

FILLIP, B., and FOOTE, D. (2007). **Making the Connection: Scaling Telecentres for Development.** Washington, DC: Information Technology Applications Center (ITAC) of the Academy for Education Development.

FRANKLIN, M., STAM, P., CLAYTON, T., HAGEN, H.-OLOF, BAUER, O., MCMAHON, R., and BENDER, S. (2008). **ICT impact assessment by linking data across sources and countries**. [Online] Available: http://epp.eurostat.ec.europa.eu/ portal/page/ portal/ver-1/information _society/methodology/ICT_IMPACTS_Summary_Report.pdf [Accessed: 30/04/2012]

FUCHS, C. and HORAK, E. (2008). Africa and the digital divide. **Telematics and Informatics** 25(1), 99-116.

GARTLAN, J., and SHANKS, G. (2007). The Alignment of Business and Information Technology Strategy in Australia. **Australasian Journal of Information Systems**, 14(2), 113-139.

GELDOF, M. (2005). "**Becoming an Information Society: The Role Of New Information Technologies in Development**." [Online] Available: http://www.wiltonpark.org.uk/documents/conferences/WP798/pdfs/WP798.pdf [Accessed 30/01/2011].

GILLHAM, B. (2000). **Case Study Research Methods** (1e). MPG Books Ltd: Great Britain.

GOMEZ, R., and PATHER, S. (2012). ICT Evaluation : Are We Asking The Right Questions ? **The Electronic Journal on Information Systems in Developing Countries**, 50(5), 1-14.

GOMM, R. (2004). **Social Research Methodology: A Critical Introduction.** New York, Palgrave Macmillian (2004).

GORDON, G., and MORSE, E. V. (1975). Evaluation Research. **Annual Review of Sociology**, 1(1), 339-361.

GOULDEN, B. and MSIMANG, M. (2005) **Collaboration in ICT Regulation in the Southern Africa Development Community: A Regional Approach to Capacity Building**. Working Paper No 30683. Institute for Development Policy and Management (IDPM), University of Manchester. [Online] Available: http://ageconsearch.umn.edu/bitstream/30683/1/cr050098.pdf [Accessed: 09/01/2013].

GREENER, S. (2008).**Business Research Methods.** Venters Publishing.

GROSSMANN, M. (2005). **The Impact Challenge : Conducting Impact Assessments for the EMPRETEC Programme**. [Online] Available: http://www.empretec-assessment.org/documents/Documents/English/Background/Background.pdf [Accessed: 11/02/2012]

GUPTA, K., SLEEZER, C.M., and RUSS-EFT, D.F. (2007). **A Practical Guide to Needs Assessment** (2e). Wiley, San-Francisco.

GUTIERREZ, A., OROZCO, J., and SERRANO, A. (2009). Factors affecting IT and business alignment: a comparative study in SMEs and large organisations. **Journal of Enterprise Information Management**, 22(1/2), 197-211.

HARRIS, R., W. (2004). **Information and Communication Technologies for Poverty Alleviation**. [Online] Available: http://www.apdip.net/publications/iespprimers/eprimer-pov.pdf [Accessed 03/08/2010].

HEEKS, R. (1999). **Information and Communication Technologies, Poverty and Development**. **Development Informatics working paper 5**. June 1999 [Online] Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp05.pdf [Accessed 23/06/2010].

HEEKS, R. (2002). **Failure, Success and Improvisation of Information systems Projects in Developing Countries**. **Development informatics, working paper 11.** January 2002. [Online] Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp11.pdf [Accessed 23/06/2010].

HEEKS, R. (2009). **The ICT4D 2.0 Manifesto: Where next for ICTs and international development? Development Informatics working paper 42.** [Online] Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp42.pdf [Accessed: 17/05/2011].

HEEKS, R. (2010). Policy Arena Do Information And Communication Technologies (ICTs) Contribute To Development ? **Journal of International Development**, 640, 625-640.

HEEKS, R. and MOLLA, A. (2009). **Impact Assessment of ICT-for-Development Projects: *A Compendium of Approaches*. Development Informatics working paper 36.** [Online] Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp36.pdf [Accessed: 15/02/2011].

HEMSON, C.D.L., MEYER, M. and MAPUNYE, K. J. (2004). **Rural Development -The Provision of Basic Infrastructure Services.** Human Sciences Research Council: Cape Town.

HENDERSON, J., and VENKATRAMAN, N. (1996). "Aligning Business and IT Strategies," in J.N. Luftman (ed.) **Competing in the Information Age**, New York: Oxford University Press.

HERSELMAN, M. and BRITTON, K.G. (2002). Analysing the Role of ICT in Bridging the Digital Divide amongst Learners. **South African Journal of Education**. 22(4), 270-274.

HERSELMAN, M.E. (2003) **ICT in Rural Areas in South Africa: Various Case Studies**. [Online] Available: http://proceedings.informingscience.org/IS2003Proceedings/docs/120Herse.pdf [Accessed: 03/08/2011].

HERSELMAN, M.E., MARIAS, M.A., PITSE-BOSHOMANE, M.M., and ROUX, K. (2009) Establishing a Living Lab Network in Southern Africa. ***Proceedings of the 3rd International IDIA Development Informatics Conference***. ISBN 978-0-620-45037-9

HOLLAND, D., and SKARKE, G. (2008). BUSINESS and IT ALIGNMENT: Then and

Now, A Striking Improvement. **Strategic Finance** 89(10), 43-45

HOLLIFIELD, C. (2003). Creating demand: influencing information technology diffusion in rural communities. **Government Information Quarterly**, *20*(2), 135-150.

HULME, D. (2002). **Impact Assessment Methodologies For Microfinance: Theory, Experience And Better Practice**. [Online] Available: http://info.worldbank.org/etools/docs/library/155591/finsecissues/pdf/hulme.pdf [Accessed: 23/10/2011]

HUMAN DEVELOPMENT REPORT (2010). **The Real Wealth of Nations: Pathways to Human Development 2010.** [Online] Available: http://hdr.undp.org/en/media/HDR_2010_EN_Complete_reprint.pdf [Accessed: 24/05/2011].

INFORMATION FOR DEVELOPMENT PROGRAM (INFODEV). (2010). **Global Practice in Incubation Policy Development and Implementation, A South African Incubation Case Study**. [Online] Available: www.infodev.org/en/Document.838.pdf [Accessed: 24/10/2011]

INTER-AMERICAN DEVELOPMENT BANK. (2004). **Priorities and Strategies in Rural Poverty Reduction Experiences from Latin America and Asia**. (D. Alarcon, Ed.)*America* (pp. 1-380). Washington, DC: Free Hand Press.

INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCIETIES. (2002). **Handbook for Monitoring and Evaluation**. (I. Osman, Ed.) Geneva, Switzerland.

INTERNATIONAL INSTITUTE FOR COMMUNICATION AND DEVELOPMENT (2010). **IICD Supported Programme: ICT Strategy for the Agriculture Sector – Bolivia.** [Online] Available: http://www.iicd.org/supported-projects/bolivia-ict-policy-for-agriculture/ Accessed: 30/07/2011].

IRANI, Z., THEMISTOCLEOUS, M., GUNASEKARAN, A., LOVE, P., and KHALIFA, G. (2001). Information Systems Evaluation : Mini-track Introduction. ***7th Americas Conference on Information Systems*** (pp. 1338-1391).

ISAACS, S. (2007). **ICT in Education in South Africa.** ***Survey of ICT Education in Africa***. **[**Online] Available: http://www.infodev.org/en/Publication.429.html [Accessed: 20/07/2010].

ISLAM, A., MOSTAK, K., and HOQ, G. (2010). Community Internet Access in Rural Areas : A study on Community Information Centres in. **Malaysian Journal of Library and Information Science**, *15*(2), 109-124.

JACOBSEN, N., GEWURTZ, E. and HAYDON, E. (2007). Ethical Review of Interpretive: Problems and Solutions. **Ethics and Human Research**, 29(5), 1-8.

JAIN, S. (2002). **ICTs and Women's Empowerment: Some Case Studies from India**. [Online] Available: http://www.ifuw.org/seminars/2007/jain.pdf [Accessed: 13/07/2010].

JOHNSON, A. M., and LEDERER, A. L. (2010). CEO/CIO mutual understanding, strategic alignment, and the contribution of IS to the organization. **Information and Management**, 47(3), 138-149.

JORGE, S.N. (2002). **The Economics of ICT: Challenges and Practical Strategies of ICT Use for Women's Economic Empowerment**. [Online] Available: http://www.un.org/womenwatch/daw/egm/ict2002/reports/Paper%20by%20Sonia%20Jorge.pdf [Accessed: 15/07/2010].

KAUFMAN, R.A. AND ENGLISH, F.W. (1979). **Needs assessment: concept and application**. Educational technology publication inc.: New jersey.

KEARNS, G. S., and SABHERWAL, R. (2007). Strategic Alignment Between Business and Information Technology: A Knowledge-Based View of Behaviors, Outcome, and Consequences. **Journal of Management Information Systems**, 23(3), 129-162.
KHOSA, M. (1996). **Social Impact Assessment of Development Projects. Infrastructure mandates for change, 1994-1999**. Cape Town: HSRC Press.

KIMMEL, A. J. (1998).**Ethics and values in applied social research**. SAGE Newbury Park: Calif.

KINGSBURY, D., MCKAY, J. and HUNT, J. (2004). **What is Development: *Key Issues in Development***. New York: Palgrave Macmillan.

KLEIN, H.K. and MEYERS, M.D. (1999).A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. **MIS Quarterly**23 (1), 67-94.

LEE, S., KIM, K., PAULSON, P., and PARK, H. (2008). Developing a Socio-Technical Framework for Business-IT Alignment. **Industrial Management and Data Systems**, 108 (9), 1167-1181.

LENNIE, J. (2002). Rural Women's Empowerment in a Communication Technology Project: Some Contradictory Effects. **Rural Society**. 12(3), 224-245.

LI, Y., GUOHUI, S., AND EPPLER, M.J. (2008). **Making Strategy Work: A Literature Review on the Factors influencing Strategy Implementation.** ICA Working Paper 2/2008. [Online]. Available: [Accessed: 01/08/2011].

LICONA, G. H. (2008). **The Construction of a Monitoring and Evaluation System for Social Programs and Education : An Institutional Challenge with Social Policy**. [Online] Available: http://siteresources.worldbank.org/INTEAPREGTOPEDUCATION/Resources/444238-1210776340325/MexicoevaluationsystemGonzaloHernandez.pdf [Accessed: 25/05/2012]

Luftman, J. (2003a). Assessing IT/business alignment. **Information Systems Management**, 14(4), 9-15. [Online]. Available: http://www.tandfonline.com/ [Accessed: 25/01/2011]

LUFTMAN, J. (2003b). Measure Your Business-IT Alignment. **Technology**, (22), 1-4.

LUFTMAN, J. and BRIER, T., 1999. Achieving and sustaining business IT alignment, **California Management Review**. 42(1), 102-109.
LUFTMAN, PAPP, R., and BRIER, T. (1999). Enablers and Inhibitors of Business-IT Alignment. **Communications of AIS**, 1(March), 1-33.

MAES, R., RIJSENBRIL, D., TRUIJIENS, O., and GOEDVOLK, H. (2000). **Redefining business – IT alignment through a unified framework.** [Online] Available: http://dare.uva.nl/document/228443 [Accessed: 14/06/2012]

MANSURI, G. (2004). Community-Based and -Driven Development: A Critical Review. *The* **World Bank Research Observer**, *19*(1), 1-39.

MCCLURE, P. (2006). **An Assessment Model for Evaluating Technological Impacts**. The Technology Teacher, 32-35. [Online] Available: http://www.iteea.org/Publications/TTT/apr06.pdf [Accessed: 16/05/2012]

MCCONNELL, P. (1995). **Making a Difference: Measuring the Impact of Information on Development**. [Online] Available: http://www.idrc.ca/openebooks/299-6/ [Accessed: 31/09/2010].

McNAMARA, K. S. (2003). **Information and Communication technologies, Poverty and Development: Learning from Experience**. **A Background Paper for the InfoDev Annual Symposium**, December 9-10, 2003, Geneva, *Switzerland*. Washington DC: The World Bank.

MEYER, H.W.J. (2002). Information as a Resource for Rural Development. **Mousaion**. 20 (1), 93-108.

MINISTRY OF PERFORMANCE MONITORING EVALUATION AND ADMINISTRATION. (2011). **National Evaluation Policy Framework. Framework**. [Online] Available: http://www.thepresidency.gov.za/MediaLib/Downloads/Home/Ministries/National_Evaluation_Policy_Framework.pdf [Accessed: 15/09/2011]

MINISTRY OF RURAL DEVELOPMENT AND LAND REFORM (2009). **The Comprehensive Rural Development Programme Framework.** [Online] Available: http://drupal6dev15.econsultant.co.za/sites/drupal6dev15.econsultant.co.za/files/The%20Comprehensive%20Rural%20Development%20Programme%20Framework%20July09.pdf [Accessed: 24/05/2011].

MOAHI, K. N. (2009). ICT and Health Information in Botswana: Towards the Millennium Development Goals. **Information Development**. 25(3), 198- 206.

MULDER, I., BOHLE, W., BOSHOMAN, S., MORRIS, C., TEMPELMAN, H. and

VELTHAUSZ, D. (2008). Real-World Innovation In Rural South Africa**. The Electronic Journal for Virtual Organisations and Networks.** 10, 8-20.

MUNYUA, H. (2000). **Information and Communication Technologies for Rural Development and Food Security: Lessons from Field Experiences in Developing Countries**. [Online] Available: http://www.fao.org/sd/cddirect/cdre0055b.htm [Accessed: 30/06/2010].

MUSOKE, M.G.N. (2002). Simple ICTs reduce maternal mortality in rural Uganda. **Bulletin of Medicus Mundi Switzerland.** 85, 2002.

MWABU, G and THORBECKE, E. (2001). Rural Development, Economic Growth and Poverty Reduction in Sub-Saharan Africa. **Journal of African Economics**, 13(1), 16-65.

MOSHAPO, S. (2010) **PROJECT CHARTER (SHORT VERSION): Fostering Desirable Changes in Energy Usage Patterns for Households that Use Multiple Energy Sources.** Unpublished Report. Pretoria: SAP Research

NDIWALANA, A., SCOTT, N., BATCHELOR, S., and SUMNER, A. (2010). **Information Needs and Communication Patterns of Rural Uganda: Implications for Mobile Applications**. [Online] Available: http://scholar.mak.ac.ug/andiwalana/files/m4d-mobileapps.pdf [Accessed: 05/05/2011].

OATES, B.J. (2006). **Researching Information systems and Computing.** Thousand Oaks, New Delhi; London: SAGE, 2006.

OPARE, S. (2007). Strengthening community-based organizations for the challenges of rural development. **Community Development Journal.** 42(2), 251–264.

PADE, C., MALLISON, B., and SEWRY, D. (2008).An Elaboration of Critical Success Factors for Rural ICT Project Sustainability in Developing Countries: Exploring the DWESA Case. **The Journal of Information Technology Case and Application** *(JITCAR*), 10(4).

PADE-KHENE, C., PALMER, R., and KAVHAI, K. (2010). A Baseline Study of the Dwesa Rural Community for the Siyakhula Information and Communication Technology for

Development Project: Understanding the Reality on the Ground. **Information Development.** 26, 4:187-212.

PADE, C., SIEBORGER, I., THINYANE, H., AND DALVIT, L. (2009b). The Siyakhula living lab: a holistic approach to rural development through ICT in rural South Africa. **ICTs for Development in Africa: Theory, Practice and the Digital Divide.** Vol 3: Development Informatics and Regional Information Technologies: Theory, Practice and the Digital Divide series. *Book Chapter to be published in 2010*.

PADE-KHENE, C and SEWRY, D (2011). Towards a Comprehensive Evaluation Framework for ICT for Development Evaluation – An Analysis of Evaluation Frameworks. ***2nd International Conference on Information Management and Evaluation (ICIME)***. 27-28 April 2011. Ted Rogers School of Management, Toronto, Canada.

PARKINSON, S., and RAMIREZ, R. (2006). Using a Sustainable Livelihoods Approach to Assessing the Impact of ICTs in Development. **Journal of Community Informatics**, 2(3), 1-12.

PRENNUSHI, G., RUBIO, G., and SUBBARAO, K. (2002). **Chapter 3: Monitoring and Evaluation. Volume 1-Core Techniques and Cross-Cutting Issues** (pp. 105-130).

RAO, H. S. (2008). **Rural Development Outcomes and Drivers: An Overview and Some Lessons.** [Online] Available: http://www.adb.org/Documents/Books/Rural-Development-Outcomes-Drivers/default.asp [Accessed: 31/09/2010].

REICH, H. B., and BENBASAT, I. (2000). Factors That Influence the Social Dimension between Business and Information Technology Objectives. **Management Information Systems**, *24*(1), 81-113.

REMENYI, J., MCKAY, J. and HUNT, J. (2004). **Community Development: in Key Issues in Development.** New York: Palgrave Macmillan.

ROBINSON, J. and PERKINS, D.D. (2009). Social development needs assessment in China: lessons from an international collaborative field school in Guangxi Zhuang autonomous region. **China Journal of Social Work**. 2(1), 34–51.

ROSSI, P.H., LIPSEY, M.W., and FREEMAN, H.E. (2004). **Evaluation: A Systematic Approach.** Thousand Oaks, California; London : SAGE, 2004.

ROTHENBERG-AALAMI, J., and PAL, J. (2005). **Rural Telecenter Impact Assessments and the Political Economy of ICT for Development (ICT4D)**. Education. Berkeley.

SCHLOSSER, F., and COLTMAN, T. (2012). Reconsidering the Dimensions of Business-IT Alignment. ***45th Hawaii International Conference on System Sciences*** (pp. 5053-5061).

SEBSTAD, J., NEILL, C., BARNES, C., AND CHEN, G. (1995). **Assessing the Impacts of Microenterprise Interventions: A Framework for Analysis**. USAID Managing for Results, Working Paper No. 7. Washington, D.C.: USAID.

SIAU, K., and ROSSI, M. (2011). Evaluation Techniques for Systems Analysis and Design Modelling Methods – A Review and Comparative Analysis. **Information Systems Journal**, 21(1), 249-268.

SILVIUS, A., WAAL, B. D., and SMIT, J. (2009). Business And IT Alignment ; Answers And Remaining Questions. ***Pacific Asia Conference on Information Systems*** (pp. 1-16).

SILVIUS. (2006). Does ROI Matter ? Insights into the True Business Value of IT. **The Electronic Journal of Information Systems Evaluation**, 9(2), 93-104.

SINGH, S. N., and WOO, C. (2009). Investigating Business-IT Alignment Through Multi-Disciplinary Goal Concepts. **Requirements Engineering**, 14(3), 177-207.

SMIT, D., HERSELMAN, M., ELOFF, J.H.P., NGASSAM, E., VENTER, E., Felix NTAWANGA, F., CHUANG, C., and VAN GREUNEN, D. (2011). Formalising Living Labs to Achieve Organisational Objectives in Emerging Economies. ***IST-Africa 2011 Conference Proceedings.*** Paul Cunningham and Miriam Cunningham (Eds) IIMC International Information Management Corporation. ISBN: 978-1-4577-1077-3

SOUTH AFRICAN GOVERNMENT, THE (2000). **The Integrated Sustainable Rural Development Strategy**. [Online] Available: http://www.info.gov.za/otherdocs/2000/isrds.pdf [Accessed: 05/15/2010].

TALBOT, H. (1998). **Information needs of rural communities**. [Online] Available: http://www.ncl.ac.uk/cre/publish/pdfs/rr98.2.pdf. [Accessed: 23/09/2011]
TAN, F. B. (1999). Exploring Business-IT Alignment Using the Repertory Grid. **10th Australian Conference** (pp. 931-943).

TARAFDAR, A., and QRUNFLEH, D. (2004). IT-Business Alignment: A Two-Level Analysis. **Information Systems Management**, 26(4), 338-349.

TAYLOR, R., and ZHANG, B. (2007). Measuring the Impact of ICT: Theories of Information and Development. **Telecommunications Policy Research Conference** (pp. 1-39). Washington, DC.

TEO, T. S. H., and ANG, J. S. K. (1999). Critical success factors in the alignment of IS plans with business plans. **International Journal of Information Management**, 19(2), 173-185.

TLABELA, K., ROODT, J., PATERSON, A, and SMITH, G. (2007). **Mapping ICT access in South Africa**. Human Sciences Research Council: Cape Town.

TRAVIS, J. (1999). Exploring the Constructs of Evaluative Criteria for Interpretivist Research. **Proc. 10th Australasian Conference on Information Systems**, *pp 1037-1049.*

ULLAH, A., and LAI, R. (2011). Modelling Business Goal For Business/IT Alignment Using Requirements Engineering. **Journal of Computer Information systems**, 5 (4), 21-28.

UNCTAD SECRETARIAT. (2010). **Measuring the Impact of ICT for Development. Geneva: Commission on Science and Technology for Development**. [Online] Available: http://unctad.org/en/Docs/dtlstict2011d1_en.pdf [Accessed: 6/09/2011]

UNITED NATIONS DEVELOPMENT PROGRAM. (2001). **Essentials: Information Communication Technology for Development. Synthesis of Lessons Learnt,** Evaluation Office No.5, September 2001. New York: United Nations Development Program. [Online]. Available http://www.undp.org/eo/documents/essentials_5.PDF [Accessed: 08/10/2010].

UNITED NATIONS DEVELOPMENT PROGRAM. (2010). **The Millennium Development Goals Report: 2010**. [Online] Available: http://unstats.un.org/unsd/mdg/Resources/Static/Products/Progress2010/MDG_Report_2010_

En.pdf [Accessed: 31/09/2010].

UNITED NATIONS. (2009). **Impact of ICT on Community Development in ESCWA Member Countries**. [Online] Available: http://unpan1.un.org/intradoc/groups/public/documents/un-dpadm/unpan044371.pdf [Accessed: 6/09/2011]

VAN DER WALT, J.S., BUITENDAG, A.K., ZAAIMAN, J.J. and VAN VUUREN, J.C.(2009) Community Living Lab as a Collaborative Innovation Environment. **Issues in Informing Science and Information Technology**, 6(1), 421-436.

VAN GREUNEN, D. and VELDSMAN, A. (2010). **Report on the Socio-Economic Landscape of the Kgautswane Rural Living Lab.** Unpublished Report. Pretoria: SAP Research

VAN GREUNEN, D., DE LOUW, R., DÖRFLINGER, J., FRIEDLAND, C.and MERZ, C. (2009) Sekhukhune Living Lab: Lessons Learnt from End User Community Building and Interaction. ***IST-Africa 2009 Conference Proceedings*** Paul Cunningham and Miriam Cunningham (Eds) IIMC International Information Management Corporation. ISBN: 978-1-905824-11-3

VAN RENSBURG, J., VELDSMAN, A. and JENKINS, M. (2008). From Technologists to Social Enterprise Developers: Our Journey as 'ICT for development' practitioners in Southern Africa, **Journal of Information Technology for Development (ITD)**, 14 (1), 76-89.

VIJU, M. (2010). Women entrepreneurship in Middle East: Understanding barriers and use of ICT for entrepreneurship development. **International Entrepreneurial Management Journal.** 6(1), 163-181.

WAGNER, D. A., DAY, B., JAMES, T., KOZMA, R. B., MILLER, J., and UNWIN, T. (2005). **Monitoring and Evaluation of ICT in Education Projects**. [Online] Available: http://www.infodev.org/en/Publication.9.html [Accessed: 6/09/2011]

WAKELIN, O. and SHADRACH, B. (2001) **Impact Assessment of Appropriate and Innovative Technologies in Enterprise Development, Enterprise Development Impact**

Assessment Information Service. [Online] Available: http://www.enterpriseimpact.org.uk/pdf/ICTs.pdf [Accessed: 02/09/2012]

WALSHAM, G. (2006). Doing Interpretive Research. **European Journal of Information Systems** 15(1), 320-330.

WALTON, M. and HEEKS, R. (2011). **Can a Process Approach Improve ICT4D Project Success?** Working paper 47. Available: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp47.htm [Accessed: 29/01/2013].

WELMAN, J.C., KRUGER S.J. and MITCHELL, B. (2002).**Research Methodology** (3e). Oxford University Press: Cape Town.

WORLD BANK, THE. (2003). **ICT and MDGs: A World Bank Group Perspective.** [Online] Available: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/09/15/000090341_20040915091312/Rendered/PDF/278770ICT010mdgs0Complete.pdf [Accessed: 29/07/2010].

WORLD BANK, THE. (2006). **Information and Communications for Development: Global Policies and trends.** [Online] Available: http://info.worldbank.org/etools/docs/library/240327/Information%20and%20communications%20for%20development%202006%20%20global%20trends%20and%20policies.pdf [Accessed: 05/15/2010].

WORTHEN, B.R., SANDERS, J.R., and FITZPATRICK, J.L. (1997). **Program Evaluation: Alternative Approaches and Practical Guidelines**. (2nd Ed). White Plains, NY: Addison Wesley Longman

YAWSON, D.O, ARMAH, F.A. and PAPPOE, A.M.N. (2009). Enabling Sustainability: Hierarchical Need-Based Framework for Promoting Sustainable Data Infrastructure in Developing Countries. **Sustainability** 1, 946-959.

YIN, R, K. (2003).**Case Study Research Designs and Methods** (3e). SAGE Publications: Los Angeles.

YUAN, W. (2003). Development of sustainability indicators by communities in China: a case study of Chongming County, Shanghai. **Journal of Environmental Management**, 68(3), 253-261.

YUSUF, M. O. and YUSUF, H.T. (2009). Educational reform in Nigeria: The potentials of information and communication technology (ICT). **Educational Research and Review**. 4(5), 225-230.

ZEITOUN, T. (2003). **Capacity Building and ICTs: A Donor's Perspective. WSIS PrepCom II–Geneva, Roundtable 5.** [Online] Available: http://www.itu.int/wsis/docs/pc2/roundtables/rt5/zeitoun.pdf [Accessed: 09/01/2013].