



**FRAMEWORK FOR EVALUATING INFORMATION TECHNOLOGY  
BENEFITS IN LOCAL COMMUNITIES**

by

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*C. Uys.*  
Signed

18 January 2016  
Date

## ABSTRACT

Governments of the developing world, including South Africa, have a strong commitment and resolve to accelerate the rollout of Information and Communication Technology (ICT) to achieve developmental benefits in communities. Consequently both government and the private sector are delivering a number of interventions in South Africa based on Information and Communication Technologies for Development (ICT4D).

Hard evidence regarding the development benefits of ICT4D interventions is lacking and there is little agreement on measures to evaluate the benefits of such projects. One possible reason for this is that there are no established evaluation frameworks to assess the benefits. Frameworks used in ICT4D evaluation are investigated in this study to ascertain their usefulness to identify benefits of ICT4D initiatives.

Sen's Capability Approach defines development as freedom. An example of such development can be the process of providing opportunities through ICT and meaningful ways to use these opportunities to realise various benefits. Tangible benefits are simple to identify (e.g. number of people using the public access centre, or number of people finding employment). Intangible benefits include the real 'wins'—capabilities garnered through access and meaningful use of ICT, leading to the recognition of new opportunities for the users of the public access centres. Sen's Capability Approach is operationalised, demonstrating the inclusion of a person's agency and conversion factors that inhibit or enhance utilisation of opportunities and choices in realising benefits.

The SmartCape initiative is a 2002 ICT4D intervention established in the libraries of Cape Town, South Africa, and is used as a case in this research study. The libraries act as public access centres that provide free ICT and Internet access to library members in the community. Surveys completed by users of these centres provided useful quantitative data. A broad spectrum of qualitative data was gleaned from interviews and focus groups with users of the ICT centre at a recently established library and with focus groups from other centres in two underserved areas of Cape Town. Quantitative data analysis techniques applied to qualitative content data was used to investigate users' diverse perceptions.

An initial framework guided the analysis of data to identify the benefits realised by the users of the public access centre. Perceptions of a changed life, aspirations for a better life, and 'hope' emerged as intangible benefits. On the intangible side, the effect of keyboard proficiency, greater ease in finding information, and a preference for

accessing the Internet at a public access centre emerged as having a significant effect on the hopefulness of PAC users. Two theme-groups were identified through using co-occurrences of themes and the statistical techniques of cluster analysis and multidimensional scaling.

The Benefits-framework, produced by this study, based on Amartya Sen's Capability Approach, represents the relationship between all the themes, includes emergent intangible benefits and can be used to identify the benefits of ICT4D interventions in public access centres. This study also produces empirical evidence of the developmental impact of the SmartCape ICT4D programme in Cape Town and thus provides evidence of its value.

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## GLOSSARY

AEF	Alternative Evaluation Framework
CA	Capability Approach
CAF	Capability Approach Framework
CESVS	Capability Empowerment Sustainability Virtuous Spiral
CF	Choice Framework
CIGI-Ipsos	
CI:	Community Informatics
CR	Critical Realism
DTPS:	South African Department of Telecommunications and Postal Services
G8:	The group of eight major industrialised nations: France, Germany, Italy, Japan, Britain, USA, Canada, and Russia
ICT:	Information and Communication Technology
ICT4D or ICTD:	Information and Communication Technology for Development
ICT4E:	Information and Communication for Education
IIC	ICT Impact Chain
IS:	Information Systems
ISAD:	South African Information Society and Development
IT:	Information Technology
ITU:	International Telecommunication Union
MDG:	Millennium Development Goals
MIT:	Massachusetts Institute of Technology
NGO:	Non-governmental organisation
PAC	Public Access Centre
PC	Personal Computer
PGWC	Provincial Government of the Western Cape
PIAC	Presidential International Advisory Council

<b>PNC:</b>	Presidential National Commission
<b>SLF:</b>	Sustainable Livelihoods Framework
<b>StatsSA:</b>	Statistics South Africa
<b>TAM</b>	Technology Acceptance Model
<b>UN</b>	United Nations
<b>Underserved areas:</b>	USAASA deems any area with less than 5 per cent electronic communications network penetration as underserved. (ITU, 2013b:50)“
<b>UNESCO:</b>	United Nations Educational, Scientific and Cultural Organization
<b>Universal access:</b>	Is the universal access to electronic communications network services, electronic communications services and broadcasting services as determined from time to time in terms of Chapter 14 of the ECT Act of 2005 (South Africa. Department of Communications, 2005:10)
<b>Universal service:</b>	Is the universal provision of electronic communications services and broadcasting services as determined from time to time in terms of Chapter 14 of the ECT Act of 2005 (South Africa. Department of Communications, 2005:10)
<b>USAASA:</b>	Universal Service and Access Agency of South Africa
<b>Wi-Fi:</b>	Local area wireless computer networking technology.
<b>WSIS:</b>	World Summit on Information Society



# Chapter 1

## Research overview

### 1.1 Introduction

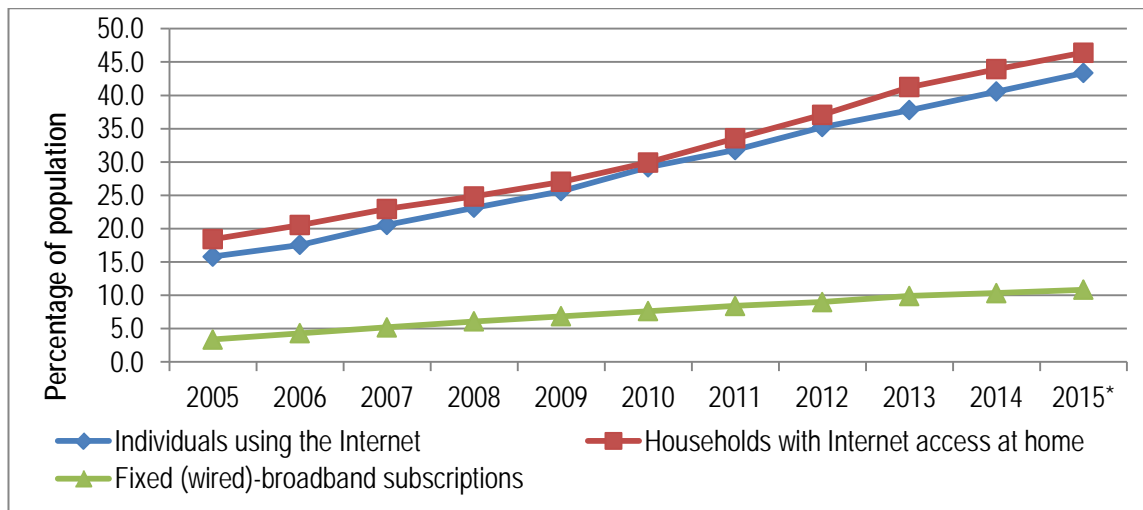
Information and communication technology (ICT) has been punted as a necessary factor in the quest for development. In the words of Sam Pitroda:

*“[As] a great social leveller, information technology ranks second only to death. It can raze cultural barriers, overwhelm economic inequalities, even compensate for intellectual disparities. In short, high technology can put unequal human beings on an equal footing, and that makes it the most potent democratizing tool ever devised.” (Pitroda, 1993:2)*

In the past twenty years, massive strides have been made to harness the benefits of the Internet for commerce and industry. However, at a societal level, the digital divide remains a harsh reality facing the modern world. Large sectors of society are either still unaware of the benefits of modern information and communication technology or do not have access to ICTs, especially broadband Internet. The Millennium Development Goals (MDG) process (UNESCO, 2002) showed that ICTs is essential to sustainable development, enabling and enhancing their users’ capabilities (ITU, 2014a:402).

The ‘*Final WSIS Targets Review*’ of 2014 reported that ICT access and use is still not equally distributed, even though growth in ICT networks, services and applications, and content has moved the global information society forward since the 2003/2005 WSIS, (ITU, 2014a: 388). By 2014 only 40.6% of the world’s population were Internet users (see Figure 1.1), only 43.9% of households had Internet, and only 10.3% of the world’s population were broadband Internet subscribers (ITU, 2015b:2).

The international Internet penetration levels are also reflected in South Africa where the uptake of the Internet is still at unacceptably low levels. Statistics South Africa (StatsSA) reported in their Community Survey that only 35.2% of South African households had access to the Internet in 2011, and this increased to 49.7% in 2014 (Table 1.1) (South Africa. Statistics South Africa, 2015:53). Thus, 51.3% of South African households do not have any access to the Internet, while only 10.9% have access to the Internet at home (Statistics South Africa, 2014:51-53) (Figure 1.3).



**Figure 1.1: Percentage of world population having access to Internet, 2005-2015**

(Source: ITU, 2015a, 2015b:2) Note: \*Estimate

Given this scenario, the governments of the developing world, including South Africa, have a strong commitment and resolve to accelerate the rollout of ICT and to catalyse the uptake and usage thereof. Nationally and internationally researchers and policy makers have long reached consensus regarding the role of ICT in developing disenfranchised communities (Castells, 1999:2-3; Balamoune-Lutz, 2003:152; Erwin & Taylor, 2004). As a result there have been a number of interventions to accelerate access to ICTs, with broadband Internet in particular through public access programmes.

In South Africa a number of such programmes have been incepted by the national and provincial governments and the private sector in an effort to meet this country's commitments to targets agreed to at the World Summit on Information Society ((WSIS, 2003)). Examples of these include community telecentres; multi-purpose community centres or Thusong centres<sup>1</sup> (South Africa. Department of Communications, 2013c), school cyberlabs (e.g. Khanya Education Technology Project<sup>2</sup>), Dinaledi Schools (South Africa. Department of Basic Education, 2014), Cape Access (Western Cape Government, n.d.), Smart Cape Access project (Smart Cape, 2010), and a number of similar projects at national, provincial and local government level.

In parallel with the rollout of such developmental projects best practice in programme implementation and management require that these projects are evaluated to determine whether the goals of developing and benefitting communities socio-

1 The Thusong Service Centre (formerly Multi-Purpose Community Centre /MPCC) programme of government, was initiated in 1999 with the aim of implementing development communication and information to rural communities.

2The Khanya project was launched in 2002 and was active until 2012

economically have been achieved. Heeks (2005b), in describing cases of ICT project failure, suggests that such projects fail more often than not. In South Africa, Van Rensburg, Veldsman and Jenkins (2008:179) point out that “*the relatively simplistic views of the ‘enabling powers’ of ICT in the development arena have failed to deliver on the promised development goals, whether Millennium Development Goals (MDG) or otherwise*”. In particular, Goal 8 of the MDG set by the United Nations Educational, Scientific and Cultural Organization (UNESCO) listed the target of “*making benefits of new technologies, especially ICTs, available to all*” (Andries, 2009:1). This need for monitoring and evaluating of projects is echoed in the Policy Framework for the Government-Wide Monitoring and Evaluation System of 2007 (South Africa. The Presidency, 2007), and continues to be important in lieu of the post-2015 UN development agenda (United Nations, 2015).

Thus, the question of how to conduct appropriate evaluation to identify the benefits is important and topical in the Information and Communication Technologies for Development (ICT4D) landscape.

However, there is scant evidence in literature of research regarding evaluation to identify benefits, both locally and internationally. Although frameworks for evaluation exist, there are no prescribed methods or established guidelines within the areas of ICT4D or Community Informatics, as to which framework to utilise to undertake evaluation exercises (O’Neil, 2002:77). Rothenberg-Aalami and Pal (2005:3) cite the Director of the Massachusetts Institute of Technology (MIT) India, who stated that almost nothing is known of factors for the effectiveness or ineffectiveness of ICT projects in developing nations (Keniston, 2002). This is supported by Colle (2005:6) who confirms that there is only scant and anecdotal evidence that community-based ICT projects are benefitting communities. In addition, other studies, such as Grunfeld (2007:7, 2011:46) reported that gaps in the knowledge of benefits or impacts of ICT initiatives exist.

## **1.2 ICT evaluation**

Frameworks for ICT4D project evaluations are rooted in theories from multiple disciplines, including economics and information technology (IT) (Grunfeld, 2007:3). Evaluation methods from other domains include Amartya Sen’s (Sen, 2001) Capability Approach (Gigler, 2004; Alampay, 2006b; Grunfeld, 2007:4), Hickey and Mohan’s (Hickey & Mohan, 2004) Participatory Monitoring and Evaluation Approach (cited in Grunfeld (2007:3)), and the Sustainable Livelihoods Theory Approach (Parkinson & Ramírez, 2006; Parkinson & Lauzon, 2008). The business and education sectors are

the main domains from which frameworks are taken (Baron & Bruillard, 2003; Milis & Mercken, 2004).

### **1.2.1 ICT Evaluation: Business and Education**

Historically the evaluation of information technology (IT) benefits has mainly taken place in the business and education sectors. For the past four decades, the research literature on the evaluation of ICT focused on evaluating ICT in business and the organisational sectors (DeLone & McLean, 1992; Seddon, Staples, Patnayakuni *et al.*, 1999). The problem of evaluating the benefits of ICT has been at the fore of business research (Boyd & Carson, 1963; Lucas, 1973; Gallagher, 1974). For example, in the business sector IT evaluation consisted of two areas, namely:

- evaluation of IT effectiveness or success, involving concepts such as information quality or user satisfaction, e.g. (Seddon *et al.*, 1999; DeLone & McLean, 2002) and
- evaluation of IT benefits involving financial or non-financial benefits, e.g. (Milis & Mercken, 2004)

The implementation and management of ICT presented both challenges and opportunities to businesses (Joshi & Pant, 2002). Among the challenges are the increased complexity of ICT and the uncertainty and unpredictability associated with benefits and costs. These challenges pointed researchers to the development of methods to evaluate the impact of their ICT investment (Irani, Love & Zairi, 2000). Therefore, over the past thirty years researchers have been greatly interested in the question of ICT effectiveness and its evaluation, starting with Boyd and Carson (1963), Gallagher (1974) and Lucas (1973).

Researchers have employed a number of methods in their search to determine the effectiveness of ICT. These methods range from simple accounting measures to multi-dimensional balanced score-card type metrics. For example, DeLone and McLean (1992) described the Information Success Model that was developed into an IS Effectiveness Matrix by Seddon *et al.* (1999). The well-known Technology Acceptance Model (TAM) has also been modified in a number of ways by researchers in the evaluation of ICT4D initiatives (Grunfeld, 2007:7). The question of whether or not these evaluation methods are suitable in an ICT4D context, according to the pertinent literature is pursued in Chapter 2 of this thesis.

In the education sector Wagner, Day, James *et al.* (2005) compiled a handbook for monitoring and evaluating the Information and Communication for Education (ICT4E) projects in developing countries based on impact evaluation. Ng'ambi and Brown



(2004) describe a utilisation-focused evaluation of ICT in education. A formative assessment of ICT in Lebanese schools was done by way of counting hardware items and measuring ICT indicators (Nasser, 2008), however, identification of impacts or benefits was not included in the assessment.

Saeed, Bharali and Bhowal (2010) used a quantitative evaluation approach incorporating structured questionnaires, a multi-stage stratified random sampling technique and statistical analyses to evaluate e-governance service delivery. Tolani-Brown, McCormac and Zimmermann (2009:5) confirmed that there are no standardised evaluation frameworks for using ICT in educational interventions.

The situation in the ICT4D domain differs from that in business, government and education in that ICT4D initiatives are typically deployed in communities that do not have access to ICT and the Internet. The objectives of these initiatives are often very broad and often do not have a standard set of outcomes.

### **1.2.2 ICT4D Evaluation**

World leaders focused on ICT and the spread of information and knowledge through the use of it, as a tool to be employed in addressing the issue of poverty alleviation. Information and communication technology was formalised as a tool for enabling social and economic development was formalised at the G8<sup>3</sup> meeting of 2002, (Rothenberg-Aalami & Pal, 2005). Thus a central theme of the World Summit on the Information Society (WSIS) held in Geneva in 2003 and Tunis in 2005 was the conviction that ICT can support socio-economic development. The Millennium Declaration has acknowledged that ICTs are important in achieving the overall Millennium Development Goals (MDGs) by, for example, improving the delivery of education and healthcare, or making government services more accessible (ITU, 2006). In the post-2015 agenda discussions the growing importance of ICTs in attaining goals<sup>4</sup> 5b, 9c and 17.8 are evident (ITU, 2013a).

The ICT4D Platform was the outcome of the 2003 meeting in Geneva (Rothenberg-Aalami & Pal, 2005:4). Since then an increasing number of multi-disciplinary research agencies are supporting research in the field of ICT4D. However, this growing body of knowledge has been criticised by authors and researchers who argue that the

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<sup>3</sup> The group of eight (G8) major industrialised nations: France, Germany, Italy, Japan, Britain, USA, Canada, Russia

<sup>4</sup> Goal 5b: enhance the use of enabling technologies, in particular ICT, to promote women's empowerment  
Goal 9c: significantly increase access to ICT and strive to provide universal and affordable access to internet in least developed countries by 2020,

Goal 17.8: enhance the use of enabling technologies in particular ICT

application of ICT to address fundamental societal issues in different cultures, different socio-economic conditions and for a range of desired outcomes is often not successful (Pigg & Crank, 2004:22; Cordell & Romanow, 2005:20; Williams, Sligo & Wallace, 2005:21). The sustainability of ICT initiatives in communities has also proved to be problematic, because many of these projects ceased when the investing organisations or governments withdrew funds (Ashraf, Swatman & Hanisch, 2007). The projects' costliness to government agencies and NGOs, underscores the need for assessing their effectiveness, but sufficient insight into methods of evaluating the effectiveness of these ICT projects on socio-economic development is lacking (Ashraf, Swatman & Hanisch, 2008:3).

Parthasarathy and Srinivasan (2006) pointed to the many unclear conceptual issues in the emergent field of ICT4D. In their opinion, an important question is how to evaluate and assess the impact of ICT on developmental outcomes. For example, Heeks (2007), indicated that ICT4D outputs: i) reflect a bias to action and not to knowledge, ii) are descriptive, and iii) are not analytical enough. Lee, Jang, Ko and Heeks (2008:2) also found mixed views and evidence regarding ICT4D outputs. They reported a lack of hard evidence regarding the economic and social impact on development of ICT4D initiatives and voiced concern that the impacts are not universally beneficial (Lee *et al.*, 2008:2). Thus, a number of authors confirmed the finding by Rothenberg-Aalami and Pal (2005:7) that there are no commonly agreed upon techniques to assess the impact of rural telecentres (Colle, 2005; Parthasarathy & Srinivasan, 2006; Grunfeld, 2007; Heeks, 2007; Ashraf *et al.*, 2008; Lee *et al.*, 2008; Hedberg, 2010; Pather & Uys, 2010; Sey & Fellows, 2011).

The need for an appropriate assessment to identify the benefits derived from ICT4D initiatives is therefore supported by many researchers in the ICT4D domain. The problem in the ICT4D domain of how to identify the benefits of ICT4D public access initiatives is now being faced by governments and non-governmental organisations (NGOs), which is similar to the situation that the business sector has faced over the last 40 to 50 years. However, in the ICT4D context, it is not a simple task to conceptualise and measure the true value of social development. Early in the 21<sup>st</sup> century O'Neil (2002:77) argued that in Community Informatics (CI) the focus of project evaluations is often on non-measurable social factors. Merkel, Clitherow, Farooq *et al.* (2005:164) agreed, stating that evaluating the impacts of technology projects can sometimes be difficult, since the outcomes can be indirect. Similarly Parthasarathy and Srinivasan (2006:3) warned against applying "*easy to measure data for well-defined indicators*" to measure social development and social factors. Other authors also reported finding little evidence of measurable impacts of these projects (Gomez, 2008;

Hedberg, 2010; Sey & Fellows, 2011:189; Gomez & Pather, 2012; Gomez, Reed & Chae, 2013:37).

Evaluation methods that are in use vary from longitudinal studies investigating the effects of the Internet on social capital (Gaved & Anderson, 2006) to quantifying performance (the impact of ICT projects) by way of a system measuring inputs, outputs and outcomes. Ashraf *et al.* (2008) developed and extended a framework to investigate the impact of ICT on the development of three villages in Bangladesh. Their research question was: “*How does an ICT project impact participants’ quality of life at the community level?*”. An overview of ICT4D impact assessment frameworks was presented by Heeks and Molla (2009b) to classify ICT4D evaluation frameworks<sup>5</sup>.

The research effort to assess the impacts of ICT4D initiatives led to the investigation of strategies to assess development. Thus, various authors in ICT4D evaluation studies utilised Sen (2001)’s Capability Approach (CA) and found that the CA was specifically suited to the developmental impacts of ICT4D initiatives on communities (Alampay, 2006b; Franklin, 2007; Fassil, 2009; Heeks & Molla, 2009b; Zheng & Stahl, 2010; Gigler, 2011; Grunfeld, Hak & Pin, 2011; Hatakka & De, 2011; Oosterlaken, 2011; Santhirasegaram, 2013; Ibrahim-Dasuki, Abbott & Azerikatoa, 2014; Kivunike, 2014; van Stam, 2014). Even though there are many initiatives examining different aspects of ICT related to development, there are still gaps in the knowledge relating to the benefits of ICT initiatives. Grunfeld (2011:46) concludes that literature regarding ICT4D initiatives attests that either no theoretical framework for the evaluation of the benefits of ICT initiatives in communities is used or the theoretical framework is very loosely utilised.

Many researchers, practitioners and funding organisations have recognised this requirement for further multidimensional research. Moreover, although there are several studies that have provided a theoretical basis for evaluation, these tend to focus on the success of the project in terms of the running and sustainability of the project and do not identify the benefits. There are therefore various research opportunities and questions to be asked in the ICT4D domain, of which the evaluation of ICT benefits is one of the most pressing.

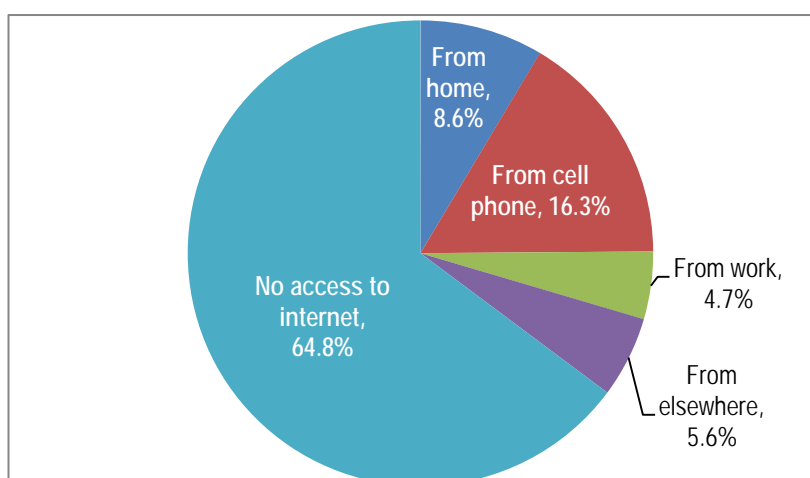
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<sup>5</sup> Discussed in more detail in Chapter Three (Figure 3.5)

### 1.2.3 The South African Context

Digital exclusion is seen as a major issue in the developed world and its impacts in countries such as South Africa are recognised as profoundly important in addressing social, economic and cultural equity. Among the digital exclusion issues on the South African agenda are concerns regarding the current levels of access to ICTs and the Internet, the lack of e-skills required to participate in the Information Society, as well as the levels of uptake and effective usage of ICTs by the broader citizenry.

Statistics South Africa (2012b:64) reported in the Census 2011 that 64.8% of households in South Africa had no access to the Internet (Figure 1.2).



**Figure 1.2: Census 2011 results: Percentage of types of access to Internet by households in SA**

(Source: Statistics South Africa, 2012b:64)

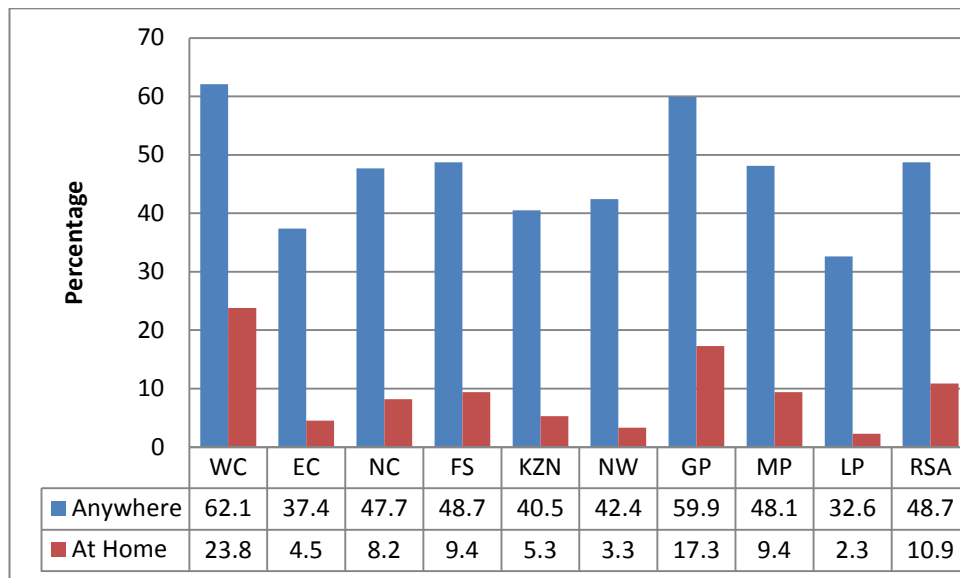
The distribution of the types of access to Internet by households in the various provinces of South Africa in 2014 is represented in Table 1.1 (South Africa. Statistics South Africa, 2015:53).

**Table 1.1 Percentage of households by types of access to Internet by province in 2014**

Internet Access	Province									RSA
	WC	EC	NC	FS	KZN	NW	GP	MP	LP	
At home	23.8%	4.5%	8.2%	9.3%	5.3%	3.3%	17.2%	9.4%	2.3%	10.9%
At work	23.0%	9.2%	10.0%	10.2%	12.8%	7.6%	25.7%	8.2%	5.2%	15.6%
Using mobile devices	49.8%	34.0%	44.6%	44.9%	34.3%	39.4%	47.5%	44.4%	29.6%	41.3%
Educational facilities or Internet Cafes	14.1%	4.8%	2.3%	10.0%	7.2%	5.6%	16.6%	6.2%	1.7%	9.7%
No Access to Internet	37.9%	62.6%	52.3%	51.3%	59.5%	57.6%	40.1%	51.9%	67.4%	51.3%

(Source: South Africa. Statistics South Africa, 2015:53)

In the Western Cape<sup>6</sup>, 43.7% of households had access to the Internet in 2011, increasing to 62.1% in 2014 (South Africa. Statistics South Africa, 2015:53). The situation in all the provinces are shown in Table 1.1 and visualised in Figure 1.3. The statistics for the various types of access to the Internet for the provinces of South Africa are shown in Figure 1.4.



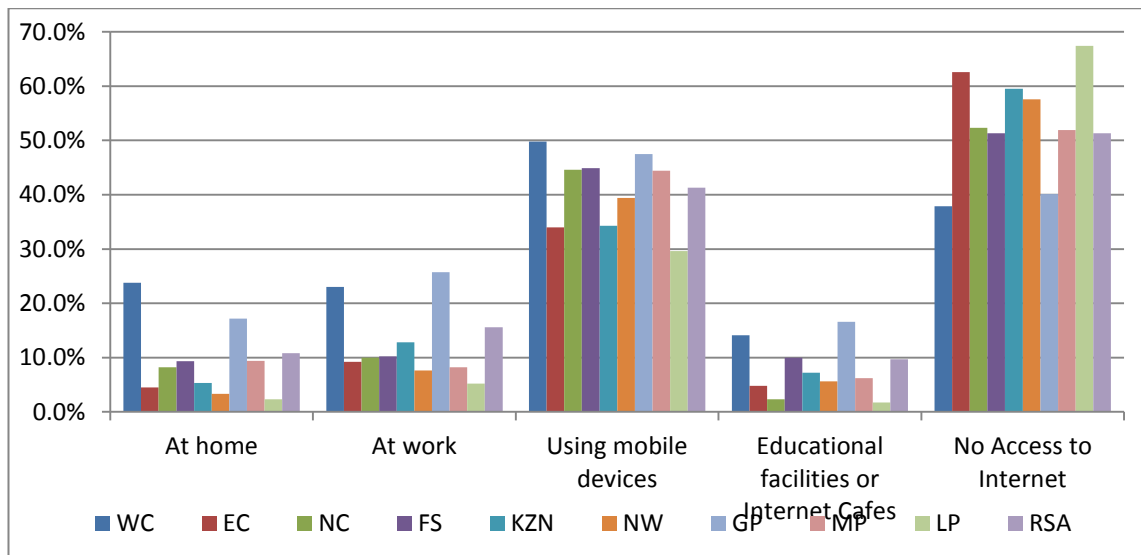
**Figure 1.3: Percentage Households who have access to Internet, General Household survey 2014**

(Source: South Africa. Statistics South Africa, 2015:53)

The South African Government has prioritised economic development policies (South Africa. Department of Communications, 2002) since the country still has an inequitable society characterised by a range of developmental levels (Langa, Conradie & Roberts, 2006). Thus the South African Government viewed opportunities presented by the use of ICT as the means by which economic growth can be sustained. In response to its commitments to the WSIS agenda and the MDGs the government established policies to address the digital divide in South Africa.

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<sup>6</sup> The Western cape is one of the nine provinces in South Africa. The case study in this research is located in this province.



**Figure 1.4: Percentage of households with types of access to Internet by province in 2014**

(Source: South Africa. Statistics South Africa, 2015:53)

Progress made in addressing the digital divide in South Africa includes:

- the Information Society and Development (ISAD) plan approved by the cabinet in 2007 following the adoption of the WSIS agenda
- the creation of the legislative framework in response to technology convergence in order to facilitate uptake and usage of ICT (e.g. the Electronic Communications and Transaction Act of 2002, the Electronic Communications and Transaction Act (ECT) of 2005, and the Electronic Communications and Transaction Amendment Bill of 2012)
- the creation of structures such as the Presidential International Advisory Council (PIAC) and the Universal Service and Access Agency (USAASA)<sup>7</sup>, the latter being a statutory body created through the promulgation of the Electronic Communications and Transaction Act of 2005 and a Presidential National Commission on Information Society and Development (PNC on ISAD) with a mandate to implement the ISAD<sup>8</sup> plan
- the Broadband Policy of South Africa of 2010 which has the vision of ensuring universal access to broadband by 2019, individually or as a household (South Africa. Department of Communications, 2010) and the resultant SA Broadband National Broadband Advisory Council (NBAC), which advises the Minister on

<sup>7</sup> The Universal Service Agency was established as directed by the Telecommunications Acts of 1996, with the role of facilitating the extension of access to ICTs to all South Africans. The Universal Service Agency has been renamed Universal Service and Access Agency of South Africa (USAASA) under the Electronic Communications Act No. 36 of 2005.

<sup>8</sup> Information Society and Development Plan

the implementation of 'South Africa Connect', the Broadband policy and strategy

- the updated Broadband Policy, called South Africa Connect (South Africa. Department of Communications, 2013a), which has the vision of giving universal access to broadband at a cost of 2.5% or less of the average monthly income
- the establishment of the high-level Strategic Infrastructure Project 15 (South Africa. Presidential Infrastructure Coordinating Commission, 2010) to oversee infrastructure development to expand access to ICT by providing broadband coverage to all households by 2020 and
- urgent attention to policy overhaul. A two-year policy review process has recently culminated in recommendations to the Minister of Telecommunications and Postal Services, and which will pre-empt the development of an integrated White Paper on ICTs (South Africa. Department of Telecommunications and Postal Services, 2015a)

Through various strategies, the government realised that a common instrument of achieving global goals is the public access centre (PAC). Although pursued since the late 1990s with varying degrees of success South Africa's programmes to ensure the provision of PACs have been the mandate of the Universal Service and Access Agency of South Africa and are based upon government's vision of creating a South African information society, as framed in the cabinet-endorsed ISAD plan (South Africa. Department of Communications, 2006)<sup>9</sup>.

To execute their role, USAASA facilitated increased access to ICT to all South Africans by setting up telecentres that provide ICT services especially in rural and semi-urban areas (Oyedemi, 2009:159). By 2009 USAASA maintained about 140 telecentres in South Africa (*ibid.*). Non-Government Organisations and Community-Based Organisations (CBOs), civil society and the government also own telecentres, and some telecentres are run by Small, Medium and Micro Enterprises (SMMEs) (Oyedemi, 2009:159). The South African Department of Telecommunications and Postal Services (DTPS) and the South African Post Office (SAPO) have launched a project establishing public information terminals (PITs) and Thusong centres to provide electronic communication to South Africans (Oyedemi, 2009:159). At lower levels of

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<sup>9</sup> Note as a result of Government restructuring in 2014, the ISAD plan is currently overseen by the newly named Department of Telecommunications and Postal Services (DTPS).

government there are also examples of PAC programmes, such as the City of Cape Town's Smart Cape programme (City of Cape Town, 2010), the City of Johannesburg's Public Access to Internet in Libraries (PAIL) programme (GautengOnline, 2012), and the Western Cape Government's Cape Access programme (Western Cape Government, n.d.).

In 2011 the South African government and industry formed a partnership and created 'a job competitiveness compact' to target a 100% broadband penetration and create a million jobs in the ICT sector by 2020. Furthermore the government adopted the Integrated National Broadband plan in December 2013 (SA Connect) targeting the building of an information society, lowering the prices of broadband access, increasing uptake and usage, and liberalising the South African ICT sector to promote competition. In addition they established the Ikamva National e-Skills Institute to attend to the dearth of e-skills and is escalating the broadband infrastructure rollout as a key Presidential infrastructure project (South Africa. Department of Communications, 2013b).

The provincial government of the Western Cape (WC) announced a broadband initiative in 2013:

*"The vision is that of a Western Cape where every resident in every town and village has access to affordable high speed broadband infrastructure and services, has the necessary skills to effectively utilise this infrastructure and is actively utilising this in their day-to-day lives"*  
(Western Cape Government, 2015b)

The Broadband initiative of the Western Cape Government comprises three inter-related legs (Western Cape Government, 2013b:1):

- Connected Government
- Connected Businesses
- Connected Citizens

The 'Connected Citizens' leg consists of the sub-programmes 'Connected Communities' and 'Connected Households'. The 2014–2019 strategic plan of the provincial government, announced early 2014, envisages the roll-out of high-speed broadband, covering services, schools and disadvantaged areas (Western Cape Government, 2015b:9). Van Der Berg (2014) reported that Wi-Fi hotspots are being deployed in underserved areas, such as Mitchells Plain and Khayelitsha, and the WC



government is piloting the provision of free or low-cost Internet services to areas such as Delft, Robertson, Atlantis and George.

The '*Broadband 2030*' vision of the WC was endorsed in the 2015 budget speech of the minister of finance of the Western Cape Government:

*"Wi-Fi hotspots at 384 Western Cape Government sites will be installed that has fibre connectivity. In 2015/16, the first 50 hotspots will go live and people within range will be able to surf the Internet for free up to a limit of 250 MB per month." (Western Cape Government, 2015a)*

Recently the national government released a set of ICT policy recommendations as a pre-cursor to the development of a National Integrated ICT White Paper that further entrenches the role of PACs. This includes recommendations that

*"Within a period of five years at least one technology hub should be developed in each of the country's major cities, where these do not currently exist, focusing on inner cities and townships" [and] "these hubs should be able to operate as a hub and spoke model with community ICT access centres" [which should support] "grassroots and community-based innovation" (South Africa. Department of Telecommunications and Postal Services, 2015b:134-135)*

This is indicative of the PAC strategy that is set to continue into the future, especially as this country struggles to reach acceptable levels of penetration of broadband internet.

Although the understanding of how ICT benefits communities and contribute to socio economic development is crucial for the advancement of the ICT4D agenda in South Africa, Benjamin (2002) concluded that although there were approximately 500 community ICT projects in South Africa by 2002, it has not been established how ICT can be used to support development. In addition Theledi (2008) reported to the Parliament of South Africa that there was "*no mechanism for monitoring and evaluating real impacts of ICT*". However, as the preceding discussion reveals, this problem is not a specificity of South Africa. A World Bank study by Batchelor, Evangelista, Hearn *et al.* (2003) confirmed this problem in the developing world at large. An assessment of the situation at the point of inception of this study in 2009 indicated that the status quo prevailed and there were still no means for evaluation

## 1.2.4 Evaluation Frameworks

Early in the new millennium O'Neil (2001:7) reported that the evaluation of ICT4D initiatives has been limited and ad hoc. Compounding the problem is the fact that there are a variety of experimental frameworks, methodologies, methods and foci in the body of project-evaluation work in ICT4D. Examples of these are

- Balanced Scorecard (Bannister & Remenyi, 2003)
- Social network analysis in civil society networks (Garrido, 2004)
- Ethnographic studies (Parthasarathy & Srinivasan, 2006:6)
- Sen's Capability Approach (Gigler, 2004; Grunfeld, 2007)

Garrido (2004) also presented results of efforts to develop systematic evaluation frameworks for ICT4D in several domains, including ICT and civil society and telecentres. Some of these evaluations used theoretical frameworks and methods that are also used in the evaluation of information-system (IS) projects in the business sector. This is supported by Ashraf *et al.* (2007) who argued for existing IS or ICT theoretical paradigms to be extended to create frameworks to evaluate ICT impacts on socio-economic development.

Heeks and Molla (2009b) provided a comprehensive list of assessment approaches to ICT4D evaluation. The Sustainable Livelihoods Framework (SLF) in the list of frameworks by Heeks and Molla (2009b:41), models various capitals to livelihood outcomes (Parkinson & Ramírez, 2006; Parkinson & Lauzon, 2008). Several researchers incorporated all or some elements of the SLF in their investigations into the impact of public access centres ((Gigler, 2004; Duncombe, 2006; Parkinson & Lauzon, 2008; Kleine, 2009; Rao, 2010; Gigler, 2011; Grunfeld, 2011; Kleine, 2011; Sey & Fellows, 2011; Garrido, Sey, Hart *et al.*, 2012; Heffernan, Lin & Thomson, 2012; Marais, 2012).

Kleine (2009) developed the Choice Framework, which was based on the SLF, the framework for measuring empowerment developed by Alsop and Heinsohn (2005:5-6), and Sen's CA that advocate development of personal freedom be viewed as development rather than economic growth. The Capability, Empowerment, Sustainability Virtuous Spiral (CESVS) is a framework designed to investigate and understand the processes associated with the realisation of benefits of ICT (Grunfeld *et al.*, 2011). The ICT Impact Chain (Gigler, 2011) evaluates the impact of ICT in terms of the CA, Hatakka and De (2011) and Kivunike (2014) base their frameworks on the concept of expanding human capabilities and functionings as key to development.

None of these frameworks, however, was developed to evaluate the *benefits* of public access centres effectively. Thus, the objective of this research is ultimately to develop such a framework.

### **1.3 Research Problem and Questions**

In light of the foregoing, the starting premise of this study was informed by the problem that governments, NGOs and other agencies in the ICT4D arena, do not have as yet the means to establish if ICT4D investments are yielding benefits in communities. In tandem with this, the framing of the research problem was also cognisant that there are insufficient theoretical bases to inform practical ways to determine whether communities (individually and collectively) have developed socio-economically through the means of ICT4D initiatives or not.

The objectives of this study are:

1. to understand ICT4D public access initiatives and how their evaluation approaches, mechanisms and methods are different from ICT projects deployed in organisations.
2. to determine which theories and/or frameworks are currently used in the evaluation of ICT4D initiatives to identify benefits
3. to identify the nature of the benefits of ICT4D initiatives; and whether they are tangible or intangible, and
4. to develop a framework for benefits from ICT4D initiatives

In pursuance of the latter objectives, the principal research question of this study was:

*What are the benefits of public access ICT4D programmes deployed in local communities?*

Sub-questions include

1. What is different about evaluation in the ICT4D context compared with the more formal contexts of ICT programme evaluation in organisations?
2. What theories and frameworks have been used in the evaluation of ICT4D public access initiatives to identify benefits?
3. What is the nature of the benefits of ICT4D public access initiatives in local communities?
4. How do these benefits of ICT4D initiatives converge into a framework?

## 1.4 Research Design

A paradigm constitutes the set of beliefs and practices that guide research. In the 20<sup>th</sup> century Information Systems (IS) research was dominated by the paradigm of positivism in which the belief is that a reality independent of the human mind exists and an inquiry process excludes biasing factors (Wyssusek, Schwartz & Kremberg, 2002). When research includes “*formal propositions, quantifiable measurements of variables, hypothesis testing, and the drawing of inferences about a phenomenon from a representative sample to a population*” (Klein & Myers, 1999) it is classified as positivist research; thus associating it with quantitative research. However, positivism is criticised as being “*ignorant towards the subjectivity of human efforts*” (Wyssusek *et al.*, 2002)

Interpretive studies, which are associated with qualitative research, attempt to understand phenomena through the meanings that people assign to them (Walsham & Sahay, 2006). Over the past thirty years research in IS has broadened to embrace the interpretive paradigm.

The critical realism (CR) paradigm has been described as midway between positivism and Interpretivism (Zachariadis, Scott & Barrett, 2010) in that the researcher looks for patterns, generalisations and causalities, which is similar to positivism (Alvesson & Sköldbberg, 2009:40), but is also cognisant of the unobservable mechanisms which is similar to interpretivism. Pather and Remenyi succinctly describes the relationship between CR, positivism and interpretivism as

*“For its intellection underpinning critical realism draws on concepts and tools from positivism, interpretivism and critical theory that assist the researcher to answer his or her research question” (Pathar & Remenyi, 2005:80)*

Traditionally researchers of the quantitative research paradigm strived to maintain objectivity in the research inquiry of social research (Johnson & Onwuegbuzie, 2004:14), whereas the researchers of the qualitative research paradigm contended that research is ‘value-bound’ and that ‘time- and context-free generalisations’ are not desirable. Research that includes methods from both quantitative and qualitative research paradigms draws from the strengths of both (Johnson & Onwuegbuzie, 2004:15). Johnson and Onwuegbuzie define mixed-methods research as:

*“The class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches,*

*concepts or language into a single study” (Johnson & Onwuegbuzie, 2004:17)*

Research towards a framework for the benefits of ICT in communities is scarce, and O'Neil (2002:88) posits that it could be because such an evaluation would have to include the assessment of social factors that are difficult to quantify and measure. In her review of methodological approaches to evaluating community informatics, the author also suggested that multi-modal tools (i.e. a combination of quantitative and qualitative measures) should be used for evaluating projects and programmes so as to reach valid findings. Gomez and Pather (2012:10) argued that by not asking the right questions the picture of development generated by ICT projects might not be clear.

This research study was performed in the ontological domain of critical realism. It is clear, from the ICT4D evaluation literature, that this research necessitates the exploration of both the measurable and non-measurable elements. Since CR draws tools and concepts from both positivism and interpretivism, research methods from both paradigms were incorporated into this study. Thus within the epistemology of the CR paradigm, both qualitative and quantitative research methodologies were utilised.

#### **1.4.1 Research Methods**

A case study as the research method is known for its ability to ‘merge’ the use of both quantitative and qualitative paradigms. This method is used if an explanation regarding a current social phenomenon is sought or if there is “*a desire to understand complex social phenomena*” (Yin, 2009:4). Yin (2009:63) states that mixed methods design enables researchers to investigate more complex research questions and confirms that data collected for these designs can be stronger and richer data collected by one method alone. In a case study the attention is focused on a single entity (Babbie, 2010:309).

Case studies have been used in many other similar studies. For example:

- Akinsola, Herselman and Jacobs. (2005) investigated ICT provision to disadvantaged urban communities in South Africa and Nigeria.
- Alao (2010) – investigated the impact of ICTs on agricultural development in Alice in the Eastern Cape, South Africa.
- Khalafzai and Nirupama (2011) – investigated the empowerment of women with ICTs in Pakistan.
- Khati (2013) investigated the role of public libraries in bridging the digital divide

- Mishra (2013) investigated the role that telecentres played in the empowerment of citizens in the Kutch district of Gujarat, India.

Therefore a case study as an overarching research design best fitted the inquiry to identify benefits of ICT projects deployed in underserved communities, since

- The focus of the study is the current usage of ICT projects
- Understanding of a social phenomenon is sought
- In a social setting there is no control over events
- ICT projects deployed by organisations are being researched, rather than the individuals

Having adopted a case study approach, the next step was to identify an ICT project deployed in the poorer communities in Cape Town. Initially, a multiple case study involving three cases (sites) in the peri-urban area of Cape Town where public access centres are situated was planned. However, a number of these sites were not operational any longer at the time of selecting the sites to be included as cases. The SmartCape<sup>10</sup> project, installing computers in libraries and making them accessible to communities, was still operational and was thus selected to be a case study in this research.

An access point of the SmartCape initiative, that was established about the same time as the inception of this study, was selected as a site for in-depth investigation for this research. This was the ICT centre within the library in Harare, Khayelitsha, the newest library of the City of Cape Town (see Chapter 6.2.1). Eighteen computers were installed in the ICT centre during June 2011, and by the third month 261 new members were registered on the SmartCape network, and a total of 7 400 45-minute computer sessions were recorded (Hardy, 2011: 53).

According to Seddon *et al.* (1999:19) identifying the benefits of ICT projects is executed differently for different groups of stakeholders. For this reason it is necessary to define the stakeholder as the funding organisations of the ICT4D projects. In this study the funding organisations include national and local government departments or agencies.

Chapter 5 of the thesis provides a more detailed account of the Research Design.

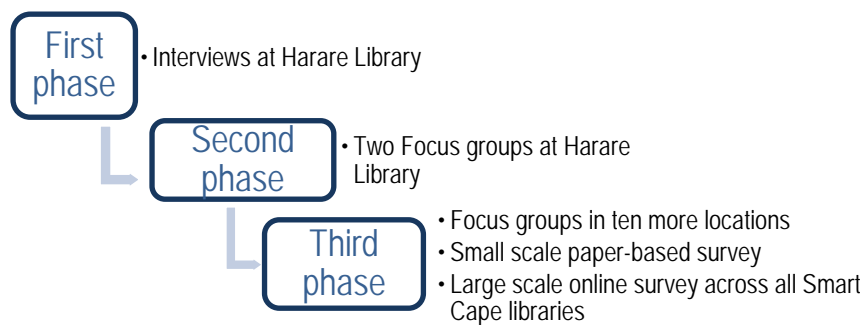
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<sup>10</sup> Also rendered as 'Smart Cape' or 'Sm@rtCape'.

## 1.4.2 Data Collection

Data collection was undertaken in three phases by way of qualitative interviews and focus groups with members of the library in Harare using the ICT centre; qualitative focus group interviews with users of the SmartCape programme in two broader areas of Cape Town; and an online quantitative survey administered to all members of the SmartCape system. Hence both quantitative and qualitative elements of data collection and analysis were incorporated.

During the first phase, evidence was gathered by interviewing community members in Harare that were users of the SmartCape system for a period of five months during the second half of 2012. The objective of the second phase was to obtain a better understanding of the main site (i.e. Harare) and utilised focus groups of users of the ICT centre of the library. During the third phase, in 2013, additional focus groups and a survey were deployed, to obtain an even broader overview of the usage of the SmartCape project. The three phases of data collection are depicted in Figure 1.5.



**Figure 1.5: Data collection phases**

## 1.4.3 Data Analysis

The interviews and focus group sessions were recorded, transcribed as readable text, and analysed using qualitative content analysis. Qualitative content analysis involves a systematic analysis of the text (Bhattacharjee, 2012:115) as raw data, transforming it into a standardised form, (Babbie, 2010:338) by selecting segments, or chunks of text, and assigning a 'code' to it, often according to a certain conceptual framework. Coding can be based on the themes from a conceptual framework, or on new themes, emerging in the text. By grouping the codes together themes were constructed and relationships between these themes were identified using a co-occurrence matrix. This was followed by the statistical techniques called Cluster Analysis and Multiple Dimensional Scaling.

The quantitative data of the survey was analysed by way of descriptive statistics (frequencies, cross-tabulations and charts) and inferential statistics, to identify relationships between groups of variables that were similar to the themes of the qualitative data. Since the data from the survey is categorical the Generalized Linear Model was applied to investigate the nature of the relationships.

The empirical evidence was used to ‘test’ the conceptual model (Chapter 4), after which a framework for benefits was developed using the results of the analysis of all the data. Chapter 6 of the thesis gives a more detailed account of the analysis process.

The nature of the benefits that emerged from the analysis of the data is both tangible (measurable) and intangible (non-measurable):

- *Easier Learning Opportunities*—online applications and online study
- *Economic Freedom*—saving of money in various ways
- *Social Capital*—making more connections with people
- *Enhanced Empowerment*
- *Increased Agency*—self-efficacy and self-esteem
- *Community Involvement*—made easier by the access and use of the ICT centre
- *Increased ICT skills*—for more effective use of ICT
- *Aspiration and Hope*
- *More and new Opportunities*—more useful ‘things to do’, as well as business and employment opportunities
- *More and new Communication*—easier individual and group communication, made possible by using email, and other social networking sites
- *Evidence of Changed Life*
- *More Choice*—specifically in their daily routine and in study choices
- *Increased English Reading and Language Skills*—deemed important in the communities where English is at least the second language

## **1.5 Delineation of the Research**

The focus of this research study is public access centres that offer access to ICTs and the Internet in the Western Cape. Public access centres are also known as telecentres, multipurpose centres, ICT centres or areas with computers in libraries. While this limits the generalisability of conclusions, it should be sufficient to produce a framework for the evaluation of benefits in a public access context. Furthermore the



research is limited to public access centres in disadvantaged peri-urban communities, and centres that are not-for-profit, as opposed to private sector cybercafés.

## **1.6 Contribution of the Research**

### **1.6.1 Academically**

The main contribution of this study to the body of knowledge of ICT4D evaluation is the benefits framework of public access ICT4D projects. A secondary contribution is the evidence to sustain the existence of, and establish more public access centres.

The framework produced by this study is informed by the capability approach, which investigates people's capabilities and freedoms, and can be used to identify benefits of measurable and non-measurable nature. The academic discourse on operationalising the capability approach is advanced by the development of this framework, in the demonstration of the inclusion of conversion factors and a person's agency that inhibits or enhances utilisation of opportunities and choices, in the realisation of benefits.

The study is intellectually underpinned by the critical realism paradigm, which investigates users' perceptions using both quantitative and qualitative lenses; illustrating the use of quantitative data analysis techniques in an ICT4D context and on qualitative content analysis results.

### **1.6.2 Practically**

Donor agencies or project teams can make use of this benefits framework to determine the degree of success of their projects, the nature of benefits produced, whether or not ICT access in underserved communities has been of value to these communities, and to assist in investigating factors that can inhibit or enhance the utilisation of access and ICTs.

Lastly this study has produced empirical evidence of the developmental impact of the SmartCape ICT4D project in Cape Town on underserved communities, and has thus added to the knowledge of the benefits of PAC programme in Cape Town.

## **1.7 Structure of Chapters**

Chapter 2 investigates the status of the research context. The chapter starts with a brief overview of the history of ICT4D and subsequently discusses the evaluation of ICT4D initiatives and the benefits of these initiatives.

Chapter 3 presents a review of evaluation frameworks in the ICT4D context.

Chapter 4 presents a deeper analysis of five evaluation models in literature and concludes with presenting a framework that is cognisant of the elements in the five models for benefits of public access initiatives.

Chapter 5 presents an overview of the scientific basis, and discusses the research methodology and research methods chosen for the empirical study of this research.

Chapter 6 presents the results of the empirical study and concludes with an upgraded framework for the benefits of public access initiatives

Chapter 7 concludes the research study and presents limitations and further possible research avenues.

## **Chapter 2**

### **ICT Evaluation**

#### **2.1 Introduction**

Chapter two is the literature review of ICT evaluations and frameworks. The objective of the literature review is firstly to explore the difference between evaluations in the ICT4D context and ICT project evaluations in organisations and secondly to investigate theories and frameworks that have been used to identify the benefits in the evaluation of ICT4D projects.

Though the field of Information and Communication Technologies for Development (ICT4D) is interdisciplinary (anthropology, sociology, development studies, computer science, information systems and geography) (Walsham, 2013:50) the most influential, probably, is Information Systems (Heeks, 2008:30) typically found in business, government, and education.

A brief overview of the history of ICT4D is presented in the first section of this chapter. Thereafter the chapter will discuss the evaluation of ICT4D initiatives and benefits of these initiatives.

Thus the following issues will be investigated in this chapter:

- Information systems (IS) and IS projects in government, business and education
- The evolution of IS to ICT to ICT4D and subsequent evaluations
- ICT4D initiatives in communities
- ICT4D evaluation
- The situation in South Africa
- Benefits evaluation

##### **2.1.1 Information Systems**

From the 18<sup>th</sup> century to the middle-19th century the world's economies revolved around industrial activities and production. After the advent of the computer, specifically the networked computer, economies were built on information, information availability and information dissemination (Aguirre, 2001:225). At first the corporate world was the main player in the utilisation of the networked computer to boost and streamline the processes in their businesses but by the 1990s people were able to own their own personal computers (PCs).

During the 20<sup>th</sup> century, the name given to the use of computers to run or manage processes in the corporate world was ‘*Information Systems (IS)*’. Smith Jr (1972:10-12) defines IS to be a set of “*interrelated rules and procedures for processing data into information in order to get or control action*”. He explains that the attributes of an information system include the software, the human component, the ability to change, the capacity to be designed for a specific purpose, and the potential to be an integral part of the organisation (*ibid.*). Information systems thus process data into pieces of usable information.

In the 1990s computers within businesses and between businesses were networked and information was disseminated via these networks. This changed the normal way business was conducted. This change was called a revolution, “*a sudden, radical, or complete change...a basic reorientation*” by Alberts and Papp (1997:5). A useful way to view IS is represented in the model by Harris (2001:75) in Table 2.1, which maps the development of IS against that of ICTs.

**Table 2.1: Information Systems as an Evolving Discipline**

Dominant Technology	Information Systems Locus	Work Group Focus	Dominant Referent Discipline	Scope
1960-1970 MAINFRAME COMPUTERS	Electronic Data Processing	Clerical Staff	Computer Science	THE ORGANISATION
1970-1980 MINI COMPUTERS	Management Information Systems	Managers	Management	
1980-1990 PERSONAL COMPUTERS	End-User Computing	Knowledge Workers	Organisational Behaviour	
1990-2000 NETWORKS	Strategic Information Systems	Shareholders	Economics Marketing	
2000-THE INTERNET	Community Informatics	Citizens	Social Science	SOCIETY

(Source:Harris, 2001:75)

Thus at the beginning of the millennium, as Harris pointed out that as IT evolved into ICT:

*“...the scope of its use has stretched far beyond the original purposes of organisational data processing into a society-wide phenomenon whose full impact is still unfolding.”* (Harris, 2001:75)

## 2.2 Evolution of ICT to ICT4D: Access to technology

### 2.2.1 The Information Age

Businesses using networked computer systems (Bresnahan & Malerba, 1999:84), together with the PC-industry (Venkatesh & Brown, 2001:75) and the start and growth of the Internet

(Chen & Wellman, 2005:468) ushered in a new economic era, called the '*Information Age*', a trending buzz-word during the first decade of the 21<sup>st</sup> century. This term came into use during the 1980s (Garson, 1999:72) and describes the last few decades of the 20<sup>th</sup> century and the early years of the 21<sup>st</sup> century (Alberts & Papp, 1997:2). According to Fukuyama (1999), the Information Age is associated with the start of the Internet. The central characteristic of the Information Age is the switching from natural and physical resources to knowledge and information as the economy of the time (Glazer, 1991:2; Alberts & Papp, 1997:5; Teece, 1998:55; Garonna & Balta, 2002:4). This meant that "*advanced industrial economies have entered a new epoch.*"(Teece, 1998:55). Teece explains that this new economy is directed by, inter alia, the managing of information and knowledge, which in turn is greatly assisted by the connectivity of the "*new information technology*" (*ibid.*).

Two definitions of the Information Age are:

1. "*the worldwide availability of networked computer systems*" (Castells, 1996; Dewar & Corporation, 1998:4); and
2. "*the widespread availability of information and communication technology and capabilities provided by these technologies*" (Alberts & Papp, 1997:2).

In 1997, it was believed that the driving force in shaping human interactions, activities, actions and institutions in the Information Age would be information and communications (Alberts & Papp, 1997:2) and through using ICT, the spread of knowledge and information would be much faster and much easier. Alberts and Papp (1997:v) believed that technology would influence and modify society, and society, would determine the direction of technology. The daily use of ICT became widespread with the growth of networked computers and the spread of the Internet.

The World leaders saw ICT and the spread of information and knowledge through the use of it as a tool to be employed in addressing the issue of poverty alleviation and, therefore, they focused on ICT as an '*enabler*'. This focus was formalised in meetings held by the world leaders over a number of years starting in the year 2000. The outcomes were as follows:

- ICT was officially recognised as a tool for enabling social and economic development by the Group of Eight<sup>11</sup> (G8, 2000). This led to the adoption of the Millennium Declaration, by the United Nations, in September 2000 by 189 world leaders. The

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<sup>11</sup> The **Group of Eight** (G8) major industrialised nations: France, Germany, Italy, Japan, Britain, USA, Canada, Russia

Millennium Declaration lists eight goals, known as the Millennium Development Goals, which were to be achieved by 2015 (McIver, 2006:150).

- In 2001, the G8 launched a task force called the Digital Opportunity Task Force (DOT Force) to provide a “*strategic framework*” for public and private enterprises to “*harness ICT for development purposes*” (Rothenberg-Aalami & Pal, 2005:4).
- At the G8 meeting in 2002, ICT was once more formalised as a “*tool for enabling social and economic development*” (Rothenberg-Aalami & Pal, 2005). At this meeting major industrialised nations acknowledged that ICT:

*“[I]s one of the most potent forces in shaping the twenty-first century [and] its revolutionary impact affects the way people live, learn and work, and the way government interacts with civil society.”* (Rothenberg-Aalami & Pal, 2005:4)

The efforts of these meetings were extended by the World Summit on the Information Society (WSIS) of 2003, which was held by the UN General Assembly in Geneva. In 2003, WSIS formally declared a:

*“[C]ommon desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilise, and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life”.* (WSIS, 2003:1).

The Plan of Action of WSIS discusses the explicit need for people to access ICTs and this was planned to occur through the establishment of ‘multipurpose community public access, which was to provide affordable or free-of-charge ICT and Internet access to citizens (James, 2006a:342). This resolve by WSIS in 2003 unleashed research activity in a new strategy called Community Informatics (see Chapter 2.2.2).

Concurrent with the development of ICT and the expansion of the Information Age, Kling and Star (1998:28) noted that the construction of social identities could be an outcome of the introduction of ICT to individuals working in groups. They also found that the use and impacts of ICT or “*computerised information systems*”, provided new ways of investigating socio-technical phenomena, specifically the new social choices available to communities (Kling & Star, 1998:28).

## 2.2.2 Community Informatics

Those with information became known as the “*haves*” and those without information the “*have-nots*” (Gurstein, 2003). This formed a new belief that poverty alleviation could be accelerated with the provision of information to communities, using the vehicle of ICT. Thus providing access to technology for disadvantaged and disempowered communities became the new project to be undertaken by all countries, governments and powers. This instigated the use of ICT for community development.

Community Informatics (CI) is defined by

*“[A] technology strategy or discipline which links economic and social development efforts at the community level with emerging opportunities in such areas as electronic commerce, community and civic networks and telecentres, electronic democracy and on-line participation, self-help and virtual health communities, advocacy, cultural enhancement, and others.” (Pitkin, 2001:1)*

Gurstein (2007), who is accredited with introducing the term Community Informatics, in his seminal work, “*Community Informatics: Enabling Communities with Information and Communications Technologies*” (Gurstein, 1999), describes it as having two forms:

*“On the one hand, Community Informatics (CI) is the application of information and communications technologies (ICTs) to enable community processes and the achievement of community objectives. On the other hand CI is the terminology that is coming to be used to describe the academic discipline and practice for systematically approaching Information Systems from a community’ perspective” (Gurstein, 2007:4)*

Community Informatics is designed to have a threefold purpose (Stoecker, 2005:16): to build communities up, to develop information, and to provide access to technology for communities. Gurstein (2007:11) confirmed a concern noted by Stoecker (2005:19) that the field of study of CI was lacking of a “*coherent core*” and explicit standards and that the information needs of communities were often only considered as an afterthought. The concern for CI academics was that community members were the least understood in the context of the discipline of CI and, therefore, Stoecker (2005:20-21) suggested a strategy for linking CI with community development.

Thus the importance of the CI emerging body of knowledge is a focus on the developmental role of ICTs and ways to bridge the digital divide (Gurstein, 2007), which is acknowledged in the domain of ICT4D.

### **2.2.3 Information and Communication Technology for Development (ICT4D/ICTD)**

The importance of ICT for development was recognised as far back as 1980 with the commissioning of a report by UNESCO that identified the need for a more equitable allocation of resources in the field of communication (Grunfeld, 2011:5).

In 1996, International Development Goals were formulated, which were formalised in 2000 as the Millennium Development Goals by the Millennium Declaration (Heeks, 2008:27). The aim was to reduce poverty, improve health and education, and foster gender equality. With the digital technologies of the 1990s, ICT4D arose as the vehicle for delivering these targets. The role of information, knowledge and ICT in development was highlighted in the 1998 World Development Report and in 2000 the Digital Opportunities Taskforce, created by the G8 countries, set the agenda. The two World Summits on the Information Society in 2003 and 2005 constructed the policy and the key learning elements in the ICT4D plan (Heeks, 2008:27).

The WSIS in 2003 resulted in “*The Information and Communication Technology for Development Platform*” (ICT4D) (Rothenberg-Aalami & Pal, 2005:4). The ICT4D Platform is a set of ‘*concrete goals*’ that are associated with the framework generated by the DOT Force in 2001.

The ICT4D movement has extended to involve a wide variety of stakeholders:

- agencies of the United Nations (UN);
- the World Bank Group;
- the International Monetary Fund (IMF);
- development donor aid governmental agencies including Canada (CIDA), the Netherlands (NORAD), and the United States (USAID);
- all levels of governments;
- local and international non-governmental organisations;
- private organisations; and
- business leaders (Rothenberg-Aalami & Pal, 2005:5)



Large resources have been committed by most of these stakeholders to provide places of access to ICT for new users in order to usher them into the Information Age (Rothenberg-Aalami & Pal, 2005:5).

By 2014, WSIS reiterated their acknowledgements of the influence of ICT on society and development and the value of it as an enabler in reaching the Millennium Development Goals (ITU, 2014b:10) in both developed and developing countries.

Since the WSIS in 2003 an increasing number of multi-disciplinary research agencies have supported research in the field of ICT4D. Throughout the world today, ICT4D is on the main agenda of social and development strategies (Pather & Uys, 2010). Though many authors have questioned the ability of ICT to assist in reaching the development goals (Heeks, 2005b; James, 2006b), the World Bank, the United Nations, many governments and other donor agencies roll out ICT projects in communities at a great expense to assist in the development of communities (Ashraf *et al.*, 2008). Ashraf *et al.* (2008) report that the implementation of these projects was the main focus rather than the impact at community level, which led to projects failing. Subsequently Heeks (2010:637) advocates for ICT projects that are not merely progressive, but transformational in their impact on development.

### **2.2.3.1 ICT4D community projects**

A large number of ICT projects are deployed in communities by national and local governments, NGOs and companies in the corporate sector in South Africa as well as worldwide (Patra, Pal & Nedeveschi, 2009:357). The motivation for these deployments comes from the belief that the use of ICT (computers and networked computers) will empower citizens, and bring change in the socio-economic situation of the members of the community.

Heeks (2010:629) describes the proliferation of ICT projects as follows:

*“launched via a series of reports and events that were strong on promise and hype; reeking of ‘technology boosterism and cyber utopianism’ and seen as the tool of Northern private sector firms seeking new markets for their goods.”*  
(Heeks, 2010:629)

World leaders started to focus on ICT to address the issue of poverty alleviation. Because disenfranchised and underserved communities do not have the same level of access to information, various governments and NGOs have developed ‘places’ where community members could have access to computers, specifically to networked computers. These places were commonly referred to as “*public access centres*” or telecentres (Parkinson &

Ramírez, 2006; Islam & Hasan, 2009). Vast sums of money went into the development of these places, but many of these projects were deployed without proper planning, and with no evaluation framework in place (Heeks & Molla, 2009a:1).

Underserved areas are defined by each country or government by their own standards. In South Africa, USAASA deems any area with less than 5% electronic communications network penetration as underserved (ITU, 2013b:50).

The ICT4D initiatives encompass a number of development foci in diverse fields such as health, agriculture, and education, including the establishment of public access centres, the use of cell phones for sourcing information on various topics, placing computers in schools and distance learning (Patra *et al.*, 2009:359-360).

Public access centres are of special interest, since they affords underserved communities access to the Internet to reach, inter alia, the following objectives:

- decrease the digital divides;
- enhance the economic, social, political cultural capabilities of the community;
- enhance the creation of local content;
- provide specific online services to the communities; and
- enhance effective use of ICTs (Clement, Gurstein, Longford *et al.*, 2004:8):

## **2.2.4 Public Access to ICTs**

In all developing and emerging countries there are communities that have no personal access to ICTs, thus excluding them from obtaining necessary information. Access to ICTs has been given to these communities via public access centres, also known as multi-purpose centres or telecentres (Huerta & Sandoval Almazán, 2007:218; Chigona, Lekwane, Westcott *et al.*, 2011a:1). It is deemed by many that public access centres, (i.e. libraries, telecentres and Internet cafes) around the world are the only way for millions of people to gain access to computers and the Internet for various services and be part of the Information Society (Sey, Coward, Bar *et al.*, 2013:24). Internet cafes, or cyber cafes, are commercial entities of paid access to ICTs. Entities such as telecentres are supported by government, NGOs and other development agencies and offer Internet access and the use of ICTs freely or at least, very cheaply.

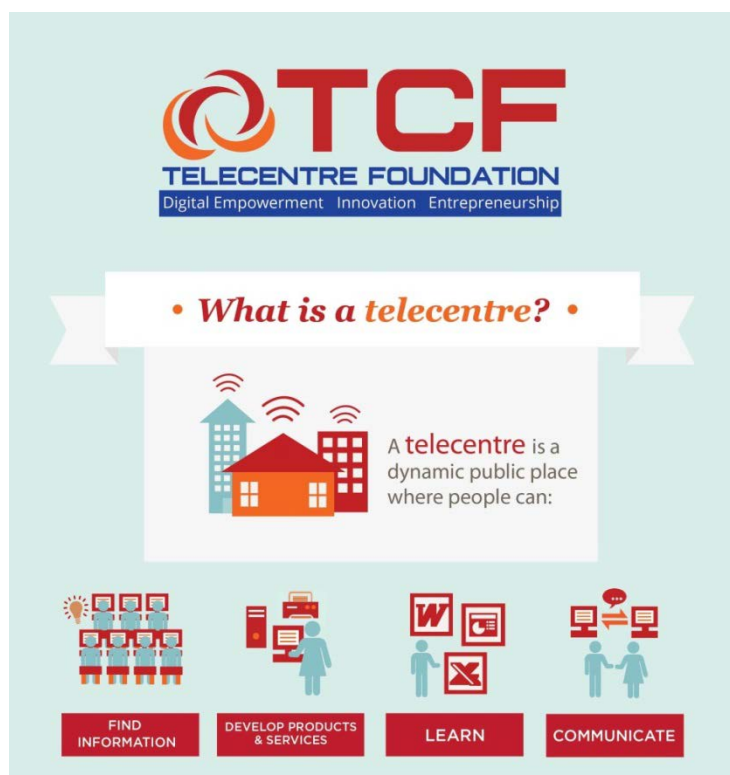
Although the role of cybercafés, of filling a need in communities by providing computer time, Internet access and/or skills training, cannot be ignored (Sey *et al.*, 2013:26) centres that

offer free access to ICTs and the Internet are the focus of this study. These centres include telecentres, multipurpose centres, ICT centres and areas with computers in libraries, etc.

Although there are many definitions and explanations of telecentres, their overarching role is given as providing public access to ICTs (Gómez, Hunt & Lamoureux, 1999a:3). Gomez and Reilly defined telecentres as:

*“physical spaces that provide public access to information and communication technologies, notably the Internet, for educational, personal, social and economic development.”* (Gomez & Reilly, 2001:1)

Telecentres have been implemented in many countries to enable access to ICT and the Internet where individual access would be impossible or unaffordable (Colle, 2000; Harris, 2001).

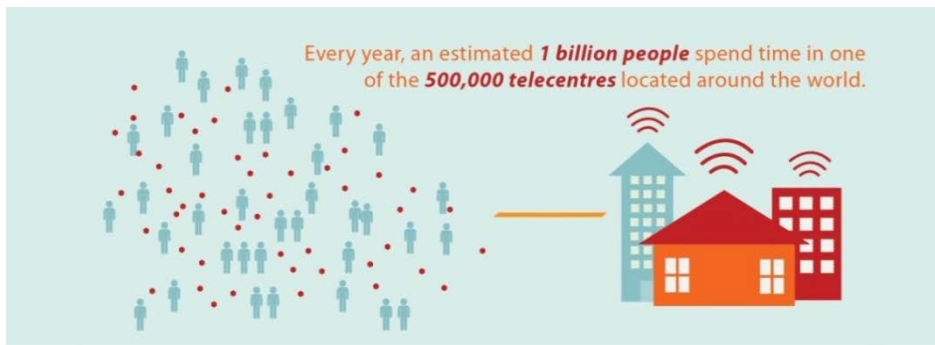


**Figure 2.1: Infographic on Telecentres**

(Source: Telecentre.Org, 2013)

Towards the end of the 20th century, Benjamin and Dahms (1999:57) pleaded for telecentres to be vehicles for access and information dissemination and not to be seen only as technology for technology's sake. Subsequently James (2006a:342), defined telecentres as

“donor-funded community access points” that offers Internet access and other technologies to communities in rural areas and in underserved peri-urban and urban areas.



**Figure 2.2: People using telecentres**

(Source: Telecentre.Org, 2013)

Because of the ability to provide necessary access to information, telecentres have been “hailed as the solution to development problems around the world” (James, 2006a:342). Chigona *et al.* (2011a:2) explain that facilities such as telecentres offer information and computer-related services such as learning systems and support systems for socio-economic growth and sustainability. Typically these centres offer access to the Internet, government information, emails, e-learning and often include printing, faxing and copying services as well (Chigona *et al.*, 2011a:2).



**Figure 2.3: Countries using telecentres**

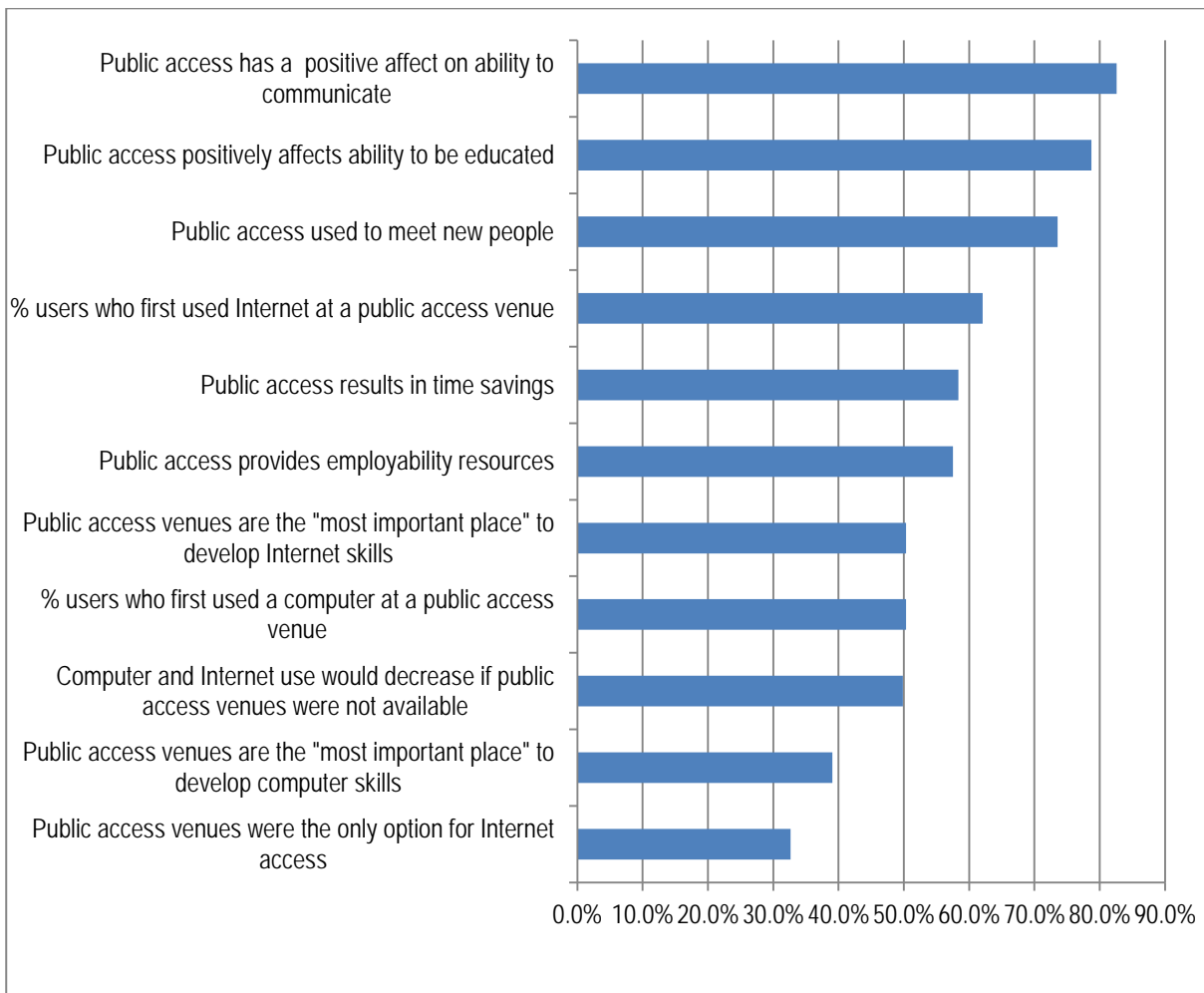
(Source: Telecentre.Org, 2013)

Internet access has been shown to empower people in their feelings of security, personal freedom, general happiness and personal well-being (Castells, Gelernter, Vázquez *et al.*, 2014:14), specifically people in the lower income groups, the less qualified, women, and people in developing countries. The study of (Castells *et al.*, 2014) also found that the Internet contributed to feelings of autonomy.

Similarly, the Global Impact Study (Clark, Sey & Sullivan, 2012), provides compelling evidence in respect of the on-going need for public access centres. Amongst the key findings emerging from this study, the following are pertinent:

- *public access venues are a critical gateway for developing skills among the public: public access venues offer many people their first experience with computers. Half of users (50%) reported first using computers at a public access venue and 62% first used the internet at such a place.*
- *Users also develop digital literacies in public venues: 39% indicated that public access venues were the 'most important place' to develop their computer skills and 50% reported found these venues to be the 'most important place' to develop their internet skills.*
- *public access venues are the only option for internet access for 34% of users. Many users continue to use public access venues despite having access elsewhere.*
- *Library users report greater impact, compared to users of other venues, for computer and internet activities related to: education, health, and culture and language (Clark *et al.*, 2012).*

Thus, even in the second decade of the 21<sup>st</sup> century there are still millions of people all over the world that are using public access centres for Internet access and other computer services, since this is still the only option they have for computer and Internet access (Sey, Bar, Coward *et al.*, 2015:71, 78).



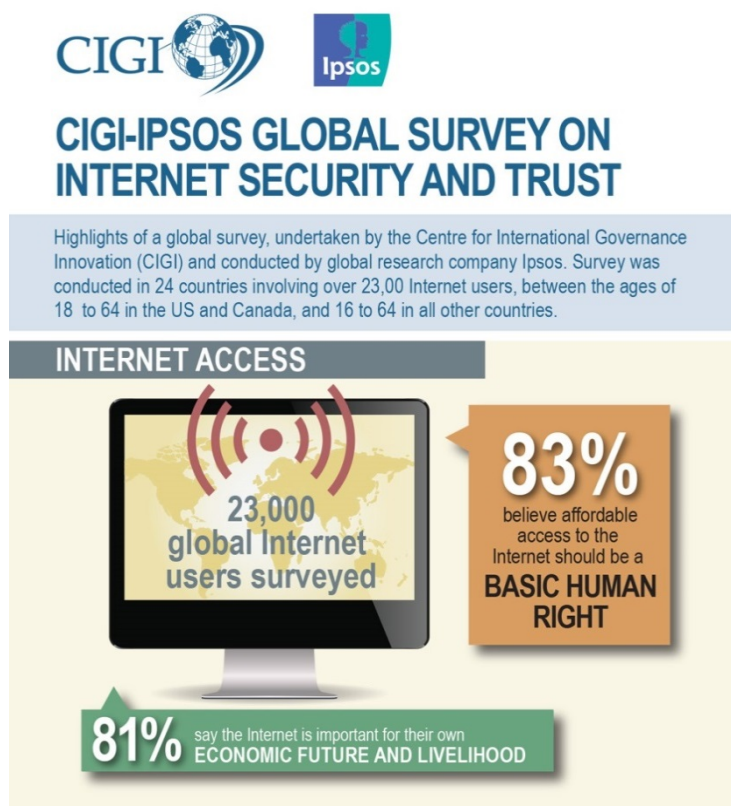
**Figure 2.4: Benefits of public access centres**

(Data Source: Clark *et al.*, 2012)

The Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression has argued for Internet access to be formally recognised as a “*basic human right*” (Barry, 2014). This notion was tested by CIGI-Ipsos (2014) in a survey administered to 23 376 users in 24 countries during October 2014 and November 2014 in which 83% of the respondents indicated that affordable Internet access should be a basic human right.

Not even the exponential growth of mobile technology, which was often cited to indicate the end of the necessity for public access centres, has detracted from the importance of these centres. Studies have shown that at least 96% of public access users also own mobile phones (Sey *et al.*, 2015:79). Baron and Gomez (2013:271) stated that the most valued benefits of PACs to underserved communities are stronger relationships, easier learning and access to more information.

A study involving 25 developing countries found that community members are using Internet cafes more because of the faster access at the existing fairly cheap rates, as well as the support and training received at these venues (Gomez, 2014:274).



**Figure 2.5: International Survey Infographic survey from**  
(Source: CIGI-Ipsos, 2014)

### 2.3 Evaluation of ICT projects

The research literature regarding the evaluation of ICT focused on evaluating ICT or IS in business and organisational sectors (DeLone & McLean, 1992; Seddon *et al.*, 1999).

Project evaluation in organisations deploying IT projects has taken place since the early 1960s (Boyd & Carson, 1963; Bevan, 1972; Smith Jr, 1972; Lucas, 1973; Gallagher, 1974; Kleijnen, 1979, 1984).

Thus, since the 1960s, the problem of evaluating the benefits of IS has been at the fore of business research, for example, Boyd and Carson (1963), Gallagher (1974), and Lucas (1973). Andresen, Björk and Betts (2000:60) found at least 30 “*IT benefits evaluation methods*” by 1999. Evaluation projects were deployed in the fields of IS in government, business, education and ICT4D. These will be explored in the following sections.

### 2.3.1 Government

In evaluating e-governance service delivery in India, Saeed *et al.* (2010) used a quantitative evaluation approach incorporating structured questionnaires, a multi stage stratified random sampling technique and statistical analyses. Garrido (2004) presented four evaluation frameworks to be used in the assessment of e-government projects.

**Table 2.2: Table of ICT/IS evaluation theories used in the government context**

e-Governance/e-Government		
	Author, Article	Theory
	Saeed <i>et al.</i> (2010)	Quantitative Evaluation approach
	Kettani, Gurstein and El Mahdi (2009)	Formal Outcome Analysis Methodology
	Buccoliero, Calciolari and Marsilio (2008)	A multidimensional evaluation: quantitative, qualitative and economical
	Heeks (2006)	Information systems evaluation (CIPSODA checklist)
		Data quality evaluation (CARTA checklist)
		Outcome-focused approach
		Change-related evaluation (longitudinal measurements)
		Public value related evaluations
	Garrido (2004)	E-government Index
		Cost-Benefits Analysis and Cost-Benefits and Impacts analysis
		Capability Approach

### 2.3.2 Business

Since it was necessary to evaluate the impact, success, and benefits of IS, research into the evaluation of benefits flourished (Boyd & Carson, 1963; Chervany & Dickson, 1970; Smith Jr, 1972; Gallagher, 1974; Kleijnen, 1979, 1984; Besore, 1991; DeLone & McLean, 1992; Jurison, 1996; Whyte & Bytheway, 1996; Dahlgren, Ardbo, MacFarlane *et al.*, 1997; Seddon, 1997; Seddon *et al.*, 1999; Andresen *et al.*, 2000; Irani *et al.*, 2000; DeLone & McLean, 2002; Irani, 2002; Tan & Hunter, 2002; Baron & Bruillard, 2003; Banwell, Ray, Coulson *et al.*, 2004; Milis & Mercken, 2004; Westbrook, Braithwaite, Iedema *et al.*, 2004). The large number of studies into IS success and benefits pointed to the impact that ICT made in the day-to-day running of organisations which unleashed an extensive interest shown by researchers and academics alike.

IT evaluation, in the business sector consist of two areas, namely:

- evaluation of IT efficiency or success, involving concepts such as information quality or user satisfaction. (Seddon *et al.*, 1999; DeLone & McLean, 2002); and



- evaluation of IT benefits involving, for example, financial benefits or non-financial benefits (Milis & Mercken, 2004)

In 1984 Kleijnen (1984:38) discussed the measurement of the financial benefits of management information systems using a framework following a sequence. Glazer (1991) made a number of propositions to manage this as an asset to business.

The implementation and management of ICT presented both challenges and opportunities to businesses (Joshi & Pant, 2002). Among the challenges are the increased complexity of ICT, and the uncertainty and unpredictability associated with benefits and costs. These challenges pointed researchers to the development of methods to evaluate the impact of their ICT investment (Irani *et al.*, 2000).

Interest in the question of ICT effectiveness and its evaluation over the past twenty years, began with Boyd and Carson (1963), Gallagher (1974) and Lucas (1973). The necessity to evaluate the benefits of computer and telecommunication technology to business became a research topic as early as 1963 (Boyd & Carson, 1963). The real value of IS and Management Information Systems (MIS) has been the topic of research since the start of the Information Age. Research into IS evaluation has been extensive and ongoing ever since.

**Table 2.3: Table of ICT/IS evaluation theories used in the Business context**

Author, Article	Theory
DeLone and McLean (1992:87)	Taxonomy introduced: IS Success Model: System quality, Information quality, Use, User satisfaction, Individual impact, Organisational impact
Seddon (1997:245)	Respecified IS Success Model
Seddon <i>et al.</i> (1999)	IS Effectiveness Matrix Framework
Andresen <i>et al.</i> (2000)	A new evaluation framework
DeLone and Mclean (2002)	Reformulated IS Success Model
Venkatesh, Morris, Davis <i>et al.</i> (2003)	TAM; UTAUT
Tan and Hunter (2002) Whyte and Bytheway (1996) Cho and Wright (2010)	Repertory Grid Technique
Bannister and Remenyi (2003) Milis and Mercken (2004) Bannister, Berghout, Griffiths <i>et al.</i> (2006)	Balanced Scorecard
Dehlin and Olofsson (2008)	Project- and Process-Orientated Model for evaluating ICT investments based on the DeLone and McLean Model (DeLone & McLean, 1992)

In their seminal paper DeLone and McLean (1992) introduced a model to guide research in the discipline of IS success and aimed to define information success as the dependent variable in IS evaluation studies. The domain in which they worked was management information studies. This domain offers a more formal environment in which to conduct an evaluation study making the measuring of aspects of IS attainable. Seddon (1997) presented a respecified and extended model of IS success, proposing that different individuals would evaluate the consequences of IT use in different ways. A two-dimensional matrix for classifying IS effectiveness measures was proposed by Seddon *et al.* (1999); the first dimension describes the type of system being evaluated, and the second dimension describes the stakeholder in whose interest the evaluation is done. DeLone and McLean (2002) subsequently reformulated the IS Success Model to include new dimensions and to combine certain dimensions.

Researchers have employed a number of methods to determine the effectiveness of ICT. These methods range from simple accounting measures to multi-dimensional Balanced Score-card type metrics. For example, DeLone and McLean (1992) described a model for information success that was developed into an IS Effectiveness Matrix by Seddon *et al.* (1999). The well-known Technology Acceptance Model (TAM) has also been modified in a number of ways by researchers in the evaluation of ICT4D initiatives (Grunfeld, 2007:7). Andresen *et al.* (2000:60) suggested a “*new evaluation framework*” to evaluate IT innovation benefits to construction organisations.

The question of whether these evaluation methods are suitable in an ICT4D context, according to the pertinent literature, is not yet answered.

### **2.3.3 Education**

In the education sector Wagner *et al.* (2005) compiled a handbook for the monitoring and evaluation of Information and Communication for Education (ICT4E) projects in developing countries based on impact evaluation. Ng'ambi and Brown (2004) describe a utilisation-focused evaluation of ICT in education. A formative assessment of ICT in Lebanese schools was done by way of counting hardware items and measuring ICT indicators (Nasser, 2008), but failed to address the impact and benefits of those items of hardware. Tolani-Brown *et al.* (2009:5) mentioned that there is no standardised evaluation framework for using ICT in educational interventions.

**Table 2.4: Table of ICT/IS evaluation theories used in the education context**

Education		
	Author, Article	Theory
	Rodríguez, Nussbaum, López <i>et al.</i> (2010)	Statistical analysis of an M&E scheme
	Nasser (2008)	Statistical Analysis of ICT indicators
	Lennie <i>et al.</i> Lennie, Hearn and Hanrahan (2005)	Evaluation of IT based on Participatory Action Research

Rodríguez *et al.* (2010) presented a monitoring and evaluation (M&E) scheme to analyse an ICT program's impact on student attainment. Data provided by this scheme was analysed statistically.

Tolani-Brown *et al.* Tolani-Brown *et al.* (2009:6-7) investigated evaluation frameworks for ICT in education and presented a comprehensive list of suggestions for future evaluations.

## 2.4 ICT4D Evaluation

Information Systems projects in the previous three disciplines are usually implemented in a formal situation and used by workers or learners in a structured project, whereas the users of ICT4D initiatives are not part of a formal or structured project and have their own motivation for using ICT. Very often the aims of the ICT4D initiatives are only broadly stated. This creates difficulties in the evaluation of these initiatives, since projects deployed in a community context often do not have a standard set of outcomes.

In the ICT4D arena governments and non-governmental organisations are facing the same problem that the business sector has faced over the last 30 to 40 years, that is, how to determine if benefits have accrued (Denison, Arnold, Johanson *et al.*, 2011:4; Venkatesh & Sykes, 2013:2). While the problem may be the same, the task to conceptualise and measure the true value of social development is vastly different and much more complicated.

Literature of ICT4D initiatives attests that either no theoretical framework for the evaluation of benefits of ICT projects in communities is used, or theoretical frameworks are very loosely utilised (Grunfeld, 2011:46). As such, evidence shows that projects are often evaluated in a haphazard way, and evidence of positive outcomes is only anecdotal, giving way to a very superficial evaluation (Colle, 2005). In their study to assess the impact of rural telecentres Rothenberg-Aalami and Pal (2005:7) also found that there was no agreed-upon evaluation method. Information and Communication Technology generated great hope in governments as a catalyst in the development of communities and poverty alleviation (Ray & Kuriyan,

2010). Heeks (2008:27) commented on this “*hype*” surrounding ICT for international development in the area of ICT4D, and the conclusions based on “*uncorroborated stories*”. This prompted repeated calls for research in the evaluation of ICT4D initiatives (Pather & Uys, 2010).

Some of the evaluation attempts of projects used frameworks or theories from other disciplines, whether suitable in the context of evaluating impact in communities or not. Historically the evaluation of IT benefits has mainly taken place in the business and education sectors, and therefore benefits of the deployment of ICT projects in communities are not as well defined. Early in the 21<sup>st</sup> century, O’Neil (2002:77) argued that Community Informatics project evaluations are scarce because the focus is often on social factors that may be difficult to measure. Parthasarathy and Srinivasan (2006:3) warned against applying “*easy to measure data for well-defined indicators*” to measure social development and social factors. Hedberg (2010) also found that telecentres did not have performance indicators when he evaluated the Tunjang Telecentre in rural Malaysia. In their study on the impact of public access ICT on development Sey and Fellows (2011:189) reported that they did not find much “*hard evidence*” of what can be measured as impacts and outcomes. This view is supported by Gomez (2008); Gomez and Pather (2012). Gomez *et al.* (2013:37) advocates including “*non-material impacts*” when evaluating the impact of an ICTD intervention on development.

Experience worldwide shows that success in the application of ICT to address fundamental societal issues in different cultures, different socio-economic conditions and for a range of desired outcomes is extremely variable (Pigg & Crank, 2004:22; Cordell & Romanow, 2005:20; Williams *et al.*, 2005:21). Although governments and donor agencies spend vast amounts of money on the deployment of ICT projects in communities the effectiveness of such projects cannot be assessed (Ashraf *et al.*, 2008) because there is a lack of sufficient insight into methods for evaluating the effectiveness of these ICT projects on socio-economic development (Pather & Uys, 2010:2).

This growing body of knowledge has been criticised by authors and researchers. For example, Heeks (2007) pointed out that ICT4D outputs: i) reflect a bias to action and not to knowledge; ii) are descriptive; and iii) are not analytical enough. Lee *et al.* (2008) confirmed these mixed views and the evidence about ICT4D outputs. They reported a lack of hard evidence regarding the economic and social impact on development of ICT4D initiatives and voiced concern that the impacts are not universally beneficial (Lee *et al.*, 2008:2). Parthasarathy and Srinivasan (2006) also point out that the emergent field of ICT4D has many unclear conceptual issues which include the important issue of how to evaluate and

assess the impact of ICT on developmental outcomes. Merkel *et al.* (2005:164) agreed, stating that evaluating the impacts of technology projects can sometimes be difficult since the outcomes can be indirect.

The need for an appropriate assessment of benefits derived from ICT4D initiatives is also supported by ICT4D researchers. Ashraf *et al.* (2007) found that ICT initiatives in communities have not been as sustainable as expected; projects ceased when the investing organisations or governments withdrew funds. It is imperative, therefore, for donor agencies, governments and practitioners to determine the benefits and analyse the impact of ICT initiatives.

Even though there were many initiatives examining different aspects of the Information Society related to development Grunfeld (2007:7) found that, there were still gaps in the knowledge relating to the benefits of ICT initiatives in the body of literature dealing with ICT4D project evaluations and measurements.

Many researchers, practitioners and funding organisations have recognised this problem and listed it as a requirement for further multidimensional research. There are, therefore, various research opportunities and questions to be asked in the ICT4D domain, of which the evaluation of ICT benefits is one of the most pressing.

## **2.5 The South African Context**

South Africa is a vast country. Its physical area spans 1 220 813 km<sup>2</sup>, and it has a population of 51.8 million people (Statistics South Africa, 2012a:9, 18). During the reign of the apartheid government (up to 1994), services and goods were distributed extremely unevenly which resulted in the democratically elected, post-apartheid government inheriting an inequitable society, of various developmental levels with a huge gap between the rich and the poor (Langa *et al.* (2006) as cited in Gomez, Pather and Dosono (2012:1)). As of 2015, it is estimated that approximately 53.8% of the population of South Africa is living below the poverty line (Statistics South Africa, 2015:13). From 1994, the government thus focused its policies and programmes on the eradication of historical societal injustices by establishing a much needed infrastructure such as new schools, clinics, roads, electricity, and water projects in rural and underserved areas (Gomez *et al.*, 2012). The government has therefore prioritised economic development policies (South Africa. Department of Communications, 2002), having one of its main objectives as the improvement of the telecommunications infrastructure to further developmental goals.

The South African Government viewed opportunities presented by the use of ICT as one of the means by which economic growth can be sustained. Progress made in addressing the digital divide in South Africa includes:

- The Information Society and Development (ISAD) Plan, which was approved by the cabinet following the adoption of the WSIS agenda;
- The creation of the legislative framework to foster uptake and usage of ICT (e.g. Electronic Communications and Transaction Act, No 25 of 2002 and the Electronic Communications and Transaction Act, No 36 of 2005);

The creation of structures such as the Presidential International Advisory Council (PIAC) and Information Society and Development (ISAD), the e-Skills Council, the Universal Service and Access Agency (USAASA) (SAFLII, 1996)<sup>12</sup> and a Presidential National Council on Information Society and Development (PNC-ISAD) with a mandate to implement the ISAD Plan, and

- The Broadband Policy of South Africa of 2010 with its vision to:

*“[E]nsure universal access to Broadband by 2019 by ensuring that South Africans are able to access Broadband either individually, or as a household, subscribe to a Broadband service, or are able to access a Broadband service directly or indirectly at a private or public access point.” (South Africa. Department of Communications, 2010)*

The definitions of universal service and universal access, as published in the Government Gazette of South Africa are:

“Universal access is provided where all persons in all areas and communities are able to obtain quality, affordable and usable access to a publicly available minimum set of quality electronic communications network service and electronic communications service, including voice, messaging and data electronic communications service and, in the case of data, including a broadband connection, and access to emergency services using free calls and messaging; and broadcasting service, including television and sound broadcasting service.

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<sup>12</sup> The Universal Service Agency was established as directed by the Telecommunications Act, 1996 [No. 103 of 1996] - G 17581 with the role of facilitating the extension of access to ICTs to all South Africans. The Universal Service Agency has been renamed Universal Service and Access Agency of South Africa (USAASA) under the Electronic Communications Act No. 36 of 2005.

*Universal service is provided where all persons, if they require it, are able to obtain quality, affordable and usable access to a minimum set of electronic communications network service and electronic communications service, on either a household or individual basis, including a voice and data electronic communications service and, in the case of data, including a broadband connection, and access to emergency services using free calls and messaging, where all services are offered on a non-discriminatory basis.” (South Africa. Department of Telecommunications and Postal Services, 2014a:72)*

The Government of South Africa thus embarked on a strategic mission to deliver ICTs to rural and under-served areas in South Africa. Some of these projects include establishing multipurpose community centres in various areas of the country.

The role of USAASA is to facilitate increased access to ICT for all South Africans. Telecentres that provide ICT services, especially in rural and semi-urban areas are being set up by USAASA (Oyedemi, 2009:159). By the end of 2007 there were 116 telecentres in existence (USAASA, 2007), and this increased to 154 telecentres and 362 cyberlabs by 2010 (South Africa. Department of Telecommunications and Postal Services, 2014c:12). There is thus a conscious and concerted effort by the government to bring the benefits of access to the Internet and other ICTs to underserved communities. This effort is underscored by the National Integrated ICT Policy Green Paper of the South African Department of Communications which states that the effective use of ICT is a necessary element in the building of societal leadership (South Africa. Department of Telecommunications and Postal Services, 2014b:81).

These efforts include establishing ICT centres in libraries, self-assisted access points or kiosks and phone shops (Pather & Gomez, 2010:2). Non-Government Organisations and Community Based Organisations (CBOs), civil society and provincial governments also own telecentres, and certain telecentres are run by small, medium and micro Enterprises (SMMEs) (Oyedemi, 2009:159). For instance, the South African Department of Communications (DoC) and the South African Post Office (SAPO) have launched a project establishing public information terminals (PITs) to provide electronic communication to South Africans (Oyedemi, 2009:159).

In 2007 the Government of South Africa published a policy framework for government-wide monitoring and evaluation of their programmes to assist the public sector in evaluating the performance of these programmes, that is, to determine if and how well services are delivered and what their ultimate impact on communities are (South Africa. The Presidency,

2007). This deems the evaluation of the benefits of projects deployed in communities of utmost importance.

Although understanding how ICT benefits communities and contributes to socio economic development is crucial for the advancement of the ICT4D agenda in South Africa, Theledi (2008) reported to parliament that there is “*no mechanism for monitoring and evaluating real impacts of ICT*”. Benjamin (2002) concluded that although by 2002 there were approximately 500 community ICT projects in South Africa it has not been established how ICT can be used to support development. However, as the preceding discussion revealed, this problem is not a specificity of South Africa. A World Bank study by Batchelor *et al.* (2003) confirmed this problem in the developing world at large.

The SmartCape project, launched by the City of Cape Town in 2002 (City of Cape Town, 2010) is an example of a project managed by a municipality. SmartCape installed online computers in all public libraries and offered free internet access for 45 minutes at a time, to library members. Another initiative is the Cape Access project launched by the Western Cape Government (PGWC) under the umbrella of the Cape Gateway project in 2001. The primary aim of the Cape Gateway project was to have an e-government presence. The PGWC developed the Cape Access project to provide free access to ICT through public e-centres for rural and peri-urban communities throughout the Western Cape Province. Existing infrastructure was used to host these ICT public access points (Maumbe, Owei & Alexander, 2008:771).

Living Labs emerged during the 1990s as an innovative environment where users co-design and co-create ICT-related products and services (Merz, De Louw & Ullrich, 2007:3). The first South African Living Lab, based on an approach of having greater community involvement and sustainability, was established in 2006 (Pitse-Boshomane, Marais, Morris *et al.*, 2008:1).

The Digital Doorway Initiative (DDI), in South Africa, was developed by the Meraka Institute of the Council for Scientific and Industrial Research (CSIR) (Stillman, Herselman, Marais *et al.*, 2011:8). This project entails giving access to communities via the presence of robust physical kiosks that have approximately four screens and keyboards from where underserved community members can access the Internet directly via cached links (*ibid.*). Stillman *et al.* (2011:6) suggested that ICT4D initiatives such as the DDI are very relevant to underserved communities, even in the face of lack of facilities such as water, sewerage, electricity and housing. The reason given by the authors for this is that using ICTs is a way of learning the English language which is a necessary skill in the job market of South Africa



today (Stillman *et al.*, 2011:6). This could also be the reason for using telecentres in South Africa.

The initiatives to bring ICT to the underserved communities have been the object of various research project throughout South Africa and even abroad. The following table lists some of the research undertaken to describe, investigate or evaluate ICT4D research in a South African context.

**Table 2.5: ICT4D research efforts in South Africa**

	Author/s, date	Findings
1.	Chigona, Van Belle, Arellano <i>et al.</i> (2005)	Libraries have established reputations, which acted like a "local champion" of CCFs to community. Establishment of CCFs in libraries increased library membership. High level of demand for information among urban dwellers. CCFs must be tailored within local contexts and should not be compliant to external objectives.
2.	Chigona (2007)	Used a qualitative interpretive approach to investigate relationship between host institutions and communal computing facilities. A number of advantages and disadvantage are highlighted
3.	Van Rensburg <i>et al.</i> (2008)	Developed a business model of "Infopreneurs" in the Sekhukhune Living Lab to implement collaboration tools and services to communities.
4.	James, Finlay, Jensen <i>et al.</i> (2008)	Descriptive research on the public access to information landscape in South Africa using questionnaires for users and operators.
5.	Andries (2009:72)	Community members in Delft, Cape Town, use the SmartCape computers and enjoyed and appreciated the free access to Internet at their libraries. They pointed out that most libraries had few (usually only five) computers resulting in long waiting times
6.	Rhodes (2009)	Used Actor-Network Theory to trace the implementation trajectory of a telecentre in Sekhukhuneland and found that the telecentre "suffered from a trajectory failure".
7.	Chigona, Roode, Nabeel <i>et al.</i> (2010)	Used Stakeholder management to analyse the SmartCape Access project. The study highlighted the fact that there was no formal stakeholder management undertaken during the planning stages. There were also many missed opportunities for stakeholder management throughout the project's lifecycle
8.	Pather and Gomez (2010)	In comparing libraries, telecentres and cybercafes in South Africa and Brazil, the authors found that South Africa generally ranked lower than Brazil using the "Real Access" framework.
9.	Attwood and Braathen (2010)	Investigated the functionality of telecentres in South Africa and proposed recommendations for 2010 – 2020 for ICT delivery to poor communities.
10.	Meissner and Blake (2011)	Used the Real Access (Bridges.org) criteria to categorise benefits of software design decisions which can affect ICT4D projects
11.	Chigona, Lekwane, Westcott <i>et al.</i> (2011b)	Used a qualitative approach interviewing 20 stakeholders to describe uses, benefits and challenges of public access centres.
12.	Walton and Donner (2012)	Their research aimed to generate evidence about impacts (with regard to communication and leisure, culture and language, education, employment and income, governance, and health) of public access to ICTs, which included libraries, telecentres, and cybercafés.
13.	Coetzee, Du Toit and Herselman (2012)	Probed key features of five Living Labs in S.A. The study found that the various LLs preferred to have their own models, goals theories and values.
14.	Fengu and Krauss (2012)	Used critical social theory as their research paradigm in investigating ways developing countries implemented ICT4D initiatives.
15.	Pade-Khene and Sewry (2012)	Developed a Rural ICT comprehensive Evaluation Framework to be applied throughout the progression of an ICT4D project
16.	Donner and Walton (2013)	Highlighted the ongoing importance of public access centres in the era of mobile Internet using interviews, focus groups and questionnaires.

	Author/s, date	Findings
17.	Lorini, van Zyl and Chigona (2014)	Used Critical Discourse Analysis to investigate the discourses among community groups of marginalised communities with regards to the social appropriation of ICTs.
18.	Parker, Wills and Wills (2015)	Report on a pilot study to develop an evaluation method for community development programmes
19.	Bytheway, Rhinesmith and Wolfe (2015)	Briefly reports on research strategies applied in Community Informatics research.

Very few of the listed research efforts focussed on the identification of benefits of projects deployed in underserved communities.

## 2.6 Benefits

General ICT literature has mainly covered the benefits in business environments, and other formal organisational contexts. This section will provide an overview of benefits research in the context of ICT4D.

Researchers and practitioners in the IS realm were interested in measuring the benefits of IT and IS projects deployed within companies from the early 1970s onwards (Boyd & Carson, 1963; Chervany & Dickson, 1970; Bacon, 1992; DeLone & McLean, 1992; Menou, 1993; Jurison, 1996; Whyte & Bytheway, 1996; Dahlgren *et al.*, 1997; Seddon, 1997; Seddon *et al.*, 1999; Andresen *et al.*, 2000; Irani *et al.*, 2000; Oestmann & Dymond, 2001; DeLone & McLean, 2002; Heeks, 2002; Irani, 2002; Joshi & Pant, 2002; Bannister & Remenyi, 2003; Ward & Daniel, 2006; Partridge, McAllister & Hallam, 2007; Gomez, 2008; Gomez & Pather, 2012).

The measurability of benefits depends on how quantifiable the identified benefits are. Bacon (1992:343) found that some IS benefits, such as intangible or non-material benefits, are not quantifiable. Intangible benefits include employee morale, employee turnover, reduced absenteeism, reduced accidents, reduced wastage, higher quality and increased sales. Ward and Daniel (2006:20) define tangible benefits as measurable benefits and intangible benefits as those that cannot be measured objectively (e.g. customer satisfaction, or improved ability to make decisions).

A generic list of benefits of IT projects in organisations, originally presented by Farbey, Land and Targett (1993) cited in Ward and Daniel (2006:7), lists strategic, management, operational, functional and support benefits. Ward and Daniel (2006:106) state the steps to follow in the process of benefit management. During the first stage of this process the benefits must be identified. Their list entails:

- *Establish agreed objectives for the investment that ensure it relates to one or more of the drivers for change in the organisation*
- *Identify all the potential benefits that could be obtained by achievement of the investment objectives*
- *Understand how a combination of IS/IT functionality and business changes can cause the benefits to be realised*
- *Establish ownership to prove that they have occurred*
- *Identify any organisational issues or implications for particular stakeholder groups that could hinder or even cause the project to fail*
- *Produce an outline business case to decide whether to proceed further or stop the investment now.*(Ward & Daniel, 2006:106)

Ward and Daniel (2006:172) subsequently developed a structure for analysing and describing benefits. The expectation is that benefits should initially be observable or measurable. Once the classification of benefits has been established, the 'measurable' benefits can be classified further into 'quantifiable or financial' benefits.

**Table 2.6: Classifying the benefits by the explicitness of the contribution**

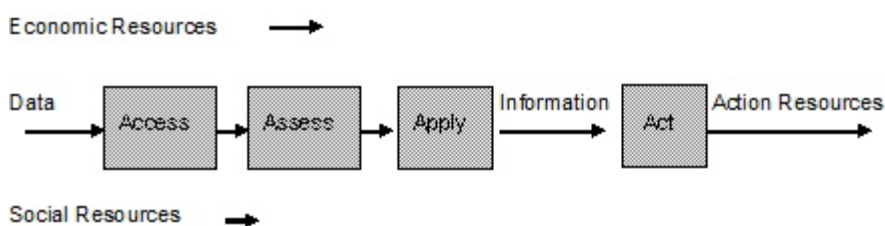
Degree of explicitness	Do new things	Do things better	Stop doing things
Financial	By applying a cost/price or other valid financial formula to a quantifiable benefit a financial value can be calculated		
Quantifiable	Sufficient evidence exists to forecast how much improvement/benefit should result from the changes		
Measurable	This aspect of performance is currently being measured or an appropriate measure could be implemented. But it is not possible to estimate by how much performance will improve when the changes are complete		
Observable	By use of agreed criteria, specific individuals/groups will decide, based on their experience or judgment, to what extent the benefit has been realised		

(Source: Ward & Daniel, 2006:173)

Ward and Daniel (2006:173) explains that the benefits that could be obtained by realising the objectives of the IS project and the ownership of these benefits must be identified and it must be determined whether these benefits can be measured or not.

Jurison (1996) explored IS benefits using a longitudinal study although he reported mostly on the productivity of staff members of an organisation. In the IS Success Model developed by DeLone and McLean (1992), benefits (or successes) realised are identified in the individual and organisational impact variables, such as system quality, information quality, user satisfaction, individual impact and organisational impact.

In later years, certain research efforts focused on the impact of ICT on the communities in which ICT programmes were deployed. For example, the PANTLEG evaluation approach developed by Gomez and Reilly (2001) was participatory, socially inclusive, locally grounded and sensitive to gender concerns, and it specifically focused on the impacts of ICT on the individual. Heeks (2002:1) developed and introduced the “*information chain*” (Heeks & Duncombe, 2001), which can be used to evaluate the effectiveness of e-development projects. Heeks (2002:1) stated that ICT projects will only benefit the communities in which they are deployed if they are adopted and utilised in an effective manner. He explained the use of this “*information chain*” proposed in the book “*Information, technology and small enterprise: a handbook for enterprise support agencies in developing countries*” (Heeks & Duncombe, 2001). See Figure 2.6.



**Figure 2.6: Information Chain**

(Source: Heeks & Duncombe, 2001)

Heeks (2002:1) lists the following requirements for the correct operation of the information chain:

- **Data Resources:** firstly relevant and up-to-date data needs to be available.
- **Economic Resources:** secondly financial resources, skills, and the technology are needed to access the data.
- **Social Resources:** motivation, confidence and knowledge to access, assess and apply the data are necessary, and they must also trust the source of the data.
- **Action Resources:** decisions made with the information needs to be acted on. This, of course, will require financial resources as well as technology, raw materials and soft resources like skills and empowerment. (Heeks, 2002:1)

Literature regarding ICT4D evaluation has mainly covered the evaluation of the *impact* of ICT on communities. This study is more concerned with the *benefits* accrued due to ICT projects. In this study a benefit is defined as ‘*an improvement in circumstance, advantage or profit derived from an impact*’ which is similar to the definition by Darlington, Zhao, Tang *et al.* (2012:13). Impacts are considered independent of any notion of good or bad (*ibid.*).

Thus, benefits are positive impacts that a project/programme deployed in a community can have on community members or on the community as a whole.

Oestmann and Dymond (2001:2) named the potential benefits of telecentres as information, new ways to communicate, new ways of teaching, training using enhanced graphics, potential of greater assistance for disadvantaged communities and new ways of conferencing for groups (e.g. video conferencing). Chigona *et al.* (2005:13) found that training received by the staff of a public access centre is transferred to users, thus benefitting users in an indirect manner.

Bannister and Remenyi (2003) presented a list of benefits and disbenefits in their “Balanced Scorecard Model” for evaluating the impact of ICT on society:

- Benefits:
  - Economic
  - Education
  - Convenience and time
  - Entertainment
  - Communication
  - Access to information
  - Political and democratic
  - Reduction in risk
  - Ecological
  - Information ecology
- Disbenefits
  - Information overload
  - Unwanted information
  - Information inaccuracy
  - New forms of crime
  - Collateral economic damage
  - Vulnerability
  - Disruption and displacement
  - Destruction of social capital
  - Increased economic competition for advanced societies
  - Reductions in (or at least threats to) civil liberties
  - Globalisation of culture
  - Lower quality employment
  - Health risks

In an evaluation study of seventeen *infoDev* projects, Batchelor *et al.* (2003:48) relate that individual anecdotes showed that these projects were benefitting the families even though the evaluation of the specific benefits proved to be difficult or impossible. The evaluation of ICT4D initiatives presents a clearer picture when both quantitative and qualitative research strategies are deployed (Garrido, 2004:5). However, it is clear that the benefits of ICT projects are in the “*transformations they bring about*” (Harris, 2007:5). Chigona *et al.* (2011a:2) state that the benefits expected from public access to ICTs include the “*potential to enhanced quality of life*”.

Partridge *et al.* (2007:1-2) expected the following benefits in their community ICT project:

- increased ICT skills and knowledge for the residents of the community;
- increased understanding by the residents of the community of the potential of ICT in their lives, both personally and professionally;
- increased community capacity building within the area in which the community lives; and
- increased understanding and interaction between the community, a university and a state library

In their report regarding the evaluation of an e-health project, Buccoliero *et al.* (2008:4) noticed from previous research studies that IT benefits only become observable after a time lag, and although the measurement of all IT benefits is proving to be difficult, ICT projects generate very important intangible benefits. This notion is echoed by Pejovic, Johnson, Zheleva *et al.* (2012:2487) who propose using a multi-faceted or multi-dimensional metric that measures a number of items and examines the weight of benefits provided by using the Internet against the subjectively measured cost of access.

Results from a number of projects investigating various types of public access identified three main “first-order effects” (Sey *et al.*, 2015:75):

1. technology access
2. information access
3. development of ICT skills

In their study, Sey *et al.* (2015:75) *et al* also found that the centre’s positive impact was felt beyond the direct user in the sense that 10% of non-users have asked someone to use the centre on their behalf.

Intangible benefits and impacts are not easily defined and measured (Gomez, 2008:6) although they are very important in the evaluation of connectedness and empowerment which may further contribute to economic growth. A list of examples of intangible benefits comprises of human resource and infrastructure improvement, life expectancy, literacy rates, distribution of power, diet, income, poverty rates, occupational structures, and enlargement of people's opportunities for choice (Gomez, 2008:6).

Non-material benefits include increase in self-esteem or self-efficacy, expressions of aspiration, positive impact on personal relations, civic engagement (Gomez *et al.*, 2013:38-39). Aspirations capacitates a person's will and ability to embark on new ventures or make use of new opportunities (Ray & Kuriyan, 2010).

## **2.7 Conclusion**

This chapter presented a literature review of the evaluation of impacts and benefits in the ICT4D context. It showed that there are a great number of ICT projects deployed in communities by national and local governments, NGOs, and companies in the corporate sector, both world-wide and in South Africa. This is due to the belief that the use of ICT (computers and networked computers) will empower citizens, and bring change in the socio-economic situation of the members of the community.

However, the review of the literature in this chapter highlighted gaps in the research with regard to the benefits of ICT4D projects:

- ICT4D initiatives are not implemented in a formal or structured context and very often the aims of these projects are broadly stated.
- Some of the evaluation attempts of projects used frameworks or theories from other disciplines, whether suitable in the ICT4D context or not.
- The benefits of the deployment of ICT initiatives to the communities are not well defined.
- Success in the application of ICT to address fundamental societal issues in different cultures or socio-economic conditions and for a range of desired outcomes are extremely variable.
- There is a lack of sufficient insight into methods of evaluating the effectiveness of these ICT projects on socio-economic development.

This research seeks to investigate the question of how one should measure the benefits of interventions by government and other entities that provide public access ICT centres,

in communities for the upliftment of those communities. The first step towards such empirical work is to investigate more deeply the existing theories and frameworks for measuring the benefits of ICT projects to establish a conceptual foundation for the developing a framework for benefits. Chapter 3 presents a review of evaluation frameworks in the ICT4D context.



## **Chapter 3**

### **ICT4D Evaluation: Frameworks**

#### **3.1 Introduction**

A review of literature has shown that frameworks for ICT4D project evaluation are many and rooted in theories from multiple disciplines, including education, business, communications, economics, psychology, sociology and information technology (Baron & Bruillard, 2003; Millis & Mercken, 2004; Grunfeld, 2007:3, 2011:46). Evaluation methods from other domains include Amartya Sen's (Sen, 2001) Capability Approach (Gigler, 2004; Alampay, 2006b; Grunfeld, 2007:4), Sustainable Livelihoods Approach (Parkinson & Ramírez, 2006) and Participatory Monitoring and Evaluation Approach (Hickey & Mohan, 2004). All of these evaluation frameworks were applied with the objective to evaluate ICT4D initiatives and did not aim to measure benefits.

Therefore, these frameworks must be utilised to inform the development of a framework to identify benefits. The nature of benefits also needs to be extracted. Most of the time when projects were deployed in communities, the possible benefits were not defined at the planning and implementation stages. Very often the aim of the projects were different from the benefits (or disbenefits) found after implementation.

This chapter will address the following research sub-questions:

1. What theories and frameworks have been used in the evaluation of ICT4D projects?
2. What is the nature of the benefits of ICT4D projects?

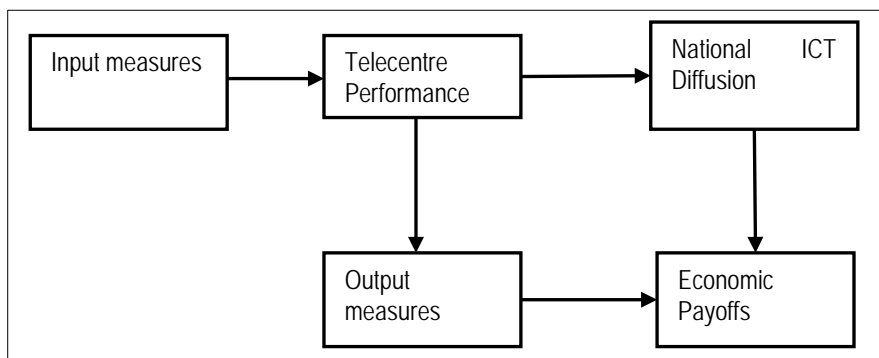
#### **3.2 An Overview of Evaluation Frameworks used in ICT4D studies**

The evaluation of projects that provide public access to ICT, which are deployed to add value to the quality of life of communities, is not a simple matter. Public access centres bring together human communities and social information systems which is emphasised by Whyte (1999:274), who pointed out that "*Traditional evaluation models do not necessarily deal well with adaptive complex systems, which is what human communities and social information systems are.*"

Early in the 21<sup>st</sup> century, the evaluation of ICT4D initiatives was carried out in a limited, ad hoc fashion and was often based on anecdotal evidence (O'Neil, 2001:7). Compounding the problem is that a variety of experimental frameworks, methodologies and methods are found in the body of project evaluation work in ICT4D with no clear indication as to which are the

most useful or appropriate. Examples of these are summarised in Hedberg (2010) who used Harris (1999) evaluation framework in an evaluation of a Malaysian telecentre.

In 2002 O'Neil (2002:88) concluded that the scarcity of research towards a framework for the evaluation of the benefits of ICT in communities could be because such an evaluation would have to include an assessment of social factors that are difficult to quantify and measure.



**Figure 3.1: Framework for Evaluating Telecentres**

(Source: Harris, 1999:2)

The evaluation of public access centres (or telecentres) only started in the late 1990s. Most of the scholarly literature regarding public access centres before 1999 dealt with the topics of designing and implementing telecentres and telecottages<sup>13</sup> (Harrison & Qvortrup, 1989; Qvortrup, 1989; Talero & Gaudette, 1995; Gómez, Hunt & Lamoureux, 1999b; Harris, 2001; Roman & Colle, 2002).

Harris (1999) began evaluating telecentres in developing countries by providing a framework for examining the role of ICTs in development (Figure 3.1) and for evaluating the “*contribution of telecentres to national diffusion of ICTs and its economic benefits*”. This framework analyses output measures relating to the achievements of the telecentre in its community that could be expressed as “*benefit to the community*”. However, the definition and evaluation of the benefits of ICT or ICT programmes/projects deployed in communities were not included in Harris’ evaluation framework. Heeks (1999: 4) argued that to understand ICTs, the concept of information needs to be understood first, implying that information should be the focus of any ICT analysis rather than information technologies.

<sup>13</sup> There are many terms that are used to describe centres that give free ICT access to marginalised communities, of which “telecottages” is but one. Telecottages were first introduced in Norway in 1985 to offer public access to computers and software.

Table 3.1 gives a chronological view of the evaluation frameworks found in ICT4D literature. .A short expansion of the usefulness of some of these frameworks to this study follows.

**Table 3.1: A chronological view of evaluation theories and frameworks in ICT4D**

Author, Year of publication	Theory
Whyte (1998)	Whyte's proposed approach to evaluating telecentres
Harris (1999)	Harris' framework for telecentre evaluation
Heeks (2002)	Information Chain (not an evaluation framework)
Bannister and Remenyi (2003)	Balanced Scorecard
Gong, Xu and Yu (2004) Musa (2006)	TAM
UNCTAD (2005)	ICT Diffusion Index at national level
Bridges.org (2005) in Gomez, Ambikar and Coward (2009:36)	Real access/real impact framework
Parthasarathy and Srinivasan (2006)	Ethnographic case studies
Gaved and Anderson (2006)	Social Capital Framework
ITU (2006)	Millennium Development Goals
Gigler (2004) Alampay (2006b) Franklin (2007) Grunfeld (2007) Kleine (2009) Heeks and Molla (2009b) Fassil (2009) Ibrahim-Dasuki and Abbott (2010)	Frameworks based (or partially based) on Sen's Capability Approach
Tibben (2007)	Nonaka and Takeuchi's Knowledge Management Framework (understanding of digital divide factors)
Hulbert and Snyman (2007)	Three-pronged data collection over a longitudinal study period (Participant observation, interviews, document analysis) Evaluation instrument
Ashraf <i>et al.</i> (2008)	Extended framework based on Heeks (2005a)
Parkinson and Ramírez (2006) Parkinson and Lauzon (2008) Heeks and Molla (2009b)	Sustainable Livelihoods Framework/Approach
Heeks and Molla (2009b)	Information economics
	Information needs/mapping
	Cultural-Institutional Framework
	Variables Relations Value Chain } evaluating Enterprise in Development
Heeks and Molla (2009b) Buré (2007)	Gender Evaluation Methodology
Hedberg (2010)	Harris' framework for telecentre evaluation
Herselman, Du Buisson, Marais <i>et al.</i> (2010)	Outcome Mapping
Gigler (2011)	ICT Impact Chain based on Sen's Capability Approach

Author, Year of publication	Theory
Grunfeld <i>et al.</i> (2011)	CESVS Framework based on Sen's Capability Approach
Kleine (2011)	Choice Framework based on Sen's Capability Approach
Hatakka and De (2011)	Capability Approach Framework
Kivunike (2014)	ICT4D evaluation model based on Sen's Capability Approach

The Balanced Scorecard was proposed by Bannister and Remenyi (2003) as a potential framework for evaluating the impact of ICT on society as a whole and not for projects or programmes in communities. The authors provided a useful list of benefits and disbenefits of ICT on society (see page 49).

In studies by Gong *et al.* (2004), the TAM model was enhanced to evaluate web-based learning in Hong Kong, and Musa (2006) used the TAM model to evaluate IT adoption for development in organisations in Africa. Garrido (2004) presented results of efforts to develop systematic evaluation frameworks for ICT4D in several domains, including ICT and civil society and telecentres. Bridges.org in South Africa developed the Real Access Framework during 2005 which sets out the factors/criteria to measure the extent of 'real access' to ICT (Gomez *et al.*, 2009:36). Their framework aimed to evaluate if the access to ICT went beyond computers and connections and affected socio-economic development (*ibid.*). The Real Access Framework sets out a roadmap to the digital divide to improve the way that ICT is integrated into projects and initiatives in various areas such as healthcare, education, small business development and government services (Gomez *et al.*, 2009:36).

Hulbert and Snyman (2007) developed an evaluation instrument that consisted of the following four broad phases (Table 3.2):

- Conceptualisation
- Implementation
- Evaluation and adjustment
- Sustainability

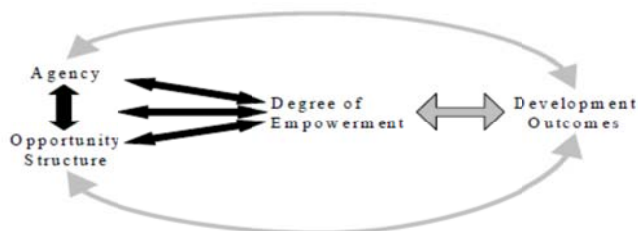
From Table 3.2 it is clear that greater emphasis was placed on measurable outcomes. The only possible non-measurable outcomes could be the perceptions of interviewed community members regarding the documented ease of accessibility and the awareness of the centre by the community members.

**Table 3.2: Evaluation and adjustment phase of the evaluation instrument**

UNIT	MEASUREMENT	DATA COLLECTION METHOD
Usage of centre	Number of people	Document analysis and interviews with staff of ICT centre
	Number of training sessions	
	Internet usage	
	Email usage	
	Other IT services	
Centre reliability	Up time of server	
	Up time of workstations	
	Connectivity to the Internet	
	Power availability	
	Access to third party	Interviews with centre staff
Assessment of user perceptions	Affordability	Registers, accounts, interviews with staff of ICT centre and community
	Appropriate services	Document analysis and interviews with staff of ICT centre and community members
	Ease of centre accessibility	
	Operating hours	
Awareness of centre		
Income	Amount	Document analysis and interviews with staff of ICT centre
Overheads	Amount	

(Source: Hulbert & Snyman, 2007:12)

Alsop and Heinsohn (2005:6) built a framework in which, according to their definition, “choice” is linked to “empowerment”. The framework in Figure 3.2 illustrates the viewpoint that an effective choice is influenced by agency, the ability to make meaningful choices, as well as by the opportunity structure, that is, the formal and informal contexts of the action. Empowerment is ‘generated’ in different degrees, and this is according to the degree to that the two factors are present.



**Figure 3.2: The Relationship between Outcomes and Correlates of Empowerment**

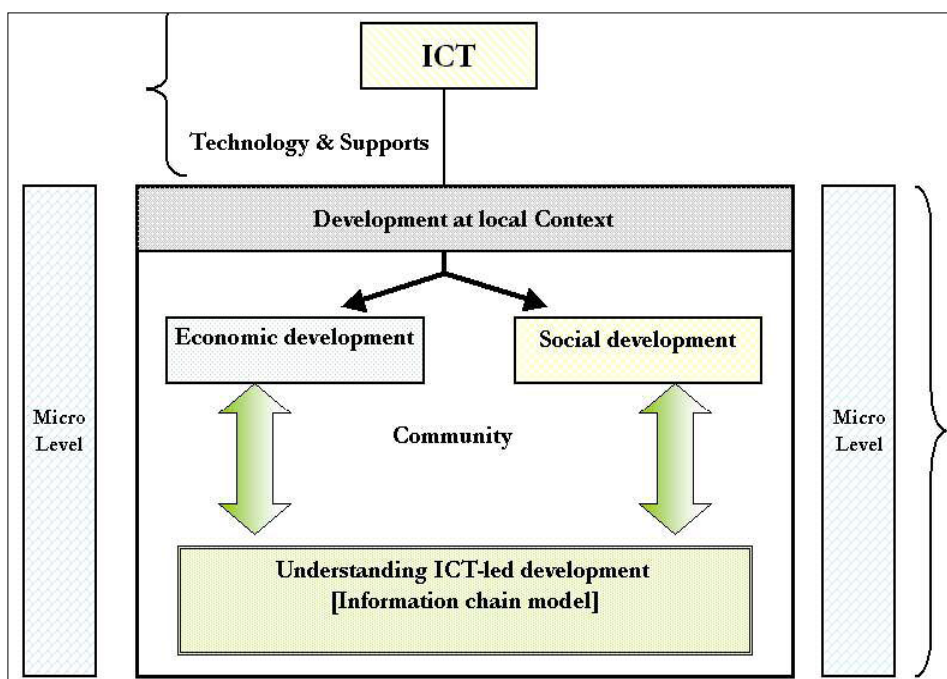
(Source: Alsop & Heinsohn, 2005:6)

The framework in Figure 3.2 considers the opportunity structure that must to be navigated using an individual’s own resources (agency). Making use of the opportunities leads to varying degrees of empowerment, which in turn, leads to development outcomes that affect the degree of empowerment

Parthasarathy and Srinivasan (2006) argued for using diverse methods and drawing from diverse disciplines when investigating economic and social changes brought about by ICTD. They used ethnographic techniques in their ICTD outcome evaluation case study in India and found these techniques especially effective in unravelling developmental processes in rural communities (Parthasarathy & Srinivasan, 2006).

The impact of ICT initiatives on social capital and quality of life were evaluated by Gaved and Anderson (2006), who defined “local ICT initiatives” as initiatives that “actively engage with assuring infrastructure development, services based on this infrastructure, and on-going social and technical support to the community”.

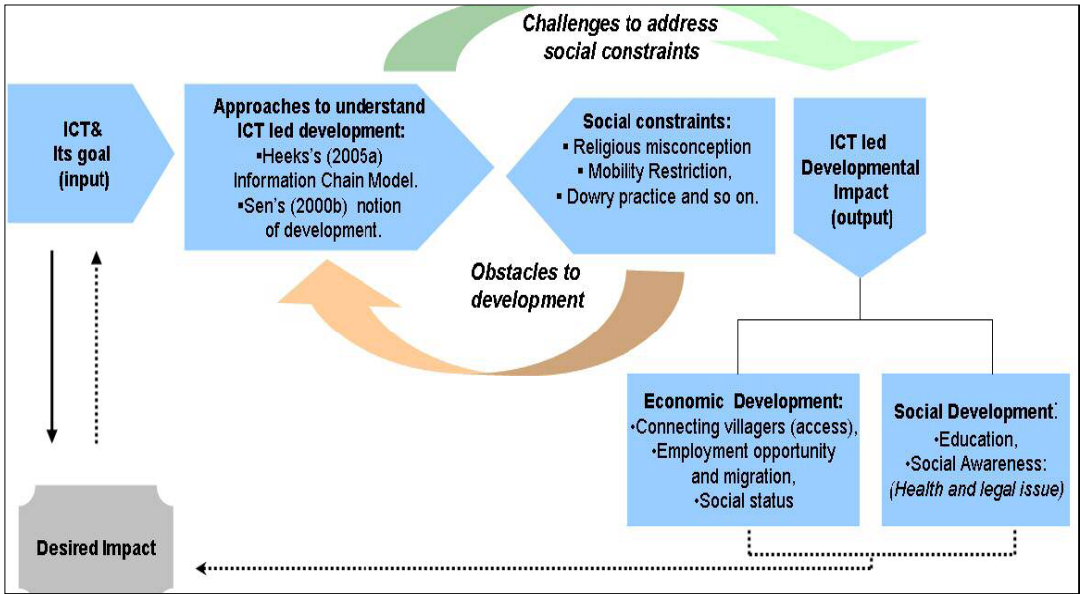
Ashraf *et al.* (2008) developed a framework to investigate the impact of ICT on the development of three villages in Bangladesh. Their research question was: “How does an ICT project impact participants’ quality of life at the community level?”. From an analysis of previous ICT impact research, the authors developed the extended framework as shown in Figure 3.3.



**Figure 3.3: An extended framework**

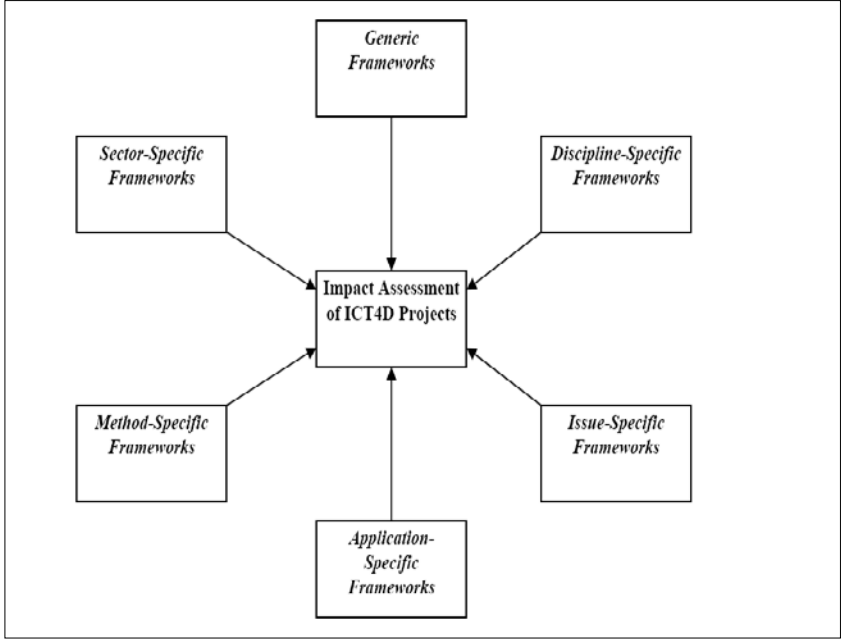
(Source: Ashraf *et al.*, 2008)

The framework in Figure 3.4 is refined to include social barriers, such as religious misconception and restriction in mobility that can hinder development (Ashraf *et al.*, 2008).



**Figure 3.4: Refined framework to investigate ICT led development at micro level**  
 (Source: Ashraf et al., 2008)

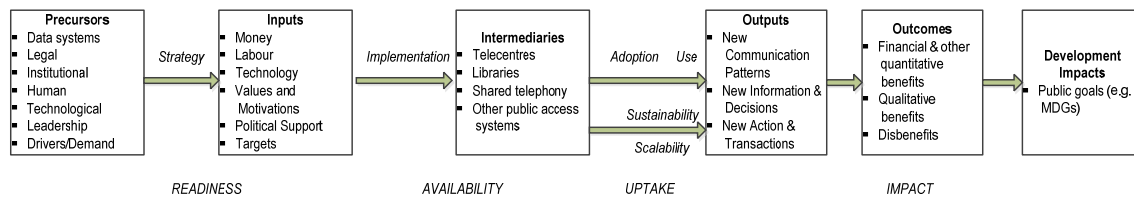
Heeks and Molla (2009b) presented an overview of ICT4D impact assessment frameworks using the model in Figure 3.5 to classify these frameworks.



**Figure 3.5: ICT4D Project Impact Assessment Frameworks Overview**  
 (Source: Heeks & Molla, 2009b:6)

Heeks and Molla (2009b:3) suggested the application of the ICT4D Value Chain as a basis for understanding the evaluation of ICT4D projects. Their focus was mainly on the assessment of impacts rather than on the other stages of the Value Chain. Similarly, in this

study the objective is to produce a framework for determining benefits that correspond to the impact stages of the ICT4D Value Chain (Figure 3.6).



**Figure 3.6: The ICT4D Value Chain**

(Source: Heeks & Molla, 2009b:3)

The authors classified benefits into two groups, namely ‘*direct benefits*’ and ‘*indirect benefits*’ (Heeks & Molla, 2009b:11). Direct benefits are further classified into two categories namely ‘*Income generated*’ and ‘*Time/money saved*’ (Heeks & Molla, 2009b:11). Indirect (also seen as intangible) benefits are defined as “*impacts on the wider community such as empowerment, equity, participation, feeling of inclusion, skills upgrade, etc. related to the outcome of the project*” (Heeks & Molla, 2009b:11). Heeks and Molla (2009b:7) “*Compendium of frameworks*” (Figure 3.7) classifies the frameworks in four of the six categories of the ICT4D project impact assessment frameworks overview in Figure 3.5.

A number of authors investigated or used frameworks and methodologies based on Sen’s Capability Approach (CA) (Alampay, 2006b; Franklin, 2007; Fassil, 2009; Heeks & Molla, 2009b; Zheng & Stahl, 2010; Gigler, 2011; Grunfeld *et al.*, 2011; Hatakka & De, 2011; Oosterlaken, 2011; Santhirasegaram, 2013; Ibrahim-Dasuki *et al.*, 2014; Kivunike, 2014; van Stam, 2014). The Capability Approach is discussed in Chapter 3.4 of this thesis.

A knowledge-based approach was used by Tibben (2007) to analyse ICT related projects in an attempt to re-conceptualise the digital divide. This author used the Knowledge Management Model proposed by Nonaka and Takeuchi (1995) in his analysis (Tibben, 2007:3-4). No attempt was made to analyse the benefits of these ICT projects.

In South Africa Hulbert and Snyman (2007:3) proposed the use of a measuring instrument to assess the “*effectiveness of ICT centre establishment*”. Their study, being the first longitudinal study of its kind, determined factors contributing to failures of telecentres in South Africa.

An extended framework to investigate the impact of ICT on the quality of life of the participants from the perspective of the community was developed by Ashraf *et al.* (2008). This framework was based on an input-output model, and adopted the information chain



developed by Heeks (2005a:9) and the notion of “*development as freedom*” by Sen (2001). Ashraf *et al.* (2008:11-12) noted with concern that social constraints are seldom addressed, making the developmental impact of ICT complex to understand. This evaluation study was also performed from the perspective of the community and not the donor. They noted that certain short term benefits may not result in long term benefits and may rather become detrimental to the community (Ashraf *et al.*, 2008:11-12).

Buré (2007:1) used a Gender Evaluation Methodology (GEM) to evaluate telecentres in Ecuador and the Philippines since they found that “*women and girls are poorly placed to benefit from the knowledge economy*”.

<i>Type</i>	<i>Sub-Type</i>	<i>Focus</i>	<i>Compendium No.</i>
GENERIC		<i>Cost-Benefit Analysis</i>	1
		<i>Project Goals</i>	2
DISCIPLINE-SPECIFIC	Communication Studies	<i>Communications-for-Development</i>	3
	Development Studies	<i>Capabilities/Sen</i>	4
		<i>Livelihoods Framework</i>	5
	Information Science	<i>Information Economics</i>	6
		<i>Information Needs/Mapping</i>	7
Sociology	<i>Cultural-Institutional</i>	8	
ISSUE-SPECIFIC		<i>Enterprise (Growth)</i>	9a (Variables) 9b (Relations) 9c (Value Chain)
		<i>Gender</i>	10
APPLICATION-SPECIFIC		<i>Telecentres</i>	11

**Figure 3.7: ICT4D Impact Assessment Frameworks in Compendium**

(Source: Heeks & Molla, 2009b:7)

Certain evaluations used theoretical frameworks and methods that are also used in the evaluation of information system projects in the business sector. This is supported by Ashraf *et al.* (2007) who argued for existing IS or ICT theoretical paradigms to be extended to create frameworks to evaluate ICT impacts on socio-economic development.

Outcome mapping (OM) as a framework for evaluating ICT projects has been implemented by Herselman *et al.* (2010) in assessing the Broadband for All (BB4All) wireless mesh network project in South Africa. However, Gomez and Pather (2012:8) argued that

*“The shift from evaluating impact to mapping outcomes comes at a cost: the detailed process to effectively conduct outcome mapping is extremely time*

*consuming, and the resulting findings offer limited explanation of the larger, broader or longer-term benefits social development is expected to produce.”*  
(Gomez & Pather, 2012:8)

Heeks and Molla (2009b) listed a number of frameworks and approaches for ICT4D evaluation. One of the approaches is the Sustainable Livelihoods Framework (SLF) that models various capitals to livelihood outcomes (Parkinson & Ramírez, 2006; Parkinson & Lauzon, 2008). Various researchers have used, or at least acknowledged, the SLF in their investigations into the impact of public access centres ((Gigler, 2004; Duncombe, 2006; Parkinson & Lauzon, 2008; Kleine, 2009; Rao, 2010; Gigler, 2011; Grunfeld, 2011; Kleine, 2011; Sey & Fellows, 2011; Garrido *et al.*, 2012; Heffernan *et al.*, 2012; Marais, 2012).

The SLF, together with the framework developed by Alsop and Heinsohn (2005), became the foundation from which researchers developed their own models. The SLF is an analytical framework that investigates the “*capitals*” or “*assets*” to which people have access and was formulated to analyse rural livelihoods by Scoones (1998:4). Four different types of capital (natural, economic, human, social) are included in this framework.

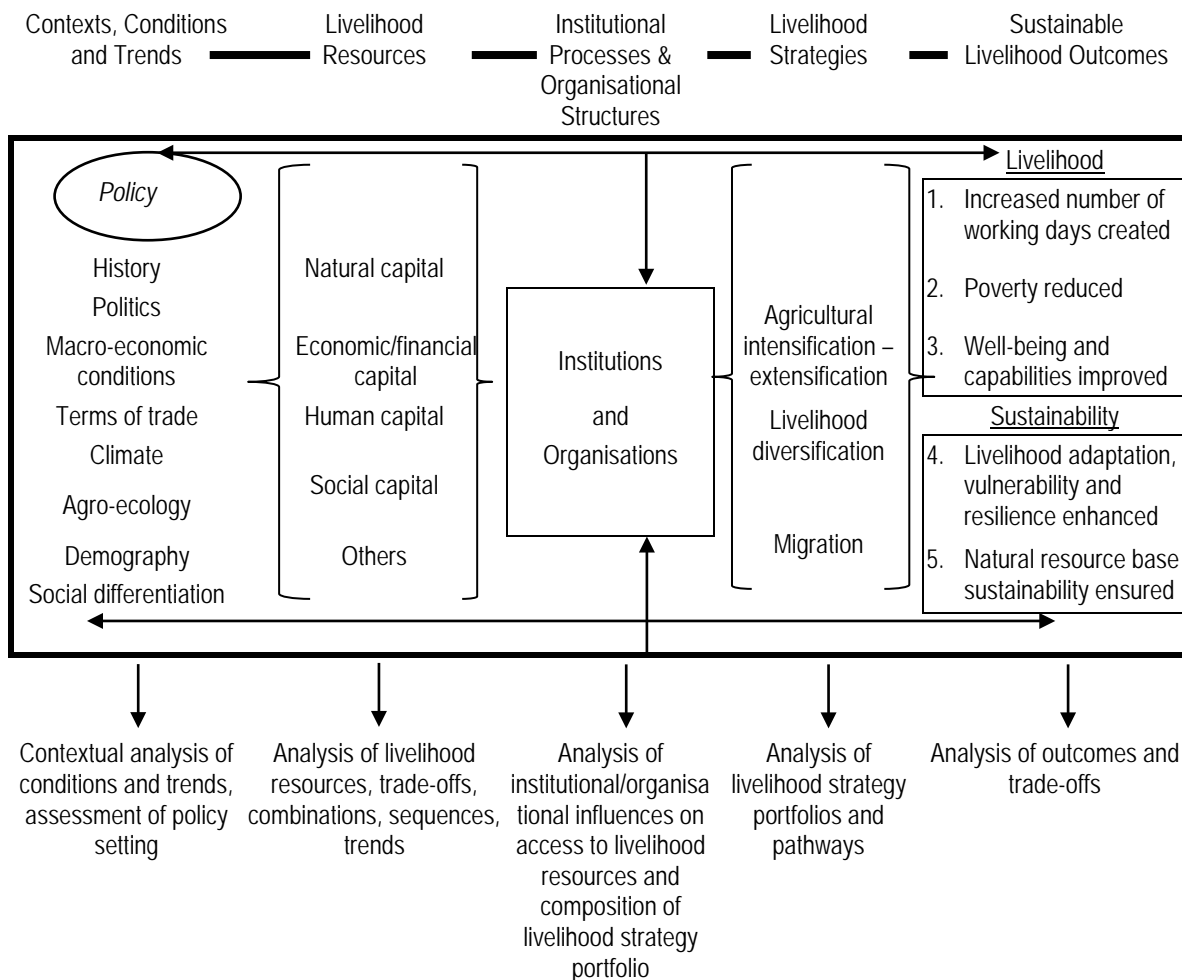
Bebbington (1999:2035) incorporated the CA into the SLF to develop the analytical framework based on capitals and capabilities and he extended this framework to include the following five capitals:

- Natural capital
- Economic/financial capital
- Social capital
- Human capital
- Cultural capital

Parkinson and Lauzon (2008:24) included theoretical perspectives of the SLF and the knowledge information systems in a revised version of the SLF (Figure 3.8) to analyse the functioning and the impact of the telecentre and the Internet on beneficiaries.

The Sustainable Livelihoods Framework addresses the question: “*what combination of livelihood resources (different types of capital) result in the ability of the poor to follow a combination of livelihood strategies with what outcome on their wellbeing?*” (Scoones (1998) cited in Gigler (2004:6).

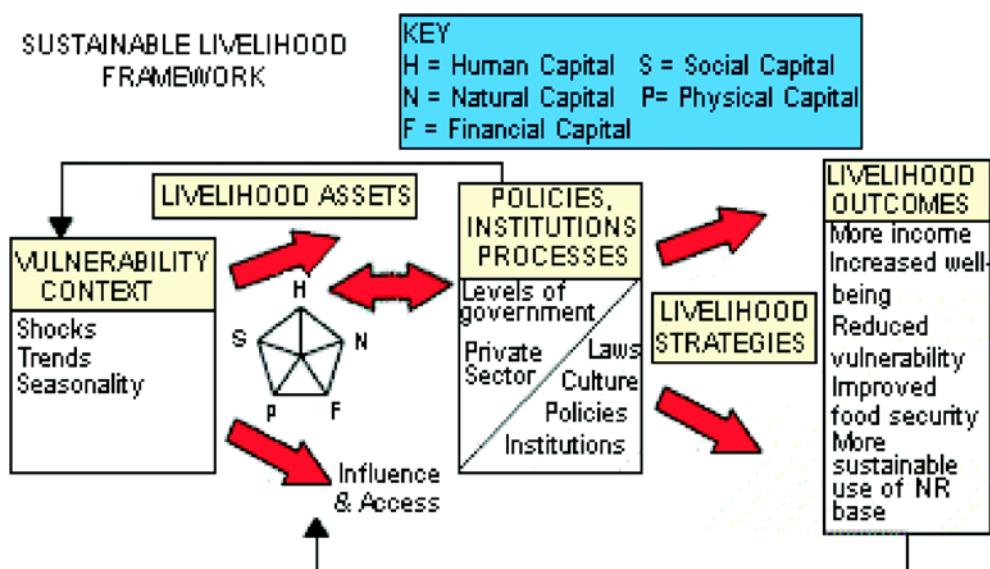
**Table 3.3: The Sustainable Rural Livelihoods Framework**



(Source: Scoones, 1998:4)

Parkinson and Lauzon (2008:24) also pointed out that the inclusion of the two theoretical perspectives flows from the definition of “*development as individual freedom*”, explored by Sen (2001) and cited by Parkinson and Lauzon (2008:24)

In the quest to find a framework to evaluate the benefits of ICT4D initiatives on underserved and poorer communities, it is necessary to ask the questions: ‘*what type of benefits*’ and ‘*how does ICT4D initiatives affect communities?*’ This impact should ideally be in the area of development that includes the aspect of human development. The following section examines this in more detail.



**Figure 3.8: The Sustainable Livelihood Framework**

(Source: Parkinson & Lauzon, 2008:24)

### 3.3 Human Development

A pertinent question is *'what is the '4D' in ICT4D?'* This necessitates a discussion of the *'4D'* (*'for development'*) concept. In this research, the assumption (or decision) is that the *'4D'* points to *'for human development'*, which is one of the main cornerstones of community development.

Many authors seek to interrogate human development and its meaning (Sen, 1990:3; Qizilbash, 1996; Garonna & Balta, 2002; Gasper, 2002; Fukuda-Parr, 2003; UI Haq, 2003a; Alkire, 2005; Robeyns, 2005; Sen, 2005; McIver, 2006; Alkire & Deneulin, 2009b; Alkire & Deneulin, 2009a; Clark, 2009; Hamel, 2010; Deneulin, 2011; Poolman, 2012; Usman-Hamza, 2012). During the 1980s and 1990s the topical discussion of the human development discourse was defining human development to include more than mere economic measures. This advanced during the first decade of the 21<sup>st</sup> century to discussing tools and means (specifically ICT) to affect human development positively.

Frequently, a complaint surfaces in the human development literature bemoaning that development has historically too often been defined in tangible or economic terms (Alkire & Deneulin, 2009b:13; Ibrahim-Dasuki & Abbott, 2010:5; Hatakka & Lagsten, 2012). For example, since 1990, the United Nations Development Programme (UNDP, 1990:10) has produced an annual report, the Human Development Report, which assesses many aspects, including the quality of life of a population, and measures everything except *'what makes life*

worthwhile'. This report defined human development as "both the process of widening people's choices and the level of their achieved well-being" (ibid.).

Sen (1993:30) argues that it would be more expedient to measure well-being by focusing on what people are capable of doing or being, rather than focusing on the intangible, such as their contentment, or measurable resources, such as income.

UI Haq (2003b) in Alkire and Deneulin (2009b:26) states:

*"The basic purpose of development is to enlarge people's choices. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures: greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, satisfying leisure hours, political and cultural freedoms and a sense of participation in community activities. **The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives**" (UI Haq, 2003b:17)*

Certain agreed aspects of human development are given in Table 3.4.

**Table 3.4: Extract from 'The human development paradigm' by UI Haq (2003b)**

- "Development must put people at the centre of its concerns.
- The purpose of development is to enlarge all human choices and not just income.
- The human development paradigm is concerned both with building human capabilities (through investment in people) and with using those human capabilities more fully (through an enabling framework for growth and employment).
- Human development has four essential pillars: equality, sustainability, productivity and empowerment. It regards economic growth as essential, but emphasises the need to pay attention to its quality and distribution, analyses at length its link with human lives and questions its long-term sustainability.
- The human development paradigm defines the ends of development and analyses sensible options for achieving them."

(Source: Alkire & Deneulin, 2009b:26)

The aspect of choice is thus very important in the academic discourse of development. Alkire and Deneulin (2009a:27) researched the relationship between choice and the values of people in the realm of human development. They found that human development is

*"... fundamentally, engaged in an ongoing conversation about what it would be most valuable for us to do next." (Alkire & Deneulin, 2009a:27)*

The life lived depends partially on the freedom of choice in "commodity bundles" (Sen, 1988:2).

According to Spence and Smith (2010:13), the human development movement “*advances combinations of economic development, social justice and social choice*”. Spence and Smith (2010:13) quoted Sen (1999:201-202) in stating that a good way of increasing social choice is by informational broadening. Human development should expand people’s capabilities in all areas of life, not only in the economic area (Spence & Smith, 2010:13). The challenge of human development is to pay specific attention to expanding the freedoms and capabilities that are very important to people in their lives (Sen, 1990:15).

### **3.3.1 Sen and human development**

Amartya Sen’s seminal works that include welfare economics, social choice and development economics inspired the Human Development Approach (Alkire & Deneulin, 2009a:30). It is, however, his Capability Approach that is credited to have advanced new directions of thought in social sciences and specifically in human development. Amartya Sen, a 1998 Nobel Laureate, published the book “*Development as Freedom*” in 1999, which became the seminal literature on the Capability Approach (Sen, 2001).

Sen holds that development should be inclusive (Sen, 2001; Hatakka & Lagsten, 2012), and should not be measured on limited, specified variables only. Concentrating on expanding people’s freedoms or enabling new freedoms brought the focus on access to information and initiated the investigation into whether expansion of information or access to information increases people’s freedoms and choice or not (Hatakka & Lagsten, 2012).

Inspired by Amartya Sen, Gigler (2004:6) voiced concern that human development should primarily be viewed as a process of expanding and increasing a person’s capabilities, which is, according to Sen, what people are capable of being, or doing, with what they are able to access.

Sen gave new importance to variables not previously included when analysing well-being and poverty (James, 2006a:340). Maslow’s hierarchy of needs is well-known in literature. However, people living in the poorer underserved communities are concerned with more than Maslow’s basic needs (*ibid.*). The anthropological findings, according to James (2006a:340), demonstrate examples of people purchasing non-basic (even luxury) items, even before basic needs were met, showing that they are not only concerned with their physical functioning but also with self-respect, a sense of belonging and status (*ibid.*).

The following sections will expand on the CA and its role in development and ICT4D in more detail.

### 3.4 Capability Approach

The Capability Approach (CA) was developed and refined by Amartya Sen (Sen, 1985, 1988, 1990, 1993, 1997, 1999, 2001, 2003, 2004, 2005) who introduced it in the Tanner lecture in 1979 (Zheng & Stahl, 2011:3).

The CA has been utilised in many fields such as development thinking, welfare economics, social policy, and political philosophy (Robeyns, 2005:3). A number of ICT4D researchers have also delved into the use of CA in their research projects (Gigler, 2004; Alampay, 2006b; Alampay, 2006a; Grunfeld, 2007, 2009; Kleine, 2009; Oosterlaken, 2009; Ibrahim-Dasuki & Abbott, 2010; Grunfeld, 2011; Grunfeld *et al.*, 2011; Kleine, 2011; Oosterlaken, 2011; Oosterlaken & van den Hoven, 2011; Steen, Aarts, Broekman *et al.*, 2011; Vaughan, 2011; Zheng & Stahl, 2011; Kullman & Lee, 2012; Oosterlaken, 2012)

Robeyns (2005:3) referred to the CA as

*“[A] broad normative framework for the evaluation and assessment of individual well-being and social arrangements, the design of policies and proposals about social change in society”.* (Robeyns, 2005:3)

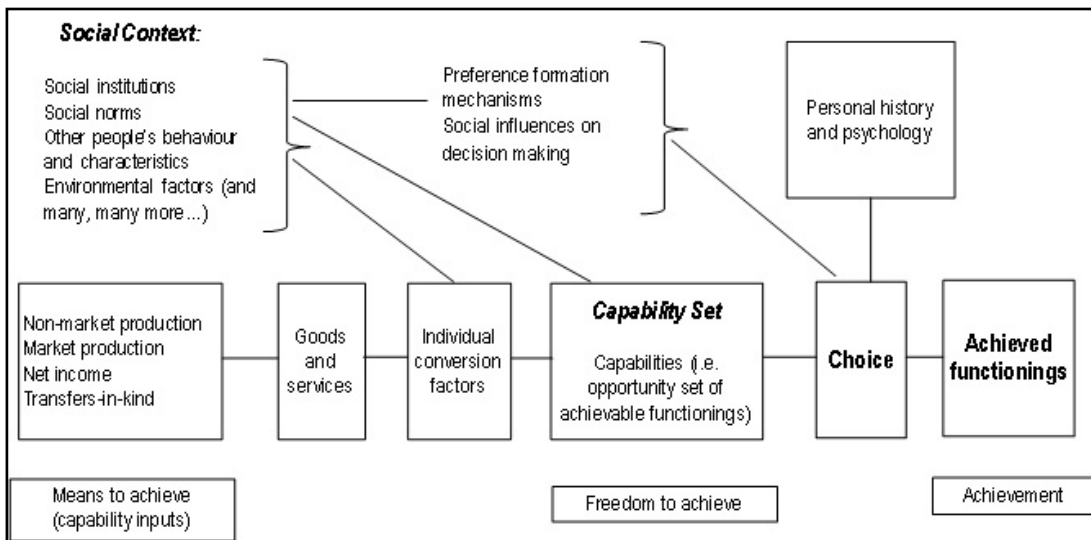
Clark (2008:3) explains the distinction of the elements of the CA in the following way:

*“Commodity (Goods) → Capability (to function) → Function(ing) → Utility (e.g. happiness)”* (Clark, 2008:3)

The CA accounts for *human diversity* by focussing on the social and institutional context in which the various functionings and capabilities as well as the conversion factors of goods into functionings must take place (Robeyns, 2005:10).

Robeyns (2005:9) explained the distinction in the CA between the means (such as goods and services) and functionings and capabilities by way of the schema in Figure 3.9.

Robeyns (2005:9) pointed out that ‘a good’ has characteristics, making it ‘of interest’ to people. Very often, this ‘interest’ lies in its inherent usefulness. For example, mobile phones are interesting because of the communication abilities they give us; the ability to communicate with almost anybody, anywhere and from place in the world far quicker than writing letters and far more conveniently than locating a landline telephone. Thus, goods or means should enable a functioning



**Figure 3.9: Robeyns's stylised non-dynamic representation of a person's capability set and the social and personal context of this person**

(Source: Robeyns, 2005:31)

Clark (2008:2) linked development of the CA theory to the “*Basic Needs Approach (BNA)*” of Streeten (1984) and Stewart (2006). In his defence of the CA, Clark quotes Alkire (2002:170) in the following way:

*“[T]he single most important function of the CA is to make explicit some implicit assumptions in the BNA about the value of choice and participation (and the disvalue of coercion)” (Clark, 2008:2)*

Alkire (2005:118) explained that any formulation of capability should consist of two parts: “*valuable beings and doings (functionings), and freedom*”. He further states that a focus on functionings without incorporating the freedom of decision or choice would be incomplete (Alkire, 2005:118). This reverberates with the discussions relating to human development.

### 3.4.1 Capabilities

Capabilities are the various functionings or combinations of functionings that a person can achieve (Sen, 1990:44). Capabilities, therefore, is a derived notion. Capabilities consist of two inherent parts, namely, functionings and opportunity freedom (Alkire & Deneulin, 2009a:32). Alkire and Deneulin (2009a:32) explain that capabilities are the “*freedom to enjoy valuable functionings*”.

Therefore, a person's ‘**capability**’ refers to:



*“... to the alternative combinations of functionings that are feasible for her to achieve. Capability is thus a kind of freedom: the substantive freedom to achieve alternative functioning combinations (or, less formally put, the freedom to achieve various lifestyles)” (Sen, 1999:75).*

In other words, capabilities refer to the extent of one's positive freedoms and comprise of what a person has done or possibly can do (Gasper, 2002:5): the freedom to achieve combinations of functionings, and the freedom to choose various lifestyles. People's ability to realise their desired and valued functionings depends on their capabilities and their entitlements or assets (Gigler, 2004:5). The capability to evaluate to freedoms and abilities people have, to live the life they choose, is found in Sen's (2011) concept of “realisation-focussed comparison” (Histed, 2011:59).

### **3.4.2 Functionings**

Sen (1993:30) explains the CA as being concerned with a person's ability to achieve various functionings as part of his life. Functionings are the things that people value doing or being (Sen, 1990:43). Functionings are combined in the capabilities from which a person can choose. Thus, as Sen explains it:

*“The approach is based on a view of living as a combination of various 'doings and beings', with quality of life to be assessed in terms of the capability to achieve valuable functionings.” (Sen, 1993:31)*

Functionings are the valuable activities and conditions that comprise people's well-being in life and from which people can choose (Sen, 1988:32). These include being healthy, well nourished, safe, educated, having a good job and being able to visit loved ones (*ibid.*). Sen further suggests that if one has the freedom, the act of choosing may itself be a functioning (Sen, 1988:32). Functionings, however, can also describe people's ability to utilise goods (or commodities).

The functioning of a person demonstrates the person's achieved '*being*' and/or '*doing*' and the capability of a person is a set or combination of functionings that can be achieved by the person to make choices such as lifestyle choices (Clark, 2005:5). A functioning refers to the use a person makes of commodities at his or her command while a capability refers to the ability of a person to achieve a given functioning (*ibid.*). According to Sen (1999:75) the concept of functioning “*reflects the various things a person may value doing or being*”.

Functionings represent “*various components or aspects of how a person lives*” (Gasper, 2002:4). Zheng and Stahl (2011:71) describe functionings as the achievement and a capability as the ‘*capability to achieve*’. A person’s capability set ‘*reflects*’ the freedom the person has to lead a certain type of life (Sen, 1993:33).

### 3.4.3 Freedom

Sen (2001) explains that the “*expansion of freedom ... both as the primary end and as the principal means of development*” is the core concept of the CA. According to Grunfeld (2007:4):

*“In the CA framework, certain political and social freedoms, such as the freedom to participate in political activities and to receive basic education are considered to be constitutive of development (i.e. they are relevant whether or not they contribute to development and/or growth).”* (Grunfeld, 2007:4):

The essence of CA is that certain capabilities are necessary to achieve this freedom and development. Each individual and/or community should aim to translate these capabilities into functionings, which can then be seen as new capabilities that reflect the opportunities or freedom of choice for the person.

Sen (1985:203) distinguishes two types of freedoms, well-being freedom and agency freedom, in the following way:

*“Well-being freedom ... concentrates on a person’s capability to have various functioning vectors and to enjoy the corresponding well-being achievements. A person’s ‘agency freedom’ refers to what the person is free to do and to achieve in pursuit of whatever goals or values he or she regards as important”* (Sen, 1985:203)

Wellbeing freedom is a general freedom, whereas agency freedom is the freedom to achieve what the person sets out to achieve (*ibid.*). It is therefore important to bring the person’s objectives, allegiances and obligations into the equation.

Development should enable people to have more freedoms than they had in the past (Sen, 1985:203). The freedom to achieve something is called “*well-being freedom*” by Sen (1985:201) and “*agency freedom*” has to be seen as a broader freedom, and refers to the freedom to personally decide what is important for the individual to achieve (Sen, 1985:203). It is imperative, therefore, to take into account a person’s goals and values before the

person's agency freedom can be understood. This brings the discussion to the topic of agency, which is another important factor in human development.

#### **3.4.4 Agency**

Sen (2001), cited in Alkire and Deneulin (2009a:31), defines agency as the “*ability to pursue goals that one values and has reason to value*”. In other words, agency is the freedom that a people have to set and follow their own goals, and describes the active involvement of people in their own development (Kivunike, 2014:4). Sen (2001:19) defined an agent as “*someone who acts and brings about change*”. Enabling people to be agents of their own destiny is one of the major goals of human development (Alkire & Deneulin, 2009a:27). Development relies on the freedom that people have in their lives to make decisions and to choose the type of development they want in their lives. This also involves removing hindrances to development through their own efforts (Sen, 2003). Utilising one's agency to make certain choices may increase or diminish well-being (Robeyns, 2005:102), thus linking agency to choice.

#### **3.4.5 Conversion factors**

In order for functioning to achieve from the enabling good, or means, it is influenced by three sets of “*conversion factors*”.(Robeyns, 2005:10). Conversion factors are necessary for people to convert the characteristics of a good or means into a functioning (*ibid.*). These are personal conversion factors, social conversion factors and environmental conversion factors. Personal conversion factors include various skills, abilities, attitudes, education metabolism and physical condition. Social conversion factors include public policies, social norms, and gender roles. Environmental conversion factors include climate, infrastructure and geographical location (Robeyns, 2005:10).

Agency, together with the personal conversion factors, assist people to act on the choices and opportunities afforded them (Kivunike, 2014:5). This results initially in empowering them and subsequently in development outcomes (*ibid.*).

### **3.5 Criticism of the Capability Approach**

The CA has been criticised by a number of researchers, which, in the main, concerns the operationalisation of the approach (Clark, 2008:5). Clark (2008:5) notes that this criticism mostly centres on the identification of capabilities. He also doubts the usefulness of the CA if there are disagreements regarding the valuation of capabilities when making comparisons of well-being (Clark, 2008:5). Notwithstanding these criticisms, poverty, inequality and well-

being are analysed in terms of the increasingly influential CA, (i.e. the freedom people have to achieve their choice of 'beings' or 'doings') since in this framework expansion of human capabilities is included in development (Clark, 2009:22).

Alkire and Deneulin (2009a:34) related two types of criticism towards the CA that have emerged over the years. The first criticism concerns the role of choice. They noted that 'choice' in development reports and research is being used in the same sense as 'capabilities', which would exclude the concept of 'value' and "have reason to value" (Alkire & Deneulin, 2009a:34). Another problem in the language of "expanding choices" may lead to the idea that "more choices are always better" (Alkire & Deneulin, 2009a:34) .

The second criticism is the relationship of Sen's CA to individualism. Sen's idea of agency underlines his focus on "*individual freedom*", where the individual is an "*agent*" (doing things) rather than a patient (having things done to) (Zheng & Stahl, 2011:71). A number of papers and reports argue against this individualistic presumption that people act alone and not as members of a group such as a community. This emphasis on individuality brought about critique in the sense that not enough prominence is given to groups and social structures (Zheng & Stahl, 2011:74) in the CA. However much of the research work regarding the CA included groups of people, and that demonstrated that many choices are made by groups and not by individual people only (Alkire & Deneulin, 2009a:35).

Poolman (2012:3, 29) is concerned that Sen "*repositioned human freedom as the end as well as the means of development*" which could lead to the CA propagating power imbalances in that the value of freedom may dominate over fellow-humans and may further result in the breakdown of dialogical relationships.

The context of the primary research question concerns the benefits of public access ICT4D initiatives rooted in development, which is the major focus in the CA. Therefore the following section will give a brief overview of the CA in ICT4D research studies.

### **3.6 The CA in ICT4D studies**

Concerning ICT, Sen made the following observation in 2005:

*"However, with the development of the Internet and its wide-ranging applications, and the advance made in information technology (not least in India), access to the web and the freedom of general communication has become a very important capability that is of interest and relevance to all Indians."* (Sen, 2005)

Due to this sentiment regarding the CA, development and ICT, various authors in Community Informatics and ICT4D research domains have applied the CA philosophy in their research endeavours and included it in evaluation frameworks (Alampay, 2003; Gigler, 2004; Slater & Tacchi, 2004; Alampay, 2006a; Gigler, 2006; Grunfeld, 2007; Ashraf *et al.*, 2008; Parker, Wills & Wills, 2008; Ashraf, Hanisch & Swatman, 2009; Grunfeld, Hak & Pin, 2009; Kleine, 2009; Wills, Parker & Wills, 2009; Blake & Garzon, 2010; Hamel, 2010; Heeks, 2010; Kleine, 2010; Zheng & Stahl, 2010; Gigler, 2011; Grunfeld *et al.*, 2011; Hatakka & De, 2011; Kleine, 2011; Oosterlaken, 2011; Oosterlaken & van den Hoven, 2011; Toboso, 2011; Vaughan, 2011; Zheng & Stahl, 2011; Andersson, Grönlund & Wicander, 2012; Hatakka & Lagsten, 2012; Heffernan *et al.*, 2012; Kleine, Light & Montero, 2012; Maiye, 2012; Oosterlaken, 2012; Santhirasegaram, 2013; Ibrahim-Dasuki *et al.*, 2014; Kivunike, 2014; Stillman & Denison, 2014).

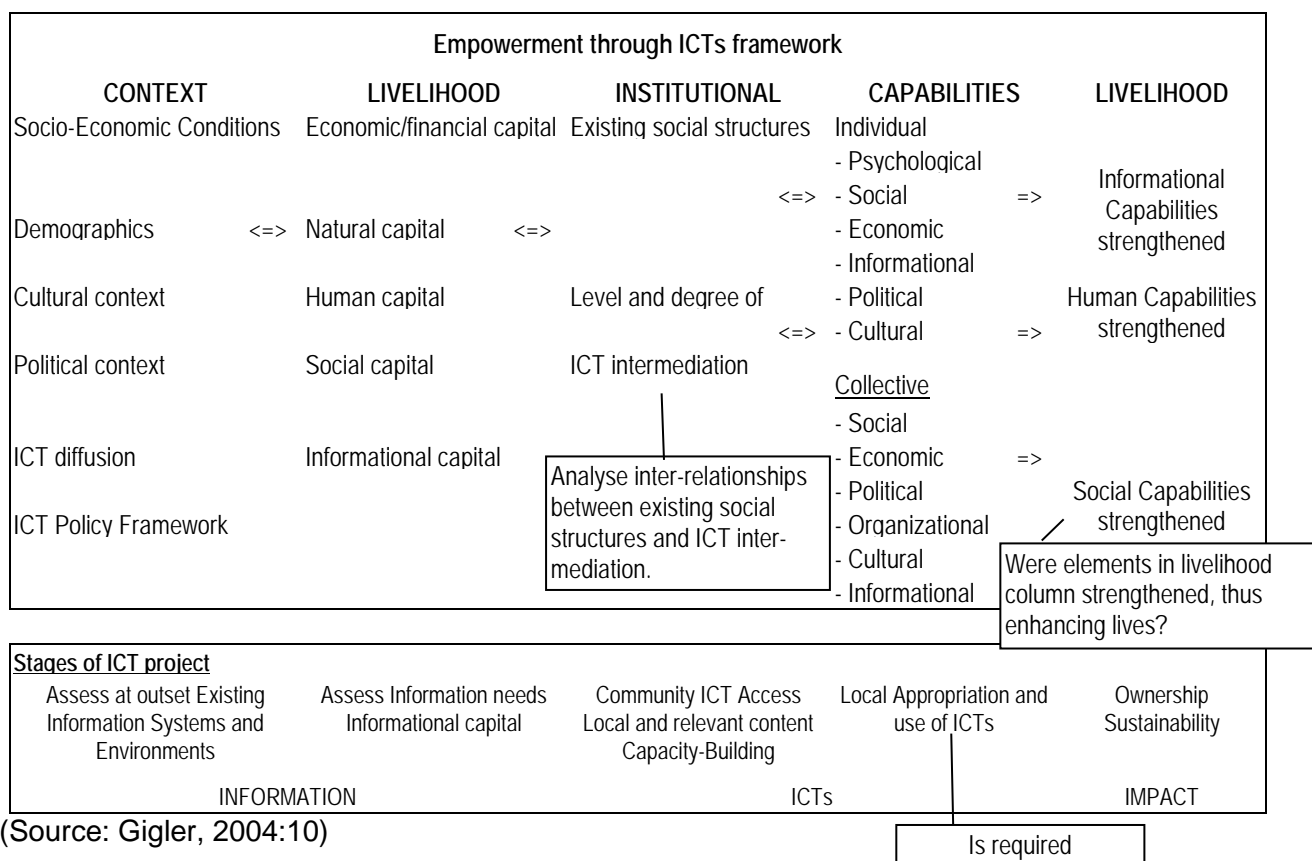
Based on the literature examined in this study, Alampay (2003) was the first researcher to utilise the CA in ICT4D research. Alampay (2003) used the CA in analysing access to ICTs in urban and rural areas of the Philippines to explore how capabilities, functionings and freedoms are influenced by key demographic traits in their communities, with respect to ICT use. Alampay (2003) emphasises the importance of investigating the access and use of ICTs at an individual or household level; as informed by the CA. This author also acknowledges the problems highlighted by other authors of operationalising the CA in dealing with the measurement of intangible capabilities (*ibid.*). He indicated that making use of ICTs (given that access is possible) depends on individual differences, capabilities and choice (Alampay, 2003:6).

Gigler (2004) used Sen's CA and the framework developed by Bebbington (1999) to formulate an Alternative Evaluation Framework (AEF) of ICT programmes in communities. Gigler (2004) includes '*informational capital*' as well as '*informational capabilities*' into the Livelihoods Approach, as can be seen in Table 3.5. Informational capital consists of four components: access to information from formal institutions; existing level and ability to use knowledge in a community; access to information from traditional information systems; and usage levels of traditional forms of ICT in communities. Gigler (2004:12) notes that enhanced informational capabilities can play a significant role in improving the well-being of a poor person. One of the foci of the framework is whether the information literacy and the ability to produce and disseminate information has been strengthened or not (Gigler, 2004:13).

Applying his AEF to two case studies of indigenous peoples of Latin America, Gigler (2004:11) found that improved access to ICTs does not have a direct impact on the lives of

poor communities; and that there is no causal relationship between “ICTs, information and empowerment”. However, Gigler (2004:11) stated that the ICT programme launched in the first case study did contribute to education objectives, and it created opportunities for youth to follow professional career. It was also clear that the success of the programme was partly due to a local NGO who played a key role in facilitating individual and collective empowerment of the peoples (*ibid.*). Gigler (2004:11) stressed that the effects of ICTs on empowerment must be analysed within the socio-economic and cultural context.

**Table 3.5: Gigler’s Alternative Evaluation Framework (AEF).**



(Source: Gigler, 2004:10)

In the second case study Gigler (2004:30) used the AEF (see Table 3.5) to assess whether the indigenous peoples were empowered and found that the programme being evaluated was unsuccessful due to various reasons. Gigler (2004:30) highlights a number of important factors that contributed to this failure. He demonstrated in the application of this framework that ICTs, under the right circumstances, could empower the poor by enhancing their human and social capabilities, but there is no direct relationship between ICT and the alleviation of poverty (Gigler, 2004:30). He stated that social, political and cultural factors are very important in influencing the successful outcome of ICT projects or programmes and that existing social structures and power relationships can be disrupted and altered by ICTs (*ibid.*). Gigler (2004:31) concluded that under certain conditions ICTs could empower the

poor at an individual and group level. The study also showed that the high expectations of the poor, due to the 'hype' around the potential of ICTs could often not be met. He further recommended that "*human development of people rather than technology itself should be at the centre of the design and evaluation of ICT programmes*" (Gigler, 2004:32). When the CA is used as the basis for the evaluation of ICT projects and programmes, the ability of ICTs to improve the daily lives of poor communities should be emphasised, and the perspective should be the recipients of the project (in his case the poor) rather than the donor (Gigler, 2004:32).

Alampay (2006a) applied the CA to analyse access to ICTs in the Philippines and Grunfeld (2007) used the CA to plan the development of an evaluation framework, the CESVS Framework, (Figure 4.2), to assess contributions of ICT to the empowerment of disadvantaged indigenous communities in north-eastern Australia.

Zheng and Walsham (2008) applied the CA in their study on social exclusion in the e-society from the human development perspective. Nigerian pre-paid electrical billing was used as a case study in an effort to evaluate the effect of ICT on development by Ibrahim-Dasuki and Abbott (2010).

Bok (2010:2), citing Appadurai (2004), describes the ability to aspire as the ability to "*read a map of a journey into the future*". Aspiration is a person's intricate understanding of future pathways that can be accessed (Bok, 2010:2). Choosing which pathway to follow requires knowledge and experience (*ibid.*).

Breytenbach, de Villiers and Hearn (2013) explains that ICT4D projects should follow the comparative realisation approach, formulated by Sen (2011), having a flexible path, and not having a fixed end result, or a perfect technology solution. These projects must have a continual evaluation of possibilities and opportunities that can increase people's freedoms.

Gomez *et al.* (2013) advocated for an approach that measures the non-material impacts of ICT4D. These included self-efficacy or self-esteem, expression of aspirations, personal relations, and civic engagement (Gomez *et al.*, 2013).

Uimonen (2015:260) concluded that with the growth of ICT4D research, it can "*hardly be said that the only evidence on ICT4D is anecdotal*". The author proposes that ICT4D initiatives or interventions will often have some impact on development, even if their own project goals were not met (Uimonen, 2015:251). A body of knowledge grew from the research efforts of a number of ICT4D practitioners and students, some of which will be elaborated upon below.

### 3.7 Conclusion

Frameworks deployed in the realm of ICT4D ranges from quantitative in nature (e.g. the balanced scorecard) to qualitative in nature (e.g. evaluating potential versus achieved functionings). The concept of development first appeared in evaluation frameworks from 2003 facilitating the investigation of intangible benefits.

Five models/frameworks have been identified as being of specific importance to inform a framework to measure benefits of ICT projects deployed in communities. These are:

- The Capability, Empowerment, Sustainability Virtuous Spiral (CESVS) (Grunfeld *et al.*, 2011) model, which was designed to investigate and understand the processes associated with the realisation of the benefits of ICT.
- The Choice Framework developed by Kleine (2009), which operationalises the Capability Approach.
- The ICT Impact Chain developed by Gigler (2011), which evaluates the impact of ICT in terms of expanded capabilities and enhanced well-being.
- The Capability Approach Framework developed by Hatakka and De (2011), which focuses on potential versus achieved functionings
- The ICT4D Evaluation Model developed by Kivunike (2014), which recognises choice as an achievement.

These models attempt to operationalise the Capability Approach and also acknowledge the crucial elements of agency, choice and aspirations in making decisions. The following chapter will elaborate on these models and through a process of reflection and synthesis develop an initial framework for the benefits of public access initiatives, while being cognisant of the elements in the five models above.



## Chapter 4 Conceptual Framework for Benefits

### 4.1 Introduction

The significance of benefits realisation of IT or ICT projects in the business or commercial world lies in its impact on time and on bottom-line profits, as well as on the efficiency of work processes. Breytenbach *et al.* (2013) explains that ICT4D projects should follow the comparative realisation approach, formulised by Sen (2011) having a flexible path, and not having a fixed end result, or a perfect technology solution. These projects must have an continual evaluation of possibilities and opportunities that can increase people's freedoms. When communities are involved these effects are far more complicated, even impossible to detect or measure. The significance of ICT projects in communities lies in the realm of human development, because the motivation for deploying such projects is often given as the assistance of communities in need.

Therefore, the impact on development, specifically human development, of ICT4D initiatives in underserved or poorer communities, is paramount in any study or investigation of the benefits, in rural, peri-urban or urban areas. Some impact of ICT on development in certain areas has been noted with caveats (Heeks, 2010:635). There is research evidence showing development in economic growth, development in sustainable livelihood and "*development as freedom*" (Heeks, 2010:635). However, in certain areas, impacts such as these are not clearly visible. Furthermore, Heeks (2010:637) advocates for ICT projects that are not merely progressive but also transformational in their impact on development. Thus, development impacts are an important consideration in the investigation of benefits of ICT4D initiatives.

Information, together with knowledge, plays a pivotal role in development, but although Heeks (1999:4) maintained that information should be at the centre of ICTs in any analysis, it is the use of information (i.e. informational capabilities, as coined by Gigler (2004:9)) in relation to ICT4D to increase development that is important in this study.

Aspects that are of equal importance in the development realm are the increase of capabilities, empowerment, and sustainability. The analysis of the expansion of capabilities is rooted in Sen's Capability Approach, a normative approach in the realm of development (Grunfeld, 2011:65). Empowerment occurs at different levels (Gigler, 2004:4-5), the individual level, the community level and the society-wide level. The development of self-esteem increases when empowerment increases at an individual level. At the community

level, empowerment is seen in the role played by community organisations and at the societal level, empowerment focuses on social and political change at the macro-level.

Therefore, the purpose of this chapter, is to develop and present a framework encompasses capabilities, choice, and empowerment, that can be used to the identify benefits of public access initiatives deployed in communities.

#### **4.1.1 Kleine's Choice Framework**

Kleine (2009) explained that it was the intention of Amartya Sen that the CA be operationalised by drawing elements of other theories together. Usually, the theories from which elements are drawn are the SLF and empowerment, as defined by Alsop and Heinsohn (2005:10). Alsop and Heinsohn (*ibid.*) defined the degrees of empowerment as existence of choice, use of choice and achievement of choice.

In Kleine's Choice Framework (CF), elements of SLF and empowerment were drawn into the CA in a case study regarding telecentres in rural Chile in order to present a systemic and holistic analysis (Figure 4.1). According to Kleine (2009:110) the primary outcome and the means of development is choice, and from this follows the secondary outcome/s such as easier communication and increased knowledge. The CF measures functionings achieved from an individual's choices rather than capabilities. The 'dimensions of choice' included in the CF lists:

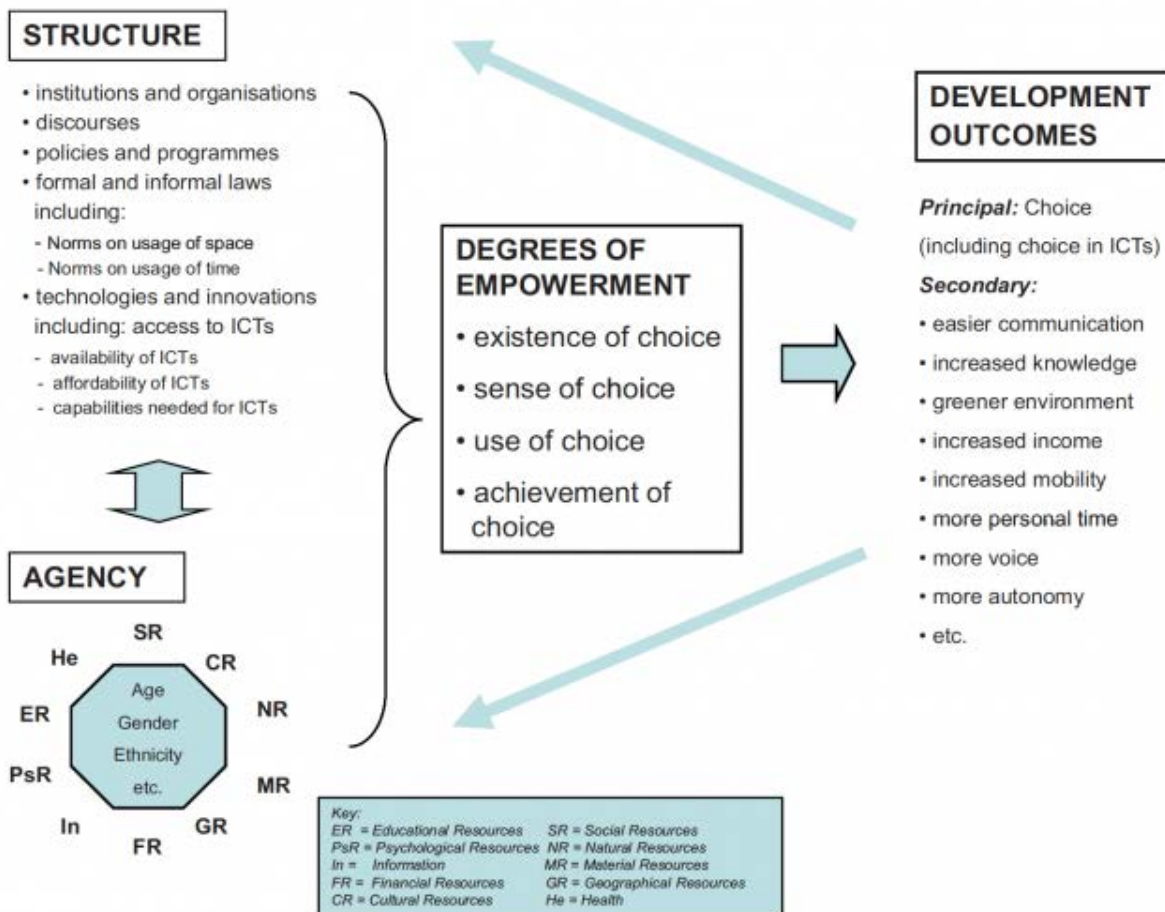
- existence of choice (if different possibilities exist within reach of individuals);
- sense of choice (awareness of possibilities by individuals);
- use of choice (if individuals made choices); and
- achievement of choice (if the outcome matched the choices made)

Kleine (2009:111) uses the term '*resources*' instead of '*capitals*' which she interprets as an individual's agency. The CF conceptualises age, gender, ethnicity etc. as personal characteristics "*which may in a given social context become related to socially constructed axes of exclusion and influence the scope and scale of the resource portfolio*" (Kleine, 2009:111). Resources include social, material, financial, natural, geographical, human, cultural and psychological resources as well as informational assets. Kleine (*ibid.*) pointed out that the agency is used to navigate the structure, given in the CF, which in turn is necessary to realise the resource-based agency. When navigating the structure communities or people become aware of and make use of choices that could lead to

developmental outcomes. These developmental outcomes, in turn, strengthen a person agency, which, in turn, strengthens the utilisation of the structure. The utilisation of the structure has, of course, a positive influence on a person's agency.

Informal or formal laws, policies, institutions and processes stemming from discourses are included in the structural factors that support (or constrain) the resource-agencies. As far as ICT is concerned: the access, availability, and affordability of ICTs and the skills needed for using ICTs are also included as elements of the structure.

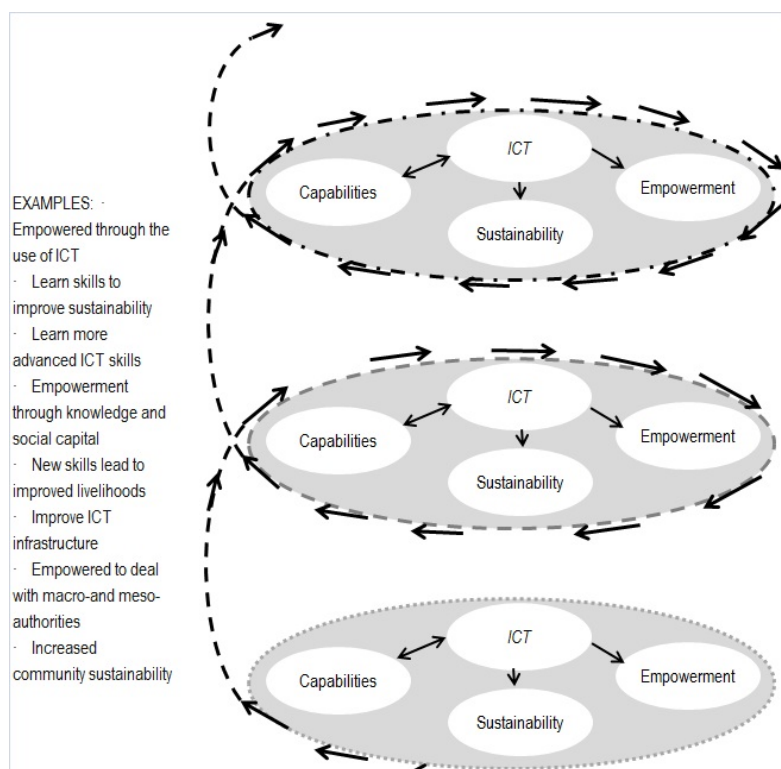
The main aim of the CF is the operationalisation of the Capability Approach to development. (Kleine, 2009:110). Kleine (*ibid.*) pointed out an important insight that capabilities are not measured directly but rather revealed by individuals and groups. Analyses based the CF works from the outcomes backwards to the structure and resources; in order to determine how projects arrived at these outcomes.



**Figure 4.1: The Choice Framework**  
(Source: Kleine, 2009:110)

## 4.1.2 Grunfeld's CESVS

Grunfeld *et al.* (2011) utilised the CESVS Framework (Figure 4.2) to explore how an ICT4D project deployed in a community or a number of communities can contribute to the development of capabilities, empowerment and sustainability. This framework describes a “*virtuous spiral dynamic*” between the use of ICT and the increase of capabilities, empowerment and sustainability (Grunfeld, 2011: 63)



**Figure 4.2: The capability, empowerment and sustainability virtuous spiral**

(Source: Grunfeld, 2011: 63)

The framework consists of four constructs: ICT, capabilities, empowerment and sustainability. Physical access to ICT is a commodity, a means through which an individual can achieve capabilities and functionings (Grunfeld, 2011:63-67). Empowerment is an essential construct because it enables individuals to remove barriers and provide opportunities to acquire or improve capabilities. Sustainability, in this framework is viewed as having a broader focus than the ecological environment alone. Information and Communication Technology has the potential to affect the ecological dimension (greener life) as well as the social (responsible behaviour) dimension. The timing element in the virtuous spiral of the model is of the utmost importance since early benefits may disappear in time

and certain impacts may only be noticeable after a while (Grunfeld, 2011:77). It is probable that some changes will only become evident over time (Grunfeld, 2011:78).

The three elements of this framework are i) a forward-looking longitudinal perspective; ii) research into micro-, meso- and macro-levels in geographic and conceptual dimensions; and iii) participatory methodology.

Implementing this framework would mean extending the research period over a number of years, in order to obtain a longitudinal perspective.

### **4.1.3 Gigler's ICT Impact Chain**

The ICT Impact Chain was developed by Gigler (2011) and was based on the AEF (Table 3.5). The AEF acknowledges i) the notion that the use of ICT '*has mostly indirect rather than direct effects on the livelihoods of the poor*'; and ii) that the relationship between access to technology, information, human capabilities and well-being are probably not causal but rather a complex relationship within the broader sustainable human development context (Gigler, 2011:12). Gigler (2011:2) also pointed out that his research and construction of the ICT Impact Chain was informed by the concept of "*effective use*" developed by Gurstein (2003). Gurstein (2007:49) defined effective use as: "*The capacity and opportunity to successfully integrate ICT into the accomplishment of self or collaboratively identified goals*".

The ICT Impact Chain describes the principal factors as well as the process of improving people's well-being and development with the access to and usage of ICT.

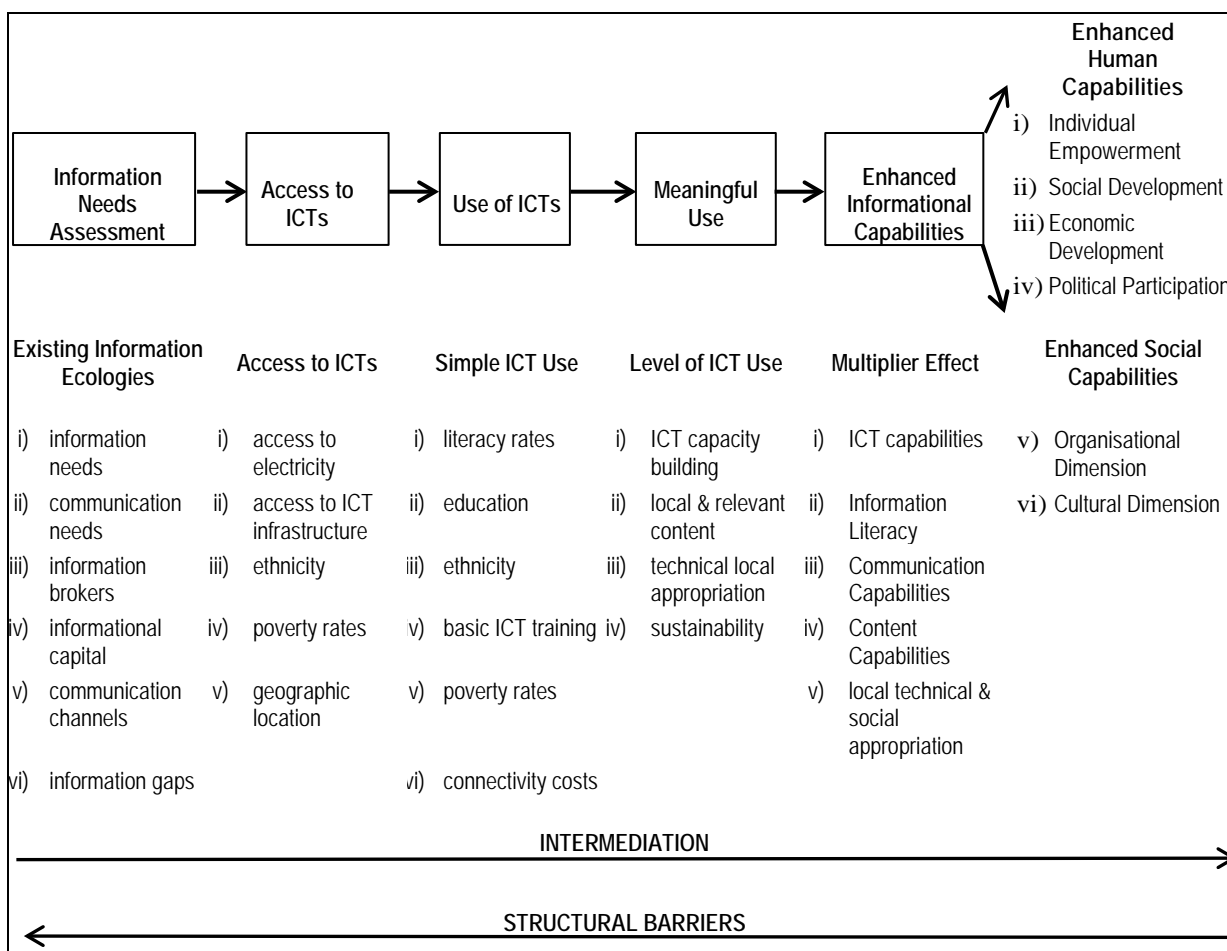
This process follows a model based on five steps:

1. An assessment of critical information needs to strengthen existing informational capital, to be accepted by communities and to be sustainable in the long term.
2. An assessment of communities' ability and skills-levels in the use of ICT.
3. The conditions for transforming ICT use into meaningful use of ICT.
4. An essential analysis of necessary conditions for the meaningful use of ICT to translate into an increase of informational capabilities.
5. An investigation into whether informational capabilities enhanced human and social capabilities – on a personal and social level or not.

The ICT Impact Chain (IIC) applies the Capability Approach to ICTs in the form of "*informational capabilities*" (Gigler, 2011:7, 12), to "*unpack*" the link between ICT and development. Informational capabilities consist of the interdependent concepts of

information literacy (how to use information), ICT capability (knowing how to use ICT in an effective way), communications capability (how to communicate effectively) and content capability (how to produce and share local content over the network) (*ibid.*).

The IIC categorises various forms of intermediation in ICT programmes (Gigler, 2011:9) under ICT (or technical) intermediation, and social intermediation. Information and Communication Technology intermediaries are those who support local communities in their ICT use, such as government, or a donor. Social intermediaries are local institutions that assist in ‘*embedding*’ the ICT programme in the local organisational structures.



**Figure 4.3: ICT Impact Chain: a 5-step process**

(Source: Gigler, 2011:14)

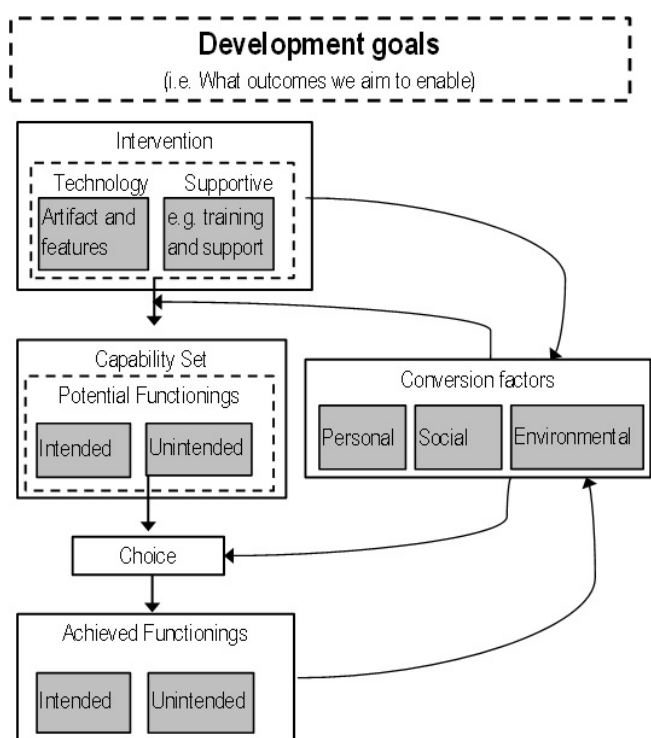
The Capability Approach Framework created by Hatakka and De (2011) (Figure 4.4) is the next to be highlighted. This framework is designed to evaluate ICT4D interventions.

#### 4.1.4 Hatakka and De's Capability Approach Framework

Technology is a commodity that may influence the ability to make a choice and is thus given an integral role in Hatakka & De's framework. The Capability Approach Framework (CAF) constructed by Hatakka and De (2011) is designed to evaluate the development goals of ICT4D initiatives and focuses on potential versus achieved functionings, the importance of context and the role for technology.

Information Communication Technology for Development initiatives should include supportive functions, such as IT training and IT support training. The introduction of these technological commodities can also have an impact on the conversion factors, and this necessitates an investigation into the technological features that can enable intended or unintended functionings. Furthermore, conversion factors influence the ability to make choices and the ability to enable potential functionings (Hatakka & De, 2011).

Thus the framework evaluates the enabling of people's intended and unintended functionings, through the ICT initiative (i.e. what people potentially can do or be following the intervention). Conversion factors, choice and the outcome of their choices may hinder the translation of potential functionings into achieved functionings. Therefore this Capability Approach Framework includes the interplay between potential functionings, conversion factors, choice and achieved functionings



## Figure 4.4: The capability approach framework

(Source: Hatakka & De, 2011)

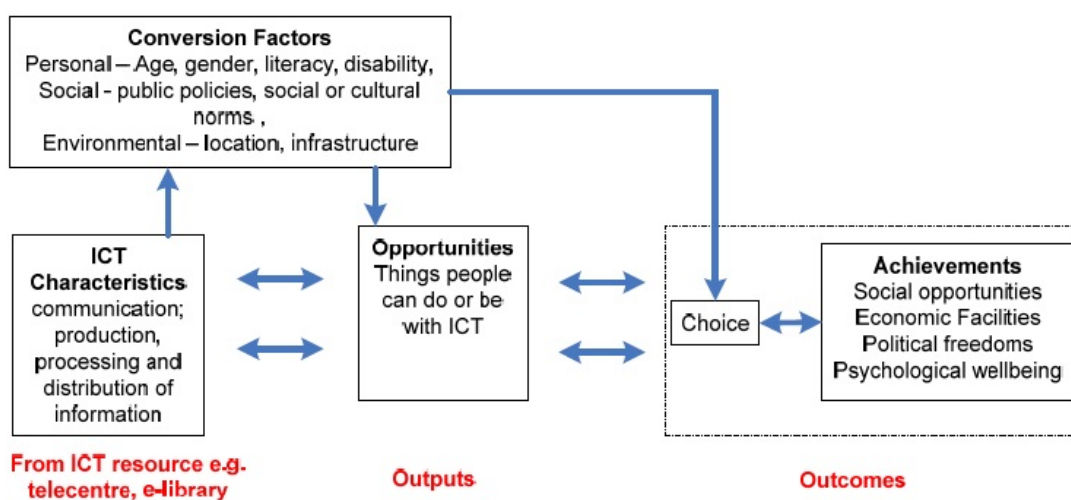
Hatakka and De's CAF evaluates development goals of an ICT4D project or intervention by investigating achieved functionings and choice that follow from potential functionings and are influenced by conversion factors (Hatakka & De, 2011).

The last framework to be discussed is broadly based on the Capability Approach Framework, and was created by Kivunike (2014).

### 4.1.5 Kivunike's ICT4D Evaluation model

Kivunike (2014:5) proposed an ICT4D evaluation model that is similar in a certain sense to the model constructed by Hattaka and De (see Figure 4.4). This model recognises the interaction between the provision of opportunities and choice, which is influenced by conversion factors. Thus, similar to Hatakka & De, Kivunike (2014:5) recognises the important role played by conversion factors on capabilities achieved, but also sees choice as an achieved capability.

Constructs such as ICT characteristics (capabilities), conversion factors, opportunities and achievements (opportunities one chooses to exploit) are included in Kivunike's model (see Figure 4.5). The resource enables ICT characteristics such as communication and dissemination of information and provides opportunities within a person's limitations of the personal, social and environmental factors. The opportunities chosen to be exploited within the restriction of conversion factors are the achievements. In this model choice is also evaluated as an achievement.





### **Figure 4.5: Kivunike's Evaluation model**

(Source:Kivunike, 2014:5)

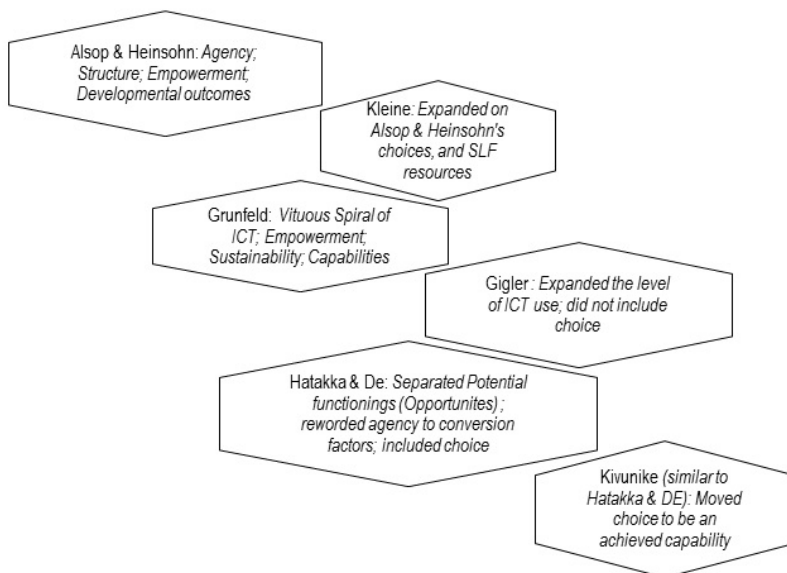
Evaluation models have evolved from the model by Alsop and Heinsohn (2005) to the evaluation model by Kivunike (2014). There is a common structure found in all the models: the idea of a person's own ability, background, and resources (agency) navigating a certain intervention (e.g. public access to ICT) and enabling him/her to grasp opportunities and make good choices to reach a developmental outcome. Positive outcomes strengthen personal agency and give the person a greater preparedness to exploit opportunities and freedoms. This model evaluates the contribution of ICT4D to development using a structured approach.

## **4.2 Links between the five models**

The CESVS (Grunfeld *et al.*, 2011) is a model designed to investigate and understand the processes associated with the realisation of the benefits of ICT that are revealed as capabilities and functionings. Kleine (2009) operationalises the Capability Approach in her CF and argues for a holistic and systemic analysis of the development process imploring for development of personal freedom to be viewed as development rather than economic growth.

The ICT Impact Chain (Gigler, 2011) evaluates the impact of ICT in terms of capabilities expanded and well-being enhanced. Hatakka and De (2011) and Kivunike (2014) also base their framework on the concept of expanding human capabilities and functionings being key to development.

These frameworks are all founded in the Capability Approach, and each including the concept of choice and functionings. The evolution of the models from the framework designed by Alsop and Heinsohn (2005) to the ICT Evaluation model by Kivunike (2014) is illustrated in Figure 4.6.



**Figure 4.6: Evaluation framework evolvment**

(Source: Own work)

Although some ICT4D researchers made a case for including expressions of aspiration as a non-material benefit, none of the abovementioned frameworks includes this concept. Therefore the question is: What is included under the umbrella of capabilities or achieved functionings (achievements)?

### 4.3 Elements of the models

The elements of the five models are: ICT intervention (or various uses of ICT such as effective use); empowerment; choice (dimensions of choice); opportunities (potential achievements); agency; conversion factors; and achievements (achieved functionings).

In identifying the benefits of ICT projects deployed in communities, the assumption is that the technology supplied by the project is available for use by community members, it is connected to the Internet<sup>14</sup> and members are encouraged to make use of the facilities. The role of technology is to be the enabler of new opportunities and freedoms and to affect the lives of the people using it.

According to the models listed in Chapter 4.1, the benefits gleaned from the initiative would be ICT and skills learnt, opportunities available and taken, additional options available and used, strengthening of enabling conversion factors and achieved functionings.

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<sup>14</sup> In the current era a broadband Internet connection is considered standard.

### 4.3.1 ICT Access and utilisation

All the models include elements of ICT intervention, the availability of ICT and access to ICT. The CF addresses the affordability of ICT access (Kleine, 2009:110). This notion is expanded to a process starting with access to ICTs and leading to the effective use of ICT in the IIC (Gigler, 2011:14). In the CAF, the supportive functions (training of trainers, IT support, etc.) are included (Hatakka & De, 2011:12-13). The ICT4D evaluation model includes the ICT characteristics of communication and information dissemination.

For ICT to be used effectively, basic ICT skills need to be present and developed into more advanced ICT skills. The access and effective use of ICT provides opportunities (potential functionings) to the users within the limitations of the conversion factors.

### 4.3.2 Conversion factors

The diverse ways in which people make use of opportunities offered are supported or hampered by personal and external factors (Kivunike, 2014:4). These factors are referred to as conversion factors, and they play a role in the determination of which opportunities or choices will be used by a person.

Conversion factors include internal characteristics such as age, gender, and general skills, and external circumstances such as social background, ownership and environmental situations that can prevent or enable individuals to increase their capabilities (Hatakka & De, 2011).

Personal Conversion factors are individual characteristics such as physical abilities/disabilities, motivation, education, age, and gender. Social conversion factors include external legalities or societal requirements that may consist of public policies, social or cultural norms and discriminating practices, as well as intermediaries such as non-government agencies, that promote ICT usage. Environmental conversion factors include location and accessibility to facilities, as well as technical aspects such as quality of service (Kivunike, 2014:4). Conversion factors influence the “*interaction of capabilities with choice*” to enable development or hamper development (*ibid.*) It is, therefore, imperative to establish which conversion factors influence people’s choices (Kivunike, 2014).

Conversion factors may be a barrier for people making use of the opportunity. In South Africa, except for government pages, computer software and general webpages on the Internet are only available in two languages (mostly English) and thus, there are nine other languages not being served. Therefore the lack of ability to understand, read, or write

English, can hinder the use of the available facilities, and the potential functioning of finding possible employment positions will not be converted into an achieved functioning.

### **4.3.3 Potential functionings**

Differentiation is made between potential functionings (i.e. opportunities emerging from the presence or use of technology) and achieved functionings (outcomes once the opportunity has been seized) (Hatakka & De, 2011:5). The goal of an ICT project could be to provide free access to the Internet and to increase the opportunities for people in the community. Outcomes from such a project that can be seen as potential functionings can be the ability of people to save money, and with access to free Internet, the opportunity to see employment positions advertised on the Internet, or more opportunities for studying/learning. Any opportunity or choice that is enabled by the access of a public ICT intervention can be a potential functioning.

#### **4.3.3.1 Opportunities**

Kivunike (2014:6) lists four types of opportunities:

- Social Opportunities-e.g. education and healthcare
- Economic Opportunities-e.g. employment, productivity
- Political freedoms—e.g. being able to participate in community development programmes
- Psychological well-being (physical, emotional and personal development )—e.g. gaining respect from peers as a result of using ICT (Kivunike, 2014:6)

### **4.3.4 Achieved Functionings**

Ward and Daniel (2006:173) suggested that the investigation into benefits in the more formal field of IS should include objectives of “*doing new things*”, “*doing things better*”, and “*stop doing things*”, and establishing whether these benefits are measurable or not. The challenge in the ICT4D realm is fact that often, ICT projects are deployed in public access venues in communities and are thus used by community members in a much less structured or organised way than in a business or corporation. In certain instances, one can focus on “*what are done in a new or better way*” (Ward & Daniel, 2006:173), but most often, benefits are gleaned from stories regarding changes in the users’ situations, behaviours, attitudes or from evidence of new aspirations.

Quantitative studies to evaluate benefits will only be possible once these benefits have been comprehensively identified, enumerated and categorised so that they can be included as options on questionnaires. Since there are no known frameworks to identify and comprehensively understand the benefits of public access initiatives, it is necessary to commence with a study that includes qualitative data to identify these possible benefits.

Identifying the benefits of ICT4D faces a number of challenges. Gigler mentions in his description of projects in both the IS and ICT4D realm (Chapter 2) that various authors state that certain benefits are intangible and are thus difficult to measure (Gigler, 2004:12).

Another challenge is that ICT benefits are not always experienced in an equivalent way by the communities in which ICT projects are deployed (Antin, 2006: 2). Very often, the benefits are only discernible after a period of time in the course of the ICT4D project or intervention (Buccoliero et al, 2008: 4). The realisation of benefits very often depends upon factors outside the realm of the public access venue (Ramírez et al, 2014: 21).and often, is only indirectly related to the impact of public access venue use.

Benefits are not only accrued to users but also to the intermediary organisations. Libraries have been found to benefit from ICT4D programmes (Coward, 2010: 216) and can, in this way, benefits can be channelled to underserved communities (Coward, 2010: 19). In an earlier study, Chigona et al (2005: 14) found that libraries benefited from ICT4D programmes in that the programmes attracted new members to the library.

Practitioners and researchers of ICT4D have been criticised in literature for largely overlooking the dis-benefits of ICT, or only mentioning certain dis-benefits briefly (Heeks, 2014: 11-13) and focusing mostly on the benefits.

**Table 4.1: Benefits of ICT4D projects**

Citation	Benefits listed
Oestmann and Dymond (2001)	Information
	New ways of communicating
	New ways of teaching
	Training using enhanced graphics
	Greater assistance for disadvantaged communities
	New ways of conferencing
Bannister and Remenyi (2003)	Economic
	Education
	Convenience and time
	Entertainment
	Communication
	Access to information

	Political and democratic
	Reduction in risk
	Information ecology
Partridge <i>et al.</i> (2007)	Increased ICT skills and knowledge for the residents of the community
	Increased understanding by the residents of the community of the potential of ICT in their lives both personally and professionally
	Increased community capacity building within area where the community lives
	Increased understanding and interaction between the community, a university and a state library
Chigona <i>et al.</i> (2011b:7)	Economic–e.g. access at no financial cost
	Social–e.g. keeping in touch with friends
	Psychological–e.g. increase in self-confidence
Gomez <i>et al.</i> (2013:39)	Personal relations: Self-esteem, Expressions of aspirations, Civic engagement
Ramírez, Parthasarathy and Gordon (2014:7)	Social benefits, Instrumental benefits

#### 4.3.4.1 Personal relations

Gomez *et al.* (2013:39) stated that personal relations “*have been found to be the strongest benefit perceived by users of public access computers, both in developed and in developing countries*”. They describe personal relations as the number, depth and quality of one’s personal relationships (*ibid.*). The number of personal connections in large, loose networks is described as bridging social capital and the depth and quality and long term reciprocity of personal relations are labelled as bonding social capital (Pigg & Crank, 2004). Marais (2012:10), giving a reminder of Sen’s conceptualisation, concluded that the conversion of resources into freedoms is influenced, inter alia, by the social climate of which social capital is an integral part.

The use of email, skype and social networking has the potential to increase social capital, strengthening existing personal relations, re-kindling lapsed personal relations and building new personal relations.

#### 4.3.4.2 Choice

Choice is one of the fundamental aspects of the Capability Approach (Hatakka & De, 2011). The aim of development is to expand a person’s number of options from which to choose (Kleine, 2011:124). The enabling of potential functionings which influences the ability to choose between all the options is dependent upon conversion factors (Hatakka & De, 2011). Alsop and Heinsohn (2005:6) emphasise the notion of envisaging options and then making ‘*effective*’ or ‘*meaningful*’ choices. Once individuals make an ‘*effective*’ choice, this can be applied to capabilities through which functionings can be achieved (Grinfeld *et al.*, 2011:163). As noted before, Kivunike (2014:5) includes choice as one of the achievements (or achieved functionings) since choice unlocks other achievements.

#### 4.3.4.3 Empowerment

Sen (2001), cited in Grunfeld *et al.* (2011:155), views empowerment as the “*capability of self-reliance, i.e. the opposite of dependency*”. Alsop and Heinsohn (2005) defined empowerment as an individual's capacity to transform choices into “*desired outcomes*”. Therefore, empowerment, as an important element of the CA, makes it possible to enlarge an individual's capability set (*ibid.*). Empowerment is thus seen as a capability to increase freedoms and choice. Empowerment is the result when agency (human diversity and personal conversion factors) is utilised to navigate opportunities. Definitions of empowerment generally point to some change in a power relationship once individuals can understand and explore their environments, enabling them greater control over their conditions (Grunfeld *et al.*, 2011). Empowerment can be seen as the capability of self-efficacy, which is closely related to self-esteem.

#### 4.3.4.4 Self-efficacy and self-esteem

Self-efficacy is the belief a person has in his capacity to handle specific situations and tasks in life (Tengland, 2008:87; Gomez *et al.*, 2013:38). Tengland (2008:87) maintains that one can have self-efficacy in relation to some tasks, and not others. Self-esteem is related to self-efficacy in that it describes personal thoughts, negative or positive, about oneself, (i.e. it is an attitude towards oneself). The difference is that self-esteem is a reflection of one's own worth, whereas self-efficacy concerns one's adaptability to various situations (Gomez *et al.*, 2013).

Tengland (2008:87) explained that certain increases in self-efficacy result in increases in empowerment. In the realm of ICT4D, Aji, Affendi, Affendi *et al.* (2010:73) described an empowered person as a person who has high self-esteem and high feelings of self-efficacy. In their view the individual use of technology for personal needs results in empowerment (*ibid.*).

### 4.4 Operationalising capabilities

A person's capability can be seen as a person's ability to achieve and select functionings (eating, reading, being, happy, etc.) of value. Capabilities are the set of functionings that a person chooses to use (Hatakka & De, 2011). Having different choices and the capability to achieve sets of functionings constitutes a person's freedom (*ibid.*).

In searching for the benefits of utilising ICTs by poorer and underserved communities this study began by investigating if the people were enabled to do the things they chose to do or

to be what they chose, while being sensitive to the social and economic context. As mentioned before, the aspect of choice is important, as are the conversion factors. Conversion factors can influence both a person's ability to utilise a potential functioning and ability to make a choice (Hatakka & De, 2011). Achieved capabilities can, in turn, have an effect on conversion factors enabling people to make additional choices (*ibid.*).

Achieved functionings, as benefits accrued, can be further classified into tangible and intangible benefits. Tangible benefits are material benefits that can be seen or measured, whereas intangible benefits are non-material benefits that are difficult to measure. Tangible benefits can include enhanced ICT skills and financial impact, and intangible benefits can be increased opportunities for learning, enhanced empowerment, increased choices, etc.

#### **4.5 Sustainable development**

There are a number of viewpoints regarding sustainability in ICT4D research literature. As a developing field of research, Dutta and Mia (2010:v), investigated the role that ICT4D could be playing in sustainable development, as explained in the preface to "*The Global Information Technology Report 2009-2010*" which saw ICT as an important part of sustainable development. In a preface to this report Robert Greenhill, of the World Economic Forum, predicted that ICT would be a powerful and crucial element in the modernising of economies and societies to improve living conditions and enhance opportunities as well as reduce the digital divide in developing countries (Dutta & Mia, 2010:v). In the same report Ware, Rueda-Sabater, De Bernabe Y Varela *et al.* (2010:38) found evidence in cities of improved basic services due to deploying ICT tools. These services would typically include: online transactions; online information access options; online portals to direct citizens to available resources and appropriate services; and using online facilities to engage with citizens and businesses on various issues.

Beardsley, Enriquez, Bonini *et al.* (2010:62) noted the programmes launched by governments to improve health, education and government services in order to extend social benefits to citizens. E-government, for instance, allows citizens faster and easier access to government services (Beardsley *et al.*, 2010:65). Accessing information and social interaction have also changed with the advent of search engines and portals such as Wikipedia, and social networking sites (Beardsley *et al.*, 2010:66). Companies have started using social networking sites for recruitment of talent, and citizens use social networking sites to search for jobs (*ibid.*). All of these examples are showing the impact of ICT on the lives of citizens already, but the promise is that more and new social benefits should be the outcome of these ICTs (*ibid.*)



Hilty and Aebischer (2015:6) use the Brundtland (WCED, 1987:37) definition of sustainable development:

*“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Hilty & Aebischer, 2015:6)*

Similarly, most ICT4D researchers endorse ‘*ICT for sustainability*’ as making patterns of consumption and production more sustainable in order to create a more sustainable society (Hilty & Aebischer, 2015:20). Heeks (2008:27) has another viewpoint of sustainability: namely the failure of ICT4D initiatives to deliver and to survive.

Given the foregoing, and taking into account this study’s research problem domain, ‘*sustainability*’ is defined as the sustainability of the public access centre to deliver benefits to the community in which it is situated. Since the evaluation of the public access centre is not the aim of this study, sustainability of the public access centre will not be included in further discussions.

The elements identified in the five frameworks in Chapter 4.3 are all possible impacts of public access centres that could be benefits. A framework for identifying benefits of public access initiatives must include these elements, namely, level of use of ICT, empowerment, choice, opportunities, agency, conversion factors, and achievements.

## **4.6 A framework of benefits in the public access context**

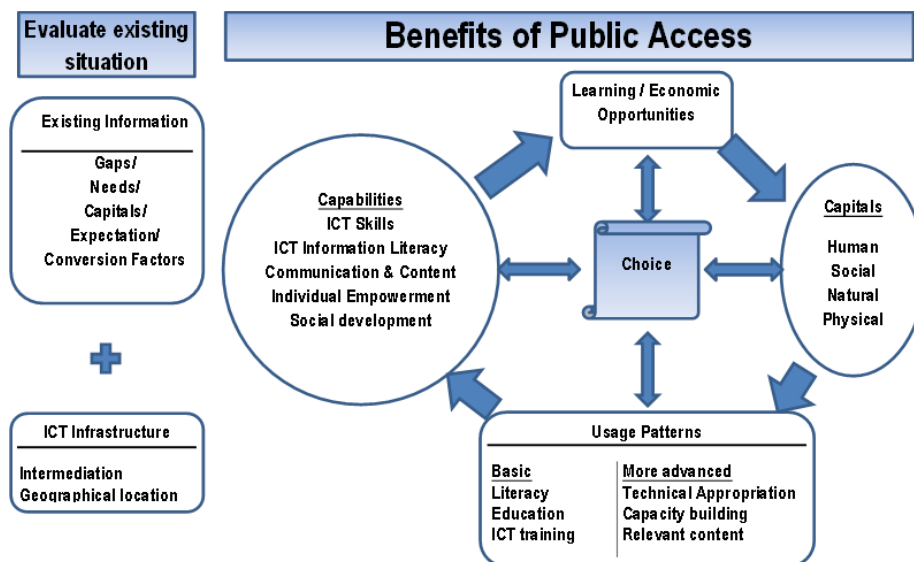
A framework of benefits of public access initiatives, based on elements from the models discussed in this chapter, is presented in Figure 4.7. The framework consists of two parts, the current situation the benefits accrued.

### **4.6.1 Elements in the framework**

The first part of the framework explores the current situation of typical public access centres and the abilities and situations of the users. It details the necessary, existing information and infrastructure of the location where the project is deployed as well as the conversion factors that can enable or inhibit users to transform opportunities into achievements.

The second part of the framework depicts the benefits that users may glean from using the public access centre. Once users start using ICT at the public access centre and connect to the Internet, capabilities may increase, empowering people to become more socially and/or financially functional while increasing capitals, such as social, human, natural and physical

capitals at the same time. This increase in capabilities and capitals, in turn, strengthens the appropriation and ‘*meaningful use*’ of the ICTs (Gigler, 2011: 15). Choice is presented as one of the primary development outcomes in the CF (Kleine, 2011:125), and when exploited, has an effect on all the other elements in the framework.



**Figure 4.7: Framework of benefits in public access context**

#### 4.6.2 Evaluation of the existing situation

Existing information, such as the existing capital and expectation of what the project could deliver has an impact on how benefits are evaluated. Gigler (2011:12) noted that “*information needs assessment*” is a critical evaluation. Communities’ development in informational capital and the sustainability of the project depends on the pre-existing “*information and communication ecologies*” (Gigler, 2011:12). These would include ICT needs, informational capital, communication channels, stakeholders, barriers and bottlenecks in the flow of information from local or national government to communities. This evaluation is to ensure that ICTs are not deployed in a top-down fashion by government or other organisations, without the participation of local community members (Gigler, 2011:13).

Deployment of ICT projects to communities without the backbone of an intermediary often results in failure due to financial and technological constraints (Heeks & Molla, 2008: 105). Embedding a project into an existing infrastructure is more sustainable and can have the effect of strengthening the informational capital current in the community (Gigler, 2011:12-13). Gigler (2011:13) emphasises this role of the intermediary to assist community members to acquire and grow ICT capabilities.

The level of use, and consequently the ability to reap the benefits of ICTs is dependent upon the geographical location of the PAC (Grunfeld, 2011:24), and thus the location of the PAC is of importance in the evaluation of benefits. Increased capabilities rest on the appropriation and effective use of the ICTs (Gigler, 2011:15; Coelho, Segatto & Frega, 2015:11).

### **4.6.3 Benefits of Public Access**

Various authors have appealed for research studies that include the intangible or non-measurable benefits (Heeks & Duncombe, 2001; Oestmann & Dymond, 2001; Heeks, 2005a; Harris, 2007; Partridge *et al.*, 2007; Buccoliero *et al.*, 2008; Ray & Kuriyan, 2010; Chigona *et al.*, 2011b; Pejovic *et al.*, 2012; Sey *et al.*, 2015). The framework in Figure 4.7 incorporates both the intangible and the measurable benefits. The measurable benefits comprise increased ICT and information skills, increased reading and language skills, and a saving of time or money. The intangible benefits include: increased choice; access to opportunities (job or business); increased ICT literacy; easier communication with government, business, friends and family; individual empowerment; and opportunities for social development.

The second part of the framework depicts the impact of access and the effective use of ICT on the increased capabilities. This, in turn, affects social and economic opportunities, these impacting on social, human, natural and physical capital. This strengthens the person's ICT and informational functioning, and the circle of impact repeats itself. At the same time, increased access and use expands the choices for people, thus affecting all other areas and benefits.

This framework is the basis from which the empirical study (Chapter 6) is implemented.

## **4.7 Conclusion**

This chapter presented an overview of five models/frameworks that have been identified as being of specific importance to inform a framework to identify benefits of ICT projects deployed in communities. Based on elements from the models discussed in this chapter, a framework of benefits of public access initiatives was developed and presented in Figure 4.7. This framework will inform the empirical study in Chapter 6.

Chapter 5 presents an overview of the scientific basis, research methodology and research methods chosen for the empirical study of this research.

## Chapter 5 Research Design and Method

### 5.1 Introduction

Scientific research differs from general human inquiry in that it requires a rigorous process or method of scientific inquiry to produce knowledge that can stand the tests of validity and reliability. Scientific research attempts to investigate and understand a certain reality, (i.e. regarding that reality and how that knowledge can be acquired (Mouton, 2006:138-139; Babbie, 2010:4-5; Bhattacharjee, 2012:4-9).

This chapter summarises paradigms, research methodologies, data collection and data-analysis strategies of scientific research specifically pertaining to answering the research questions being investigated in this study.

### 5.2 Scientific research

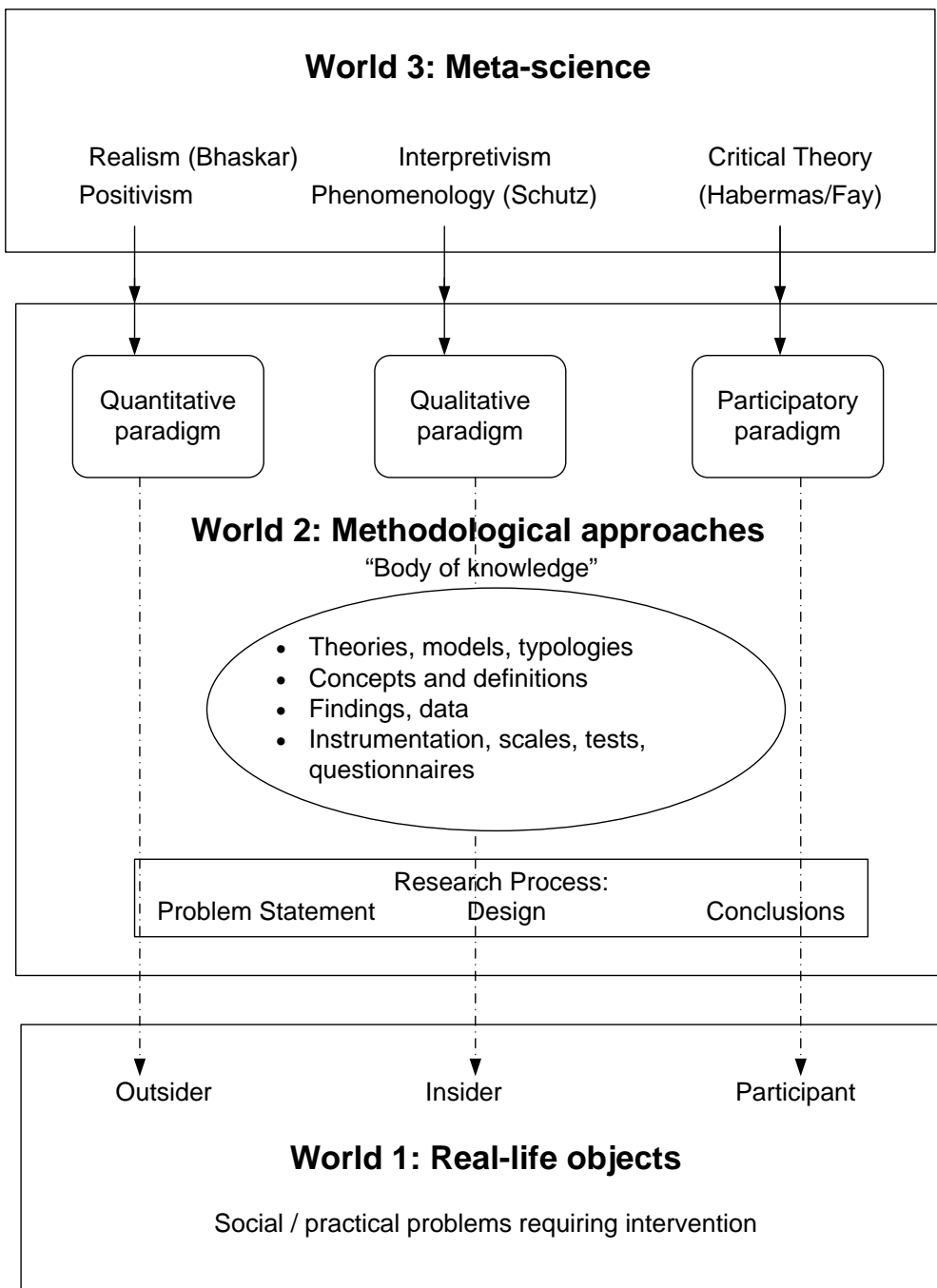
One of the ways to describe the functioning and process of scientific research is to use the Three-Worlds Framework outlined by Mouton (2001:137).

Discussion and reflection on meta-disciplines, which is found in Mouton's third world of meta-science (Figure 5.1), concerns the philosophy of research and the nature of science and scientific research (Mouton, 2001:139). Research paradigms such as positivism, interpretivism, phenomenology and realism are situated in this third world (Mouton, 2001:139). Constant and critical reflection of research decisions led to the development of these meta disciplines (Mouton, 2001:139).

The overriding goal of Mouton's second world, the world of science and scientific research, is the searching for truth or "*truthful knowledge*" (Mouton, 2001:138). Scientific researchers function within this paradigm (Babbie, 2010:33), which underpins the way they search for the truth and the knowledge.

Mouton's first world is the world of general knowledge and everyday life, in which the everyday problems that occur are investigated and sometimes solved in a practical way (Mouton, 2001:138).

Figure 5.1 depicts the distinctions of the three worlds and the perspectives of doing research and demonstrates where the epistemological and methodological approaches are to be found.



**Figure 5.1: The relationship between meta-science (philosophical paradigms) and science (methodological approaches)**

(Source: Mouton, 2001:140-141)

The goal of scientific inquiry is the search for “*truth*” or “*truthful knowledge*” (Mouton, 2006:138). Answering the research question of this study cannot be accomplished by using non-scientific methods of human inquiry because these do not withstand the tests of validity or reliability. The following section explains the dimensions of scientific research in more detail.

## 5.2.1 Major dimensions in scientific research

Scientific research methodologies (World 2) make assumptions regarding the nature of the world and the nature of knowledge (Mingers, 2001a:242). These assumptions can be stated as questions regarding the nature of reality, and they become the key questions that steer research processes. Reilly (2011:48) presented the following four questions as aspects of ontology, epistemology, methodology and methods (Table 5.1).

**Table 5.1: Key questions driving the research process**

Aspect of Research	Question
Ontology	What is the nature of the reality to be studied?
Epistemology	What can be known about this reality, and how can it be known?
Methodology	How can the knowledge be acquired?
Methods	What procedures can be used?

Source: Adapted from Grix (2002:180) by Reilly (2011:48)

### 5.2.1.1 Ontology

The questions that guide the ontological orientation of the scientific pursuit are: “*What is the form and nature of reality?*” and “*What is there to know about it?*”(Guba & Lincoln, 1994:108) In answering these questions ontology reveals the philosophical claims that researchers make about what knowledge is (Bloomberg & Volpe, 2012:28). Ontology is, therefore, the point where research starts, leading to the epistemological and methodological positions (Grix, 2002:177). Wyssusek et al. (2002:832) phrases these ontological questions as:

*“What is the nature of the ‘knowable’; what is the nature of ‘reality’ and is reality external to the individual and imposing itself on the individual consciousness or a product of individual cognition?” (Wyssusek et al., 2002:832)*

The assumptions of ontology therefore shape what the researcher believes to be social reality. For example, if the researcher assumes a ‘real’ world, then matters concerning the artistic, (visually appealing), and moral realities will not be in the realm of scientific inquiry. The ontological position of the researcher is the answer to: “*What is the nature of the social and political reality to be investigated?*” (Grix, 2002:177). Research is thus viewed from the position of realities, whether one or more. The question can be modified to: ‘*Is there one reality in the realm or area of the investigation, or can there be more than one reality present?*’

Ontologies in research include realist, critical realist and relativist stances (Gomez, 2013:10). In a realist philosophy, the ontology of objectivism asserts that “*social phenomena and their meanings have an existence independent of social actors*” (Grix, 2002:177). Thus objectivism assumes a single reality. Alternatively, constructivism “*asserts that social phenomena and their meanings are continually being accomplished by social actors*”, pointing to many different realities (Grix, 2002:177).

The epistemology of a research study lies within the frame of the researcher’s belief/view regarding the social reality or realities.

### **5.2.1.2 Epistemology**

Epistemology is concerned with the gathering of knowledge and the developing of theories and models (Grix, 2002:177). The questions posed by epistemology are:

*“What is the nature of the relationship between the knower (the inquirer) and the known (the knowable)? What are the grounds of knowledge? What is truth?”*  
(Wyssusek *et al.*, 2002:832)

The answers to these questions are contained in the answer to the ontological question regarding the nature of reality. The ontological realist, framing the positivist epistemology, perceives a single objective reality and, therefore, focuses on measurable quantities (Wyssusek *et al.*, 2002), while interpretivists within the relativist ontology are more interested in intangible feelings, perceptions and opinions, recognising multiple realities (Henning, Van Rensburg & Smit, 2004). These are, of course, two end points on a continuum.

Within this study, the quest for including intangible benefits in the framework necessitates the study to be situated in an epistemology that does not only focus on the measurable but also includes perceptions, opinion and feelings. Therefore the relationship between the researcher (the inquirer) and the known must move beyond the objective into the subjective.

### **5.2.1.3 Methodology**

Methodology is concerned with the empirical process of a research study. The methodological question asks “*how the researcher can go about finding out whatever he or she believes to be true*” (Guba & Lincoln, 1994:109) or “*How should the inquirer go about finding out knowledge?*” (Wyssusek *et al.*, 2002:832). The answers to these questions are constrained by the answers to the epistemology questions. These empirical processes include the research design and research methods within the design that the researcher will follow in the research process.

Research must take place within a theoretical framework (Henning *et al.*, 2004:12), that is, it must follow a specific design. The selection of a research design is dependent upon the research topic and the research objectives. Identifying the research design or a mixture of designs at the commencement of the research is imperative to ensure the validity and credibility of the research.

Research designs are plans or blueprints, encompassing processes or steps, to execute the research investigation. Within these plans or designs, decisions regarding the research methods of data collection and data analyses must be made. The decision to follow a research design with its methods are informed by the worldview of the researcher regarding the research process (Creswell, 2009:3), the nature of the research problem, the researcher's own experience and the recipients of the research results, and it should be informed by the research phenomenon being studied (Bhattacharjee, 2012:43).

Traditionally, researchers of the quantitative research paradigm (positivist research) strived to maintain objectivity in the research inquiry of social research (Johnson & Onwuegbuzie, 2004:14), whereas the researchers of the qualitative research paradigm (interpretivist research) contended that research is value-bound and that time- and context-free generalisations are not desirable.

A mixture of designs, which is often desirable, draws from the inherent strengths of both quantitative and qualitative research paradigms (Johnson & Onwuegbuzie, 2004:15; Onwuegbuzie & Leech, 2005:377). Johnson and Onwuegbuzie (2004:17) define mixed-methods research as:

*“...the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”. (Johnson & Onwuegbuzie, 2004:17)*

The concerns of the researcher are more often adhered to in a quantitative setting whereas the qualitative researcher seeks to hear the voice of the participant (Onwuegbuzie & Leech, 2005:384). In the sphere of a mixture of research methods the advantages of both these situations can be tapped (*ibid.*).

#### **5.2.1.4 Methods**

The research methods selected are the steps followed to gather data. These steps must fit into the pre-determined methodology within the particular research paradigm. Data collection methods followed by objectivist (positivist) researchers usually include:



constructing questionnaires to be used in large-scale surveys; performing experiments in which precise measurements are taken; taking accurate measurements in from patients in a clinical situation; using statistical analysis techniques; and presenting aggregate results that are generalised to a particular research population. On the contrary, interpretivists mostly collect data by interviewing people, observing situations or analysing texts for meanings and themes, using non-numerical methods.

## **5.2.2 Paradigms in ICT4D**

The choice of an appropriate research paradigm has been an issue in a number of social science disciplines, including the field of IS and ICT4D (Galliers, 1985; Alavi & Carlson, 1992; Galliers, 1992; Walsham, 1995; Klein & Myers, 1999; Mingers, 2001b; Lamb & Kling, 2003; Roode, 2003; McMaster & Wastell, 2005; Gunasekaran, Ngai & McGaughey, 2006; Walsham & Sahay, 2006; Avgerou, 2008; Lee & Hubona, 2009).

### **5.2.2.1 Positivist paradigm**

Positivism, holds the belief that a single reality, independent of the human mind, exists and the inquiry process excludes biasing factors (Wyssusek *et al.*, 2002). It includes formal propositions, quantifiable measurements of variables, hypothesis testing, generalising a sample's results and conclusions to a population (Klein & Myers, 1999). Positivism is therefore, usually associated with quantitative research. Post-positivism, which developed from positivism, believes that laws or theories governing the world can be tested and verified (Bloomberg & Volpe, 2012:28). Positivist research views observer bias as problematic, as acknowledged by American sociologist, Paul Lazarsfield, who pioneered large-scale survey research using statistical analysis techniques (Bhattacharjee, 2012:8). Internal validity is achieved by the extent to which changes in a controlled variable causes changes in a dependent variable (Healy & Perry, 2000:121).

Research in a positivist realm is not always ideal or practical. The major characteristics of scientific research (i.e. repeatability, reductionism and refutability) are problematic when carrying out social science research (Galliers, 1985:272-273). Checkland (1981:70) cited in Galliers (1985:273) pointed out that growth in human knowledge influences social systems and occurrences within these systems and thus, the very research done in social sciences may affect the outcome. This is confirmed by Pather and Remenyi (2005) citing Wyssusek *et al.* Wyssusek *et al.* (2002), who criticised positivism as being "*ignorant towards the subjectivity of human efforts*".

### 5.2.2.2 Interpretive paradigm

The need to find a framework that allows for participants feelings, perceptions, views and realities gave rise to qualitative research techniques (Henning *et al.*, 2004:19-20) being employed in IS research studies. Interpretivist studies associated with qualitative research endeavour to understand experiences or events through the perceptions and meanings of people (Walsham & Sahay, 2006). From the beginning of the new millennium ICT4D researchers, aiming to capture, understand and interpret the lived experiences of participants, started to prefer pragmatic or interpretive paradigm stances in their research studies rather than positivism (Gomez, 2013:11).

Interpretivism challenges the assumption of positivism or post-positivism that reality can be reduced to its component parts. The interpretivist researcher seeks to investigate and understand phenomena in a social sphere from a context-specific perspective. The inquiry is viewed as being influenced by the study context as well as by the researcher (Bloomberg & Volpe, 2012:28).

Pather and Remenyi (2005:80) argued for a combination of approaches in conducting research, which is often deemed more effective than approaches in isolation. The philosophical stance of this combination came to be known as critical realism, which is situated on the continuum between positivism and interpretivism.

### 5.2.2.3 Critical realist paradigm

As a philosophy critical realism (CR) originated from the philosopher Roy Bhaskar. At first, it was seen as a “*critique*” to positivism on the one end of the scale and interpretivism on the other (Kaboub, 2001:1). The term ‘*critical realism*’ has been used to “*categorise the work of a range of philosophers who have taken ontological questions about the nature of the natural and social world as a starting point for their analyses*” (McEvoy & Richards, 2003:412).

Critical realism postulates that a world, independent of human beings, exists and has deep structures that can be represented by scientific theories (Alvesson & Sköldberg, 2009:16). This is explained by Dobson (2002:5) in the following manner:

*“[T]here exists a reality totally independent of our representations of it; the reality and the ‘representation of reality’ operating in different domains.”*  
(Dobson, 2002:5)

These domains, as part of the notion of reality and central within CR, are the ‘*empirical*’, the ‘*actual*’, and the ‘*real*’ domain (Alvesson & Sköldberg, 2009:40). The empirical domain

describes what can be observed, the actual domain encompasses what transpired independently of the researcher, and the real domain includes the underlying mechanisms that produce events and situations in the world (*ibid.*). Critical realism tasks researchers to investigate the real domain and the relationships it has with the other two domains.

Babbie (2010:44) defines the reality of CR in relation to the effects it produces:

*“A paradigm that holds things are real insofar they produce effects.”* (Babbie, 2010:44)

As noted in the quote above, CR suggests that which has an effect must be seen as being real (Babbie, 2010:44). Our knowledge of reality is conditioned by our social environment, and it must be understood in relation to the social actors involved in the process of acquiring and deriving knowledge (Dobson, 2002:5).

The ontology of CR states that *“something is real, if it can bring about visible or material changes”*. One of the original objectives of CR was to *“re-establish a realist view of being in the ontological domain”* (Mingers, 2004:91). Critical realism proposes a ‘single reality’ but is interested in the ‘multiple perceptions’ of this reality (Healy & Perry, 2000:123, 125), which involves triangulation using multiple data sources.

The epistemology of CR practitioners requires a *“pragmatic theory of truth”* (Kaboub, 2001:1); to *“accept relativism of knowledge as socially and historically conditioned”*. The philosophy of CR as a *‘transcendental one’*, begin with an accepted phenomenon and proceed by asking what the world must be like for this phenomenon to occur (Mingers, 2004:91 - 92).

The relationship between CR, positivism and interpretivism is succinctly given as

*“For its intellection underpinning critical realism draws on concepts and tools from positivism, interpretivism and critical theory that assist the researcher to answer his or her research question”* (Pather & Remenyi, 2005:80)

Critical realism has thus been described in between positivism and interpretivism (Zachariadis *et al.*, 2010). As with positivism, the researcher looks for patterns, generalisations and causalities (Alvesson & Sköldbörg, 2009:40), but is also cognisant of the unobservable mechanisms (similar to interpretivism). The researcher working within CR perceives the real as the focus point. The presence of a causal effect points to this reality, which is not only comprises material objects but also consists of ideas and discourses, which can have causal effects (Alvesson & Sköldbörg, 2009:41). Where a positivist attempts to find

exact relations between cause and effect, the critical realist acknowledges that relations are often very complex and are not fixed and recognises that causality is not directly notable (Alvesson & Sköldbberg, 2009:42). Healy and Perry (2000:123) explained that CR:

*“discovers knowledge of the real world by naming and describing broad, generative mechanisms that operate in the world”.* (Healy & Perry, 2000:123)

### **5.2.3 Research paradigm underpinning this study**

The ontological position that informed this study lies on a continuum between objectivism and constructivism; working from the perspective of a single reality and encompassing people having their own experience and perception of this reality, which is, therefore, not entirely independent of the people living within this reality. This describes the ontological stance of CR.

This research study necessitated the exploration of both measurable quantities and the non-measurable or intangible constructs to investigate the multiple perceptions of the reality. The quest for identifying the benefits of ICT4D initiatives deployed in communities necessitated the investigation into patterns and possible causalities through the perceptions, opinions and feelings of community members. Awareness of people’s perceptions was deemed important in the quest for knowledge and comprehension.

Since the CR draws tools and concepts from both positivism and interpretivism, research methods from both paradigms were utilised in this study. Therefore, within the epistemology of the CR paradigm, both qualitative and quantitative research methodologies were utilised. This is in accordance with the tenets of the CA, which does not prescribe research designs or methodologies (Grunfeld, 2011:94).

The fallible nature of measurement necessitates the use of different sources of data and various analysis techniques to ensure validity (Henning *et al.*, 2004:20). In this study results were triangulated by using three methods of data gathering. When the research question asked: *‘What brings about change’* the research method focuses on data collection methods including interviews analysed using qualitative methods which is in line with the CR ontology of having one independent reality but many perceptions of that reality (*ibid.*). Thus, for this research, data collection included qualitative methods (interviews and focus groups) and quantitative methods (survey). Even though quantitative methods were included, the objective thereof was not to generalise results, but rather to acquire a feel for the perceptions of a large sample of users from all areas. In addition, data was only aggregated in some instances to give a clearer presentation of the results.

### 5.3 Research Method for this study

Research praxis in IS and ICT4D in the 20th century has been carried out within both the positivist and the interpretive paradigms. At first most IS research took place in the positivist paradigm. However, by the 1990s, research based on other philosophies were utilised (Mingers, 2004:87). These research philosophies include ethnography (Antin, 2006; Parthasarathy & Srinivasan, 2006), hermeneutics, ethno-methodology, phenomenology, critical theory (Zheng & Stahl, 2011), critical realist, post-modernism and actor-network theory. It is notable that research informed by the Capability Approach (as is the case with this study) has no prescribed research designs or methodologies (Grunfeld, 2011:94).

O'Neil (2002:88), in her review of methodological approaches to evaluating community informatics, suggested the use of a combination of quantitative and qualitative measures for evaluating projects and programmes to reach valid findings. Approaches utilising a combination of quantitative and qualitative methods are also valuable for situations where, due to time and other constraints, it is only possible to collect limited data (Antin, 2005). Furthermore the context of social life does not lend itself naturally to purely quantitative methodologies that cannot easily probe the feelings and thoughts of the participant (Babbie, 2010:287).

The context of this study (i.e. investigating the benefits in a social community setting) is very different to the formal office/work setting in Information Systems studies, and this lends itself to an approach comprising quantitative and qualitative methods.

#### 5.3.1 Case studies

A case study as a research design is known for its ability to 'merge' the use of both quantitative and qualitative paradigms. This method is used if an explanation regarding current social phenomenon is sought or if there is "*a desire to understand complex social phenomena*" (Yin, 2009:4). Yin (2009:63) states that using more than one type of design enables researchers to investigate more complex research questions. Yin (2009:63) adds that data collected for these designs can be stronger and richer than data collected by one method alone. According to Babbie (2010:309), in a case study, the attention is focused on a single entity or a single instance of the phenomenon under study. Generalisations in single case studies are explained by Flyvbjerg (2006:12) as follows:

*"One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods. But formal generalization is overvalued as a*

*source of scientific development, whereas 'the force of example' is underestimated."*

Case study methods are usually utilised in situations in which minimal control of events is required and in which the focus of the research is current events (Yin, 2009:9). Furthermore, the case study method is better suited for the study of organisations or entities and less suited for the study of individuals (Easton, 2010:123). Single case studies are often used in descriptive research to describe a phenomenon in the real-life context of its occurrence (Baxter & Jack, 2008:548). Often there are multiple units within a single case which allows for depth of analysis and multiple methods of data collection across units (Baxter & Jack, 2008:549).

Case studies have often been used in similar studies to this research. For example, Akinsola *et al.* (2005) utilised a case-study method to investigate ICT provision to disadvantaged urban communities in South Africa and Nigeria, using semi-structured interviews and non-participant observation to collect data. The impact of ICTs on agricultural development was investigated by Alao (2010) in Alice (Eastern Cape, South Africa), using a rural community as the case study. Khalafzai and Nirupama (2011) adopted a case study approach to research the empowerment of women with ICTs in Pakistan, utilising a quantitative data collection and analysis method their research. The role of public libraries in bridging the digital divide was investigated by means of a case study and a mixture of qualitative and quantitative research by Khati (2013). Mishra (2013) used qualitative data collection methods in a case study to investigate the role that telecentres played in the empowerment of citizens in the Kutch district of Gujarat, India.

The case study approach thus best fitted the inquiry in this research study to identify the benefits of ICT projects deployed in underserved communities, since:

- The focus of the study is current usage of ICT projects.
- Understanding of a social phenomenon is sought.
- In a social setting, there is no control over events.
- ICT projects deployed by organisations rather than individuals are being researched.

Thus, this research adopted a case-study approach and identified a public access ICT programme deployed in various community libraries in Cape Town, South Africa, thus constituting a single case with multiple units. This study was initially planned as a multiple case study involving three cases (sites) in the peri-urban area of Cape Town where public access centres are situated. However, at the time of selecting sites to be included as cases,

it was found that a number of these sites were no longer operational. The public access sites that were still operational were the libraries that had computers installed as part of the SmartCape initiative.

### **5.3.1.1 SmartCape Overview**

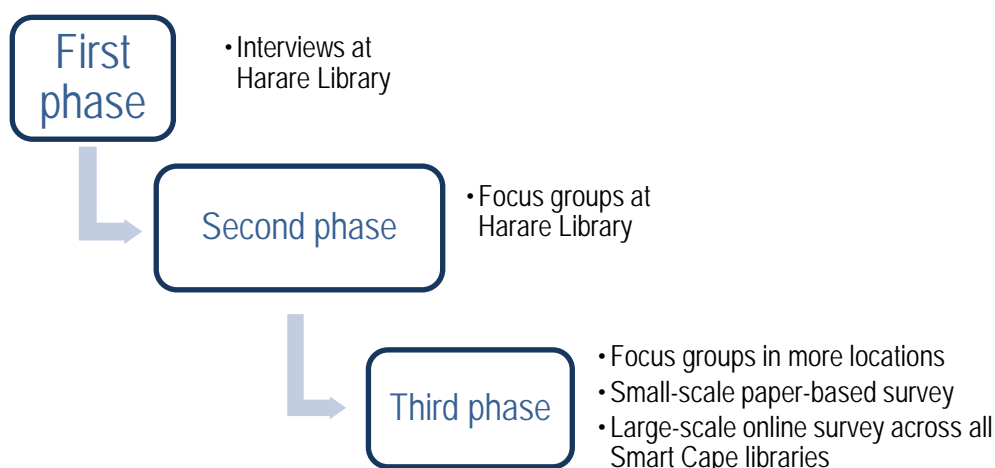
The SmartCape initiative was launched by the City of Cape Town in 2002 as an initiative that affords free access to the internet and other ICTs to communities throughout the City of Cape Town Metropolitan Municipality (Cape Town Metro). This was deemed an appropriate ICT project for this study, given that it is a typical public access project. At the inception of this study, the site where this project was launched was selected as the site to collect data for this research. This recently established access point of the SmartCape initiative, is the ICT centre within the library in Harare, Khayelitsha, the newest library in the city of Cape Town (Chapter 6.2.1). This library opened during July 2011 and has an ICT centre that houses 18 computers to be used at no cost by library members. Permission to include the Harare Library as a site where interviews with community members could be sought, was obtained from the Library Marketing & Research Officer of the Library & Information Service Department of the City of Cape Town (Appendix A). The initial phase of data collection took place within this ICT centre.

During the problem conceptualisation phase at the outset of this study, a quantitative methodological regime was planned. However, as a critical analysis of the extant literature progressed and as the formulation of the underlying CR paradigm took shape, the realisation that the study begged for a qualitative bent became obvious. Information and Communication Technology for Development programmes are situated within communities and the search for benefits of these programmes should primarily be for benefits accrued to the communities. Since there is very little evidence regarding benefits to communities in literature, it became clear that a purely quantitative study would not be sufficient. Thus, data collection was done by way of qualitative interviews, focus groups, and quantitative surveys, incorporating both quantitative and qualitative elements of data collection and analysis

Evidence was gathered by visiting the site approximately three times a week for a period of five months during the second half of 2012. During these months, a number of interviews were conducted with users of the programme and staff of the library. Notes were taken and observations were recorded. The aim was not only to be present at the time of the interviews but also to be at the library often enough to become a '*familiar figure*' there. Although this is similar to an ethnographic study in which the researcher enters the world of the participants (Babbie, 2010:304), there was no formal decision to follow such a strategy.

After the first phase of qualitative fieldwork, it was determined that a broader understanding of usage behaviour across the entire program was needed. Thus, data collection from the initial case (Harare Library) was expanded to include a second and a third phase. This data collection process is depicted in Figure 5.2.

The second phase involved obtaining a better understanding of the main site (i.e Harare Library) and utilised focus groups of users of the ICT centre at the library. Additional focus groups and a survey were deployed during the third phase to acquire an even broader overview of the usage of the SmartCape project.



**Figure 5.2: Data collection phases**

During phase three, qualitative data was collected from a series of ten focus groups, involving fifteen community members from two selected (underserved) areas in Cape Town. As part of the case study, this determined the profile of users, the usage trends of community members accessing the Internet at the SmartCape access points, as well as determined the understanding that communities had of the Internet and its benefits (or disadvantages). During these focus group discussions, participants completed a survey questionnaire to ascertain their demographic and usage patterns. Subsequently, a larger online survey was launched on the SmartCape website targeting all SmartCape users of the wider Cape Metropole areas. SmartCape users who went online were requested to complete this survey at the start of their online sessions.

### 5.3.2 Population

The population of a research study includes those members, participants, or instances that can possibly be included in the data collection effort. In this study, the population being



investigated was users of the SmartCape initiative in Cape Town (the selected case) with a special focus on the users of Harare Library in Khayelitsha, Cape Town.

### 5.3.3 Sampling

Qualitative researchers typically employ non-probability sampling techniques to select participants to interview. Usually purposive sampling (i.e. selecting participants based on their knowledge of the situation) is used in a qualitative study (Babbie, 2010:193). A consecutive sampling technique is often used in a situation in which all the users of a centre are requested to take part in the research as they arrive during the time of data collection (Lunsford & Lunsford, 1995:110; Joubert & Ehrlich, 2007). In this study, a combination of purposive sampling and consecutive sampling was used for the selection of participants to be interviewed during the first phase of data collection. Only users of the ICT centres in the library were approached to request interviews. If they indicated that they did not use the computers or had only very recently started to use the computers they were not included in the group to be interviewed. It was important to select users because non-users would not have had an insight into the usage and, therefore, would not have experienced the benefits of computer use in their lives. When applying the purposive sampling technique (also called judgmental sampling) the researcher selects participants based on the knowledge of the *'population'* from which the sample is selected (Babbie, 2010:192).

The size of the sample when utilising a qualitative research strategy depends on the information received. In the process of conducting interviews the researcher notes a point after which new interviews do not yield additional or new information (Mason, 2010). This is called the saturation point. In qualitative studies one occurrence of a piece of information is equal importance to information of which there are many occurrences (Mason, 2010), since qualitative studies are not concerned with generalising results to some population. Mason advises that when conducting qualitative research, sample size decisions concerning the concept of saturation should follow the principles of Glaser and Strauss (1967). Thus, during the first phase, a purposive sampling technique was deployed. The members of the focus groups of the second phase of data collection were also selected using purposive sampling.

In the realm of quantitative research, it would be very difficult to select a true probability sample from community members. Firstly, this is because a sampling frame from which to select a random sample of users is not readily available, and secondly, many community members do not consent to take part in these surveys. Consecutive and purposive sampling strategies are more pragmatic and feasible to use in these situations. In any data collection situation in which people are requested to complete a survey, they can decline, forcing the

sample selection to be a self-selecting sampling technique, which is often the case when using online surveys (Andrews, Nonnecke & Preece, 2003:8; Fricker, 2008:25).

Two strategies were employed during the administration of two of the surveys during the third phase of data collection: consecutive sampling and purposive sampling. A purposive sampling strategy was employed in which community members were approached to take part in focus groups, and the members who consented were also asked to complete a survey questionnaire. This phase included an online survey. All SmartCape users were requested to complete the survey at the start of their sessions. If they declined they were redirected to their own user accounts, but if they assented, they were initially directed to the online website to complete the survey before being redirected to their user accounts. The sample collected from this survey can thus be called a self-selected sample.

The results of a statistical analysis cannot be generalised to the research population when utilising consecutive, purposive or self-selected sampling techniques. Very often, however, as is the case in this study, generalisation of results is not the objective of the research.

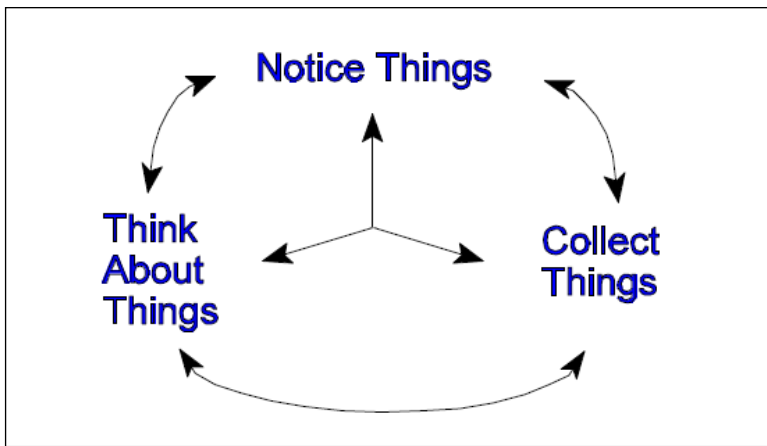
## **5.4 Data collection strategies**

Consistent with CR, which relies on multiple perceptions of a single reality, triangulation of multiple data sources was utilised in this research study (Healy & Perry, 2000:123, 125). As demonstrated in Figure 5.2, data was collected in three phases. During these phases, qualitative and quantitative data-collection strategies were employed.

During the initial phase of data collection planning, a parallel opportunity arose in which this Cape Peninsula University of Technology was commissioned to participate in a project evaluating community needs regarding Internet access. The data needs of the community project dovetailed with this study, and thus, two other data collection opportunities were harnessed to feed into this study. These included the additional focus groups, a small-scale paper-based survey for community members attending the focus groups, and a large-scale, online survey deployed on the SmartCape system.

### **5.4.1 Qualitative data collection strategies**

In Figure 5.3 below, Friese (2012:92) explains the process of qualitative data analysis using the NCT model, which is based on the model by Seidel (1998)).



**Figure 5.3: NCT model of the qualitative data analysis process,**  
 (Source: Seidel (1998:2) as cited in Burns and Grove (2010:92))

The NCT model explains qualitative research as an iterative and progressive cycle. By thinking about things and then noticing things, one is prompted to collect new things and start to think about these new things (Burns & Grove, 2010:101).

Before the data analysis, the researcher reads, and rereads the data text, in this case reading the transcriptions of the interviews, recalling observations, to become ‘soaked’ in the data (Burns & Grove, 2010:80). During this time, personal feelings and experiences are also explored using a process of ‘*reflexive thought*’, to obtain a deeper understanding of the study (*ibid.*).

#### 5.4.1.1 Interviews

The qualitative research design, which is usually followed by interpretivist and constructivist researchers, seeks to understand the meaning of the lived world from the subject’s point of view (Mason, 2010). Subjects need to be interviewed in an open, non-threatening manner in order for them to have the security of voicing their perceptions and opinions. The qualitative interview allows for interplay between participants, their actions and the individual external contexts influencing them (Kvale & Brinkmann, 2009:1; Verd & López Andreu, 2011).

Knowledge gained from an interview is contextual, narrative and pragmatic (Kvale & Brinkmann, 2009:18). Interviewing as a data-collection tool makes use of conversational skills and is an inter-change of views regarding a mutual theme of interest between two people. Interviews can be structured (i.e. strictly following a set of questions), semi-structured (following a set of questions as a guideline) or completely unstructured (similar to having an open conversation about a topic and letting the flow of the conversation dictate the flow of the interview).

The number of participants to be interviewed (usually far fewer than you would find in a typical quantitative study) is not determined by way of a formula, as is the method used in quantitative research. The focus is on the meaning of individual statements and not generalised hypotheses in an inquiry into a phenomenon, and a single instance of data is as important and useful as many instances (Mason, 2010:1). The number of interviews needs to be sufficient for the researcher to cover all possible topics/themes (*ibid.*). Very often, the interviews cease once the researcher realises that a point of saturation has been reached (i.e. no new information is forthcoming).

Research in a general community situation precludes the sole use of quantitative data collection methods. Information, knowledge and perceptions obtained from users of public access centres where ICT projects are deployed in communities are integral in the discovery of ensued benefits. To understand completely the perceptions of community members concerning ICT projects deployed in a community and their experiences in their usage of it necessitates the inclusion of face-to-face or focus group interviews. The imperative was thus to follow qualitative research design by collecting evidence from community members who are users of the ICT centre by way of face-to-face interviews.

Community members were approached and invited to be interviewed when they arrived at the library to use the computers in the ICT centre. After a brief explanation of the aim of the study willing participants were given a consent form (Figure 5.4) to sign.

A mutually agreed time was decided upon for the interview. The participants also received a business card containing the researcher's contact details to be used in the event they needed to contact the researcher to postpone or cancel the interview appointment. Many users were approached and 49 consented to an interview.

The interviews took place between the researcher and the interviewees in an atmosphere of an informal conversation, despite the presence of a pre-prepared question framework. It is also important to mention that the language used by the researcher (English) was the interviewees' second, or in some cases, third language since the home language of the interviewees was different from the home language of the researcher. This meant that often sentences had to be repeated to ensure the correct interpretation.

As stated before, appointments were made for 49 interviews and before the interviews participants were reminded of the interview by SMS. However, only 20 users arrived at their appointed time and were subsequently interviewed. In discussion with other participants three possible reasons for not keeping their appointments were offered: i) bad weather (most

had no transport and walked to the library) affected people's plans for the day; ii) people often found casual work on the day of the interview; and iii) people were unfamiliar with an interview or research situation. A staff member at the library confirmed:

*"Sometimes they get employment, and then they can only come on Saturdays. I see the people sitting here are the regulars. But they are not the regulars of March this year."*

Thus a reason for not arriving for the interview was often a sudden employment opportunity. Since this is one of the poorer communities, if people had the opportunity of employment for even one day, they would accept that rather than attend the interview. A way of gaining the trust of the library users and staff members was to visit the library a few times a week over a period of five months

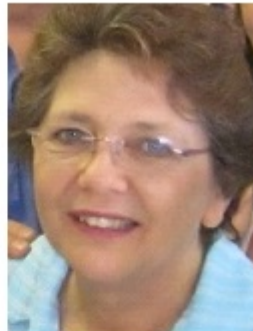
Hello

My name is Corrie Uys, a doctoral student at the Cape Peninsula University of Technology (CPUT).

My research seeks to figure out

*"How does one evaluate benefits of ICT projects in communities?"*

I'm trying to find out what benefits ICT projects like telecentres, multipurpose centres having ICT facilities, etc. actually bring to a community.



In my studies I hope to talk to many people from the community, to users of the centre, and of course to the staff. However, my research will probably not bring any direct benefits to the community or to members of the community.

My supervisor for this study is Prof Shaun Pather of the Faculty of Informatics and Design at CPUT (e-mail: [paths@cput.ac.za](mailto:paths@cput.ac.za)). I look forward to meeting you.

Corrie Uys

Cape Peninsula University of Technology

e-mail: [uysc@cput.ac.za](mailto:uysc@cput.ac.za)

### Interview Permission

My name is \_\_\_\_\_ and I am more than 18 years old. I would be happy to talk with Corrie and for her to include my opinions in her research. I understand that my name or personal details will not be disclosed.

Signature \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Figure 5.4: Interview consent form

The head librarian gave permission for the interviews to be conducted in a boardroom of the library where the participants could feel free to discuss their experiences, without being overheard by other users. The interviews were recorded and transcribed. The duration of the interviews averaged 40 minutes, depending on the time available to the participant and the amount of information gleaned from the participant. The aim of the interviews was to determine skill levels, usage patterns, attitudes, and the perceived benefits of using the ICT centre.

#### **5.4.1.2 Focus groups**

Focus group discussions are based on a schedule of questions that are discussed amongst the participants. Participants are encouraged to dialogue with one another, to ask questions and share experiences. Kritzinger (1995:299) explains that this interaction with one another enriches the data even more, which is different to group interviews. Participants in focus groups open up their thinking about a topic or question, confirm notions, remind one another of issues or offer new or opposite ideas (Skop, 2006:117). Using focus groups to discuss pertinent issues can also empower participants (*ibid.*).

After five months in the field, two focus groups were conducted for triangulation (Lennie, 2006:31) to glean richer data and input from a larger group of community members. The aim of the two focus groups was similar to the interviews: to determine skill levels, usage patterns, attitudes, and perceived benefits of using the ICT centre. Library members who were willing to take part in a focus group completed forms that were left at the circulation desk of the library. These forms were collected after a few days. The members selected one of the four focus groups according to the time and their availability. Forty-one users consented to be part of a focus group.

The focus group sessions followed a semi-structured format. Open discussions were encouraged, even though the facilitator worked from a schedule of questions. The community members who attended the focus group sessions preferred conducting the sessions in their home language (isiXhosa) and, therefore, the recording transcript had to be translated into English by a language expert.

The first focus group consisted of six participants and the second focus group consisted of eight participants. Thus only 14 out of the 41 users arrived at the time and venue where the focus groups were being held. Therefore only two focus groups took place. An independent facilitator who was fluent in the home language (isiXhosa) of the participants, facilitated the focus groups. The participants were encouraged to use their home language (isiXhosa and

Sotho, in one instance). The duration of the focus groups was 90 minutes and 2 hours respectively. The discussions were recorded, transcribed and translated by a language expert who was proficient in both English and isiXhosa. Participants were not promised a gift as an incentive, but refreshments and a small gift were given to them at the end of the focus group.

All individual interviews and focus group interviews were recorded on an audio recording device, and transcribed. The transcription process was the first *'read-through'* of the data from the individual interviews. All transcription documents were imported into ATLAS.ti (version7) for qualitative data management and analysis.

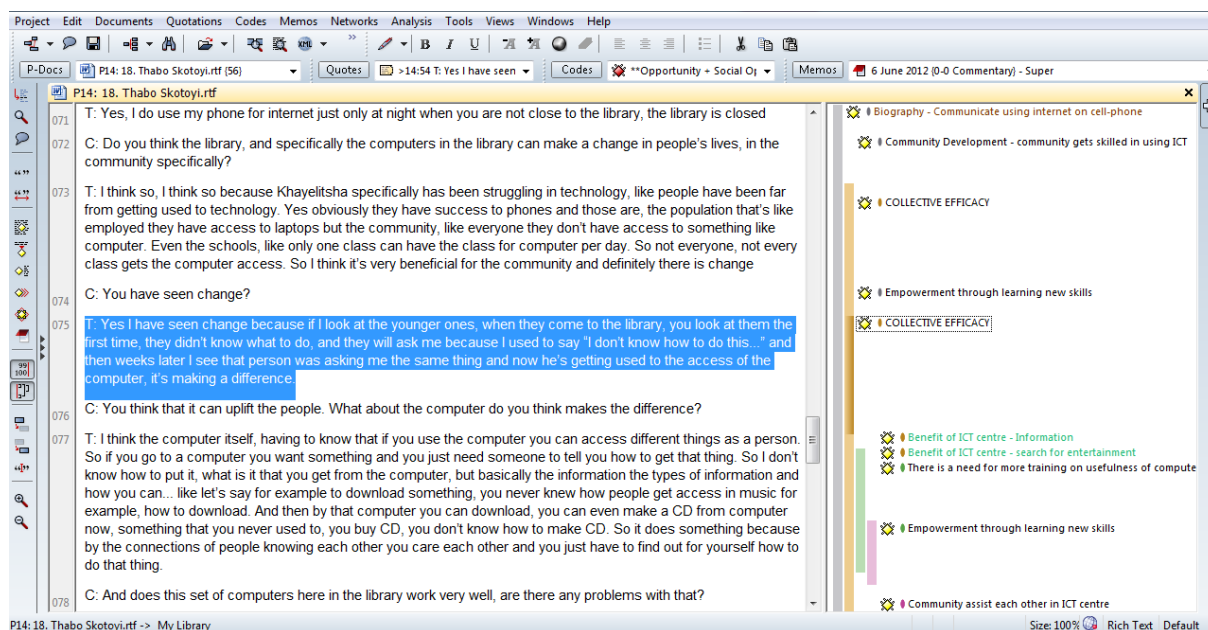


Figure 5.5: Coding in ATLAS.ti

## 5.4.2 Quantitative data collection strategies

### 5.4.2.1 Survey Method

The second research method utilised in this case study was the survey. Surveys are used if the research question includes the concepts of who, what, where, how many and how much (Yin, 2009:9). Surveys are usually implemented if a large number of respondents from a given population are required to answer a number of questions in a questionnaire under comparable conditions (Burns & Burns, 2008). These questions are mostly closed-format questions in which the respondent is given a number of options from which to select. Questions in various formats can be included in survey questionnaires, namely, single-response-option questions, multiple-response-option questions, and open-format questions requiring a single number or word or a full a sentence as the response. Survey responses

are analysed using statistical analysis techniques and very often, the results can be generalised to the population of interest. Various statistical analysis techniques can be used and these are chosen according to the type of research question and the type of data created by the responses to a question.

The greatest advantage of quantitative data collection techniques is the vast amount of data that can be collected in a comparatively short period of time from a large number of respondents (Babbie, 2010:287). Quantitative data is usually collected from: i) questionnaires completed by respondents and ii) from data and statistics published by various entities. Data collected from questionnaires differs from data collected from interviews in the objectivity of the situation and the researcher. The only part played by the researcher is the constructing of the objective neutral questionnaire in a logical manner (Babbie, 2010). The language and the context of the questionnaire must be such that all the respondents understand the meaning of the questions in exactly the same way. Therefore, questions must be constructed to have only one meaning. This means that the researcher must have an idea of the range of possible answers to a question, before it is included in a questionnaire.

Questionnaires can be completed in a number of ways, a face-to-face situation with the researcher asking the questions and recording the responses or a situation in which the researcher is not present at all (e.g. an online survey). The responses gleaned from the respondents are coded into numerical categories for ease of statistical analysis. Quantitative data is thus objective, numerical and is analysed by statistical means. The usual aim of quantitative data collection is to generalise results to the entire population covered by the research question. However, very often, researchers only want to describe a specific situation and are not interested in the generalisation of results.

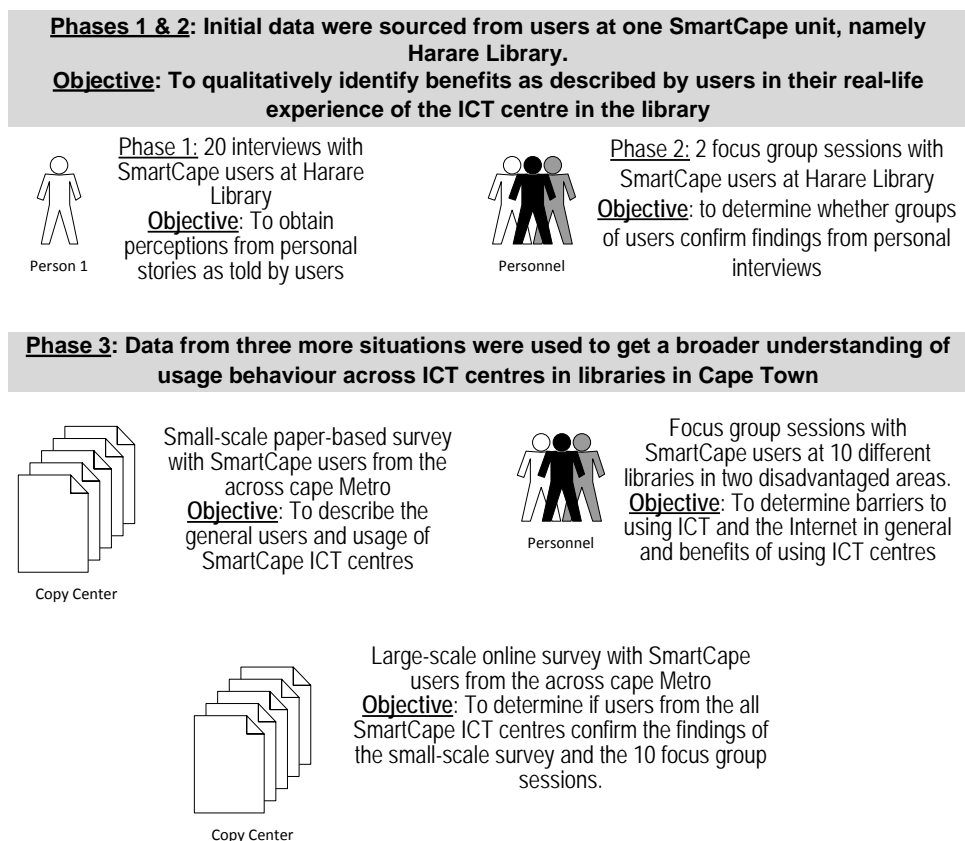
### **5.4.3 First-phase Data Collection**

Data collection strategies comprised unstructured face-to-face interviews with the head-librarian and deputy head-librarian of Harare Library, and semi-structured interviews with 20 users of the ICT centre in the library.

Face-to-face interviews were conducted with twenty users and two staff members of the ICT centre in the library in Khayelitsha June 2012 to October 2012. During each of the visits to the library, which took place three to five days a week, library members were requested to take part in the study. By remaining at the library for a number of hours each day, the use of



the ICT centre by members of the library were observed. The interviews followed an informal conversational style even though an interview schedule guided the discussion. Relevant topics volunteered by the participants were explored, and if questions were too complicated to answer, they were excluded. Interview questions related to the biographical background of each participant, their type of community, their knowledge (previous or current) of computers and the Internet, the frequency of their visits to the library and ICT centre, their general usage of the computers and the Internet in the centre, and their perceptions of the impact of being able to access the Internet on their lives. The interviews were conducted in a relaxed, conversational manner. (See Appendix C for the Interview Guide)



**Figure 5.6: Data collection strategies and goals**

#### 5.4.4 Second Phase data Collection

During the first phase of data collection, there was a sense of needing to include more voices from the Harare Library in the data. Thus focus groups of users of the ICT centre at the Harare Library were planned. Two focus group interview sessions were held in Khayelitsha during October 2012. The questions asked these sessions with participants from the Harare Library, in Khayelitsha, were very similar to those asked in the interviews, but they were fewer. In these two focus groups, participants discussed their responses with one another

and the facilitator in a conversational manner, and all discussion was recorded using an audio recording device. Biographical background details were not requested during the focus group sessions. The focus group sessions followed a semi-structured design, in which specific questions were asked and the participants were invited to discuss the issues raised by the questions.

### 5.4.5 Third Phase Data Collection

The third phase of data collection was executed during 2013. It included both qualitative and quantitative data collection. The key objective of this phase was to obtain a broader sense of usage behaviour across the entire program. The data collection strategies comprised focus groups and surveys

#### 5.4.5.1 Focus groups

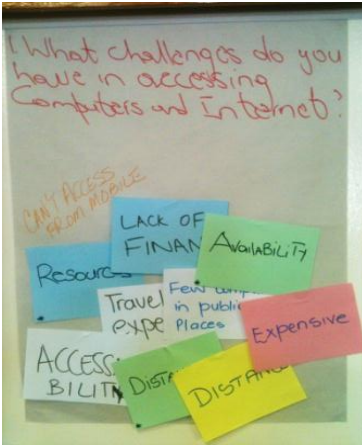
Ten focus groups were conducted with users and non-users of SmartCape ICT centres in libraries in Khayelitsha and Mitchells Plain, each consisting of about fifteen members.



**Figure 5.7: Focus groups in Khayelitsha and Mitchells Plain**

This series of focus groups included only three questions that related to: i) the participants' perceived challenges in accessing the Internet; ii) their view of how helpful it would be to have access to Internet from their home; and ii) their perspective regarding how having access to the Internet brings hope to them and their families.

The participants in each focus group were divided into groups of four or five. The questions were given to the groups, and they were tasked to discuss them within the group. Their responses were written on pieces of paper that were collected, and posted on large posters, using inputs from the group to arrange the ideas into logical categories.



**Figure 5.8: Responses to a question during a focus group in the third phase of data collection**

The venues and sizes for the focus groups are listed in Table 5.2.

**Table 5.2: Focus group venues**

Focus Group Venue	Frequency	Percent
1. Khayelitsha Centre	14	9.3%
2. Khayelitsha Site B library	16	10.7%
3. Khayelitsha Shawco	14	9.3%
4. Khayelitsha Harare Library	15	10.0%
5. Khayelitsha TAC Office	17	11.3%
6. Mitchells Plain Town Centre	15	10.0%
7. Mitchells Plain Family Centre	16	10.7%
8. Mitchells Plain Baptist Church	14	9.3%
9. Mitchells Plain Town Centre	13	8.7%
10. Mitchells Plain Family and Youth Centre	16	10.7%
Total	150	100.0%

#### 5.4.5.2 Surveys

Each participant in the second series of focus groups was given a questionnaire to complete. This questionnaire contained questions regarding:

- biographical details such as age, gender, home language, and qualifications;
- current computer and Internet use, usual places of Internet access, distances travelled (walked) to access the Internet, frequency of use, length of time using computers and the Internet, perception of own proficiency in using computers or the

Internet, the giving or receiving of assistance when using computers or accessing the Internet;

- ease of use of various computer-related tasks and Internet searches;
- point of access preference, affordability, devices owned, device preference, importance of public accessibility; and
- hopefulness.

The final sample size for this survey was 150.

#### **5.4.5.3 SmartCape online survey**

An online survey was administered via the SmartCape website to users of the SmartCape computers in libraries across Cape Town during April and May 2013. The questionnaire was similar to the previous questionnaire. However, library members have only 45 minutes once a day to use the computers and, therefore, due to these time constraints for users some questions had to be excluded to shorten the time needed to complete the questionnaire. The question content of this survey was:

- biographical details such as age, gender, home language, and qualifications;
- usual places of Internet access, distances travelled (walked) to access the Internet, frequency of use, perception of own proficiency in using computers or the Internet;
- ease of use of various computer-related tasks and Internet searches;
- point of access preference, affordability, devices owned, importance of public accessibility; and
- hopefulness.

The online survey launched on the SmartCape system between April 2013 and July 2013 was completed by 2274 SmartCape users from various areas in Cape Town (Figure 5.9). Cape Town library had the largest percentage of respondents (159 = 7%) followed by Bellville (122 = 5.4%), Khayelitsha (119 = 5.2%), and Mitchells Plain (106 = 4.7%). Seventeen per cent of the respondents did not give their library name or area in which they were working.



Figure 5.9: Library users who took part in the online survey

## 5.5 Data Analysis

Data analysis techniques were informed by the research methods that were employed. Thus both qualitative data analysis techniques and quantitative data analysis techniques were used. The qualitative data was also analysed using quantitative data analysis techniques. This was carried out to confirm relationships among the categories and themes found in the qualitative data.

In line with the tenets of CR, the objective of the data analysis was to identify patterns, generalisations and causalities (Alvesson & Sköldberg, 2009:40). Although the latter are aligned with a positivist leaning, the inquiry also sought to identify unobservable mechanisms such as those in the school of interpretivism. The key objective of the quantitative analysis was to find evidence of relationships.

### 5.5.1 Qualitative data analysis

Qualitative analysis differs from quantitative analysis in that quantitative analysis strictly analyses numerical data using statistical methods such as counting or aggregating. Qualitative data can take the form of words, longer text, and still or moving images (Miles, Huberman & Saldaña, 2013:10). Thus, qualitative data analysis analyses text, such as written documents, written observations or transcribed interviews, using a number of methods including content analysis, global analysis, narrative analysis, discourse analysis,

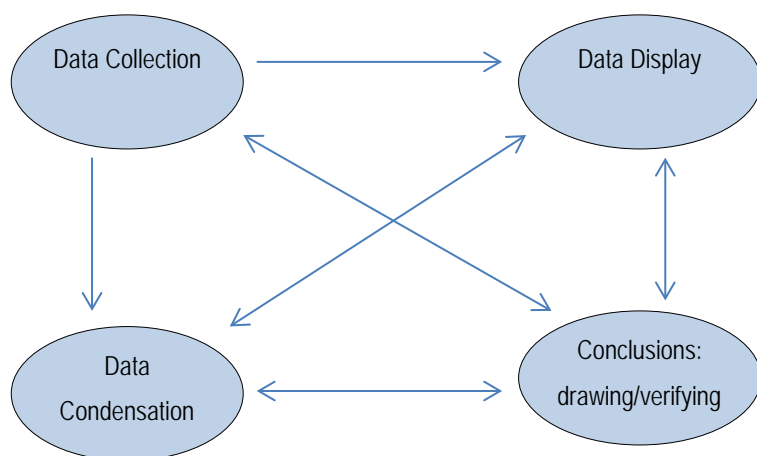
grounded theory analysis, conversational analysis, ethnomethodological analysis or a hybrid of analysis types (Henning *et al.*, 2004:104-140).

Qualitative data analysis consists of:

- the condensation of data (summarising, coding, developing themes);
- the display of the data and the conclusions (extended text, graphs, charts, networks); and
- the drawing of conclusions and verification of the display (Miles *et al.*, 2013:12-14).

The three steps above do not necessarily follow linearly, since qualitative data analysis is an iterative and interwoven process (Figure 5.10). As researchers start to collect data they also start to 'condense' and 'display' the data, which influence them to go back and rethink or modify the collection of the data.

Data condensation consists of summarising, finding concepts (coding) and developing themes. Data display consists of representations of the data and the findings. Together with the drawing of conclusions, these concepts form the full data analysis process (Miles *et al.*, 2013:12-14).



**Figure 5.10: An interactive model of the components of data analysis**

(Source: Miles *et al.*, 2013:14)

In the analysis of qualitative data, the objective is 'sense making' rather than a statistical interpretation of the data (Bhattacharjee, 2012:113). The sense making in this study is to obtain an understanding from the users of the ICT centre of their usage and the benefits they received from using the ICT computers and the Internet at the ICT centre.

Qualitative content analysis involves a systematic analysis of the text (Bhattacharjee, 2012:115) as raw data being transformed into a standardised form (Babbie, 2010:338) by selecting segments or chunks of text and assigning a 'code' to it, often according to a certain conceptual framework. Content, as noticed by the researcher (manifest content) in the transcribed interviews, can be coded (e.g. by looking for explicit keywords in the text). Alternatively underlying meanings (latent content) may be utilised. Babbie (2010:338) advocates the use of both methods, because the first one has an advantage in reliability and specificity, and the second method's advantage lies in its validity. Coding can be based on themes from a conceptual framework or new themes emerging in the text (Bhattacharjee, 2012:115). Silverman (2011:60) points out that “*any analysis depends on the use of theory-dependent concepts*”.

#### **5.5.1.1 Coding**

Qualitative data analysis was undertaken by importing all interview transcription texts into the qualitative data management software ATLAS.ti, which gives easy access to documents and coded sections of documents. The process of analysis is still dependent upon the recognition of statements that can be used as evidence of a phenomenon.

Various methods of analysis of qualitative data involve breaking the text into smaller sections (i.e. phrases or sentences) and applying a code to each of these sections (Henning *et al.*, 2004:105). By reading the transcription documents in ATLAS.ti, codes were assigned to meaningful sections of texts that revealed evidence of an element or a concept. Codes or categories from a conceptualised framework were applied to the sections of the transcribed text that were identified. This method is called open coding (Henning *et al.*, 2004:131-134). Data identified by open coding was linked back together through a process of axial coding (*ibid.*) from which relationships between categories or codes could be identified. Categories were then grouped into themes, which were compared to literature. During the analysis, deductive and inductive methods of finding categories were followed. During deductive analysis, categories that were derived from literature were considered, whereas inductive analysis allows for new categories to emerge from the text itself (Miles *et al.*, 2013:81). From these categories 'themes' that related to the concepts in the various frameworks were identified.

#### **5.5.1.2 Developing themes**

There are a number of ways to determine the emerging themes from transcribed interviews. Ryan and Bernard (2003) advocate that they can be found by noting:

- repetition of topics or ideas;
- local terms (often used in unfamiliar ways);
- metaphors or analogies;
- natural shifts on contents of speech;
- similarities or differences between phrases or sections;
- connecting words or phrases;
- topics that were avoided; and
- prior theoretical perspective (*ibid.*).

Themes were identified in two ways:

1. Themes occurring in the ICT4D literature regarding the impact on communities using public access centres or from the various research frameworks (Chapter 4) were deemed apt to be selected as the starting point in the analysis of the interview and focus group data
2. Reading through all the interviews in an objective manner (to borrow from '*thematic content analysis*'), to find common themes (Anderson, 2007).

### **5.5.2 Quantitative data analysis**

The main objective of the quantitative analysis was to determine the profile of users, the usage trends of community members accessing the Internet at the SmartCape access points, as well as the understanding that communities have of the Internet and its benefits (or disadvantages).

The surveys of the third phase of data collection were analysed descriptively and inferentially. Descriptive statistics endeavour to summarise numerical data in measures of central tendency (mean, median or mode), spread (range of values, standard deviation or variance) and shape (symmetrically distributed or skewed) and categorical data using frequency tables or charts. Throughout the presentation of the findings, (Chapter 6), descriptive univariate and bivariate statistics, using frequencies, cross-tabulations or charts, are utilised to present the results from the surveys.

Inferential statistics uses techniques to prove hypotheses relating to size, shape, spread or relationships between variables. In this study, an inferential multivariate technique, called a Generalized Linear Model, was applied to determine relationships between categorical variables. The dependent variables and most of the independent variables were transformed to a dichotomous state (having only two outcomes).



Usually hypothesis tests of relationships between a dependent and multiple independent variables are analysed using a linear model, based on a number of assumptions, of which normality is one. Since the dependent and independent variables in this are categorical variables, the assumption of normality cannot be met. Therefore a Generalized Linear Model for non-normal, categorical or binary data (Simonoff, 2003:125-133; Agresti, 2007:66) was utilised.

The Generalized Linear Model is of the family of linear models that includes analysis of variance and regression models. It is a generalised form of the classic linear model.

The classic linear model has the form:

$$E(Y) = a + bx \quad \text{or} \quad Y = \mu + \epsilon$$

Where  $a$  = the intercept

$B$  = the slope

$X$  = independent variable

$Y$  = dependent variable

Classic linear models assume that all observations are independent of each other and are normally distributed. When working with a construct that was aggregated from Likert-scale type questions in a survey, one cannot safely assume that the construct will be normally distributed. This is the case with the variables and constructs of this research study, meaning that relationships cannot be found using the classic linear model.

### 5.5.2.1 Theoretical background to the Generalized Linear Model

The Generalized Linear Model consists of three components, a random component, a systematic component and a link function (McCullagh & Nelder, 1989). The assumptions of the classic linear model, as outlined by McCullagh and Nelder (1989), are:

- 1) each component of the dependent variable,  $Y$ , is independent and normally distributed, having a common variance (random component),
- 2) the covariates are combined to give the linear predictor (systematic component),
- 3) a link function,  $g(\cdot)$ , which specifies the relationship between the random component and the systematic component

$$g(p_i) = \eta_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik}$$

In the case of the generalized linear model, the first assumption is relaxed such that the dependent values may be from one of the exponential family of distributions<sup>15</sup>, the variance does not have to be common, and the link function mentioned in the third assumption is monotonic and differentiable. Link functions are chosen according to the data type and the context of the data. In this study, the dependent variable is a binary variable, thus a logit link function  $g(p) = \ln \frac{p}{1-p}$  is selected, where p, for example, is the probability (p) of a specific profile making a specific selection (Simonoff, 2003:366-367).

The logistic regression model relating the predictors (independent variables, i.e.  $x_1, x_2 \dots, x_k$ ) to a specific p are written as:

$$\log \frac{p}{1-p} = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (5-1)$$

From (1) the probability (p) of a specific profile making a specific selection can be calculated as

$$p = \frac{e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k}}{1 + e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k}} \quad (5-2)$$

The Generalized Linear Model was applied to determine which categorical variables have an impact on the hopefulness of respondents who completed the surveys.

### 5.5.3 Quantitative data analysis to identify a relationship between themes

Once themes have been identified in the qualitative data, a relationship between these themes can be established using quantitative techniques. A symmetrical matrix of frequencies of co-occurrences of themes in the data can be determined (Atlas.ti, 2014:21, 259). The higher the frequency, the more often the themes occur together. This can be statistically visualised by constructing a proximity matrix from the co-occurrence table using cluster analysis and multi-dimensional scaling (MDS) to plot the dependencies (Vargas-Quesada & De Moya-Anegón, 2007:63).

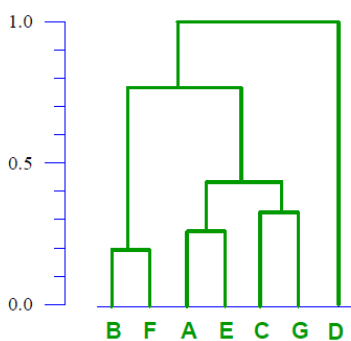
Cluster analysis combines multivariate techniques which classifies objects based on their characteristics (Hair, Anderson, Tatham *et al.*, 1995:423). Similar objects are clustered together and dissimilar objects are in different clusters (*ibid.*). The similarity or dissimilarity between objects is measured using correlations or a distance measure, or other association

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<sup>15</sup> The exponential family is the class of distributions that includes the Normal, Poisson, Gamma, Inverse Gaussian, Binomial, Exponential and other distributions.

measures between objects. In this study, the distance measure, which is the most commonly used method, is used to identify the clusters from the co-occurrence matrix of themes (Hair *et al.*, 1995:432-433). The method used is called hierarchical clustering and utilises the agglomerative method in which initially, each object is placed in its own cluster. In the following steps, the closest clusters are combined according to the distance between the clusters, thus reducing the number of clusters until all the objects are clustered together in one group (Hair *et al.*, 1995:437-438). This process is graphically represented in the dendrogram (Figure 5.11).

Thus cluster analysis creates a proximity matrix from frequencies in the co-occurrence matrix, which is then analysed using MDS. A proximity matrix consists of similarity or dissimilarity measures between pairs of objects. For qualitative coding or themes, a proximity matrix parallels the correlation matrix (Bazeley, 2013:301). Multi-dimensional scaling (MDS) is a group of techniques that allows a researcher to identify the key dimensions from a series of similarity measures, such as a proximity matrix (Hair *et al.*, 1995:488).

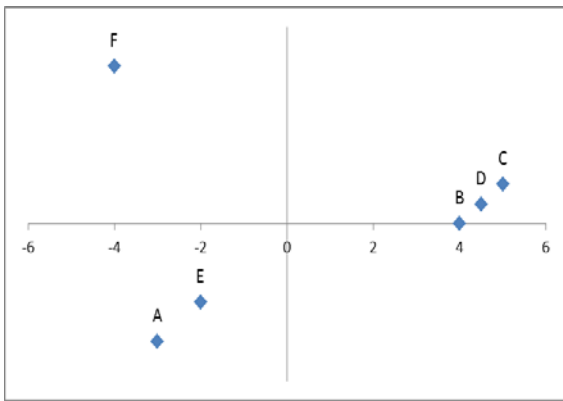


**Figure 5.11: Example of a dendrogram**

(Source: Greenacre & Primicerio, 2013:7-4)

Multi-dimensional scaling determines the number of important dimensions, their relative importance and how they are related perceptually (Hair *et al.*, 1995:488). The result of MDS is a multi-dimensional perceptual map, which shows the relative positioning of the objects to the axes and to each other (Figure 5.12). The aim of MDS is twofold:

1. to identify unrecognised dimensions affecting behaviour; and
2. to compare object evaluations when specific bases of comparison are not known (Hair *et al.*, 1995:492)



**Figure 5.12: Example of a two-dimensional perceptual map**

The evaluation measures used to test the fit include goodness-of-fit and badness-of-fit measures (Sturrock & Rocha, 2000:50). The first of these measures is the stress value, which is the sum of inaccuracies when three or higher dimensional data is represented by an easy-to-comprehend, two dimensional representation (ibid). However, Sturrock and Rocha (2000:50) pointed out that the stress measure in reality shows badness-of-fit, since the higher values shows a poorer fit. Small normalised raw stress values indicate a high level of adequacy between dimensions and the group of stress measures indicates the “*goodness of the model*” (Santo, 2009:3). The second measure is the dispersion accounted for (D.A.F) value, which is calculated by  $1 - \text{Normalised Stress}$ , and represents a goodness-of-fit measure. The D.A.F values should be close to 1 to indicate a good fit (ibid.).

Dugard, Todman and Staines (2010:275) cited in Watson (2014) gave the following table (Table 5.3) as an evaluation measure for stress and noted that stress values below 0.15 represent a good fit.

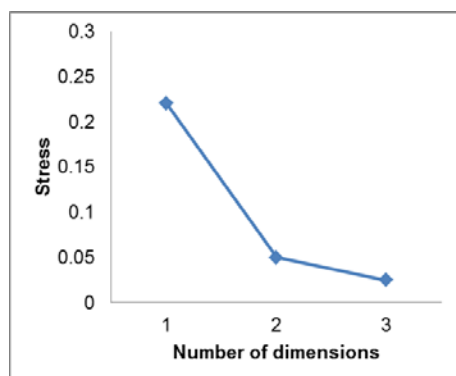
**Table 5.3: Stress-1 Evaluation Values**

Stress	Goodness of Fit
0.200 or above	Very Poor (not worth doing)
0.100 – 0.199	Fair
0.050 – 0.099	Good
0.025 - 0.049	Excellent
0.00 - 0.024	Near Perfect Fit

(Source Dugard *et al.*, 2010:275)

The first step in creating the perceptual map is to determine the number of dimensions in the data. Once the number of dimensions is determined the stress measure is used to determine how good the fit is (Hair *et al.*, 1995:505). Since the stress measure increases as

the number of dimensions increase, a scree plot (also called stress plot) (Figure 5.13) is used to determine the dimensionality of the scaling in MDS.



**Figure 5.13: Example of a scree plot**

The scree plot plots the number of dimensions (horizontal axis) against its stress value (vertical axis). The point at which the line bends (makes an elbow) shows the optimal number of dimensions in the data (Hair *et al.*, 1995:505).

Once the number of dimensions has been identified, they must be labelled, usually by visual inspection and evaluation (Hair *et al.*, 1995:511). This can be done using known characteristics or by devising new descriptors if the dimensions are intangible in character (*ibid.*).

The relationship between the themes was determined using the techniques described above (Chapter 6.3.7).

## 5.6 Evaluation of the research

Even though quantitative methods were included in this study, generalisability is not an important issue because this study is the first step towards identifying the benefits of a public access programme in underserved communities. Due to this and the fact that this study includes qualitative research techniques, other approaches need to be followed to evaluate the research outcomes of this study. This section will discuss the final component of the research design.

One of the questions in evaluating research is usually '*Are the research findings reliable and valid and can they be generalised?*' The resulting responses vary in attitude and content. For example, Kvale and Brinkmann (2009:244-145) commented on extreme positions of researchers towards validity, reliability and generalisability. Some qualitative researchers

have ignored these concepts (*ibid.*), while others, such as Guba and Lincoln (1994:114) have proposed criteria defined as credibility, transferability, dependability and confirmability each of which parallels one of the validity, reliability and objectivity concepts. Although qualitative studies are not judged by the same tenets as quantitative studies, Kvale and Brinkmann (2009:245) argued that similar terminology be retained as verification language but reconceptualised to be relevant to qualitative research(see Table 5.4).

**Table 5.4: A comparison of quantitative and qualitative research evaluation strategies**

Quantitative	Qualitative
Objectivity	Confirmability
Reliability	Dependability
Internal validity	Credibility
Generalisability / External validity	Transferability

(Source: Pather, 2006:118)

Thus, in this study, which includes qualitative and quantitative methods, traditional terminology will be used to describe the various evaluation strategies.

### 5.6.1 Objectivity

In quantitative studies objectivity mostly relates to the stance of the researcher towards the research, minimising the researchers bias at all points during the research process. On the contrary, in the qualitative research domain, objectivity, also termed confirmability, discusses reliability and validity, and the objectivity of knowledge created (Kvale & Brinkmann, 2009:242).

#### 5.6.1.1 Qualitative research

Reliability, termed dependability by Guba and Lincoln (1994) describes the extent to which the measurement technique produces consistent and trustworthy results (Burns & Grove, 2010). Although this concept stems from a positivist paradigm, it is still pertinent in qualitative research in which, for example, it translates to whether interviewees will change their responses during an interview or give different responses to different interviewers (Burns & Grove, 2010). Validity in qualitative studies considers whether the research method is investigating what it is supposed to be investigating or not.

Miles *et al.* (2013:311) frames objectivity as an issue of relative neutrality and freedom from “*unacknowledged research biases*” and suggests the following considerations for qualitative studies:

- Describe the study's methods and procedures explicitly and in detail.

- Explain the sequence of data collection, processing, analysis and display clearly.
  - Conclusions must be explicitly linked with analysed data.
  - Keep a detailed record of methods and procedures for the purpose of auditing.
  - Be explicit about self-biases and personal assumptions and their possible effect on the study.
  - Examine competing or rival hypotheses.
- Retain the data for re-analysis by others (Miles *et al.*, 2013:311-312).

### 5.6.1.2 Quantitative research

In quantitative research objectivity pertains to the researcher's relationship to the research process as a whole. During the research process, the influence of a quantitative researcher's judgement is minimised (Mertens, 2014:272) by:

- selecting an appropriate research method;
- peer-reviewing of the data collection instrument;
- administering the data collection instrument in comparable situations; and
- using statistical techniques to analyse the data.

## 5.6.2 Reliability

### 5.6.2.1 Qualitative research

A way of ensuring reliability in the qualitative research process is to document the complete process (Flick, 2009). This can be achieved by an audit inquiry, as proposed by Lincoln and Guba (1985) cited in Babbie (2010:417), to assess the process and the content of what was observed. Remenyi, Williams, Money *et al.* (1998) as cited in Pather (2006:122) made the following two suggestions:

- keep collected evidence in an easily retrievable form; and
- keep a log showing decisions and justifications for decisions pertaining to research design.

### 5.6.2.2 Quantitative research

In quantitative research methods, such as using a survey to collect data, reliability describes the consistency of responses and results when the measurement instrument is administered in various settings (Burns & Grove, 2010:364). In the case of construct development,

reliability can be statistically tested by using the Cronbach's alpha coefficient that measures internal consistency (Hinkin, 1995:978).

### 5.6.3 Validity

#### 5.6.3.1 Qualitative research

In qualitative studies, validity addresses the question whether the research method is investigating what it is supposed to be investigating or not. Validation includes actions to check, to question, to theorise, and to discuss and share (Henning *et al.*, 2004:147-149). Another notion of validity relates to the usability of the findings and the empowerment of research participants (*ibid.*)

Guba and Lincoln (1994:114) split validity in qualitative studies into two concepts, namely, credibility and transferability.

##### a. **Credibility**

Credibility refers to the “*compatibility between the constructed realities that exist in the minds of the respondents and those that are attributed to them*” (Babbie and Mouton (2001:277) as cited in Pather (2006:120)). Strategies for increasing the credibility of qualitative research include:

- Analytic induction
- Constant comparative method
- Deviant case analysis
- Comprehensive data treatment
- Using appropriate tabulations (Silverman, 2011)

The techniques listed above are not applied separately or linearly but are all interwoven in the qualitative data analysis process (Silverman, 2011:368-388). Analytic induction relates to the process of uncovering relations in the characteristics of the phenomenon studied and includes the techniques of i) constant comparison; and ii) searching for deviant cases (*ibid.*). The constant comparative method entails constantly searching for another case, or entity, to test out a certain phenomenon (Silverman, 2011). In a dataset of a single researcher this translates to analysing a small section of the data and testing the generated set of codes by analysing increasingly more data (*ibid.*) until all the data is analysed. This is called “*comprehensive data treatment*” (Silverman, 2011:368-388) . The comparative method also ensures deviant-case analysis, in which deviant data (deviant in relation to the conceptual



model used) is identified and addressed. In smaller datasets, this means repeated analysis of all pieces of data from the research (*ibid.*). Lastly comprehensive data treatment is aided by suitable tabulations of codes and categories. This is used to acquire a sense of the variance in the data and to check the prevalence of the phenomenon in the data.

**b. Transferability**

Transferability relates to the concept of generalising the results of a study to other situations (Kvale & Brinkmann, 2009:260-261). In qualitative studies the important consideration of generalisability is whether knowledge produced in a specific interview or case study can be transferred to other situations or not (*ibid.*).

Silverman (2011:386) describes three ways to generalise in qualitative studies (Table 5.5).

**Table 5.5: How to generalise in qualitative research**

Deductive inference	Choosing a critical or deviant case to prove the refutability of an accredited theory
Comparative inference	Identifying cases with extreme situations, or a wide range of situations as well as certain characteristics to maximise variation
The emblematic case	Choosing a typical case – e.g. a single case study that embodies one or more key aspects of social action or social process

(Source: Silverman, 2011:386)

Thus, generalisability is accommodated by the choice of case to study (*ibid.*).

Furthermore, Babbie and Mouton (2001:277) cited in (Pather, 2006) propose two strategies for transferability:

- Thick description—collecting detailed descriptions of evidence and reporting with sufficient detail and precision to allow the reader to make judgements about transferability
- Select participants purposively—selecting different or similar participants.

**5.6.3.2 Quantitative research**

Burns and Burns (2008:425-431) differentiate between external, internal, population, and ecological validity in quantitative studies. External validity refers to generalisability (i.e. whether the analysis results of the sample can be generalised to the full population). In a similar way, population validity, addresses the question of whether the sample responses are an “*accurate assessment of the target population*” or not (*ibid.*). Ecological validity addresses the question of whether the results can be generalised to other environmental contexts or not, and internal validity refers to the extent to which the researcher can control

the conditions in which the study takes place (*ibid.*). Internal validity consists of five subtypes as demonstrated in Table 5.6.

**Table 5.6: Subtypes of internal validity**

Content validity	Does the measurement reflect the intended content?
Face validity	Does the measure appear important and professional to participants?
Predictive validity	Can the measure be used for future performance predictions?
Concurrent validity	Can the measure predict the correct outcome now?
Construct validity	Does the measurement tap the theorised concept?

(Source: Burns & Burns, 2008:427-430)

It is important to determine the extent to which a study should be generalisable or transferable to other environments.

### 5.6.4 The research evaluation framework for this study

Table 5.7 demonstrates the strategies used in this study to ensure the quality of the research.

**Table 5.7: A framework for increasing the quality of the research outcomes**

Qualitative research imperatives	Strategy	Quantitative research imperatives	Strategy
Confirmability	Describe the methods and procedures of the study explicitly. Explain the sequence of data collection, processing, analysis and display clearly Conclusions must be explicitly linked with analysed data Keep a detailed record of methods and procedures for the purpose of auditing Retain the data for re-analysis by others	Objectivity	Select an appropriate research method Review data-collection instrument Administer the data-collection instrument in comparable conditions Use statistical techniques to analyse the data.
Reliability	Keep collected evidence in an easily retrievable form. Keep logs showing decisions and justifications for research design decisions	Reliability	Use Cronbach's alpha coefficient for constructs
Transferability	Choose a typical case – Report findings with sufficient detailed descriptions Select participants purposively	Validity	Survey and questionnaire designed in conjunction with peer researchers, and administered to focus groups and online. Sample size is large, not random, and representative of the SmartCape population.
Credibility	Constant comparative method-Analyse a small section of the data and test the generated set of codes by analysing increasingly more data Use appropriate tabulations		

## **5.7 Conclusion**

This chapter commenced with the Three-World Framework (Figure 5.1) as an exposition of the relationship between research philosophy, research approaches and research methods, and the solving of problems in the everyday world. Chapter 5.2 also discussed three research paradigms and established that the Critical Realist paradigm is the appropriate intellectual underpinning this study.

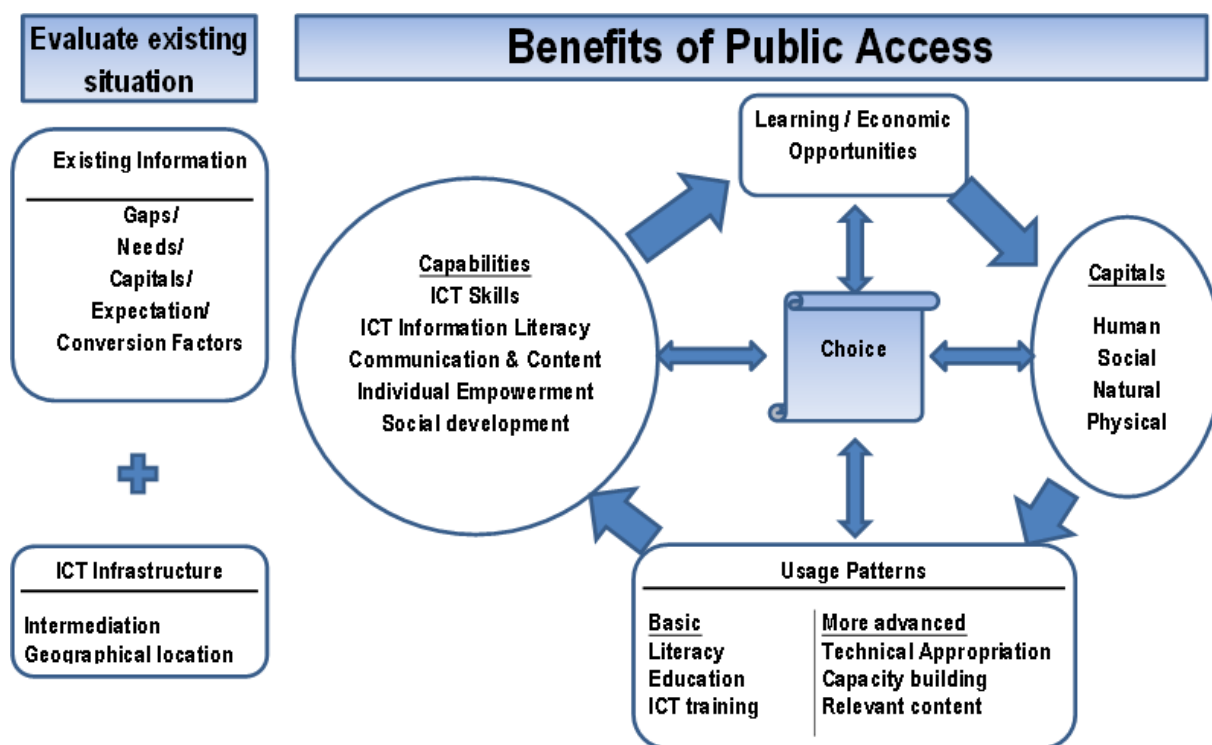
The case study research method is described in Chapter 5.3 as the appropriate method for this study and shows that this method allows both quantitative and qualitative research techniques to be utilised. Chapter 5.4 gives a detailed explanation of the three phases of qualitative and quantitative data-collection strategies. The data-analysis strategies are discussed in Chapter 5.5, covering the qualitative content analysis and the statistical analysis of the survey data and qualitative results. Chapter 5.6 poses a framework for ensuring the quality of the research is presented.

Thus Chapter 5 presented an overview of the qualitative and quantitative research strategies utilised in this study. The findings of the research study using these strategies are demonstrated in Chapter 6.

## Chapter 6 Findings

### 6.1 Introduction

The investigation into the themes that occurred from the interview and focus group data was underpinned by the conceptual framework discussed in Chapter 4.



**Figure 6.1: Framework for Benefits of Public access initiatives (Chapter 4.6)**

All of the concepts that occurred in the benefits section of the framework were investigated in the interviews, focus group sessions and surveys. These concepts include increased capabilities, (such as ICT skills, information literacy, communication, empowerment, and social development), economic and social opportunities, and increased capitals (such as human, social, natural and physical). The usage pattern of the users was also noted. New concepts that emerged from the data were investigated further and included in the analysis.

The framework is founded on human development concepts by way of the Capability Approach, which focuses on the expanding of people's existing capabilities as freedoms, as well as enabling new capabilities, through expanding existing choices and forging new choices. New opportunities, increased choices, and enhanced achieved capabilities, hampered or enhanced by conversion factors dependent on the meaningful use of ICTS are elements included in the evaluation frameworks, listed in Chapter 4 .

This chapter commences with situating the SmartCape initiative within the context of this study, and discussing the use of the ICT centres, with a special focus on the ICT centre in the Harare Library. The analysis of the themes found is presented thereafter.

## 6.2 Case study: The SmartCape Initiative

The City of Cape Town initiated the SmartCape Access project in July 2002, offering free Internet access at public libraries (Chigona *et al.*, 2010:1), and having the following three primary goals

- to provide free public access to computers and the Internet;
- to prove that open source software is affordable, appropriate technology for a public service digital divide initiative; and
- to increase opportunities for members of disadvantaged communities (Infonomics, 2003:5; City of Cape Town, 2010, 2015b):

The key success factors according to the City of Cape Town are listed as (*ibid.*)

- Use of the computers and the Internet for web browsing and email should be at no monetary cost to the user (*i.e. free to be used*).
- The hardware, software and network management need to be installed and maintained at as low a cost as possible and provided in such a way as to attract sponsorship and donor support readily.
- The physical facilities should be placed where people already go for information (e.g. libraries).
- Personal investment of time by users to develop their ability to make basic use of the facilities provided should have immediate personal benefits, for example, by immediately being able to send and receive emails (rudimentary training provided).
- The technology solutions utilised should allow technical management, including maintenance to be performed remotely as far as possible and require no technical input from the facility staff (*i.e. by external technical team not by library personnel*).

During 2002 the City of Cape Town installed five computers in six public libraries across the City. Even though this began as a pilot project, 3000 citizens registered as SmartCape users during the first six months. Given this success, the project was extended to all 97 public libraries in Cape Town by the end of 2004 (Smart Cape, 2010).

By October 2005, the project boasted that the close to 500 access stations launched from 2002 have provided computing facilities to more than 26000 users (South Africa.info, 2005).

In 2003 the Bill and Melinda Gates Foundation's 'Access to Learning' project awarded SmartCape US\$1 million to extend the project (*ibid.*).

**Table 6.1: Number of SmartCape registered users, total sessions and sessions per user per year**

Years	Registered Users	Total Sessions	Sessions per user
2008	37547	718744	19.14
2009	33214	843607	25.40
2010	30443	807287	26.52
2011	31785	854659	26.89
2012	35934	1011448	28.15
2013	34552	1028264	29.76
2014	32550	952976	29.28
Jan - Apr 2015	10256	285549	27.84

(Source: Western Cape Government, 2013a; City of Cape Town, 2015c data aggregated)

Table 6.1 shows the number of registered users, total sessions and sessions per user per year for 2008 to 2015 for all the SmartCape Libraries (City of Cape Town, 2015c).

As of 2015, the programme has more than 360 000 registered users across the city (City of Cape Town, 2015a). The newest library, which opened in Harare, Khayelitsha during July 2011, was selected as one of the sites for this in the research study.

The first goal of the SmartCape initiative (free access to ICT) is easy to evaluate, since all community members can have free access to ICT in the libraries in which the SmartCape computers are installed. Therefore the first tangible benefit realised is free access to the Internet that became possible with the establishment of the SmartCape libraries.

The ICT infrastructure of the SmartCape project is provided by the City of Cape Town libraries, as the intermediary. All queries and complaints of the systems are also dealt with by the technicians of the SmartCape system, and not by library personnel.

### **6.2.1 Harare Library and public ICT centre**

The Harare Library has its roots in the Violence Protection through Urban Upgrading (VPUU) project, which was launched in 2005, and funded by a partnership between the City of Cape Town, the German Federal Ministry for Economic Development and Cooperation, and the German Development Bank. The aim of the project was to transform Khayelitsha, a poverty-stricken area that is rife with crime, into a safe place for its residents. The programme hoped to address factors that contribute to instability such as lack of access to basic services, inadequate schooling and lack of economic opportunities. The goal was to influence

residents to be more involved in their community and to increase the delivery of social and commercial services to strengthen community structures (Reid, 2011).

As part of the aim to strengthen community services, a new library was established in Harare, Khayelitsha. The Harare Library is situated on Harare Square, which is part of the 'Quality Public Spaces Programme' legacy of the City of Cape Town and was funded by the Carnegie Corporation of New York, the partnerships with VPUU, the Neighbourhood Development Partnership Grant and a provincial grant (Hardy, 2011:52). The library was show-cased as one of the World Design City 2014 projects for its unique construction features and eco-friendly design (Hardy, 2014). The head librarian stated that: "*This building cost 23 million rands because it is a green building*" (Langeni, 2012).

The Harare Library was built subsequent to other public VPUU facilities in Khayelitsha. These include two community buildings, a new park, and a school sports complex (Reid, 2011). The Harare Library uses natural ventilation and daylight efficiently (Figure 6.4 - Figure 6.6). Facilities in the library include free Internet (delivered by the SmartCape network), a giant chess board, an area where early childhood development programmes are run, a gaming room and Wii consoles for educational and fun purposes. There are also offices and areas for community groups such as NGOs to conduct meetings and run programmes (Reid, 2011). The ICT centre offers access to SmartCape by way of desktop computers and Wi-Fi connection. Figure 6.2 and Figure 6.3 shows the artwork on the outside walls of the Harare Library that was created in collaboration with local artists.



**Figure 6.2: Harare Library: right front window**

(Source: own photo)



**Figure 6.3: Harare Library: Front mural**

(Source: own photo)

Figure 6.4 demonstrates the light streaming in from the high rows of windows at different levels



**Figure 6.4: Harare Library's natural light**

(Source: own photo)

The library is stocked with quality books and digital media due to the grant from the Carnegie Corporation.

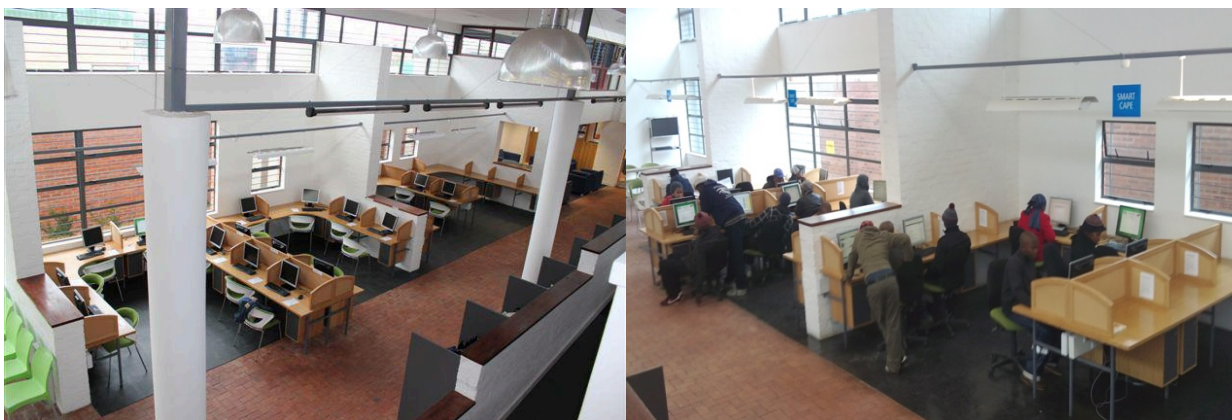




**Figure 6.5: Inside Harare Library**

(Source: Hardy, 2014:066/061)

Eighteen computers were installed in the library at the start—a deliberate increase on the five computers in other libraries—with the promise of more. By the third month of its existence 261 new members were registered on the SmartCape network, and a total of 7400 45-minute sessions were recorded (Hardy, 2011: 53). During the day, all the computers are usually occupied with a number of community members queuing to use the computers. It is clear from the popularity of the ICT centre in the Harare Library that the community members derive benefits from using the centre.



**Figure 6.6: Harare Library, ICT centre;**

(Source: Left: Harare Library (2012); Right: (own photo).)

The librarians follow a two-pronged method to introduce the books to new members and give them access to the computers and the Internet. New members who register to borrow books are encouraged to register on the SmartCape network and are assisted if they need help using the computers and the Internet. Similarly, new members who register at the library solely to use the computers, are required to choose a book first before can register on the SmartCape network.

### 6.3 Main themes

In this section, the main findings from the statistics received from Smart Cape, and the field research and the surveys will be introduced. In framing the benefits of the SmartCape computers, it must be stated that certain dis-benefits relating to slow Internet connections, time-outs when downloading application forms, and waiting in queues while school children and young adults '*play on Facebook*' were also mentioned. These disadvantages appear to be both technical issues and logistics in the ICT centre. However, the overarching impression is that SmartCape is assisting underserved communities<sup>16</sup> to connect with people, business, government and friends through email and online applications of employment and studies, therefore assisting in day-to-day business activities and increasing choices, opportunities and capabilities which lead to increasing self-esteem and self-efficacy and feelings of empowerment. Participants reported a general perception of a '*changed life*', when access to the ICT centre occurred on a regular basis. An intangible benefit that emerged from the analysis of the interview data is the notion of hope, for a better future, and expressions of aspirations that access to Internet are making possible. It is also evident that, even in the face of the proliferation of the Internet on smart phones and tablets, there still is a definite necessity for public access centres with desktop computers and printers connected to the Internet.

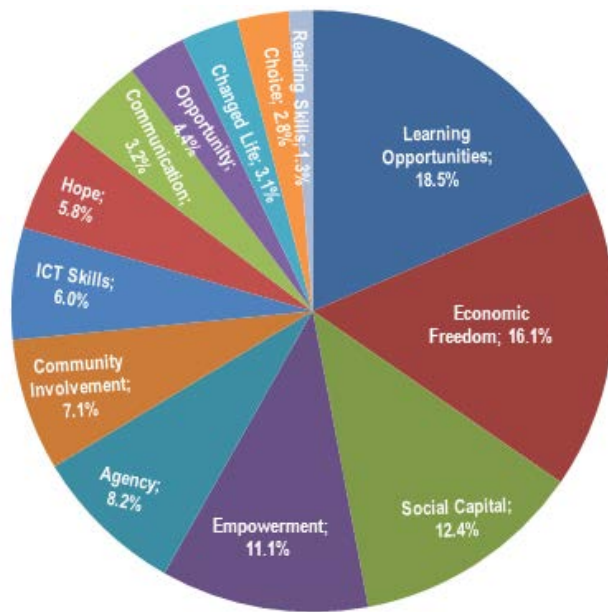
The main themes of benefits that emerged during the interviews were:

- Easier *learning opportunities*
- Economic freedom
- *Social capital*—making more connections with people
- Enhanced *empowerment*
- Increased *agency*
- Community involvement
- Increased *ICT skills*
- Aspiration and *hope*
- More and new *opportunities*
- More and new *communication*
- Evidence of *changed life*
- More *choice*

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<sup>16</sup> USAASA deems any area with less than 5% electronic communications network penetration as underserved. (ITU, 2013: 50).

- Increased English *reading skills*



**Figure 6.7: Themes that emerged from interviews and focus groups**

The percentages in the pie chart (Figure 6.7) were derived from the number of times the themes occurred in the interview and focus group data. This quantification indicates how early in the user's experience the theme manifests, rather than its importance.

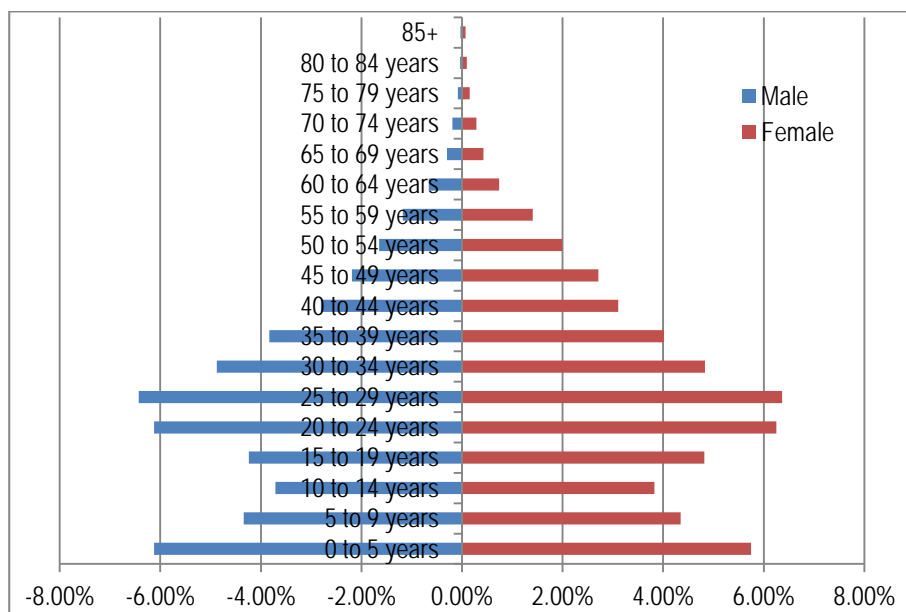
Themes relating to the basic or advanced use of ICT were also noted as well as the presence of certain enabling and disabling conversion factors. A concept relating to the resources that facilitate opportunities, known as agency in the CA, is also noted as a theme. Certain themes can be identified as benefits, whilst others are conversion factors. Some of the benefits relate to potential functionings (opportunities) and others relate to achieved functionings (freedoms and skills).

### 6.3.1 Situating the ICT centre in the Harare Library

Harare spans 1.9 square kilometres, has a population of 28971 people and houses 8823 households (South Africa. Statistics South Africa, 2012). The population statistics from the 2011 census shows a relatively high birth rate which is represented by the 0 to 4 age group in the population pyramid for Khayelitsha (Figure 6.8) and a smaller population for the groups between the ages of 5 and 19. This is followed by a population '*bulge*' in the 20 – 24 and 25 – 29 age groups (South Africa. Statistics South Africa, 2012). The 2011 census gives the average age of the population of Khayelitsha as 25.77 years and also revealed that 16.8% of

the households of Khayelitsha have no income. The average household income is about R3358 per month, which places the area in the second lowest income bracket in Cape Town.

The average age among the interview and focus group participants is 30, and the average age of the respondents in the two surveys is 33.21 (standard deviation is 13.30) (South Africa. Statistics South Africa, 2012).



**Figure 6.8: Khayelitsha – Population pyramid**  
 (Source data: South Africa. Statistics South Africa, 2012)

Most members of the community of Khayelitsha (an average of 64.4% of all the wards) have no Internet access at all (South Africa. Statistics South Africa, 2012). Only 2.9% of the population indicated that they had Internet access at home. Given that less than 3% of Khayelitsha has access to Internet at home, Khayelitsha can be classified as an underserved area as far as Internet access is concerned.

Sixteen out of the twenty-four (66.7%) focus groups and interview participants who disclosed their employment status indicated that they were unemployed. However, among the Khayelitsha respondents who completed the surveys, 52.3% indicated that they were unemployed.

The community of Harare is described in contrasting ways by the interviewees. As depicted by one user, it is a township where life is hard, where there is crime and young people use drugs and alcohol:

*“This is a township where life is not easy. Uhm. Not because we need something, but because of our people; you know. You know we’ve got youngsters who are busy with drugs, alcohol and crime. Ja, which makes life difficult for other people who are not doing that.” (P5, 2012)<sup>17</sup>*

One participant of a focus group explained his perception of what contributes to the crime rate in the area in the following way:

*“[I]f you notice, here in Harare that is, most of the people that are behind the violence and the crime are poor people. Poor people, who don’t have anything, who sleep with empty stomachs because for example, you see the construction site around the corner? Just the other day we caught a young man stealing scaffolding. You see, when we asked what he would do with them when he stole them he said that he would sell them then manage to obtain money for bread because he is hungry. So those are the kind of things that occur around here.” (FG1B, 2012)*

Other participants described the community as a warm and welcoming community, consisting of caring, spiritual people who attend religious meetings and who live according to the positive community values of the rural communities:

*“Most of them, they still have those norms and values that they brought with them from the Eastern Cape.<sup>18</sup> You know, those African values and norms whereby you actually put value on your neighbour, you respect your neighbour. I mean you don’t disregard your neighbour, okay, you respect your neighbour as if they are your brothers and sisters because that’s the first person to come to the rescue in times of trouble, even if you are not there.” (P19, 2012)*

The new developments, which include business developments and a hospital as well as the library in Harare were mentioned with pride by a number of participants:

*“Harare is different. We even have business centre developments. Shame, at least hospitals are being built and the unemployment rate is decreasing than before.” (FG1P, 2012)*

The organisations implementing the development collaborated with the communities on the type of development needed in Harare. This was pointed out with appreciation by the participants:

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<sup>17</sup> PXX refers to an interview participant of the first phase of data collection, and FGXX refers to a participant of a focus group during the second phase of data collection.

<sup>18</sup> The region of the Eastern Cape is a typical rural dominated region

*“[T]hen I answered by saying that I would like it for there to be a football field, a netball court, and an area for any recreational activity. And now, those have been done. So what I like about Harare is that when they come do the research, those in charge act upon our requests.” (FG1L, 2012)*

Participants are impressed with the modern library and the way the space inside the library was created:

*“What I will highlight is this library. We are unique because we've got a modern library and in other locations we don't have a library of this stature, the kind of the standard. So Harare is unique, because it has a modern library, which competes with libraries from town.” (FG2S, 2012)*

In summary, the evidence depicts the community of Harare as being a community in transition from an extremely poor area with only informal housing to an area in which developments have transformed the community to a more formal housing community. The traditional values of the rural areas are still present in this area, but the problem of drug use and crime is also present. Thus, within the community of Harare, there are strengths as well as weaknesses which were pointed out by participants.

#### **6.3.1.1 Community Strengths**

In this section, community strengths refer to the resources that can help community members navigate new technologies for their benefit. All the participants were asked to describe ‘*what they liked about the community*’. Keeping rural cultural values of neighbourliness (as described in the previous section), demonstrating friendliness and warmth towards each other, entrepreneurship efforts, new developments (including the library and ICT centre), and formal housing were listed amongst the ‘*likes*’ of the community members. This is shown by an interview participant in his own words:

*“Then as I've seen the situation about the people how they live and then how they are socialising, then I saw that there's no harm here. Then I started to relax. .... But where I'm staying, they are so good. They are so humble. They greet each other you see. So I don't see any negative things. But they are very, very humble.” (P6, 2012)*

Khayelitsha is home to a large number of people who are unemployed and must find ways of making a living for themselves. Participants related how the community members operate small businesses or offer services on the street sidewalks in front of their houses:

*“Because of people, they just wake up in the morning and when they think of something, they do it. There in front of their places. And the business, it's going you see.” (P6, 2012)*

The construction of the centre around the library and the opening and existence of the library brought new pride to the community. The architecture of the library also increased the self-esteem of the communities surrounding it, as can be seen in the following statements:

*“Yah, can I also add on what the guy said? He said, like according to the library, I think this library is the best library because it's got space, and it's also the SmartCape. They got so many computers compared to other libraries. Other libraries are got small spaces, like the library in Khayelitsha. It's in a hall, as if it was added onto the hall, as if it was not made for that space, and so this library is the best according to space.” (FG2B, 2012)*

and

*“Ja, because especially when the time it was opened, it was very full. People were come in. So they like it. And it seems as if they themselves admire it. They don't break the windows of the place. They pay their respect on things.” (P8, 2012)*

Participants ascribed the drop in the crime rate to the new development in Harare:

*“Actually, I mean with the help of these extra developments; because before we had no building, it was like a forest. It was easier for the thugs to hide. Now because we have these buildings and the communities are now working together. It is easier to identify that this is a criminal and we can't live with a criminal. And our, as you can see we, we have buildings that makes it not to be easy for a criminal to hid. But this is a very nice society that I would love to stay with for the rest of my life. But until we fix these things, I think it can be easy for everybody.” (P5, 2012)*

and

*“Harare is established now and because you see the infrastructure are coming this way.” (P16, 2012)*

Some community members who are unemployed create employment for themselves by providing a service or selling goods:

*“We do have different types of people. Others are hustling, others, because there is no futures forward, they just sit home doing nothing. But they are those who are working and stuff you know, coz more people in my community are working, few are not.” (P17, 2012)*

Harare has mostly formal housing, with some areas consisting of informal housing:

*“What I can say is similar, sir. It’s like it’s almost the same as others, but in terms of development, it’s not the same. Like if you see some areas, you find houses built using zinc. And here, most houses here are brick houses.” (FGIB, 2012)*

Harare was one of the underserved, poverty-stricken communities that had areas that were overgrown with bush. The developments had a considerable influence in bringing both tangible and intangible benefits to the community. The benefits include clearing the fields, establishing buildings for small businesses to operate, creating a soccer field for recreation, building a new library and increasing the size of the ICT centre in the library to contain more than three times the number of computers found in other city libraries. The intangible benefits include pride, increased self-esteem, increased sense of security, increased self-efficacy, greater positive community involvement and greater communication between community members.

### **6.3.1.2 Community weaknesses**

Some participants volunteered aspects about the community that they did not like, and these were framed as questions to other participants. A number of comments regarding the behaviour and attitude of young children in the community were made by participants, as can be seen in the following statement:

*“Well me, uhm. What I don’t like in this community are these children, these groups of children who are fighting who are fourteen, thirteen. Just for instance these children are small. Just to feel for the parents—the pain to lose your child; it’s not a nice feeling. That’s what I don’t like about those children who fight who want to talk about gangsterism what so ever and they think that is the best thing to do.” (FGIN, 2012)*

Other weaknesses mentioned related to criminal activities, the inability of the authorities to deal with crime, unemployment, corruption, the instances of nepotism among the authorities when employment positions become available and the struggle of local artists to be recognised and given opportunities.

These weaknesses inform the community needs mentioned by the participants.

### **6.3.1.3 Community needs**

Given that more than 50% of the population of Khayelitsha is unemployed, it is understandable that employment possibilities, crime, gangsterism, the proliferation of drug addiction and the selling of drugs were among the greatest social ills mentioned by the participants:



*“[S]omething that's the same is the level of poverty, across the Khayelitsha communities and other townships. And unemployment. Most people, specially [sic] the youth, are unemployed. Because most of us were not skilled because we didn't go to school, through different reasons, some maybe through laziness, others through financial constraints at home.” (FG1A, 2012)*

Another participant mentioned the problems caused by young children joining gangs:

*“Well me, uhm. What I don't like in this community, are these children, these groups of children who are fighting, who are fourteen, thirteen. Just for instance, these children are small.; Just to feel for the parents—the pain to lose your child; it's not a nice feeling., So, who so ever is in charge for that I'm sure it's an elderly person. That's what I don't like about those children who fight, who want to talk about gangsterism whatsoever, and they think that is the best thing to do whereas it's not, you understand.” (FG1N, 2012)*

The way authorities deal with crime and with the people committing the crimes was mentioned by a few participants:

*“Ya, and then crime and the way the authorities deal with. Let's say I get robbed somewhere, and I go report the crime, and say 'Yes, I've been robbed'. Then they ask: 'Do you know the person that has robbed you?' Understand? And if you don't know the person who has robbed you, there's nothing they can do for you. Understand? So, I don't agree with the way the authorities deal with crime. Understand? And then as a response, you as a complainant receive one that you do not like. Yes, crime does occur, but then it feels as if the authorities are not doing anything about it.” (FG1B, 2012)*

Given the density of the population in Khayelitsha, concern for more access to computers and the Internet by young people in the wider community of Khayelitsha was also pointed out by participants:

*“Before this library arrived,; we have three libraries here. This library, there is another one that is next to the station that is not very far; it has about five computers and another one in Khayelitsha; it has another five computers as well. But the problem is that Khayelitsha has a large number of people. Khayelitsha has about 3 million people and out of that 3 million people the estimation says about 1/5th is young people. Now if we say these libraries, we can only have a library that contains five computers, it would be difficult for young people because in my estimation, I can say it's about 200 000 and something young people who are using the Internet. Now, we can't. Even 100 young people cannot use five computers. There was every day you will see new faces; new faces coming to check the Internet. Now I was using that Internet, but it was always full. So I have to go to the Mall, to Silolutho to check if I can, if I have money.” (P5, 2012)*

This underscores that Khayelitsha, and thus Harare, is an underserved community. This was particularly the case before the establishment of the Harare Library and the ICT centre in the library. The SmartCape initiative afforded access to the Internet and computers to members of underserved communities.

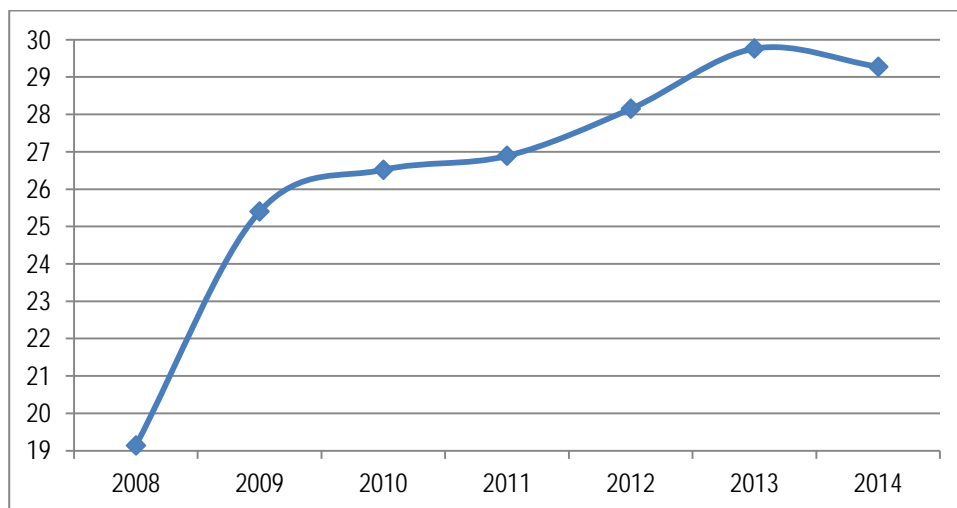
### 6.3.2 Use of facilities

The purpose of this section is to understand how much (or little) the community is making use of the ICT centres in the libraries. Data from the two surveys as well as the focus group and interviews are used to answer this question.

#### 6.3.2.1 Access

In today's world, access to the Internet is an imperative for unemployed people in their efforts to search and apply for employment (Armstrong & Ruiz del Arbol, 2015).

From secondary data sourced from the SmartCape ICT offices, it can be seen that the rate of access of the SmartCape system by citizens in the broader City of Cape Town, measured by the number of registered users and the number of sessions per user, increased over the years. The number of sessions per user increased by 52.9% from 19.14 in 2008 to 29.28 in 2014. The chart in Figure 6.9 depicts this increase in usage clearly.

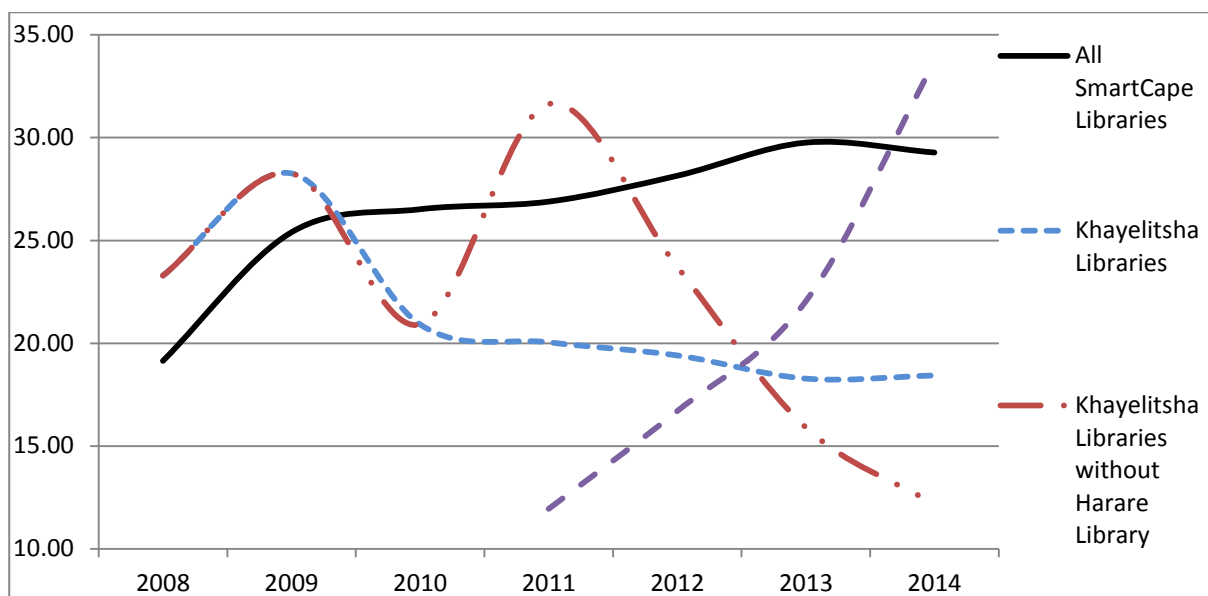


**Figure 6.9: Number of SmartCape sessions per user in Cape Town libraries**

The increase in usage in the Khayelitsha region is influenced by the establishment of the Harare Library in 2011. A number of users registered on SmartCape when the library opened but initially used the computers at a slow rate (11.95 sessions per user). However, this increased by 40% in the following year (16.7 sessions per user). The zero sessions for a

number of users at the onset of the Harare Library caused the drop in sessions per user in the 'Khayelitsha Libraries' curve (Figure 6.10). However, by the end of 2014, the users of the Harare Library increased their sessions to more than the users of other SmartCape libraries. Some of the interview participants indicated that they migrated from other Khayelitsha libraries to the Harare Library. This was due to the close proximity of the Harare Library to their homes and because there are more computers than in the other libraries.

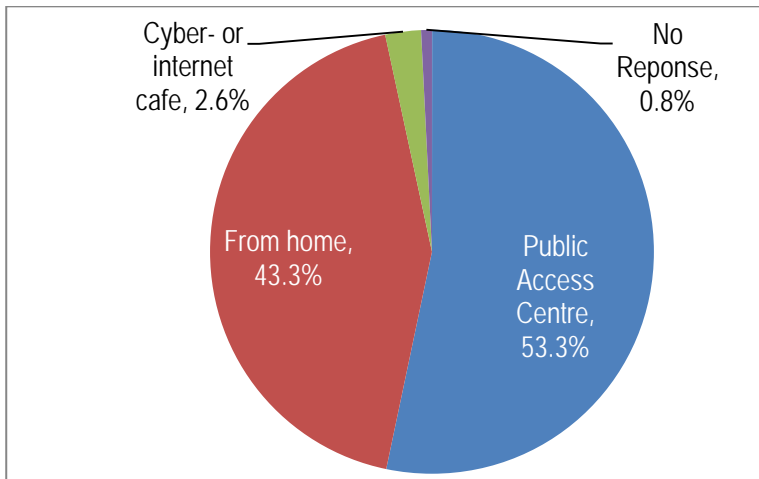
The overall increase in usage points is indicative that there must be benefits for community members who are using the system.



**Figure 6.10: SmartCape Session per user: Influence of Harare library users**

The results of the focus group survey showed that 63 out of 150 (42%) participants are not accessing the Internet at all. In addition 37.3% of all respondents in the focus group survey (64.4% of the respondents that do access the Internet) access the Internet from a public access centre (i.e. from the SmartCape system in libraries). According to the online survey, the Internet is mainly accessed from a public access centre by 83.5% of respondents. Together 80.7% of the respondents indicated that they access the Internet at a public access centre.

Respondents' preferred point of access of the Internet was investigated with the question "Where would you prefer to access the Internet?" This question was included in the questionnaires.



**Figure 6.11: Respondents' preferred point of Internet access**

The result, represented in Figure 6.11 above, shows that a significant number of respondents (53.3%) preferred to use the public access centre rather than an Internet cafe or home use ( $\chi^2 = 13.32$ ,  $p\text{-value} = < 0.001$ ). The reasons for their preference are given in Figure 6.12.



**Figure 6.12: Reasons for choosing a PAC as first choice**

The results represented in Figure 6.11 and Figure 6.12 show that public access centres are still the preferred point of access to the Internet for these users. The three main reasons given for this are:

- free to use;
- can receive assistance from others (as well as give assistance); and
- can receive free training in computer and Internet skills

The respondents in this survey who made use of the public access centre (58%) indicated an awareness of the opportunity of free access to the Internet, free assistance from other users

of the ICT centre and free, albeit informal, training in computer and Internet skills. Furthermore they made the choice to utilise the public access centre.

Many of the participants in the interviews and focus groups are unemployed and spent a part of their day at the library and the ICT centre. Thus, most of the participants indicated that they visited the ICT centre on a daily basis during the week, and two participants included weekends as well. The average time spent in the library is 1½ hours per day. Given that they are only allowed 45 minutes a day to use the computers, it is understood that the rest of the time is spent finding books or studying. The 45-minute rule is only applied when all the computers are in use.

Some of the participants stated that they only started using computers and the Internet when it became available through the SmartCape system. This is indicated by the following statements:

*“[B]efore those computers, I had never ever even been closed to a computer, let alone use one. I was not able to use a computer, but I now can.” (FG2S, 2012)*

and

*“I wasn’t using any computer before. If I wanted a job or something, I had to buy some paper and check for career times.”(P4, 2012)*

The availability of computers and the Internet also inspired participants to learn more about the technology:

*“I too was just like Sipho; I didn’t know anything about computers. But since the library was created, I began using them. And my interest within them grew to the point where I decided to go study it and gain a certificate.” (FG2K, 2012)*

Wireless access also became available to community members using smart phones, tablets or laptops:

*“[E]ven, your phone. Once you walk into the library, you are already connected.” (FG2B, 2012)*

and

*“So I thought that if they (her clients) have the wireless then now I can sit anywhere”.(P7, 2012)*

### 6.3.2.2 Basic ICT usage

One of the five steps towards reaping benefits is the basic use of ICT (Gigler, 2011:14). In this section, basic ICT usage describes using the computer to type and print documents and using the Internet for social networking, emails and basic searches without specifying computer or Internet proficiency. Gigler (2011:14) posits that having access to ICT is a tangible benefit (and one of the aims of the SmartCape initiative), but it has to translate into use in order to open up more opportunities, choices and increased capabilities. The type of ICT use changes when the choices and opportunities are exploited and benefits are obtained from them. Participants in the interviews were thus asked to describe their usage of ICTs to determine the level of use since this would have an influence on the type and level of benefits they received from the ICTs:

Usage statistics supplied by SmartCape included number of sessions, number of users and number of sessions in which certain computer programmes were used (Table 6.2).

**Table 6.2: Computer software usage statistics**

Year	Total Sessions	Presentation Used	Spreadsheet Used	IRC <sup>19</sup> Used	PDF <sup>20</sup> Reader Used	Word Used	Internet Used	Email Used	Typing Tutor Used	Paint Used
2008	718744	1.50%	1.80%	7.30%	1.70%	15.40%	72.10%	27.20%	3.20%	3.90%
2009	843607	0.70%	1.00%	3.70%	1.00%	11.20%	82.60%	22.70%	1.40%	1.80%
2010	807287	0.50%	0.83%	2.81%	0.79%	11.20%	67.62%	15.99%	1.07%	1.46%
2011	854659	0.43%	0.80%	2.36%	0.62%	10.86%	57.78%	8.94%	1.00%	1.44%
2012	1011448	0.4%	0.8%	2.3%	0.6%	9.9%	60.6%	6.0%	0.9%	1.6%
2013	1028264	0.4%	0.7%	1.7%	0.5%	9.6%	55.5%	4.7%	0.9%	1.8%
2014	952976	0.4%	0.7%	1.5%	0.5%	9.6%	64.6%	2.5%	0.9%	1.8%

(Source: Western Cape Government, 2013a; City of Cape Town, 2015c data aggregated)

The focus group survey results regarding the easy usage of certain software programmes presented in Table 6.3. The table represents the number of respondents who indicated that using the software is easy or somewhat easy. The last column shows the frequency of the number of respondents from the focus group survey who indicated that they are users of the SmartCape system (n = 87).

<sup>19</sup> IRC = Internet Relay Chat

<sup>20</sup> PDF = Portable Document Format

**Table 6.3: Computer software usage by focus group survey respondents**

Computer program	Respondents	% Respondents (n=150)	% Respondents (n = 87)
Play games	73	48.67%	83.9%
Type documents	49	32.67%	56.3%
Use social media	46	30.67%	52.9%
Use music software	46	30.67%	52.9%
Use spreadsheets	55	36.67%	63.2%
Do a visual presentation	79	52.67%	90.8%
Use imaging software	65	43.33%	74.7%
Create your own web-page	38	25.33%	43.7%

A total of 2260 respondents in the combined group of respondents of the online survey and the focus group survey answered the computer, computer keyboard and Internet proficiency questions. The results are represented in Figure 6.13. The question regarding the use of the Internet to study was answered by 1475 respondents.

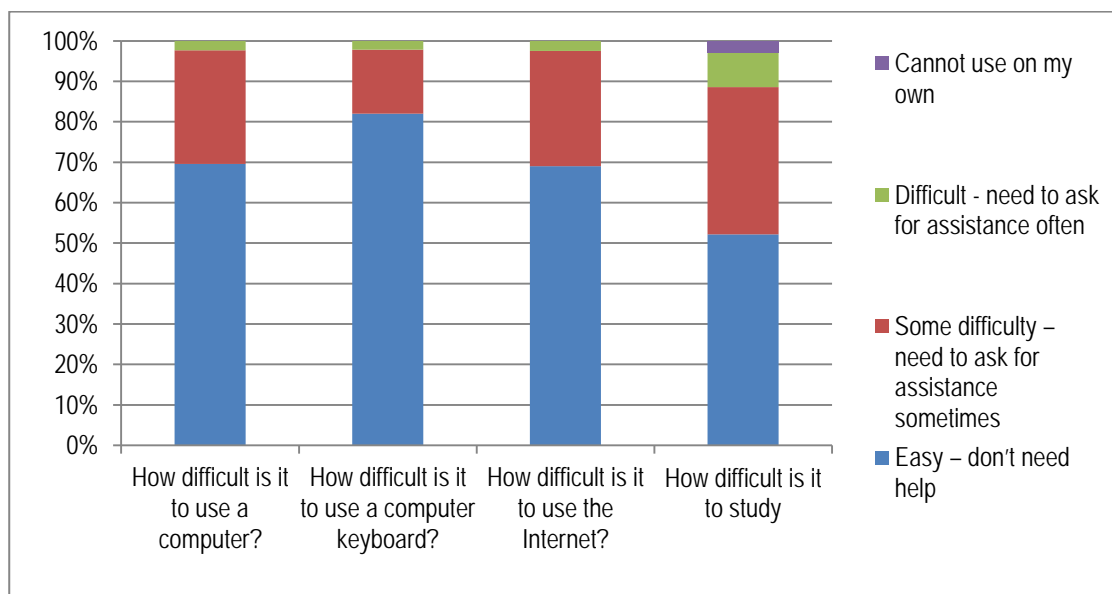
Seventy-eight percent (1772 of 2061) of the respondents indicated that they used the Internet almost daily or at least once a week and most (52.6%) stated that they did not have far to walk (about 1 to 2 km) to access the Internet.

Thirty participants of the interview and focus groups indicated how often they utilised the ICT centre and the length of their stay. The average number of days of usage of the ICT centre is 4.6 days a week (standard deviation = 1.003 days), and the average length of time is 1.45 hours (standard deviation = 1.170 hours) at a time. Given that the computer time allowed is only 45 minutes (enforced on busy days), the 1.45 hours probably includes some waiting time and general library time. This is strengthened by the quote below from one of the participants:

*“Ya, I come to the library on a consecutive basis. I come all the time. I even made friends with the receptionists and the staff. And when I come they ask me how I am doing, and that happened because I came to the sessions, and use the computers and study. Or if I'm composing, I go to a quiet space and compose my music, or write one of my plays, or one of my poems. So, I spend a lot of time. If I get here at ten, I will leave at about three, when I feel like I have exhausted my creativity. Then I decide that I must go and play or take a breather.” (FG2M, 2012)*

Between 2.2% and 2.5% declared that usage of a computer, computer keyboard or the Internet is either difficult or they need assistance. Between 95% and 97.8% deem using these is easy or only a little difficult. Of the 1475 respondents to the fourth question in the

table, 88.6% stated that studying using the Internet is either easy or a little difficult while 11.4% declared it to be very difficult, with them needing assistance.



**Figure 6.13: Survey 3: ICT proficiency**

These usage patterns were confirmed during the interviews and focus group sessions. Most participants indicated that they used email, Internet or typed documents, which is indicated by the following quote:

*“Before I came here I didn’t know how to send emails on the computer and stuff, but now I can. Something else is that it has helped me with school, in terms of applying online to different universities, you see. What else? Typing! You see, the typing on the computer has helped increase the speed at which I type.”(FG1B, 2012)*

Fewer participants indicated the use of spreadsheet or presentation software:

*“Because of these SmartCape then we became used to using it. Yes, more specially the Internet, Microsoft Word. What we are not using here is PowerPoint. Nobody’s using PowerPoint. We only use Microsoft Word; we only use the Internet. Yes. The majority of people who are coming here, they are here for the Internet. If there is no Internet, nobody uses the computers”.(P5, 2012)*

*“I can say it was the basics of the computer. It was just Word, Excel, presentations, but I was using Word most of the time and the Internet.”.(P9, 2012)*

*“I’m used to Windows 2007, Microsoft Excel, Microsoft Word, Office, Publisher and PowerPoint.”(P14, 2012)*



*“Yah we also use MS word and MS Excel and PowerPoint; I know how to do that, yah, I think. I have designed our own webpage as group at school yah so I’m going flexible with the computer at the moment. I would say so.” (P15b, 2012)*

The use of image and music software was only mentioned once, by one of the participants. Searching for employment and the typing and printing of documents (such as CVs or résumés) was mentioned mostly by the participants. This shows that the ICT centre and the Internet are being used mostly to search for employment, which is an important developmental goal.

Benefits gleaned from the basic use of ICT may spur people on to the more advanced use of ICTs, which would be more effective use.

### **6.3.2.3 Advanced ICT use**

Gurstein (2007:49) defined “effective use” as: “The capacity and opportunity to successfully integrate ICT into the accomplishment of self or collaboratively identified goals”. Giger (2011:14) used the term ‘meaningful use’ in his IIC (Chapter 4.1.3 and Figure 4.3) as capturing the depth, usefulness and level of expertise of Internet use. In this research study the term ‘advanced ICT use’ is utilised to define the search for government information and information for school and university projects, the use of online banking and online government services and the creation of content for local information services. That is, using the Internet to find local and relevant content and increasing the informational capabilities of people, thus accomplishing self-identified goals.

The advanced use of ICT was dealt in the surveys administered during the third data collection phase in the questions regarding online searches made by the respondents when using the ICT centre. Respondents were asked which searches they found easy to carry out.

Table 6.4 shows the number of respondents from the two surveys who found specific searches to be easy or somewhat easy.

**Table 6.4: Searches made by respondents of the focus group survey**

Searches	Respondents of both surveys (n = 2361)	%
Health	2093	88.6%
Education	2058	87.2%
Entertainment	1956	82.8%
Finding employment	1899	80.4%
Government services & activities	1837	77.8%
Your current work/job	1769	74.9%

The searches found to be easiest by the respondents were information searches for health, education, entertainment, and employment, although there were no significant differences in the ease of these searches. These high levels of searching for health information, education and employment opportunities point to the individual development of the SmartCape users.

Participants of the focus groups and interviews searched mostly for information for school or college projects and employment situations. Participants also mentioned searches for government information and general knowledge information.

**Table 6.5: Searches made by participants of interviews and focus groups**

Searches	Instances	% Instances
Employment	63	27.8%
Information	51	22.5%
Research	41	18.0%
Studies	38	16.7%
Knowledge	25	11.0%
Government information	9	4.0%
TOTALS:	227	100.0%

Participants mentioned searching for employment 63 times (27.8%) during the focus groups and interviews, and searching for general information was mentioned in 22.5% of the instances. The following quotes are examples of this:

*“The SmartCape computers have personally helped me a lot because on the Internet, all I used to do was to go on Google and google irrelevant things, but now I can see new job positions and post internships and other relevant things.” (FG1P, 2012)*

and

*“To search for work from different companies because I'm in search of job.” (FG2M, 2012)*

Participants also commented on the searching skills that they had learnt:

*“Uhm, I for one can say, it's like okay. I have learnt a lot about the Internet because before, I couldn't even use a computer, and I didn't even know what it's for, so but now at least I know how to gather information easily and fast.” (FG1A, 2012)*

Accessing information and news by searching on the Internet is discussed by participants among their friends who are not using the ICT centre or the library, thus benefitting community members, even though they are not current users:

*“Like my friend for one, who didn’t have a library card. But because I do, I would research things, then we would discuss things like news and current affairs. So when I would see things on the Internet, I would then be able to tell him what I’d see, and then we’d discuss those things about the happenings of the world. Its very fun” (FG1B, 2012)*

Participants shared a positive belief in finding useful information on the computers or the Internet (called ‘*Internet serendipity*’), thus providing new possibilities of learning or opportunities:

*“So when you use the computer, there’s a huge possibility of you finding something that would be able to help you or be interesting to you.”(FG2B, 2012)*

and

*“But through the Internet, you know, when you go to the Internet, when you Google something it will give you another thing; and then you say ‘Let me check this one’”.(P5, 2012)*

Other meaningful uses of the ICT facilities included: searching address information to visit clients by a participant employed as an insurance consultant; creating a rudimentary webpage to advertise training offered by the participant; essentially using the ICT centre as a ‘*work office*’; and completing SARS e-filing for small businesses.

*“Ja, I do use Google for directions. Because I have to go to clients, you see. Sometimes I don’t know where it is, the house, then I use Google to get directions.” (P7, 2012)*

*“Now there is another website that I have published our work. It’s kuza.com.. It’s here in Cape Town, Jo’burg, Durban and North Africa and in the UK. I designed a page for our organisation.” (P6, 2012)*

*“The computers have helped us a lot because without even using the computers here, but even through using Internet. You can bring your laptop, then you connect your landline(dial-up cable) and it’s for free. Even a phone, you can use a phone. I sit and look at my chair sometimes and look at how it okay’s like an office. You can sit , discuss , do all your work , research and leave and go home. It really sometimes looks like an office. You can even use the library as a meeting space: Say to people ‘meet me at my office in the library’.” (FG2M2, 2012)*

*P16: "I started the e-filing now. You see there is lot of organisations. You can't get a tax clearance certificate if your paper work is not in order. It cost us R120 to go to Bellville and back. So when we came back, I said: 'That's a lot of money'. And then I went on to the e-filing, sorted it out, did the applications."(P16, 2012)*

It is evident from the sample of quotes above that users benefited from the use of the ICT centre in the following ways:

- Economic related uses (using the ICT centre as an office and for SARS e-filing for businesses)
- Informational capital (knowing how to search for information and sharing it with others)
- Community upliftment (SARS e-filing for local businesses and placing training advertisement on the web).

Very little evidence was found in the interviews of local content creation via the Internet by participants using the ICT centre in the library. Participant P6 started an organisation assisting victims of crime and disaster in the community and reporting on that to various entities, as well as creating a website to assist in that work. The page did exist at the time of the interview but a year later, it was taken down.

### **6.3.3 Conversion Factors**

Conversion factors, as explained in Chapter 4.3.2, enable or disable people to convert resources to opportunities and to use opportunities to develop capabilities. The fact that the public access centres exist, means that any opportunities afforded by the use of computers or the Internet are available to community members.

The establishment of computers in libraries in underserved communities, such as Khayelitsha, affords opportunities to these communities to access the Internet. Education, employment, gender and age are examples of personal factors that can enable or disable the conversion of an opportunity into an achieved capability. In the focus group survey 63 respondents (out of 150) indicated that they have not made use of the ICT facilities in the libraries. Of these 63 respondents, almost 70% are older than 24 years, 61.9% are female, 77.8% are unemployed and 75% have not passed Grade 12. Thirty percent (19 out of 63) of the group of non-users have all the characteristics. Of the 87 respondents who indicated that they do access the facilities, only 16% had all the characteristics. This constitutes a statistically significant difference ( $\chi^2 = 4.213$ , p-value < 0.05) in the presence of the personal disabling conversion factors between the two groups. This is an example of how lack of

education, lack of employment, gender and age can interact to become a disabling conversion factor.

An example of an environmental enabling conversion factor is the free access to the Internet that public access centres give communities, via the computers in the libraries or the free wireless connection available to members.

*“[F]or me I would say that they are very helpful because we get the Internet for free.” (FG2M, 2012)*

and

*“The computers have helped us a lot because, without even using the computers here, but even through using Internet. You can bring your laptop, then you connect your landline (dial-up cable) and it’s for free.” (FG2M2, 2012)*

Knowing how to use computers and developing skills in the use of computers are personal enabling conversion factors. The fact that the public access centres are accessible to all and are seen to be *“the cool place to be”* (Gomez & Gould, 2010) models them as social enabling conversion factors.

In this study the environmental-disabling factors include connection problems and broken computers. Personal disabling-factors are the low ICT skills of certain community members as well as the lack of English language skills.

### **6.3.3.1 Enabling conversion factors**

#### **a. Environmental-enabling factors**

An example of an environmental-enabling conversion factor is implied in the following quote:

*“What I like about the library is that it’s close by, and the people who work here, like the secretaries are very nice and are unlike the ones were used to at other libraries.” (FG1B, 2012)*

The friendly assistance of the library personnel was mentioned by participants.

*“Some of them they don’t know how to use the computer but they were being assisted by the staff.” (FGIT, 2012)*

and

*“Ok, the library: Let me start with the people who work here. They are very helpful. When/if you want to do something that you are unable to do, I always see*

*them help people. Yes, they come and help you. All you need to do is raise your hand and they will come help you.” (FG2B, 2012)*

At some of the libraries in which only a few (usually five) SmartCape computers were installed, the complaint of long queues causing long waiting times can be considered as an environmental-disabling factor. Conversely, the fact that the Harare Library has eighteen computers makes it an environmental-enabling conversion factor.

*“And secondly, this library, like it has more computers, which means I don't have to queue all the time if and when I want to use a computer. That's it.” (FG2M, 2012)*

The computers at all the ICT centres are connected to the Internet and are running free Open Source Software (OSS) that includes word processing and spreadsheet and presentation software (City of Cape Town, 2010). A printer is also available for the printing or photocopying of documents and forms.

*“Some people make mistakes like photocopying only half of what they want to copy, but that security takes most things and does the photocopying for the people, free of charge.” (FG2M, 2012)*

#### **b. Social-enabling conversion factors**

Social and cultural norms that do not prevent community members making use of opportunities, public policies and work done by intermediaries but to encourage the use of ICTs are examples of the social-enabling conversion factors identified in this study. An Internet café business, run by local community members and offering courses in basic ICT skills to community members at very low prices, is such an example. One of their business premises are situated opposite the library in Harare. Some participants indicated that they have completed, or are still doing, computer courses at this company.

Being perceived as a good person when the community sees one using the library or ICT centre is another example of a social-enabling conversion factor. For example:

*“Then they must saying: ‘That girl that is going to go partying with their friends’ But when they see you here they minds change, and they say: ‘Oh no, she’s not one of them, she’s one of the good people.’ Or: ‘She’s one of the ones who’s trying to do something about their life to change their life and not be one of the ones who just don’t care.’ Ok.” (P3, 2012)*

The vibrant atmosphere (being a social-enabling factor) is perceived by people arriving at the library and the ICT centre as welcoming, as depicted by one participant:

*“Yah, I see a lot of interesting things here. Like, you can pick up the vibe when you come in. You see a group of people, then you’re like: ‘Oh, it’s nice.’” (P21, 2012)*

**c. Personal-enabling factors**

Education can be a personal-enabling or disabling conversion factor. Without proper education, it is more difficult to convert opportunities related to ICT centres into achieved capabilities. Of all respondents in the online survey, 70.9% indicated that they have completed Grade 12. Grade 12 was completed by 83.3% of the respondents from Khayelitsha, 61.5% of the respondents from Mitchells Plain and 71.1% of the respondents from the remaining libraries (Table 6.6). This is in contrast to the results of the focus group survey, in which only 21.8% of the respondents indicated that they had completed Grade 12.

**Table 6.6: SmartCape online survey: Having completed Grade 12 by area**

	Area				Total
	Unknown area	Khayelitsha	Mitchells Plain	Balance of SmartCape Libraries	
No matric	117	20	34	481	652
	32.9%	15.9%	37.4%	28.3%	28.7%
Matric	238	105	56	1210	1609
	66.9%	83.3%	61.5%	71.1%	70.8%
No response	1	1	1	10	13
	0.3%	0.8%	1.1%	0.6%	0.6%
Total	356	126	91	1701	2274

A possible reason for this significant difference is that the online survey respondents were from SmartCape libraries in the greater Cape Metro, whereas the participants who completed the focus group survey were members of communities in which poverty often forced them to earn a living before they had completed their schooling.

Seventy-eight percent of the interview and focus group participants indicated that they have completed Grade 12, two participants indicated that were in the process of completing Grade 12 and the balance did not indicate their highest education level.

Most instances of personally-enabling factors in the interview discussions could be seen when participants discussed the reading of books and interesting material that they found online. Since the case study includes computers placed in libraries, it is understandable that most of the focus group and interview participants mentioned reading as one of their activities. There were at least 64 mentions of reading by participants, the love of books, and

the necessity of reading. However, a few participants said that they only started reading once they were introduced to the library, as is evidenced by the following:

*“Like, to be honest, like I didn’t enjoy reading. I only read because I had to when I was in high school coz they give you these novels like you have to read. You don’t have a choice. But, like this book that I just took, it was my first time to actually take a book and, I’m almost finishing it. But besides school work and stuff, just a book to read for leisure. So yah, it’s a nice book, yah, I’m enjoying it”*(P21, 2012)

Some participants showed perseverance in their attitude towards achieving their goals:

*“I pressed for that and eventually I got the job, yah, because I don’t give up when I need to achieve. I never give up. I’m that kind of person.”*(P19, 2012)

The factors identified in this study that enable potential capabilities to convert into achieved capabilities are:

- ICT centres situated close to entire community;
- friendly assistance (including informal training) from library and security staff;
- exciting and vibrant atmosphere inside the library;
- availability of many computers, resulting in shorter waiting times;
- being perceived as an ‘*upstanding*’ citizen when visiting the library and ICT centre;
- education—having completed grade 12;
- good reading skills—and love of reading;
- upskilling of themselves to be computer users; and
- perseverance or persistence of users.

Although most participants were positive regarding the number of computers at the Harare Library and the assistance received from the library and security staff there, some participants did find that they waited too long for a vacant computer or complained about the lack of formal ICT skill training at the library. Thus, these can also be perceived as disabling conversion factors.

### **6.3.3.2 Disabling Conversion Factors**

Disabling conversion factors hinder community members in making use of opportunities to increase capabilities. Evidence of environmental-disabling, social-disabling, and personal-disabling factors emerged during the interviews.



### **a. Environmental-disabling factors**

Participants complained about slow Internet connections, connection time-outs in downloading documents, computers and printers being out-of-order, and the short time limit (45 minutes) on using the computers. Three participants stated:

*“I think it's the time we get to spend on the Internet. At least an hour would suffice.” (FG1B, 2012)*

and

*“And a negative is: sometimes you come here and there's a computer that's off. When you ask, you are told that the computer doesn't work. When you ask why, they don't give you a reason, or they say there's no network, whereas you have been logged. And the lack of network eats into your time”(FG2M, 2012)*

and

*“[B]ut we have a challenge with the computers here. Yah the Net, they have a problem with the network. I experienced that several times; it's always slow or some computers are not functioning. They always have a problem with the network. I'm sure maybe it's because of the number. They need to have technicians to, I mean, to sort out this challenge.”(P19, 2012)*

Other instances are noise: levels when there are many children in the library; time taken to fix broken computers; and having to wait in long queues to work while ‘*children play on Facebook*’.

*“And with what has already been brought up, I too wish that there could be a children's section and an elders' section also because the children tend to make a lot of noise. And, I also wish that at the computers, there would be another list because what tends to happen is while waiting, two people can come in front of you and then randomly claim that they were there before you.” (FG2M, 2012)*

Although the policy of the library is that all members can use the computers to access the Internet, only children from about high school age ( $\pm$  13 years) upwards are allowed. This causes tension; having access is benefitting children, but waiting adults perceive the children's access time as time wasted.

### **b. Social-disabling factors**

Shyness or lack of confidence to use new facilities has been mentioned as a reason for young girls not to make use of the library and the ICT centre. This is an example of a social-disabling conversion factor. Participants also mentioned the lack of ICT skills as a

challenge in using the ICT centre. In addition, young community members have to withstand peer pressure when they visit a library.

*“If you tell them you going to the library they tell you ‘you are boring’”.*(P3, 2012)

A perception exists among certain community members that the use of the library and the ICT centre as a free commodity is only for poor people:

*“[T]here are people that come to me. They need help with stuff and that. They live here; they won’t come into the library to look for themselves. You see, library to certain people is seen like a handout. So Silulo Luto opened across the road, uh the internet café. They will walk there with R4 for 15 minutes.”* (P16, 2012)

This perception precludes these community members from making use of the ICT facilities in the libraries. Thus, this hinders the development of skills, acquisition of information or knowledge and financial benefits.

**c. Personal-disabling factors**

Although education has been listed as an enabling conversion factor, lack of education is a disabling factor. This can be seen in the percentage of respondents in the focus group survey who have not completed Grade 12, and who have not made use of the free access to ICT in the libraries (Table 6.7).

Forty-two percent (63 out of 150) of the respondents of the focus group survey indicated that they do not access the Internet. Of these 63 respondents, 48 (76.2%) did not complete Grade 12. Stating this in another way, 43.6% of respondents who did not complete Grade 12 do not access the Internet at all, while only 19.4% of the respondents who had completed grade 12 do not access the Internet at all.

**Table 6.7: Focus group survey: Cross tabulation of ‘Accessing Internet or not’ with ‘Having completed Grade 12 or not’**

	Don't Access Internet	Access Internet in some way	Total
No matric	48	62	110 (73.3% of 150)
	43.64%	56.36%	100.00%
Have matric	6	25	31 (22.1% of 150)
	19.35%	80.65%	100.00%
No answer	9	0.0%	9.0 (6% of 150)
	100.00%	0.00%	100.00%
Total	63	87	150
	42.00%	58.00%	100.00%

Even though access to the Internet is available to all community members, the lack of education (i.e. lack of self-confidence) is a barrier to access, and thus a disabling personal conversion factor. Ignoring the nine respondents who did not give their education levels, this difference is statistically significant ( $\chi^2 = 6.034$ , p-value < 0.025).

This was corroborated during the third phase focus group discussions where the participants highlighted lack of e-skills or computer literacy leading to low self-esteem as a barrier to access.

Disabling conversion factors identified in this study are:

- limited time to use computers;
- tension while waiting in queues;
- hardware problems—broken computers and network outages;
- peer pressure among the youth;
- perception by community that free Internet access is charity to the poor; and
- lack of education or training

The environmental-disabling factors can be addressed by the SmartCape organisation, or the library, but the factors inherent in the community or inherent in the people using the ICT centre will only be addressed when the community members themselves have enough courage to rise above them.

### **6.3.4 Agency**

The CA incorporates the '*freedom process*', which is the ability to pursue goals valued by a person (Den Braber, 2013:72). This freedom process is related to human agency (*ibid.*). Human agency includes people's own and collective resources that, together with conversion factors, can enable or disable a decision or choice to make use of an opportunity. Once a choice is made and the successful use of an opportunity is established, this resource can, in turn, be strengthened. Kleine (2011:123) uses the term '*Resources*' in the Choice Framework, whereas the Department for International Development (DFID, 1999:1) refers to '*Capitals*' in the Sustainable Livelihoods Framework. Kleine (2011) extends the resources to include ten possible resources from which a person can draw.

Agency in the CA refers to self-efficacy, individual empowerment, self-awareness, cultural capital, self-organisation, resilience and self-regulation (Cox & Pawar, 2013:105-144) as cited in Den Braber (2013:72).

The following quotes from participants indicate a positive self-esteem:

*"I love meeting new people in my life. I like making friends"*(FG1L, 2012)

*"I can say that I am reserved, but I've got an opinion about most things."* (FG1B, 2012)

*"I am a person who likes business because I'm used to communicating with people so, so I'm just a good person."* (FG1A, 2012)

*"I love to communicate and learn new things with people and do things at most of the time with people, learning new things."* (FG1N, 2012)

*"[W]hat can I say about myself I like to be with people too. Meet new people. Uhm, I'm very old, but at my age I decided, I've raised my children. I want to try for myself, to do something for myself. So I went to UNISA and registered for a degree in Education, so I'm doing my third year now."* (FG2B, 2012)

*"I don't want to depend actually on government because I believe that I can do something on my own."* (P5, 2012).

According to participants their use of the computers and the Internet at the public access centre boosted their self-confidence and self-efficacy.

*"I have learned a lot about the Internet because before, I couldn't even use a computer, and I didn't even know what it's for, so but now at least I know how to gather information easily and fast."* (FG1A, 2012)

*"The people now, they can able to type their own CV's and do, and design them the way they want it."* (FG1N, 2012)

*"Another thing is that you can apply online. And like there are a lot of places at which I applied for online. And that was something I was not able to do. I was forced to fax or post. But at least, I now know that I can apply online."* (FG2M, 2012)

One participant relates his own learning experience at the Harare Library ICT centre, and the newly acquired self-confidence:

*"Here, I don't have any background of using a computer. I still remember the first time this library was opening and I was like 'Oh there are computers and I don't know how to use a computer', but luckily for me, I registered for a library card and I started using a computer here. I was so nervous and I was looking to other people, next person sitting next to me and I was like 'this one is so..., is doing fine'. But I make sure that I will be like that next person to me. Today I can proudly say that I know how to use computer. I know each and every angle of the computers because of here. I've never learnt anywhere but here."*(P12, 2012)

Knowledge received from the Internet, or via email, also boosted self-esteem, as indicated by the following quote:

*“Ja, I know ‘cause that’s the change ‘cause at least I’ll be here like Monday, maybe, and I’ll be going to school later that day. When I read my email, I’ve got information on like maybe snake bites. Just an example. And they haven’t learnt that at school. When I go there they’ll be saying ‘Topic today is snake bites’ and then ‘I know that!’.” (P3, 2012)*

Participants employed in part-time businesses have found that using the public access centre to contact clients for the business increased their self-confidence:

*“I do use Google for directions, because I have to go to clients, you see. Sometimes, I don’t know where it is, the house, and then I use Google to get directions.” (P7, 2012)*

This study showed that some users of the ICT centre had their own inherent self-esteem, self-confidence or self-efficacy, which enabled them to access and to use the Internet with confidence. Evidence from the study shows that using the ICT centre and finding the information or knowledge benefitted the users. This increased their self-confidence or self-efficacy, boosting their agency to convert opportunities into achieved capabilities.

### **6.3.5 Tangible benefits**

Tangible benefits emerging from the interview analysis include financial benefits (economic freedom), increase ICT skills, increased opportunity for education, and increasing language and reading skills. Accessing at no financial cost and not having to travel by public transport to access the Internet is particularly relevant to underserved and disadvantaged communities in which the rate of unemployment is very high. Many participants named access to the Internet at the ICT centres as a benefit to them.

#### **6.3.5.1 Financial benefits**

Many participants reported being able to save money since the ICT centre’s access to Internet is free.

*“To save the money from going to the internet café.” (FG1P, 2012)*

The participants mentioned that they save money by not having to take public transport into town to visit a good library with an ICT centre.

*“[A]nd something else, the library is very close. Because many times, when you got to the one at the bottom, you don't always get the information you want, and then that would mean you would have to take a taxi and go to a library in town. And so, it's better here because there are a lot of things, and it's also convenient for a person who chooses to walk. Even if you come from the college you can walk to the library and back home.” (FG1U, 2012)*

Respondents to the surveys were asked about the distance they needed to cover to access Internet at an ICT centre. Sixteen percent of the respondents indicated that they could access the Internet at home or through a mobile device, whereas 52.9% of the respondents indicated that they are within 2 km (easy walking) distance from the nearest centre, and 30.7% of the respondents indicated that they needed to travel more than 2 km to access the nearest centre.

Participants also stated that they could create and email résumés when applying for employment positions:

*“Ok, let me say that the computers have been a huge help, especially when it comes to things like CVs. Because now, people are able to type their CVs and one page of printing is only 60c and before the computers, you would have to go to the Internet café and you would have to pay R15. And for the youth, when they wanted to research things, they needed to go to places like town, but now we can all surf the Net.” (FG2K, 2012)*

Being able to apply to colleges and universities online without having to travel was also mentioned by participants:

*“How I benefit. If I want to apply to a certain university, you are able to get their application form without having to go there and thus waste money you could have saved.” (FG2M, 2012)*

Participants assisting small businesses reported financial saving in the online submitting of tax forms ('SARS e-filing').

*P16: “I started the e-filing now. You see there is lot of organisations. You can't get a tax clearance certificate if your paper work is not in order. It cost us R120 to go to Bellville and back. So when we came back, I said, 'That's a lot of money'. And then I went on to the e-filing, sorted it out, did the applications. So now, I only need to make one try to go and pick up the actual certificate.” (P16, 2012)*

Participants gave second-hand evidence of community members having found jobs after responding to advertisements seen on the Internet at the ICT centre:

*“Yes, they are helpful. I mean there are some people whom I know who were regular coming here to search for work and they are working now.” (P8, 2012)*

Even though only one participant reported having found employment through an online advertisement, the perception still exists among users of the ICT centres that they have more access to employment opportunities because of the access to online advertisements and the application processes afforded to them by the ICT centre:

*“The SmartCape computers have personally helped me a lot, because on the Internet all I used to do was to go on Google and google irrelevant things, but now I can see new job positions and posts, internships and other relevant things.” (FG1P, 2012)*

### **6.3.5.2 Reading and English language skills**

Reading and language skills in the English language are important when using ICT in South Africa since most programmes and websites are still only available in English. Translation into Afrikaans, which is the language spoken by 34.9% of the citizens in Cape Town (Statistics South Africa, 2012c), is available, but translation into the other official languages of South Africa is not yet available<sup>21</sup>. Thus, improvement in reading and language skills is an important tangible benefit.

The survey respondents indicated that they were very proficient in the reading and writing of the English language. Eighty-six percent of the 2424 respondents who took part in the two surveys indicated that they found reading and writing English easy.

There is a significant difference in the responses from the focus group survey to the question regarding English reading and writing proficiency between the group accessing the Internet at public access centres (87 out of 150) and the group not accessing the Internet at all (63 out of 150). Of the group that indicated that they have access to the Internet in some way, 65.5% indicated that they found reading and writing in English easy, whereas only 42.9% of the group who do not access the Internet at all found reading and writing in English easy. Twelve respondents (19%) of the group not accessing the Internet found reading and writing in English very difficult, whereas only one out of 87 in the group accessing the Internet found reading and writing in English very difficult. Pure statistics, based on the quantitative study, do not show causality, only evidence of some relationship. Thus it is not easy to decide whether the community members who find reading and writing English easy are more

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<sup>21</sup> The dominant languages of the participants of the focus groups of the third phase of data collection were Afrikaans and isiXhosa.

inclined to access the Internet, or whether improvement in reading and writing in English is a benefit of accessing the Internet.

It is therefore important to search for evidence of improvement in language and reading skills in the participants from the interviews and focus group discussions. Participants volunteered evidence of improvement in language skills resulting from using the library to read and to access the Internet:

*“The books and the computers are in English. You see, by reading books you become fluent in English.” (P4, 2012)*

Improvement of reading skills occurred when participants wanted to use the computers but were told that they must take out books as well.

*“So it’s really benefitting. And the people now are getting into reading, they get to know reading. Because they like. If you want to use the computer they say, ‘First go and fetch a book, even if it is only one’. And then people, they started with one, and they realise they like reading.” (P10, 2012)*

Improving language skills may thus be an indirect benefit of beginning to read books at the library rather than a direct benefit of having more access to the Internet.

### 6.3.5.3 ICT Skills

The library and SmartCape personnel of the City of Cape Town do not offer formal training in the use of computers or the Internet. But there were many mentions of community members learning from each other or learning from library staff while receiving assistance.

Increased skill in using computers, computer keyboards and in connecting to the Internet is a benefit mentioned by participants. Table 6.8 demonstrates that 80.8% of the respondents indicated that they are very proficient in using a keyboard and 68% responded that they find using a computer and the Internet to be easy.

**Table 6.8: Proficiency in using keyboard, computer and Internet**

Proficiency in	Easy–don't need help		Some difficulty–need to ask for assistance sometimes		Difficult–need to ask for assistance often		Cannot use on my own	
	Count	%	Count	%	Count	%	Count	%
Internet	1596	68.1%	680	29.0%	48	2.0%	21	0.9%
Computer	1599	68.0%	689	29.3%	51	2.2%	12	0.5%
Keyboard	1899	80.8%	390	16.6%	52	2.2%	8	0.3%



Increased typing skills and the typing of documents after using the ICT centre were mentioned by the interview and focus group participants:

*“Typing! You see, the typing on the computer has helped increase the speed at which I type.”(FG1B, 2012)*

and

*“What I like is that people, most of the people that they can able to type their own CVs instead of being able to pay a R30 for a CV, so you can type. The people now, they can able to type their own CVs and do, and design them the way they want it.” (FG1N, 2012)*

Increasing skills in computer use was also commented on by participants. For example:

*“I didn’t even know how to press a computer, but by coming here every day, I have been able to learn exactly how to operate a computer. So on and so forth, as he already said.”(FG1N, 2012)*

The sending and replying to emails and the increasing skills in searching for information were also mentioned:

*“But then one day, I decided to come here because I had nothing to do. That is when I noticed that there are other things you can gain from these computers. I got the opportunity to create a Gmail account. Before that I didn't even have an email address, and I would constantly see forms asking for my email address, and I would be confused. I would even go to the lengths of writing www.axolilencayo.com, and to me that was creating an email address. Then my friend told me that no, you have to first go to Google, then after Google you will go to Gmail, and Gmail will show you. So I can say that I have learnt something because all I knew about computers was games until I came here. So that's a positive, because all I knew about computers was games until I came here.” (FG2A, 2012)*

and

*“Uhhm, I for one can say, it’s like OK, I have learnt a lot about the Internet because before, I couldn’t even use a computer, and I didn’t even know what it's for, so but now at least I know how to gather information easily and fast.” (FG1A, 2012)*

The notion of acquiring the skill of using a computer is also deemed important to the participants since they have the perception that many employment positions require computer skills, and that these positions will open up to them once they have learnt how to

use a computer. A participant indicated that he decided to enrol in a six-month course in computer basics before he started applying for employment positions:

*“In six months, yes, and due to the fact that most of jobs use computers. In any field you use a computer. You have, you must have a computer.” (P17, 2012)*

One of the key success factors of the SmartCape Access project as listed by Infonomics (2003:5) is the “*immediate personal benefits (for example, by immediately being able to send and receive email)*” of acquiring basic ICT skills. Evidence in this study is not of the ‘*immediate personal benefits*’ but rather of benefits through persistent use, over a length of time. For example, one participant found that he needed additional computer skills in order to benefit from using the computers, so he enrolled in a short computer course at an Internet café. The discussion proceeded as follows:

*Researcher: “Do you use the email address?”*

*“Honestly I do to like—if there is a form that I must sign it, and there is space for email address, I do, but I don’t know how to use it to email something from me to other person.”(P17, 2012)*

*Researcher: “So you still going to learn that at Silulo?”*

*P17: “Absolutely yes, I am gonna learn it there”.(P17, 2012)*

### **6.3.6 Intangible Benefits:**

Gomez (2008:6) states that the identification and measurement of intangible benefits or impacts is not easy, because “*attribution is often not direct*”. Using the foundation of Sen’s Capabilities Approach, intangible benefits can be identified as increased choices, empowerment and achieved functionings of community members who are users of public access centres. Gomez *et al.* (2013:39) list outcomes such as self-efficacy, aspirations, personal relations and civic engagement as non-material outcomes. The increased dimensions of choice and increased empowerment are posited by Kleine (2009:109-110) as important intangible benefits. Empowerment is emphasised by Grunfeld *et al.* (2011:151) as an important intangible benefit of Internet access at public access centres. Being able to pursue a goal for users of a public access centre is one of the intangible benefits mentioned by Sey *et al.* (2015:82).

In this study self-esteem, self-efficacy and empowerment are categorised in the theme ‘*agency*’ (Chapter 6.3.4). However, empowerment is also discussed in this section as an intangible benefit.

### 6.3.6.1 Opportunities

One of the three primary goals of the SmartCape Access initiative is “to increase opportunities for members of disadvantaged communities” (Infonomics, 2003:5). Opportunities refer to the things people can do or be with ICT. The establishment of computers in libraries in underserved communities such as Khayelitsha affords Internet access opportunities and the concomitant opportunities of information and knowledge to communities. These opportunities are the output of public access centres (Kivunike, 2014:5), and once they have been exploited by the users they become achieved capabilities.

The interview and focus group participants mentioned that the new developments in Harare, including the establishment of the library and its IT centre, gave young people new opportunities to occupy their time rather than be involved in crime. These included new opportunities for studies (via online advertisements and applications), employment (via online employment advertisements) and the running small businesses, as well as advocacy and better communication with distant relatives,.

*“I am very grateful for the library because it is helpful to me and I believe to other youths, it is also helpful. And when it comes to the rate of crime, I think it has dropped since this library has been here because we see more people coming in, studying books, finding information—things that can help themselves rather than walking around and robbing people. And also, the grass roots soccer field. It is one of the places that I think it has changed our community, because you see more youth coming there, watching sport, playing soccer, having fun. So I say, our community has changed since these things have been here.”(FG2L, 2012)*

The existence of the library and the ICT centre has given some community members, especially the youth, more opportunities in the structure of their daily life, opportunities as unassuming as having something to do instead of staying at home all day:

*FG2B: “So, people then realise that they would rather spend the time they would usually spend doing nothing at home, and go to the library on the computers. So it's not only used by the academics. Even the ones who don't know about computers, I see them come here a lot. They might not be educated, but they can access the computers and look at the things that interest them.” (FG2B, 2012)*

For other participants, the ICT centre and the library offer new and valuable assistance towards studying:

*“Something else is that it has helped me with school, in terms of applying online to different universities you see.” (FG1B, 2012)*

Participants are now also able to use the ICT centre as a place to study, as well as a means to source information for assignments.

*“The computers have been a great help to me. They have made a huge impact in my life because as a mature student, I many a times find that I don't have the information needed especially when doing some of the assignments we are tasked to complete. But now, I can go on the Internet, google, and find what I want and use it for my assignments. And there are also some assignments I have to submit online, and these computers have allowed me to that. And I couldn't do it before, but I learnt it here at Harare.” (FG2B, 2012)*

and

*FG2M3: “I use the computers to look for learner-ships, internships—all of those kind of things. I look them up on the computer. Then I also apply online using the Internet. And I also get information for my assignments.” (FG2M3, 2012)*

Participants mentioned that applications for employment have to be made online. Using the public access centres provides the opportunities for community members to complete and submit online applications:

*“You see, for example, now the employers now have shifted that thing of written applications. So they want the people to apply online. So I think the use of the computers can change people's lives cause now they will be able to have the access and apply for better jobs.” (P7, 2012)*

Other opportunities mentioned were for young people starting small businesses:

*“And it has changed a lot in my life because before I was not able to access the Internet, and I needed it because I'm running an organisation. So, the library has also exposed to a lot of other opportunities via the Internet.” (FG2M3, 2012)*

Participants who have established informal businesses have the opportunity to use the ICT centre as a place to run the business:

*FG2B: “...it has helped my mom. She runs a stokvel. Now there is a stokvel called Just Be Paid. But they run it through the Internet. So it has helped my mom a lot because I used to do it for her on my phone, but now that the library is opened, she has the ability to come and run her stokvel.” (FG2B, 2012)*

The uniquely South African term, *stokvel*, is the name of group savings scheme consisting of voluntary members contributing a fixed amount on a regular basis to a common pool (Lukhele (1990) as cited in (Matuku & Kaseke, 2014)).

Opportunities for advocacy have risen through the use of the ICT centre

*“I print out and give it there to these places that we seek the sponsorship or assistance from. Even the Department of Health, I did send them. Because of this, they don’t know exactly how we live, you see. So I give them the pictures. This is how we live; this is what we want from you or on your side. Then at least they respond back. Even now, Sanlam, they have responded on my email that I send them and the pictures. They said that they loved what I took them because it’s different, and our aim is not for... only Khayelitsha people” (P6, 2012)*

In addition, participants related a drop in crime to the opportunities afforded by the establishment of the library and the ICT centre in Harare:

*“And when it comes to the rate of crime I think it has dropped since this library has been here because we see more people coming in, studying books, finding information—things that can help themselves rather than walking around and robbing people.” (FG2L, 2012)*

The capability set consists of functionings, which are the opportunities that a development initiative offers. The opportunities offered by the ICT centre of the library span a wide range; such as having more choice in the things to do in a day, seeing new opportunities for learner-ships and studying, or having the opportunity for advocacy. Participants linked the drop in the crime rate in the area to local developments, the new library and the new ICT centre. The realisation of one of the goals of the SmartCape initiative is the availability of new opportunities, which is also a realised benefit of the ICT project.

The opportunities have been recognised and identified by the participants. Achieved functionings are the opportunities that have been made use of by people given their specific context.

#### **6.3.6.2 Achieved functionings**

As defined in Chapter 3 a person's '*capability*' refers '*to the alternative combinations of functionings that are feasible for him or her to achieve*'. Capability is thus a kind of freedom to achieve alternative functioning combinations (or the freedom to achieve various lifestyles). Sen (2001) as cited in Grunfeld (2011:137) defined five freedoms, namely economic, political, social opportunities, transparency and protective freedoms. According to Kivunike (2014:6), political freedom includes the concepts of community development, collective empowerment, civic engagement, public debate and participative democracy. In this study, evidence was found of community development or involvement and collective empowerment. Economic freedom relates to the freedom to generate income, improve entrepreneurship, increase economic capital and build capacity. Social opportunities include the opportunities to be educated, to access healthcare and empowerment. Transparency is the freedom to

enhance social integration and cohesion, to build relationships, to increase bonding and bridging social capital. Protective security includes the freedom to make use of social services and have social security.

In this section '*learning opportunities*' is listed as a benefit on its own, and is thus not part of '*social opportunities*'. The term "*transparency*" is replaced by the term "*social capital*". Benefits relating to economic opportunities are grouped with other opportunities, and other financial benefits are dealt with as a tangible benefit.

#### **a. Learning Opportunities**

In the model of the free public access to communities, the Smart Cape Access program does not include training in ICT skills. Thus, in this study, "*Learning opportunities*" refer to achieved capabilities relating to learning, namely, submitting applications for study or assignments online and doing research for study purposes or to increase knowledge.

Gomez (2014:274) found that communities in developing nations prefer accessing the Internet at sites that provide faster access speeds and formal training, which are usually found at commercial Internet cafés. No evidence of people '*moving away*' from using computers in libraries was found in this study, however a number of participants indicated that they are receiving training at a commercial Internet café, although they still preferred using the free access to the computers and the Internet at the library. This is perhaps due to the prevailing high costs in South Africa, and that public access centres have better bandwidth than private centres due to local governments investing in their own networks.

*"I too was just like Sipho. I didn't know anything about computers. But since the library was created, I began using them. And my interest within them grew to the point where I decided to go study it and gain a certificate." (FG2K, 2012)*

Participants searching for specific knowledge or being involved in formal studies, whether at school, college or university, benefitted by obtaining this knowledge and information easily. All of these participants verbalised the use of the computers and the Internet at the ICT centre as greatly benefitting their endeavours in their studies or schoolwork.

*"But now, I can go on the Internet, google and find what I want and use it for my assignments. And there are also some assignments I have to submit online, and these computers have allowed me to that. And I couldn't do it before, but I learnt it here at Harare. So these computers have helped a lot." (FG2B, 2012)*

Many participants mentioned that being able to find relevant information for projects and assignments and gain knowledge from this was a benefit:

*“It also helps with schoolwork. With some difficult subjects like maths and physical sciences and even sometimes history, you can now come to the computers and research, and find out what you may need to know.” (FG2M, 2012)*

Knowledge and skills gained simply from using the Internet and having access to more information than what can be physically found in a library emerged as a benefit from the interviews and focus groups. This is depicted by the following participants:

*“You see, SmartCape is quite something; something whereby it gives us knowledge ‘cause you learn stuff, you see stuff. You just like google something then it will just appear on the Internet. Main benefit for me is to get that knowledge. It’s my main benefit to have that knowledge.”(P3, 2012)*

and

*“You know when you go to the Internet when you Google something, it will give you another thing, and then you say ‘Let me check this one’. So, we somehow, we came here for another reason. Maybe, I was here to play Facebook alone, uhm, but if I check something else, I get to learn another thing. By using the Internet every day, I’ve got a lesson to learn. As I was saying to you, uhm, I saw something that was interesting about intercession, and then I thought, it will be better for me to share it to my friends.”(P5, 2012)*

Learning opportunities do not only consist of assistance in finding information and new knowledge for formal school and college studies, but also include the garnering of skills and knowledge through the repeated use of ICT. The *‘informational capability’* benefit as identified in this study is the processing of information into new knowledge and the subsequent dissemination of this knowledge (i.e. the expansion of a person’s *‘information literacy’*) This is defined by Gigler (2004:13) as *“a set of abilities enabling individuals to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information”*.

#### **b. Making new connections**

New connections increase a person’s bridging social capital, as stated in Chapter 4.3.4.1. Gomez *et al.* (2013:39) found to have been the strongest benefit perceived by users of public access computers. Evidence in this study also points to the benefits reaped by users of the SmartCape project as the strengthening of existing personal relations, the re-kindling of lapsed personal relations and the building of new personal relations. One participant, who is quoted in the section denoted **Communication**, stated how she had an opportunity to communicate with the author of a book.

Participants told of the new friends they made by visiting the ICT centre in the library. This is depicted by the following quotes:

*FG2M: “Ya, I come to the library on a consecutive basis. I come all the time. I even made friends with the receptionists and the staff.” (FG2M, 2012)*

*“So that’s what I just hate, and I don’t have friends whereby I can communicate with, and at least here at the library, I’m getting to know people here who comes to the library often, whereby we meet like once in a while and just talk and just go again.”(P3, 2012)*

*“Because you meet people here and then which you never thought that maybe you’ll be talking to in the street, or but you become friends. You meet, you do mingle with other people.”(P3, 2012)*

*“I meet people. I’ve got people who became my friends because I met them in the library.”(P5, 2012)*

*“Sometimes you meet people that you know, and you start talking, I mean there’s a lot of interesting things that they do at this library.”(P21, 2012)*

Social networking sites such as Facebook and LinkedIn also extended people’s personal relations:

*“And then I use ‘ling’ ... I’m not sure what is that, ‘ling’ ... [LinkedIn?]. But for connection, people, yes. [And Facebook?] Yes for connection as well. Because I am a business woman, mos, I have to know people working for government.”(P7, 2012)*

(‘Mos’ is a colloquial Afrikaans expression loosely translated as ‘as you know’ or ‘supposed to be’)

*“Yah it has, it very much has because sometimes in Facebook because I can sometimes meet people I didn’t even know they are my family because my surname they will check. And then say ‘I have the same surname as you’. They will ask my father and stuff like that and then I will say ‘No this is my father’s name’ and say ‘No this is my uncle’ and stuff like that. And then you can find each other and then I can ask my parents. I found a person like this because yah—new connections.” (P15a, 2012)*

### **c. Empowerment**

Empowering community members to navigate their life situations and conditions more to their own choosing is one of the main benefits mentioned by many researchers in the ICT4D field (Kivunike, Ekenberg, Danielson et al., 2009; Heeks, 2010; Gigler, 2011; Grunfeld et al.,



2011; Kleine, 2011; Sey & Fellows, 2011; Zheng & Stahl, 2011; Gomez *et al.*, 2012; Gomez *et al.*, 2013; Mishra, 2013; Castells & Himanen, 2014; Gabriels & Horn, 2014; Kivunike, 2014; Lesame & Seti, 2014; Stillman & Denison, 2014; Sumlaji, 2014; Coelho *et al.*, 2015).

Phrases such as *'I can now do'*, *'I am now able'*, or *'changed my life'* recurred throughout the interviews and focus group discussions. Being able to type their own CVs, learning how to send emails and send their CVs by email, applying for work or studies online, being able to type out assignments for their studies, and gaining respect from the community because of ICT skills learnt are some of the benefits mentioned by participants.

*"There are a lot of things I've learnt by coming here you see. Sending emails, ya. Before I came here, I didn't know how to send emails on the computer and stuff, but now I can."* (FG1B, 2012)

*"Uhm, like the computers here at the library have helped me greatly, and well most of things have already been mentioned. Like a lot of things I can do now are things that I was never able to do."* (FG1N, 2012)

*"I can say they help us a lot because we are able to send our CVs and get a response."* (FG2M, 2012)

*"Another thing is that you can apply online. And like there are a lot of places at which I applied for online. And that was something I was not able to do."* (FG2S, 2012)

*"And what I've also gained is respect because we as blacks, if you see a person using a computer, you regard that person as brilliant. And some of my friends they will be like 'Hey, you're using a computer. Yhoo, you are going up in the world!'"* (FG2M, 2012)

Evidence of group empowerment emerged with discussion of involvement in advocacy or local community development. The direct use of the computers in the ICT centre was not mentioned, except in situations of communicating with one another. The real change in this community occurred with the start of the development, which included the planning of the new library and the enlarged ICT centre. Public access centres do not exist in a vacuum. The development of the Harare Library and the ICT centre occurred in conjunction with other development projects in Harare, Khayelitsha (Chapter 6.2.1). Although the initial intent of establishing the ICT centre in the library may have been to offer free Internet access, the presence of a PAC usually spurs on peripheral activity, which, as is evident in the Harare case study, leads to empowerment, as described by the participants

*"You see things like—what is this thing again, e-VPUU, you see? The community came together and formed a patrol that patrols at certain times. You see, so it's*

*not about the authorities or them having had improved the community. Crime affects us, but then, that's why we have such organisations in place.”(FG2M, 2012)*

Furthermore participants were empowered to promote education to youth groups:

*“The youth group specifically—it’s about discussing, basically promoting education, that’s our slogan. We are seeking better to promote our education. We don’t want no one, like no youth to be out of school. We want to make sure that if you want to go to school, we make sure that you get the needs and the ways to get to school. For instance, if you are going to a school that we know that the population is bad and the record is bad and you are not comfortable with that school, we wanna make sure that you are comfortable and you are getting the access of the education there as a student. And we wanna make sure that after high school you go to University. So we have had some of the students who went to University because of us.”(P14, 2012)*

This participant elaborated on his use of the computers in the ICT centre:

*“Basically we use computers for information, research and projects because we are given research sometimes projects sometimes. And as me been the person that I am, having to mentor and help other people, they sometimes ask me to research something for them and then I research that and then I just give it to them. And sometimes, you look for jobs on the Internet. We browse jobs on Internet. They help us to get Internet. They help us to get jobs also. It’s pretty a lot.” (P14, 2012)*

#### **d. Community Involvement**

In both the focus groups and the interview conversations, it emerged that participants made use of the new opportunities created by local developments in the Harare community, which included the establishment of the library with the ICT centre. Participants described their appreciation of having an opportunity to be part of the decision-making in the development of the community:

*“There was a group of people that came here to conduct a research about fields. They asked us what can be done or more so, what do we feel needs to be done to the fields to make them a better facility. Then I answered by saying that I would like it for there to be a football field, a netball court, and an area for any recreational activity. And now, those have been done. So, what I like about Harare is that when they come do the research, those in charge act upon our requests.”(FG1L, 2012)*

and

*“Ja, I’ve been living in this area for quite, about 18 years hmm. I am part of the structure or a body that is known as Youth Development Council, uhm that*

*advocates the youth development. Ja, and I've been part of this library ever since it's been started. As they were coming with an idea that they going to build a library; they came to us; they informed us as a structure of the development. Ja.”(P5, 2012)*

Another participant also belonged to a voluntary organisation in the community:

*“I've been busy with the communities cause I joined. There is a movement called Prevention Action which operates under the auspices of the Western Cape Network on violence against women. Basically that organisation is fighting women abuse so we were working with that organisation on voluntary basis. Yah, they just gave us the stipends, you know. It's nothing much. Stipends so that at least we can afford the taxi, something like that.”(P19, 2012)*

Some participants are mentoring young people in the community as indicated by the following:

*“The youth group specifically, it's about discussing, basically promoting education. That's our slogan. We are seeking better to promote our education. We don't want anyone, like no youth to be out of school. So we have had some of the students who went to university because of us. Yes it's mentoring, and we also have younger kids who are in Grade 8 down to Grade 4. We are mentoring them, helping them with their assignments, and we also encouraging them to participate in sport.”(P14, 2012)*

The ICT centre and the library also created new opportunities for by children:

*FG1: “Ya, I can say that it has changed many people's lives just because if you notice, even amongst the children. Now that were old, we realise that when we were young, we didn't know about things like computers, but the children of today at least they too know how to operate computers at a young age. And when we look at ourselves, we doubt that when we were their age we would have been able to operate computers. Only in our old age.” (FG1A, 2012)*

The opportunity to obtain government news or information on the development plans of the city for the area was used by participants:

*“Sometimes I go to the website of the City of Cape Town to check if there are new developments that are coming to Khayelitsha, so that we can be all aware that there is something that is coming to Khayelitsha. I always go to the website of the government to find the about the plans of the government about our city about our country, the new developments and what are the allocation that they have for us as young people.”(P5, 2012)*

Evidence of active involvement in the life of the community was given by a participant who was using the ICT centre to capture and analyse area crime statistics in order to communicate it with provincial government departments:

*“Because my research is towards on the violence we black people wanted to give. As such, the violence, I think is a human thing, you see, then. But our organisation’s part is: we are assisting the Department of Health you see. When you call an ambulance, what time an ambulance arrives at the other place. Then, geographically here in Cape Town, there are lots of houses and lots of streets. So I just record those things and then, not all the time, we have to rely on that 112. So, I’m using this library and statistics of researching how does this Department of Health they work. You see. So I’m only doing that.” (P6, 2012)*

One participant explained the type of computer work involved when he assisted people using the ICT centre:

*“Organisational work, structuring work, training people that require stuff. Actually, I said to somebody actually this morning, I don’t do what you don’t want me to do. So you must sometimes check what you want me to do. So its people’s constitutions, organisations’ constitution, developing it, business plans, applying for corporate social investment, applying for funding.” (P16, 2012)*

Community involvement and civic engagement were, to a great extent, made possible with the general developments in Harare, of which the library was a part of. The ICT centre enabled community members to track new developments planned by the City of Cape Town and the provincial or national governments. Participants also spoke of advocacy being made easier by the use of the ICT centre. Thus, the benefit of community involvement was realised at an early stage due to the new developments and became real when community members started using the ICT centre to find or communicate information.

Communication takes place between businesses or businesses and clients using electronic mail. The benefit of an email address is the providing of communication opportunities and subsequent new economic opportunities.

#### **e. Communication**

Reilly (2011:48) stated that the capacity to communicate is more urgent than access to more information. For instance, more and more communication with government agencies, businesses and private employers is taking place online via email or communication through the government or company’s web page (Armstrong & Ruiz del Arbol, 2015).

Email, social networking and free SMSs via a website are some of the methods of communication utilised by participants. Participants mentioned that new and easier group communication capabilities are possible by using the ICT centre in the library:

*“Ya, the computers have helped a lot, like at church. The church has a website so in order to have the ability to log in and have access to the website, you need Internet access, and then you have to have your own email address. And so each and every day, your pastor post everything on the Internet, so you have to log into the ‘Ucoz’, and then able to see what is your pastor telling you to do today whatsoever and some other the things. And as I’m a leader for my church, so we have a discussion through that ‘Ucoz’ website you see. So it’s helped me a lot.”(FG1N, 2012)*

The same participant also mentioned that communicating with the authors of books borrowed from the library is possible:

*“It’s the same thing I was going to say. Because what I was going to say is sometimes, you borrow a book from the library, read it, and then you find that you really enjoyed that book. So maybe, the book avails the authors email. So in the event that you want to further communicate with the author, the computers allow you to do that, using the free Internet access.” (FG1N, 2012)*

Communication with distant friends and family members or with whom contact has been lost was also spoken of by participants:

*“[A]nd you can even communicate with people you maybe haven't seen in a long time through things like Facebook.” (FG2M, 2012)*

Email communication created new opportunities for employment applications:

*“To get like if you get jobs, they will like ask you for an email address.” (P3, 2012)*

Evidence of employers or NGOs replying to applications by email emerged from some applicants:

*“I send my email to jobs, and there’s this thing, ‘Learn to Earn’, here in Illita Park. I did send them the email; they sent it back. They invited me on the 25th of August. I want to know what they do because I want to do something. I don’t want to sit at home. They specialise in baking and stuff, woodwork and all sort of things. So on the 25th of August, I’m going there to know more about that so I can join in.” (P11, 2012)*

Participants also mentioned that they have started relying on email as a communication tool:

*“Yah, I do agree with her. Like at this time of age, like nowadays, we are using mostly emails to contact people. So we have to have Internet in order to check your emails because sometimes cell phones, someone cannot get hold of you and then over an email, obviously you will read your emails. That’s why we need computers. They are vita. I think they are very important.” (P15b, 2012)*

Participants also spoke about using social networking as the new preferred vehicle for social communication among friends, and using email only as an official form of communication:

*“[A]ll of me and my friends we’ve got emails, but we are using Facebook. We’ve got the same forms for each other, so the email has lost a value somewhere, because there is no need for me to send you an email if I can send you a message on Facebook. For me, an email is something for if at school, they are sending me something, I can receive it via email.” (P5, 2012)*

The opportunities of communicating with educational institutions and being able to submit assignments online are available to community members, as depicted by the following participant:

*“I think when speaking for myself, I can say that I submit my assignments on time because I know there is free Internet in the library.” (FG2M, 2012)*

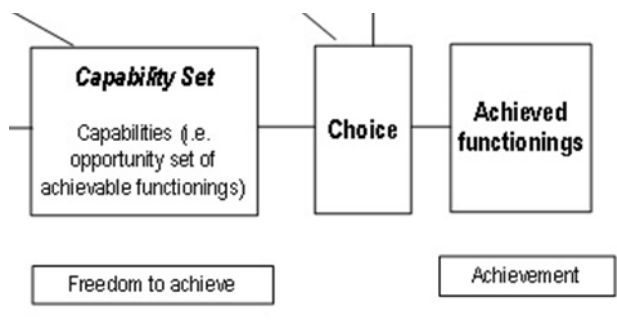
All participants indicated that they now regularly use email, which they perceive as indispensable. Emails are mostly used to communicate with prospective employers, educational institutions, organisations to which they belong, groups with which they associate, distant friends and family, and even authors of books they have read at the library. It is also clear from the interviews that they have learnt that employment opportunities must be applied for by email and, therefore, having an email address is imperative. Communication is not only via email, but also through social networking, web sites and online free SMS facilities.

The benefits obtained in these instances are the increased communication opportunities which in turn, expand bridging social capital (the number of connections a person has with others).

#### **f. Choice**

People are constantly faced with choices in choosing the life they want to live. Sen’s notion of development is to increase these choices and expand the freedom to choose (Kleine, 2011:124). The use and achievement of an existing choice leads to greater empowerment, but to utilise a choice, it has to exist (Alsop & Heinsohn, 2005:7). The public access centre with free access to the Internet is available for use by the community, but development will

only be achieved once the choice of using it has been made and followed through, as is represented in Figure 6.14.



**Figure 6.14: Section of the stylised non-dynamic representation of a person's capability set**

(Source: Robeyns, 2005:31)

Sixty-three (42%) of the focus group respondents indicated that they have not made use of the Internet access at the ICT centres in a library. A chi-square analysis was performed to determine the profile of these respondents. The result demonstrated significant relationships ( $p$ -value < 0.01) ICT use has with age, gender, employment and educational level. Of those that indicated *not* using the computers

- 55.6% are older than 34 years
- 68.4% are female
- 81.7% are unemployed
- 88.9% has not completed Grade 12 (high school)

When the factors are tested together, the effects of unemployment and not having completed Grade 12 overshadow the effects of age and gender on whether a person accesses the Internet or not. Sixty percent of the group not accessing the Internet is unemployed and had not completed Grade 12.

Asking this question in the online survey was moot, since only registered SmartCape Access users were asked to complete the survey at the start of the SmartCape sessions.

Except for one, all of the participants in the interviews and focus group sessions indicated that they are users of the SmartCape Access system. Thus they all have already exercised their choice by visiting the library regularly.

The establishment of the ICT centre and the library gave unemployed youth something different to do:

*“Ja, it has changed our lives; it has changed the way we live because if you can check here, you’ll find young people who are inside who are waiting for the Internet. But previously you would find young people at the corner; you’d find young people in bar, playing pool, drinking alcohol. Because why, they are bored; they have nothing to do. Now if you’ve got Internet, at least you’ve got something to do. You know. .I ‘m gonna spend my time there’.” (P5, 2012)*

Thus, evidence of the expansion of choice from the interviews and focus group sessions was mostly focused around the new choices in their daily routine, such as a place to study, or how to spend their time:

*“Yes, as for me, I think this community is different because most of the young people, they like to study. Spend much time here in the library.” (FG1T, 2012)*

*“I travel and come here every day.” (FG2B, 2012)*

*“Because for someone who’s like me, who does not have a computer at home, it gives me an opportunity to come here every day to look at what I want every day, so it’s very much worthwhile”(P12, 2012)*

*“I didn’t know anything about computers. But since the library was created I began using them.” (FG2K, 2012)*

*“[B]ut I started using the library this year coz I had nothing to do from January to June, and then came to the library find something read or go to the computer.”(P17, 2012)*

New choices regarding the search for employment were highlighted by certain participants:

*“Like a lot of my friends, when we started coming to the library here, we logged on into Gumtree, and I think that was a good thing. It was a good cause because we were looking for jobs, and we had access to look for jobs here at the library because we might have computers, but we don’t have Internet, and this is good, so yah, that’s all I know.”(P21, 2012)*

Participants voiced appreciation for the availability of Internet access:

*“Immensely, immensely! Just imagine some of our schools up to this day. They don’t have enough facilities, I mean to educate the pupils or the scholars. The fact that we have libraries with computers, it actually has made a difference in our communities. You know, I’m talking about those who are still schooling. I’m talking about those who are running their businesses. They are able to do a lot of things in the computers in the libraries. They use the library computers, so it has done an immense difference, yes”(P19, 2012)*



The establishment of the ICT centre offers new choices in daily activities, such as searching for employment, places to be or to study, places to meet people for informal and formal reasons, and these are being utilised by the participants in the study. Participants also acknowledge the existence of more choices in education and knowledge gathering even though not all have utilised these.

**g. Perception of better lives**

The recurring theme of having ‘*changed lives*’ due to free access to the Internet at the ICT centre emerged in the interviews and was explored further in the focus groups. Ray and Kuriyan (2010) reported that comments such as ‘*changed life*’ occur frequently in ICT4D research literature. Changed life occurred together with the notions of access to information, new communication possibilities, access to learning institutions and increase in knowledge. The power of information and knowledge to change the lives of people by the broadening of the mind was acknowledged by participants:

*“Uhm I still say this: In Khayelitsha we are so privileged. In other areas they don’t have things such as this. And when you speak about some things you find that they are so lost. They don’t know what you are talking about. Because as you as a person who’ve got Internet, you are researching; your mind is always having new things new. Whenever you meet these people who do not have access to the Internet, they always so lost. They don’t know what to, because they don’t know how to get it. They don’t have the information that you have. The most thing that we need from the Internet, the thing that is valuable on the Internet, is the information. And if we don’t have information, we can’t do anything without information.”(P5, 2012)*

Access to new information gleaned in a serendipitous manner was also noted:

*“Yes. Yes, computers has changed our lives because many of us, uhm, there are things that we didn’t know. Uhm. But through the Internet—you know when you go to the Internet, when you google something it will give you another thing; and then you say ‘Let me check this one’. So we somehow we came here for another reasons. Maybe I was here to play Facebook alone, uhm, but if I check something else, I get to learn another thing. By using the Internet every day, I’ve got a lesson to learn. As I was saying to you, uhm, I saw something that was interesting about intercession, and then I thought it will be better for me to share it to my friends”.(P5, 2012)*

and

*“So, when you use the computer, there's a huge possibility of you finding something that would be able to help you or be interesting to you. So I then can say that the*

*computers affect some sort of change in the lives of community members.” (FG2B, 2012)*

Easy access to information was identified by the users of the ICT centre as being an important factor in the improvement of their lives:

*“It has changed my life because I still remember when you wanted some information, and the person that you believe is the only person that you know can give that information is far away from you. At the point in time you cannot reach that person either telephonically or face to face you know. So it used to be difficult to get the information and sometimes it is urgent, that information, but now, I mean it’s just a walk away. I just walk to the library and I wait for my turn in the computers. I just register my name there in the queue for the computer. I go to the Net. I just get the information, just by clicking you know, yah, pressing those buttons I just get the information, the information that I need. So, it has changed my life; it had had an impact, yes, on my life.”(P19, 2012)*

The ability to carry out online booking or online shopping without having to travel to a shop or an agency was mentioned by the following participant:

*“So I would say the use of Internet is, has changed my life yah. It has changed my life. It has made my life easier also because now I get to book me, if we go maybe to Johannesburg, you get to book a hotel before we go there, you see. I would say it has changed my life. Sometimes we do online shopping” (P15b, 2012)*

Participants in the focus groups were invited to discuss and elaborate on the idea of changed lives due to the free access to the Internet at the ICT centre. The notion that community members of all ages, who are usually at home all day, with nothing to do are now being seen using the computers at the ICT centre. They have made use of a new opportunity to modify their daily existence into one where more and new information is being accessed, and new connections are being made. By using this opportunity, they are expanding their informational and social capital.

*FG2B: “I think the people here have benefited from the computers. Their lives have changed because here, it sometimes gets very full of people who have come to use the computers. Mothers, like me; fathers as old as me and even older. So, people then realise that they would rather spend the time they would usually spend doing nothing at home and go to the library on the computers. So, it’s not only used by the academics. Even the ones who don’t know about computers, I see them come here a lot. They might not be educated, but they can access the computers and look at the things that interest them. So, when you use the computer, there’s a huge possibility of you finding something that would be able to help you or be interesting to you. So I then can say that the computers affect some sort of change in the lives of community members.” (FG2B, 2012)*

The last example of the ICT *'changing lives'* is the remark from a participant involved in the music business, which described the new economic opportunities available to him purely by having an email address:

*“Just to add to what has been said, to add onto what Axolile said. I also didn't have an email address, so when I go to functions or a gig people would want my email address and I wouldn't know what to say. And I would just say random things. But now, I just easily say you can check me out on Twitter, tell people my handle, and give them my WhatsApp or Facebook details, the whole shebang. So, I really didn't have an email address, so the computers have helped a lot in that sense.” (FG2M, 2012)*

One of the community wellness outcomes listed by Gomez *et al.* (2013:38) is the expression of aspiration by the community members. During one of the early interviews, during 2012, a participant used and expression of hope relating to his use of the free public access in the ICT centre in the Harare library. Because of this and similar indications from others questions relating to hopefulness were included in both surveys and in the focus group discussions during 2013. The following section analyses the responses to these questions.

#### ***h. Hope***

During the interviews in 2012, an expression of hope, due to the availability of the public access centres, and the consequent opportunities afforded, emerged. This is demonstrated in the following dialogue:

*Interviewer: “Is there anything else that you can tell me about using this computer centre or anything else about the computer centre?”*

*“It gives you hope. I can say it gives you hope”(P4, 2012)*

Hope, which is fuelled by aspirations, is a capability that assists people to grow their resources, and to navigate their daily journey. The above was a typical response underscoring the somewhat powerful effect of a public ICT on people's lives.

Kuchi (2005) as cited in Ray and Kuriyan (2010) pointed to the *“enormous hope, mystique and symbolism”* generated by use of ICTs, as revealed in early research into the impact of ICTs. Furthermore, Castells *et al.* (2014:138-139) showed a positive correlation between the frequency and intensity of Internet use and the indicators of personal happiness, which is informed by aspirations. People's actions are influenced by their well-being, and well-being is directly linked to hopefulness (Parker & Wills, 2009). Increased self-esteem, which leads to empowerment, is also dependent on feelings of hope and aspiration (Freistadt, Pal & da Silva, 2009:10). Duflo (2012:40) declared hope to be a capability:

*“We see how hope not only works as an enabling capability, but also is a key to the development of other capabilities. Hope can fuel aspirations”*

The deduction is then made that hope plays a significant role in the realm of human development. Duflo (*ibid.*) posits that lack of hope could be the cause of people remaining in ‘a *poverty trap*’ even in situations where assistance is offered. Hope is thus vital to people. Hope is a catalyst for aspirations, and hope leads to a better, brighter future (Nor & Muhlberger, 2011a:145). Even in the times of the ancient Greeks (Groopman, 2005c:3152) this was an acknowledged fact. Groopman (2005a:194) writes about hope as

*“[A] comforting, energizing, elevating feeling that you experience when you project in your mind a positive future. This requires the brain to generate a different affective, or feeling, state than the one you are currently in.”*

Groopman (2005a:102-214) further asserted “*Hope can be imagined as a domino effect, a chain reaction, each increment making the next increase more feasible.*” In his research as an oncologist, Groopman observed time and again how patients get better in even the worst circumstances, because they have been given hope, or have been allowed to have hope. Groopman explains in the foreword to the book “*Anatomy of hope*” that hope is “*rooted in unalloyed reality*” (Groopman, 2005a:xiv). True hope is not based on false positivism, and it recognises obstacles that need to be overcome on the road to a better future (*ibid.*). Groopman found that hope gives the necessary courage to confront an adverse situation and gives the ability to conquer these circumstances (Groopman, 2005a:xiv). The situations of people in underserved communities are often such that it results in feelings of hopelessness, which in turn can sap the courage a person needs to move forward to address the situation.

The function of hope underwrites the way people relate to the world around them, their behaviour, their thought processes and their feelings (Farran, Herth & Popovich, 1995) as cited in Duggleby, Cooper and Penz (2009:2377). Even if a desired outcome does not occur, hope is fluid enough in its expectations that it does not necessarily diminish (*ibid.*)

Furthermore ‘*hope*’, as an attribute, has been investigated within various research disciplines, and from various perspectives and spheres of human life. It has been written about by many authors in various domains in both academic and non-academic literature ((Snyder, Harris, Anderson *et al.*, 1991; Curry, Snyder, Cook *et al.*, 1997; Huy, 1999; Snyder, 2002; Groopman, 2005a, 2005b, 2005c; Curtis, Engelberg, Young *et al.*, 2008; Martin, 2008; Parker & Wills, 2009; Ruger, 2010; Nor & Muhlberger, 2011b, 2011a; Duflo, 2012). Huy (1999:26) describes hope as an ‘*attribute of emotional intelligence*’. Hope spurs interest,

strengthens perseverance, is a motivation for people to believe in a better future and to find a way to attain that future (Huy, 1999:26).

Not only is a person's well-being directly linked to hopefulness, it also determines actions (Parker & Wills, 2009:6). The authors found that blogging on social networks assisted individuals in keeping balanced levels of well-being (Parker & Wills, 2009:6). Parker (2014a) re-defined the term "*Economy of Hope*" to include the development of people as the currency. As quoted by Ashoka (2014) Parker believes that "*The greatest currency in the world is people.*"

Marlon Parker (2014b) is the founder of the global social enterprise Reconstructed Living Labs (RLabs.org), a non-government organisation operating in underserved communities. He states part of their mission as '*to give hope and make a difference*' and one of their values as '*a movement of hope*'. The branding of '*hope*' is pervasive in the work done amongst the poor, unemployed and underserved living in "*communities in tension*" (RLabs, 2012). Parker defined hope as:

***"Hope is having a certainty in the present and a firm expectation in the future"***  
(Parker, 2014b)

Access to and training in ICT and the Internet provides opportunities to access information that can transform the lives of the receivers. Parker submits that lack of hope adversely affects a person's decision making, and confirms that hope operates as a capability. (Parker, 2014b). This echoes findings of Banerjee and Duflo (2011) that lack of hope is an inhibiting factor in decision-making situations. Echoing the findings of Gropman (2005a), Duflo (2012) reported that hope very often acted as a positive catalyst in the development of other capabilities. She suggested the possibility that hope may be "*closer to having physical manifestations (similar to proper nutrition) than have been acknowledged up to now*". Thus the generating of hope may have a functional and intrinsic value (*ibid.*). She concludes that "*a little bit of hope and some reassurance that an individual's objectives are within reach can act as a powerful incentive*".

Interview and focus group participants elaborated on the new opportunities that they are now finding, which made it possible to have aspirations to find employment, to find ways of continuing their studies, to connect with more people and ultimately to be able to plan a better future for themselves:

*“Sometimes it makes you want to go back to school because you have a library now here, so it may be easy to find some information. That’s what I wanted. I want to go back to school really this year.”(P4, 2012)*

Participants noticed the difference in their own development from merely having more information:

*“Because as you as a person who’ve got Internet, you are researching; your mind is always having new things new. Whenever you meet these people who do not have access to the Internet, they always seem so lost. They don’t know what to do because they don’t know how to get it.”(P5, 2012)*

During interview and focus group discussions, other participants also used words and phrases that pointed to an aspiration or a hope. These are highlighted in the following quotes:

*“Because next time you phone me to come to a meeting, I will hopefully say that I’m at work. And that would be because of the computers.” (FG1B, 2012)*

*“That is my positive highlight. The computers have come like a form on emancipation in my life by introducing me to computers.” (FG2S, 2012)*

*“Yes I feel like that, because, you know, I come here every day looking for a job and each and every day, I keep on coming with a hope that one day I will get a proper job in the internet, so yes.” (P12, 2012)*

*“Yah, it’s like what happens to me, now I’m addicted. So when I stayed at home doing nothing, I feel like, no man, there is something that is behind me. I needed to pull it away and I needed to study.” (P18, 2012)*

Following on from this, four questions relating to hopefulness towards their future, their family, their community and their country were included in the third phase focus group and online surveys. The responses of the focus group survey to the question regarding hopefulness towards their future showed a significant relationship between the use of the Internet and the hopefulness of respondents, ( $\chi^2 = 4.885$ , p-value < 0.05) in that 90.6% of users indicated a hopefulness for their futures and only 77.4% of non-users indicated the same.

The results of both surveys (combined) show that more than 90% of the respondents have a very definite attitude of hope for themselves and for their families (Table 6.9). Slightly fewer (but still more than 75%) have hope for the communities and the country.

**Table 6.9: Hopefulness in sample of two surveys**

	Responses	% Cases
I am very hopeful or somewhat hopeful for my future	2191	90.5%
I am very hopeful or somewhat hopeful for the future of my family	2114	91.6%
I am very hopeful or somewhat hopeful for the future of my community	2028	83.8%
I am very hopeful or somewhat hopeful for the future of South Africa	1925	79.6%

The Cronbach's alpha coefficient, which tests the interrelatedness of the four statements (Sijtsma, 2009:114) resulted in 0.848, which is classified as 'good' using the "rules of thumb" interpretation by George and Mallery (2010:231). From these four statements a mean hopefulness construct was computed that indicated the hopefulness of the respondent to all of the four statements. The mean of this hopefulness construct was calculated to be 1.51 (midway between 'very hopeful' and 'somewhat hopeful') with a standard deviation of 0.634. The distribution of values is skewed to the left. The response '1' (very hopeful for all circumstances) is the value that occurred most frequently.

When the results in Table 6.9 were combined 1776 respondents (73.5% of the 2417 that responded) were hopeful in all instances, whereas 26.5% were not hopeful in at least one of the four situations. This combination was used to compute a new dichotomous variable, consisting of the categories: i) 'very hopeful for all situations (self, family, community and country)'; and ii) 'less than very hopeful in at least one of the situations'.

The relationships of a number of the predictor variables with this dichotomous variable show significant but fairly weak relationships. Using the Generalized Linear Model, the following predictor variables had a significant effect on the dependent variable, hopefulness in all instances. The overall model is significant ( $\chi^2 = 87.951$ , p-value < 0.001).

Table 6.10 shows the tests for the model effects.

**Table 6.10: Test for model effects of "Hope" dependent variable**

Source	Type III Wald Chi-Square	df	p-value
(Intercept)	7.700	1	0.006
Age group	13.745	5	0.017
Employment group	16.779	2	0.000
Keyboard proficiency	14.417	3	0.002
Finding information easily	9.429	1	0.002
Preferring to use PAC	8.811	2	0.012
Language	37.925	3	0.000

Table 6.11 gives the parameter estimates (the estimated beta values) of the significant predictor variables for dependent variable 'Hope'.

**Table 6.11: Parameter estimates (B) of the significant predictor variables for dependent variable "Hope"**

Parameter	B
(Intercept)	-1.117
Under 18	0.155
18-24	0.110
25-34	0.339
35-44	0.079
45-64	-0.170
Employment = At School/College	0.031
Employment = Employed	0.419
Keyboard proficiency =Easy	0.408
Keyboard proficiency =Some difficulty	-0.029
Keyboard proficiency =Difficult	-0.127
Finding information easily = Yes	0.277
POA preference = PAC	0.177
POA preference = Internet café	-0.537
Language = Afrikaans	-0.142
Language = English	-0.059
Language = Xhosa	0.541

The probability of a person in this study being hopeful in all instances (self, family, community and country) can be calculated by substituting the parameters estimates from Table 6.11 into equation 5.2 (page 126). This probability is 0.92 for a person that is an unemployed Xhosa-speaking person between the ages of 24 and 35, is proficient in using a computer keyboard, finding information easily on the Internet and prefers using a public access centre.

$$p = \frac{e^{-0.1.117+(3)(0.339)+0.408+0.277+0.177+(3)(0.541)}}{1 + e^{-0.1.117+(3)(0.339)+0.408+0.277+0.177+(3)(0.541)}} = \frac{10.860}{1 + 10.86} = 0.916$$

If this person has some difficulty in using a computer keyboard and in finding information the probability of being hopeful drops to 79.0%. Thus, there is a significant effect of being able to find information, being able to use a computer keyboard and preferring to access the Internet at a public access centre on the hopefulness that a respondent has for all instances (self, family, community and country).

Hope is thus a very important capability, because it, in turn, influences a person's ability to navigate resources, make the right choices and make use of opportunities. This study shows how users of the ICT centre have modified their daily existence (of staying at home and



*‘doing nothing’*), to visiting the ICT centre regularly for various reasons. All of this points to the broadening of their horizons and the unveiling of new opportunities which made the users excited for their futures because of this newfound hope:

*“You see SmartCape is quite something; something whereby it gives us knowledge!” (P3, 2012)*

During focus group sessions in the third phase of data collection, the pertinent question *‘How would having the Internet at home make you hopeful about the future of yourself and that of your family?’* was posed to the group in each session. They were tasked to deliver short phrases as answers to the question. The following categories emerged in relation to hopefulness and are also presented in the word cloud in Figure 6.15.

**Table 6.12: Categories of Internet derived “Hopefulness”**

Category	Phrases	%
Education	47	29.2%
Economic	29	18.0%
Aspiration	17	10.6%
Business	15	9.3%
Safety	14	8.7%
Empowerment	8	5.0%
Social capital	6	3.7%
World information	6	3.7%
Skills	4	2.5%
Innovation	3	1.9%
Communication	2	1.2%
Goods	2	1.2%
RSA information	2	1.2%
Self-reliance	2	1.2%
Information	1	0.6%
Knowledge creation	1	0.6%
Motivation of others	1	0.6%
Role model	1	0.6%

Participants in the study strongly related Internet use to broader information regarding the world and their country, better education, more business opportunities, a changed life, empowerment, more economic opportunities, better communication with friends and family, enhanced ICT skills and opportunities to acquire goods more easily.



**Figure 6.15: Categories from Internet-derived ‘Hopefulness’**

Phrases used by research respondents included:

- “Having access to Internet will help develop a healthy mind-set that will cause my family to have hope for my future”
- “Help to achieve in life what you want in the future”
- “It can bring big hope of success in life for me and my family”
- “Family business opportunity”
- “Very bright ... start my own business”
- “Hoping for better business opportunities”
- “Do a business (Internet café)”
- “Help you live life better (Improve life style)”
- “It brings hope in my family because they know that I am going to achieve all my studies”
- “Able to earn better wages”

Exposure to computers and the Internet and the free use of the computers at the ICT centre of the library have introduced new opportunities for users of the system. However, these opportunities must still be harnessed for tangible benefits to be realised. A very pertinent comment from one of the 2012 focus group participants in the following dialogue demonstrated this sentiment:

*“Besides the information the library doesn’t have, there hasn’t been anything that has benefitted me. If I were going to speak about benefits, I would rather address the end product. So in the event that I apply, I would only see it as a benefit if and when I would be accepted. So, that is the only time I would be able to come back and truly say the computers have benefitted me. Or maybe if I get a job interview*

*and get hired, that's the only time I can say, through the computers I have seen a benefit. Otherwise to date, I have not seen a benefit. Yes, there are benefits because, it avails information to me, but then..."(FG1B, 2012)*

*Facilitator: "It brings information to you?"*

*"Ya, but now I'm waiting for the end product."*

### 6.3.7 Relationships between main themes

Significant relationships were found among the themes. The qualitative data analysis program ATLAS.ti produces a co-occurrence table of all the themes. This table also includes a co-occurrence index, 'c-coefficient', which is an indication of the strength of the relationship between the two codes. The calculation for the c-coefficient is:

$$c_{ij} = \frac{n_{ij}}{(n_i + n_j)} - n_{ij}$$

Where  $n_{ij}$  = the number of quotations that occurred in both categories

$n_i$  = the number of quotations that occurred in category i

$n_j$  = the number of quotations that occurred in category j

The relationships that emerged from the c-coefficients are given in Table 6.13.

**Table 6.13: Relationships between themes**

	Empowerment	ICT Usage
ICT Skills	0.55	
ICT Usage	0.31	
Economic Freedom		0.33
Learning Opportunities	0.2	0.33
Social Capital		0.33

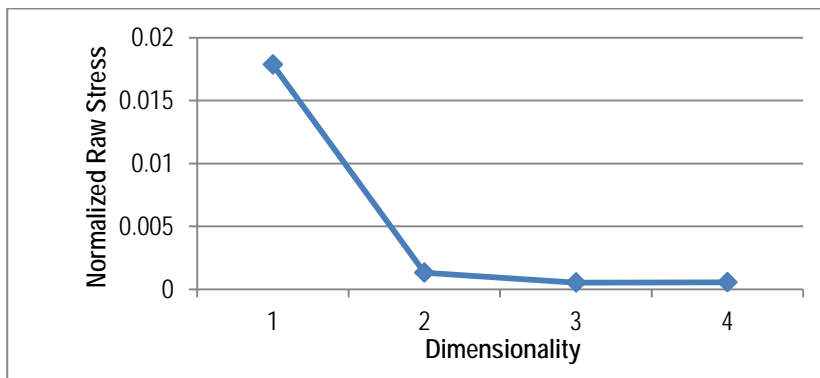
To explore the relationships further, a co-occurrence table for the themes was constructed and analysed for clustering of themes. The co-occurrence table is a matrix based on the frequency count of simultaneous occurrences of categories or themes in the qualitative data (Coxon, 1999:68). Hierarchical cluster analysis is utilised to create a proximity matrix from the co-occurrence matrix, as input into a multi-dimensional scaling analysis to generate a scatter plot that shows the relative positions of the themes. Themes that are in a close 'relationship' will lie close together on the scatter plot (Leydesdorff & Vaughan, 2006:4).

The proximity matrix, created by hierarchical cluster analysis, is given in Table 6.16. Proximity matrices are either similarity or dissimilarity matrices. Hierarchical cluster analysis creates a proximity matrix consisting of squared (Euclidian) distances, utilised as dissimilarities, from the co-occurrence matrix created by ATLAS.ti (Leydesdorff & Vaughan, 2006:6). The SPSS statistical analysis technique called PROXSCAL is used to obtain the scatter plot, and the dimension of each object on the plot. The 'fit' of the model is measured by 'stress' values, which indicates bad-ness-of-fit, since higher values shows poorer fit (Sturrock & Rocha, 2000:50). The stress measure of this model is shown in Table 6.14.

**Table 6.14: Stress Measures**

Badness-of-fit	
Normalised Raw Stress	.00155
Stress-I	.03935 <sup>a</sup>
Stress-II	.06564 <sup>a</sup>
S-Stress	.00293 <sup>b</sup>
Goodness-of-fit	
Dispersion Accounted For (D.A.F.)	.99845
Tucker's Coefficient of Congruence	.99923
PROXSCAL minimizes Normalised Raw Stress.	
a. Optimal scaling factor = 1.002.	
b. Optimal scaling factor = 1.000.	

The dimensionality of the current data is two, as shown in the scree plot in Figure 6.16.



**Figure 6.16: Scree or Stress plot**

The final coordinates for the two-dimensional scatter plot calculated by MDS is given in Table 6.17. The scatter plot in Figure 6.17 demonstrates clusters (or groupings) of themes that are closely related to each other.

**Table 6.15: Theme co-occurrence table generated by ATLAS.ti**

	Agency	Empowerment	Opportunity	Reader	Changed Life	Choice	Communication	Disabling	Economic Freedom	Enabling	Hope	ICT Skills	ICT Usage	Community Involvement	Reading Skills	Learning Opportunities	Social Capital
Agency	0	23	9	6	6	1	2	6	17	11	16	15	52	1	0	33	14
Empowerment	23	0	13	13	20	8	0	0	30	13	10	63	106	10	3	52	20
Opportunity	9	13	0	2	8	14	1	0	17	4	4	9	36	8	1	16	1
Reader	6	13	2	0	0	2	1	4	7	17	2	4	22	4	13	21	6
Changed Life	6	20	8	0	0	5	0	0	11	2	2	10	25	5	0	15	10
Choice	1	8	14	2	5	0	2	1	15	5	2	3	22	7	1	11	4
Communication	2	0	1	1	0	2	0	0	23	2	0	0	23	2	0	2	25
Disabling	6	0	0	4	0	1	0	0	4	7	3	0	12	3	0	6	5
Economic Freedom	17	30	17	7	11	15	23	4	0	30	11	21	124	12	2	40	18
Enabling	11	13	4	17	2	5	2	7	30	0	5	10	41	15	4	26	16
Hope	16	10	4	2	2	2	0	3	11	5	0	2	20	1	0	15	4
ICT Skills	15	63	9	4	10	3	0	0	21	10	2	0	60	6	1	10	11
ICT Usage	52	106	36	22	25	22	23	12	124	41	20	60	0	29	4	120	115
Community Involvement	1	10	8	4	5	7	2	3	12	15	1	6	29	0	1	14	6
Reading Skills	0	3	1	13	0	1	0	0	2	4	0	1	4	1	0	17	0
Learning Opportunities	33	52	16	21	15	11	2	6	40	26	15	10	120	14	17	0	20
Social Capital	14	20	1	6	10	4	25	5	18	16	4	11	115	6	0	20	0

**Table 6.16: Themes proximity matrix**

Themes	Agency	Empowerment	Opportunity	Reader	Changed Life	Choice	Communication	Disabling	Economic Freedom	Enabling	Hope	ICT Skills	ICT Usage	Community Involvement	Reading Skills	Learning Opportunities	Social Capital
Agency	0	7324	1481	2002	1597	2195	3221	3719	7154	1222	2441	2955	47521	1524	4071.000	9372.000	5369.000
Empowerment	7324	0	10603	13640	12711	13923	14891	16953	5094	8742	14077	12359	48557	12260	18059.000	9166.000	5863.000
Opportunity	1481	10603	0	945	530	768	1544	1394	10961	1007	682	3600	54408	515	1918.000	11909.000	7208.000
Reader	2002	13640	945	0	619	703	1601	829	13140	1892	513	4763	54575	430	1085.000	14930.000	9865.000
Changed Life	1597	12711	530	619	0	404	1130	950	12767	1339	396	3568	52748	429	1290.000	13865.000	9376.000
Choice	2195	13923	768	703	404	0	904	598	14207	1631	428	4854	56464	327	938.000	15141.000	10030.000
Communication	3221	14891	1544	1601	1130	904	0	960	15925	1925	1096	6030	56120	1095	1816.000	15697.000	11110.000
Disabling	3719	16953	1394	829	950	598	960	0	17185	2803	450	6900	62088	795	364.000	18579.000	12466.000
Economic Freedom	7154	5094	10961	13140	12767	14207	15925	17185	0	10284	14365	8301	56473	11972	18751.000	5016.000	2007.000
Enabling	1222	8742	1007	1892	1339	1631	1925	2803	10284	0	1681	3853	46419	1526	3143.000	10350.000	7053.000
Hope	2441	14077	682	513	396	428	1096	450	14365	1681	0	4746	55850	489	808.000	15331.000	10184.000
ICT Skills	2955	12359	3600	4763	3568	4854	6030	6900	8301	3853	4746	0	48078	4241	7808.000	5899.000	5986.000
ICT Usage	47521	48557	54408	54575	52748	56464	56120	62088	56473	46419	55850	48078	0	55377	61142.000	52401.000	62436.000
Community Involvement	1524	12260	515	430	429	327	1095	795	11972	1526	489	4241	55377	0	1173.000	13508.000	8465.000
Reading Skills	4071	18059	1918	1085	1290	938	1816	364	18751	3143	808	7808	61142	1173	0.000	20981.000	14164.000
Learning Opportunities	9372	9166	11909	14930	13865	15141	15697	18579	5016	10350	15331	5899	52401	13508	20981.000	0.000	4323.000
Social Capital	5369	5863	7208	9865	9376	10030	11110	12466	2007	7053	10184	5986	62436	8465	14164.000	4323.000	0.000

The way to interpret the plot is to look for clusters or groups or to look for objects that are far apart. The real numerical values of the coordinates of the objects are only important to locate the object on the plot but have no other statistical meaning. After many repetitions of the hierarchical cluster and MDS analysis, the final graphical representation of the relationship between the themes can be found in Figure 6.17.

**Table 6.17: Final coordinates**

	Dimension 1	Dimension 2
Learning Opportunities	1.200	-.523
Economic Freedom	1.174	.057
Empowerment	1.038	.640
Social Capital	.775	-.031
ICT Skills	.135	-.281
Agency	-.040	.034
Enabling	-.162	.034
Opportunity	-.268	.007
Community Involvement	-.351	.014
Changed Life	-.365	-.010
Reader	-.412	.037
Choice	-.438	-.004
Hope	-.451	.013
Communication	-.528	-.035
Disabling	-.608	.017
Reading Skills	-.699	.029
Learning Opportunities	1.200	-.523

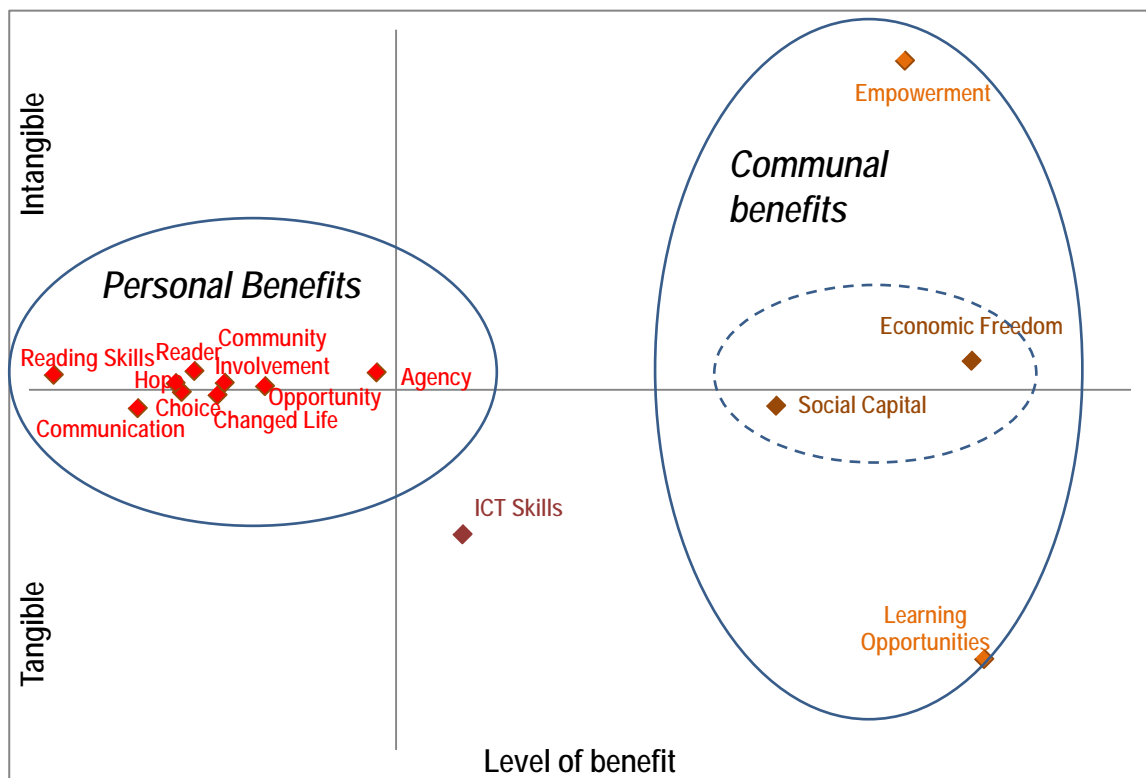
The themes congregate in two areas; one to the left side of the vertical axis (Table 6.18) and the other to the right side of the vertical axis. On closer inspection the first group of themes can be labelled as a group of personal benefits. The second group of themes can be labelled as a group of communal benefits.

**Table 6.18: Theme groups**

First theme group			Second theme group
Agency	Choice		Learning Opportunities
Enabling	Hope		Economic Freedom
Opportunity	Communication		Empowerment
Community Involvement	Disabling		Social Capital
Changed Life	Reading Skills		
Reader			

The expansion of ICT skills, situated on its own in between these two groups, can belong to both groups, and influences both groups, since ICT skills '*facilitates*' the occurrences of other benefits.

The benefits listed in the personal benefits group are mostly intangible benefits, with the possible exception of 'reading skills'. Regarding the benefits listed in the communal benefits group, 'economic freedom' and 'social capital' can be seen as tangible benefits since economic freedom in this study referred to the financial saving by using the ICT centre and the expansion of employment and business opportunities. Social capital referred to the meeting of new friends and the reconnecting with friends and family with whom the users have lost touch.



**Figure 6.17: MDS two-dimensional scatter plot showing the relationship between the themes**

Thus, the horizontal axis represents the level of the benefit (i.e. the personal or the communal) and the vertical axis represents the measurability. The benefit of learning opportunities, including information found and knowledge gained are found a distance below the horizontal axis and empowerment (a non-measurable benefit), which includes individual as well as group empowerment is found high above the horizontal axis. Some elements of social capital (number of new connections made) and economic freedom (money saved, more employment opportunities) are measurable. However, both have non-measurable elements. For example, social capital has elements that describe deepening of older relationships, and having free access to information and knowledge through free access to the Internet at the ICT centre are a non-measurable benefits. The identification of all the



themes was based on the initial conceptual framework described in Chapter 4.6. The following chapter will re-visit the framework.

## **6.4 Conclusion**

This chapter presented the empirical results of the research study gleaned from the investigation into the research question pertaining to the nature of the benefits of public access ICT4D initiatives in communities. The study was carried out within the intellectual underpinning of critical realism, acknowledging various perceptions from participants of an existing reality. Using the framework developed in Chapter 4, and the tenets of the Capability Approach, the research question was answered by doing the following:

- selecting a case to include in the study;
- interviewing users of public access at an instance of the case;
- conducting focus group sessions with more users of the case;
- conducting focus groups with community members in close proximity to the public access centres;
- conducting a survey among the community members of the focus group; and
- conducting a large-scale online survey among all users of the case in a wider area.

The content analysis of the qualitative data identified themes consisting of community needs, community weaknesses and community strengths, use characteristics of the public access centre, tangible benefits and intangible benefits. The environmental, social and personal conversion factors and the impact of the public access centre on these conversion factors were highlighted as well. Finally, the relationship between all of the themes was presented in a bi-plot (Figure 6.17).

In this empirical investigation, benefits and relationship between benefits emerged, that were not indicated in the initial framework presented in Chapter 4.6. Thus whilst the empirical data confirms the capabilities, opportunities and usage pattern groups in the initial framework, the need to adapt the framework arose. The benefits identified and the relationships between the benefits that emerged in this chapter were used to construct a reworked framework for the benefits of public access initiatives in Chapter 7.

## **Chapter 7 Conclusion**

Public access centres are used by millions of people worldwide to access ICTs. However, concerns have been raised about the ongoing necessity to sustain these venues (Sey *et al.*, 2015). These concerns can be addressed by investigating the benefits and the nature of benefits to communities in which public access venues are situated. This thesis presents the results of such a research study, showing that although the nature of the benefits is mainly intangible, they do enhance the capability to live a meaningful social and economic life, having more opportunities and choices in the life they would want to create for themselves. For example, agency increases the ability and propensity to recognise and make use of opportunities that presents itself.

This study commenced with an investigation into the development of ICT, IS and ICT4D initiatives to compare the application and impacts of these projects and programmes. The next step was to review the literature to find existing frameworks for the benefits in the general disciplines of IS and ICT and more specifically, in the discipline of ICT4D. Five evaluation frameworks were identified as foundations from which to work, even though none focuses on identifying benefits. Thereafter, a framework, based on the elements of the five frameworks was developed to identify the benefits of public access programmes in underserved communities. After applying the framework to conduct the research, the findings in the previous chapter directed that it must be adapted to represent the results of the study more closely. This framework (Chapter 7.5.3) is the contribution of this study to the existing body of knowledge.

### **7.1 Benefits Framework of Public Access Centres**

The main research objective of this study was to develop a framework for benefits related to public access ICT4D initiatives in local communities by answering the following sub-questions:

1. What is different about evaluation in the ICT4D context compared with the more formal contexts of ICT project evaluation in organisations?
2. Which theories and frameworks have been used in the evaluation of ICT4D initiatives to identify benefits?
3. What is the nature of the benefits of ICT4D initiatives in local communities?
4. How do these benefits of ICT4D initiatives converge into a framework?

The following section will present the results of each sub-question.

## 7.2 Sub-Question 1

*“What is different about evaluation in the ICT4D context compared to the more formal contexts of ICT project evaluation in organisations?”*

A review of the literature has shown that research into the evaluation of ICT projects and the benefits in business and education are prolific, resulting in the development and application of a number of evaluation theories (Table 2.3 and Table 2.4).

These frameworks and theories are applied in the more formal context of organisations working within strict boundaries of policies and procedures and having set objectives and outcomes which can be evaluated at different time points and following prescribed strategies and processes. Deployment of IS and ICT in education projects very often leads to more streamlined work processes and successes such as time saving or increased profits for the organisations. On the contrary, the expected impact of ICT initiatives deployed in communities is of a developmental nature and is, therefore, more complex to evaluate and measure.

Furthermore, ICT4D initiatives often do not have a standard set of objectives or outcomes to guide the evaluation. In addition the communities in which these projects are deployed are not bound together in any formal structure or ‘*working*’ towards any unified goal. Therefore, identifying the benefits of ICT4D initiatives requires a different approach that that used by the formal business and education sectors.

Researchers in the ICT4D context have acknowledged this and have examined how the more formal theories can be applied in the field of ICT4D. While some have called for IS theories to be used, others have illustrated the insufficiencies of these theories in the ICT4D context in that they cannot measure social development and only evaluate easy-to-measure outcomes.

The validity of scientific research results depends on the research process, which is underpinned by the theory and methods of the research. Existing theories that are appropriate to the research environment at a specific point in time have to be sought and used. Scientific research is an ongoing project and theories serve to offer the best possible explanation of a complex phenomenon.

Therefore, the question is which theories are acceptable and can be used in the investigation of the benefits of ICT4D initiatives. The investigation results are summarised in the following section.

### 7.3 Sub-question 2

*“Which theories and frameworks have been used in the evaluation of ICT4D initiatives to identify benefits?”*

Review of the literature indicated that for many years there have been no formal evaluation frameworks in use in the ICT4D context. Although a number of authors have devised frameworks, none of them evaluates or identifies the nature of the benefits or the benefits accrued by users of public access centres. A number of researchers used theories from the IS field or constructed their own evaluation frameworks (Table 3.1).

Existing gaps in the knowledge of evaluation of benefits and the nature of these benefits were highlighted by various authors (Ashraf *et al.*, 2007; Grunfeld, 2007; Ashraf *et al.*, 2008; Gomez, 2008; Sey & Fellows, 2011; Gomez & Pather, 2012; Gomez *et al.*, 2013). These authors acknowledged the complexity of measuring social development in ICT4D (the ‘D’ in the abbreviation denotes ‘development’). The focus of evaluation attempts, therefore, shifted to the concept of development, specifically human development. The Capability Approach (CA), devised by Sen (2001), inspired ICT4D researchers to view human development as a process of expanding a person’s capabilities as freedoms and choice. Various authors in Community Informatics and ICT4D research domains have applied the CA philosophy in their research endeavours, and subsequently included it in evaluation frameworks (see the author list in Chapter 3.6).

A few of these authors are mentioned below:

- Alsop and Heinsohn (2005) devised a framework to evaluate the impact of ICT4D initiatives on development outcomes and empowerment.
- The Sustainable Livelihoods Framework (SLF) models various capitals to livelihood outcomes (Parkinson & Ramírez, 2006; Parkinson & Lauzon, 2008).
- Kleine (2009) developed the Choice Framework, based on Sen’s Capability Approach (CA) and the SLF, which evaluates the development of personal freedom.
- Grunfeld *et al.* (2011) developed the CESVS Framework, which was designed to investigate and understand the processes associated with the realisation of the benefits of ICT.
- The ICT Impact Chain developed by Gigler (2011) evaluates the impact of ICT in terms of the CA
- Hatakka and De (2011) evaluated expanding human capabilities and functionings as key to development.

- Kivunike (2014) used the framework of Hattakka and De but modified it to include 'choice' as an achieved functioning

At the start of the era of ICT being utilised to serve development goals of poor communities, evaluation research has followed a similar route as ICT evaluation research in mainstream organisations. This trend emphasised outcomes of projects, as can be seen in the first evaluation framework by Alsop and Heinsohn (2005). As ICT4D projects developed and matured, efforts to evaluate these projects emphasised the investigation of impact and more specific elements of impact, such as expansion of choice (Kleine, 2009) and empowerment. In reaching maturity these projects require on-going evaluation, specifically to understand the benefits to communities. However, none of these frameworks identified benefits to communities using public access centres. Therefore, the contribution of this study is a framework which identifies these benefits, and provides insight into their inter-relationships.

#### **7.4 Sub-question 3**

*“What is the nature of the benefits of ICT4D initiatives in local communities?”*

Empirical data from the three phases of data collection gave an insight into the benefits of public access centres to communities, using the framework in Chapter 4.6 as the foundation for the investigation. The epistemology of the critical realist paradigm allows both qualitative and quantitative research methodologies to be utilised. The data was collected through: i) interviewing users of the SmartCape system at the Harare Library, Khayelitsha; ii) conducting focus groups with different sets of users from the same library; iii) conducting focus group sessions with community members using ten other libraries (five in Khayelitsha and five in Mitchells Plain) in which SmartCape is deployed; iv) administering a survey to the users of the ten libraries at the time of the focus groups; and v) an online survey administered to all SmartCape users in the Cape Metropole (Figure 5.2). One hundred-and-fifty community members took part in the ten focus groups of the third phase of data collection and 2274 users of the SmartCape programme in the Cape Metropole completed the online survey.

From the ontology of the critical realist paradigm, a reality can be investigated by considering multiple perceptions of this reality. Both positivism and interpretivism tools and techniques to investigate a phenomenon are acceptable in the Critical Realism paradigm, which allowed this research study to utilise qualitative and quantitative research methodologies to explore perceptions of benefits from community members who are users of the public access centres. During the interviews users of the public access centre expressed their impressions

and perceptions of the impact on their lives of access to the Internet from the utilisation of the ICT centre in the library.

Findings from the accumulation of data indicated that the primary benefits to SmartCape users are the ability to connect with people, business, government and friends, through email and to apply online for employment and studies. Furthermore access affords the users the ability to conduct day-to-day business activities and to have increasing choices, opportunities and capabilities, which in turn, lead to increasing self-esteem and self-efficacy. A general perception of a '*changed life*', with regular access emerged together with the notion of hope for a better future, and expressions of aspirations of making use of new opportunities that access to the Internet is making possible.

The main themes of benefits that emerged during the interviews were:

- *Easier Learning Opportunities*—online applications and online study
- *Economic Freedom*—saving of money in various ways
- *Social Capital*—making more connections with people
- *Enhanced Empowerment*
- *Increased Agency*—self-efficacy and self-esteem
- *Community Involvement*—made easier by the access and use of the ICT centre
- *Increased ICT skills*—for more effective use of ICT
- *Aspiration and Hope*
- *More and new Opportunities*—more useful '*things to do*', as well as business and employment opportunities
- *More and new Communication*—easier individual and group communication, made possible by using email, and other social networking sites
- *Evidence of Changed Life*
- *More Choice*—specifically in their daily routine and in study choices
- *Increased English Reading and Language Skills*—deemed important in the communities where English is at least the second language

The nature of the benefits are thus both tangible (measurable) and intangible (non-measurable). Included in the measurable benefits are economic benefits, increased skills in reading, language and ICT. The benefit of saving money was a recurring theme in the interview and focus discussions. With regards to the intangible benefits, the ability to connect, or re-connect with people, including family, friends, businesses and government, emerged as an important benefit. Notable also is the feeling of increased empowerment in both individuals and the community of users, and the increased ability to make use of new

opportunities and choices (agency). According to Sen (2001), cited in Alkire and Deneulin (2009a:31), agency is the “*ability to pursue goals that one values and has reason to value*” and the freedom to make use of opportunities is an element of capabilities (Alkire & Deneulin, 2009a:32).

By investigating co-occurrences of the themes of the qualitative data, a relationship between the perception of empowerment and increased ICT skills (Table 6.13) emerged. In addition a relationship between ICT usage and financial benefits, learning opportunities and social capital became apparent. A relationship between empowerment and learning opportunities was also evident. The Generalized Linear Model analyses of the survey data of the third phase of data collection, showed that keyboard proficiency, finding information easily and language proficiency had a significant effect on the perception of hopefulness in the respondents. Thus there is a statistically significant relationship between increased ICT usage and ICT skills and the intangible benefit of hope. This finding thus emphasises the notion that using ICT and developing the associated skills leads to more use of ICT which has the concomitant benefit of producing a feeling of hope. This in turn acts as a catalyst which enables people to expand their resources, and to navigate their daily journey. This confirms the appeal by ICT4D researchers to evaluate non-measurable as well as measurable impacts and benefits (Grunfeld *et al.*, 2011; Gomez & Pather, 2012; Gomez *et al.*, 2013).

## **7.5 Sub-question 4**

*“How do these benefits of ICT4D initiatives converge into a framework?”*

The framework in Chapter 4.6 was developed as an early attempt to guide the analysis of the empirical phase of the study. This early framework did not include the achieved capability of hope or of increased agency, which have emerged as intangible benefits in this study. Thus, a modification of this framework is required to include these emergent benefits. The importance of these emergent benefits is that both are enabling capabilities that assist people in identifying and making use of opportunities presented to them. This modification is also informed by the elements of the five of the models discussed in Chapter 3, namely: the Choice Framework (Kleine, 2009:110); the ICT Impact Chain (Gigler, 2011:12); the CESVS model (Grunfeld *et al.*, 2011:153), the Capability Approach Framework (Hatakka & De, 2011), and the ICT4D Evaluation model (Kivunike, 2014).

One of the intangible benefits that was identified was the feeling of hope that is engendered by the access to technology and use of technology in the public access centres in

underserved communities. Hope is a non-material construct, extremely important in the realm of well-being and quality of life, although seldom mentioned in quality-of-life research studies (Rustøen, 1995). To understand the concept of hope and the role it plays in the day-to-day lives of people, it is necessary to explain the relationship between hope and aspiration, a non-measurable benefit identified by Gomez *et al.* (2013:38).

### 7.5.1 Expression of aspiration

Aspiration describes the hope—a looking forward to—that one has, to be or to achieve something. Arjun Appadurai (2004), cited in Pal (2008) makes a case for aspiration to be an important construct in development. Pal states “*both the determinants of aspiration and their impacts on individual behaviour are important*” in the realm of ICT4D (*ibid.*). Freistadt *et al.* (2009) reported that the aspect of aspiration was one of the impacts of access to ICT centres that culminated in a ‘*strong aspirational discourse*’ among graduates of a training course at an ICT centre. Individuals with aspirations focus their time and energy on future accomplishment (Gomez *et al.*, 2013:38).

When aspirations stem from increased human capabilities in association with ICT use and not purely from own personal desires, they translate into a ‘*navigational capacity*’, thus strengthening agency, and a development outcome (Ray & Kuriyan, 2010). Ray & Kuriyan further suggested the operationalisation of aspiration is informed by three questions:

- Do poor people use existing resources and capabilities differently after exposure to ICT services?
- What is the effect of ICT interventions specifically regarding average or median members of low-income groups?
- Are there measurably new social networks enabled by ICTDs that allow the poor to look beyond their existing windows of aspiration? (Ray & Kuriyan, 2010)

These are very similar to the questions of Ward and Daniel (2006:173) in an investigation into benefits, namely: Are the people doing new things? Are they doing things differently than before? Have they stopped doing things?

Thus the expression of aspiration brings a very important perspective to the realm of ICT4D in general, and the domain of PACs in particular. This importance is borne out by evidence in this study of the enthusiasm in grassroots communities in respect of the ability to find employment. In addition, the excitement at the prospect of commencing



or continuing studies, and the capability to plan a better future for themselves are elements of Aspiration.

## 7.5.2 Hope

'Hope' is the intangible and elusive beneficial element that is lacking in all the frameworks, and all the evaluations of ICT4D initiatives, listed in Chapter 4, even though it was alluded to by Gomez *et al.* (2013:38). Well-being and self-esteem, which lead to empowerment, are directly linked to feelings of hope and aspiration, and hope has been declared a capability (Freistadt *et al.*, 2009:10; Parker & Wills, 2009; Duflo, 2012:40)

*"We see how hope not only works as an enabling capability, but also is a key to the development of other capabilities. Hope can fuel aspirations" (Duflo, 2012:40)*

The capability of hope emerged as a critical intangible benefit and provides a very compelling argument for the role of PACs in the development of communities.

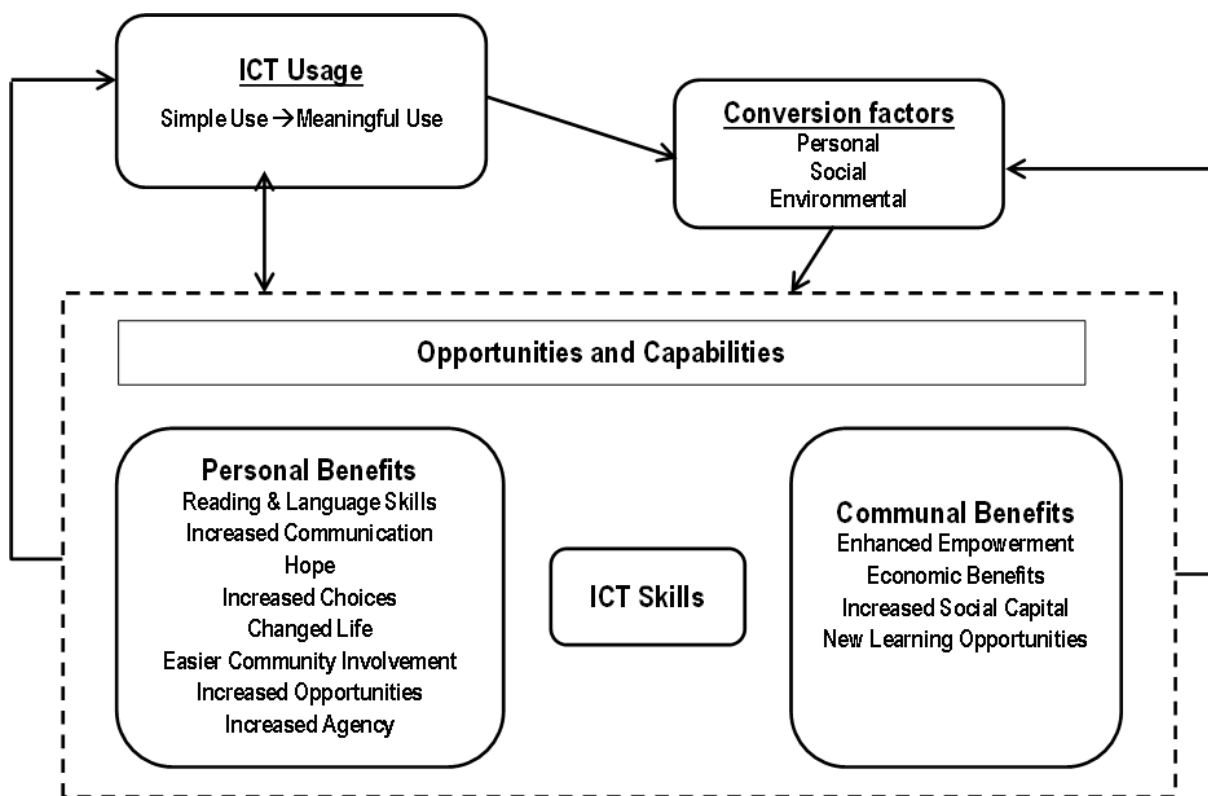
*"Hope is like a road in the country; there was never a road, but when many people walk on it, the road comes into existence." Lin Yutang*

Since hope emerged in the interviews as a benefit, hope, representing expressions of aspiration, has been included in the proposed framework for benefits as achieved functionings, together with choice and other achievements.

## 7.5.3 The Benefits-Framework

The analysis of the data from the interviews, focus groups and surveys was informed by the framework in Chapter 4.6, which included elements of the Capability Approach, and the five models represented in Chapter 4.1. The framework in Chapter 4.6 does not include the benefits that emerged from the data, such as hope and the feeling of a changed life, or the relationship between the themes as seen in Chapter 6.3.7.

Therefore, the initial framework was reworked to represent the findings of this study more closely, and is presented in Figure 7.1. The framework comprises the elements ICT Usage, Conversion Factors and Opportunities and Capabilities and lists the benefits.



**Figure 7.1: Benefits-Framework: Public Access ICT4D Initiatives**

### 7.5.3.1 ICT Usage

Access and use of technology by users of the public access centre are imperative for both tangible and intangible benefits, to be realised. This study found that PAC users increased their frequency of access to ICTs once they experienced a benefit, such as communicating with family or friends, finding new information, registering online to study or being able to make use of new business opportunities. This, in turn, increases the type of use and new benefit possibilities. Thus, benefits accrued from regular and increased access to technology leads to more meaningful use of ICTs.

### 7.5.3.2 Conversion factors

Public access centre users expressed satisfaction that the centre is in close proximity to their community, which enabled them to use the facilities without having to travel to the centre and incur expense. The larger number of available computers and the friendly attitude of the library personnel towards new users were also mentioned. However, participants felt that having only 45 minutes per day<sup>22</sup> limited the type of work or communication they needed to

<sup>22</sup> This is the current policy of the SmartCape programme to ensure that as many users as possible are able to access the centre.

do. Network outages were also mentioned as problematic. These are examples of environmental enabling and disabling factors.

A user's personal and social conversion factors can be strengthened by meaningful use of ICTs, which enables the realisation of benefits and enhances a person's capacity to exploit choices and increase capabilities. The findings showed a positive impression of the ICT centre, and demonstrated a positive personal reputation of respondents when perceived by their community as a user of the ICT centre.

These factors are included in the framework since they have a definite positive or negative impact on the realisation of benefits.

### 7.5.3.3 Opportunities and capabilities

The benefits received by PAC users all relate to new opportunities and achieved capabilities. These elements are based on the three emerging groups of themes from the data, namely the personal benefits, the communal benefits, and the increased ICT skills identified by the MDS analysis and the bi-plot.

#### a. *Personal benefits*

Table 7.1 shows the benefits in the first theme group, namely personal benefits. These benefits emerged from the participants in relation to the impact that the use of the ICT centre has had on their lives.

**Table 7.1: First theme group**

Agency	Opportunity
Community Involvement	Changed Life
Hope	Choice
Communication	Reading Skills

Increased self-esteem and self-efficacy, which are represented by 'agency', hope, perception of a changed life, presentation of new opportunities, enhanced communication, increased reading skills and community involvement opportunities, comprise the list of benefits in the first group. All of these are benefits to the individual, hence the term '*personal benefits*'. Hope, a novel finding which has emerged as a benefit in this study, is a facilitating and path-finding capability because it influences a person's ability to navigate resources, make the right choices, and make use of opportunities. Once PAC users realised this benefit, they changed their behaviours and daily routines, in order to make full use of the opportunities.

**b. Communal benefits**

The second group of benefits relate to new opportunities available to the community of users of the public access centres, as evidenced by the participants.

**Table 7.2: Second theme group**

Learning Opportunities
Economic Freedom
Social Capital
Empowerment

These opportunities, listed in Table 7.2, are learning and study opportunities, financial opportunities, opportunities to make and foster connections and the increased perception of empowerment of individuals and the community, through access to the ICT centre and the Internet.

**c. ICT skills**

The benefits of increased ICT skills were mentioned by participants in relation to themselves as well as to the community as a whole. Thus, ICT skills is a benefit, but it does not fit into the two previous groups, according to the MDS analysis (Chapter 6.3.7) in this study. As stated before, increased ICT skills have a positive impact on empowerment, which in turn has a relationship with learning opportunities (Table 6.13).

**7.5.3.4 Summary**

This framework brings together the benefits that can be realised through the access and use of ICTs and the expansion of people’s abilities to exploit new avenues and opportunities afforded to them. In addition to the foregoing description of each element, the framework also represents the relationship between all the entities. The double-headed arrows between ICT usage and opportunities and capabilities represent a two-way effect; that is, as basic use of technology changes into more effective and meaningful use, the assumption is that more benefits will become available, which will increase the users’ confidence to learn additional ICT skills. Using ICT meaningfully affects conversion factors, which in turn, affect people’s ability to make choices and exploit opportunities. The more people realise benefits, the greater will be their courage to exploit new opportunities. Thus PAC users make new choices through more effective use of ICTs and convert disabling personal or social conversion factors into enabling factors.

## **7.6 Contribution of this research**

The main contribution of this study to the body of knowledge of ICT4D evaluation is the development of a framework of benefits in respect of public access ICT4D initiatives. This framework fills the gap in the understanding of the realisation of benefits in the ICT4D arena.

During the literature analysis it became clear that ICT4D research processes had to follow an alternative approach to the methods used in the information systems research context and business or education evaluation research. Initially, ICT4D researchers employed approaches from these fields and came to the same conclusion. The context of ICT4D initiatives deployed in communities require an alternative research approach since communities are not structured, do not work towards some unified goal and the benefits accrued by communities are often not measurable.

The framework produced by this study can be used to identify benefits of both a measurable and non-measurable nature and to evaluate these benefits and their impact on the conversion factors and increased meaningful use of technology by the users. In addition, this framework furthers the academic discourse on operationalising the Capability Approach by demonstrating the inclusion of a person's agency and conversion factors that inhibit or enhance utilisation of opportunities and choices in the realisation of benefits.

Within the intellectual underpinning of the critical realism paradigm, users' diverse perceptions were investigated using both quantitative and qualitative approaches, illustrating the use of quantitative data analysis techniques in an ICT4D context on qualitative content data.

From a practice perspective, this framework will be useful to donor agencies or project teams and governments to determine the degree of success of their interventions. This includes whether benefits have been produced or not, whether access to ICT to underserved communities has been of value to these communities or not, and to assist in investigating factors that can inhibit or enhance the utilisation of access and ICTs.

Finally, this study produced empirical evidence of the developmental impact of the SmartCape ICT4D programme in Cape Town and thus provided evidence of its value.

## **7.7 Advancing the Information Society in South Africa**

Evidence of the developmental impact of ICT and Internet access emerging from this study provides additional motivation for the various levels of the South African Government to

maintain and extend the public access centre initiatives in order to avail these benefits to the poorer communities. The free access to the Internet and ICTs offered to these communities produces benefits of both a measurable and non-measurable nature, from the notion of affordability to the acquisition of hope, thus fuelling aspirations for a better life with more choices.

Furthermore this study confirms the findings of Donner and Walton (2013:15) that the demand for and usage of public access centres is not on the decline, even among the mobile-Internet-using teenagers. The benefit of creating, printing and sending documents is not yet an easy task on a mobile device, including a smart phone.

These findings render the framing of a national e-strategy to promote universal access (South Africa. Department of Communications, 2012:41) by establishing public access centres in all underserved communities an imperative for the South African Government, the Western Cape Provincial Government and the City of Cape Town as local government. The maintenance and extension of the Cape Access Programme and the SmartCape initiative (Western Cape Government, n.d.) as well as the broadband rollout announced by the provincial government (Western Cape Government, 2015b:10, 13) is also encouraged. Similarly, the Universal Broadband Network Strategy of the City of Cape Town can use these findings to motivate broadband infrastructure throughout the metro (City of Cape Town, 2014b) to expand the SmartCape initiative to and to provide free Wi-Fi Internet access at all public libraries throughout the metro (City of Cape Town, 2014a).

## **7.8 Evaluation of the research**

The research evaluation for this study spans approaches from both quantitative and qualitative research traditions. The evaluation methods for the qualitative component include confirmability, reliability, transferability and credibility, whereas for the quantitative methods, evaluation efforts include objectivity, reliability and validity.

### **7.8.1 Qualitative methods**

#### **7.8.1.1 Confirmability**

To achieve confirmability, the data collection methods, namely, the sequence, processing, and analysis must be clearly described in the study. For this study, the data collection sequence is described in Chapter 5.3 (Figure 5.2) as:

- Phase one—collecting data by interviewing users of the Harare Library ICT centre

- Phase two—collecting data from focus group discussions with users of the Harare Library ICT centre
- Phase three—collecting data from ten focus group discussions with community members living in close proximity to libraries in which the SmartCape computers are installed and from a survey deployed on the SmartCape system

The textual data from the first two phases were recorded with permission from the participants, translated into English (where necessary) and transcribed into text. The qualitative data management software, ATLAS.ti version 7, was used to analyse the textual data. Themes in the data emerged using qualitative content analysis, and a matrix of co-occurrences of these themes were constructed using the co-occurrences table tool of ATLAS.ti. These co-occurrences were imported into SPSS 22. Hierarchical Cluster Analysis was used to transform the co-occurrences into a proximity matrix of dissimilarities. A two-dimensional scatter plot (bi-plot) of all the themes was generated using the proximity matrix as input data to Multi-dimensional Scaling Analysis. This bi-plot informed the development of the framework in Chapter 7.5.

#### **7.8.1.2 Reliability**

As stated in Chapter 5.6.4, keeping evidence in an easily retrievable form for investigation and re-analysis by others is one of the ways to ensure reliability. This has been done with all the data used in this study. The textual interviews and focus group data is kept in Microsoft Word format and in plain text format, as well as in the ATLAS,ti qualitative data management system.

Research decisions were informed by the critical realism intellectual underpinning of the study. The ontological stance of critical realism is that of a single reality being perceived from multiple viewpoints, and the epistemology allows for both quantitative and qualitative research methods to be used. This informed the decision to investigate the perceptions of users of the ICT centre in the Harare Library, using interviews and focus groups, and broadening the data collection to include perceptions of community members from ten areas surrounding SmartCape libraries in two areas in Cape Town.

#### **7.8.1.3 Transferability**

Generalisation of results to a population of interest in qualitative research is not an imperative. However, Silverman (2011:386) advises the qualitative researcher to generalise by ensuring transferability of results. This can be done in a number ways. In this study, generalisation is achieved by choosing a typical case that embodies key aspects of public

access initiatives deployed by the public sector. The SmartCape programme, deployed by the City of Cape Town municipality, is such an initiative in that it gives free access to ICTs and the Internet to underserved communities. Data collection took place from a site that was launched in 2011, which was the most recent at the time. Participants were selected purposively from the users of this site. Participants were selected on the basis of their usage of the computers at this site since not all library users used the computers.

The findings of this research are reported using detailed descriptions of the participants' perceptions and comments in Chapter 6.

#### **7.8.1.4 Credibility**

Credibility can be achieved by using

- Analytic induction
- Constant comparative method
- Deviant case analysis
- Comprehensive data treatment
- Appropriate tabulations

This is carried out while analysing the data. As stated in Chapter 5.6.3.1, these techniques are not applied linearly or mutually exclusively, but are interwoven in the analysis process.

Analytic induction is applied using the techniques of the constant comparative method and the search for deviant cases. Applying the constant comparative method, a phenomenon emerging in the analysis of one entity is subsequently continually tested in the analysis of the following entities to prove the credibility of the phenomenon. In this research this technique of testing and retesting a phenomenon using the first few interviews was used to develop a set of codes, which were then applied in the analysis of the remaining interviews and the focus group data of the second phase of data collection. Although deviant-case analysis was not applied directly, all the interviews and the sets of focus group data were analysed repeatedly throughout the analysis period to confirm findings.

Finally, themes emerging from the coding structure were tabulated and presented the frequency tables and a pie chart to display the variation and present the prevalence of the benefits found in the data. The tabulation of themes in the co-occurrences table (Chapter 6.3) became the input data to the Hierarchical Cluster and MDS analyses to investigate the relationship between themes.



## 7.8.2 Quantitative Methods

In quantitative research the objectivity of the researcher and the reliability and validity of the research are of utmost importance. Since neither the Capability Approach nor the epistemological stance of the critical realism paradigm prescribe a specific research methodology, this study included both qualitative and quantitative methods in its investigation. A survey was administered to obtain perception from a large number of users, and data from this survey was analysed statistically. In addition, co-occurrence data from the qualitative content analysis was analysed using statistical methods.

### 7.8.2.1 Objectivity

The survey method is an appropriate method to obtain objective opinions and perceptions from a large number of respondents. The survey questionnaire was constructed and reviewed by four peer researchers. Facilitators of the ten focus group sessions in the third phase of data collection were asked to administer the survey questionnaire at the time of the sessions but before the sessions commenced. A second survey containing similar questions and statements was launched on the SmartCape website, and all users were requested to complete this questionnaire online. In both these situations, the researcher was only involved in the initial construction of the questionnaire. Data from these surveys were analysed separately as well as in combination.

The table of co-occurrences from the qualitative content analysis was analysed using the statistical Hierarchical Cluster Analysis and Multidimensional Scaling to obtain a bi-plot displaying the relationship of the themes to each other according to the steps outlined by Vargas-Quesada and De Moya-Anegón (2007:63).

### 7.8.2.2 Reliability

Reliability of quantitative research results is achieved through consistent and reliable data collection situations, which was the case in both the focus group and the online survey administration.

Reliability can also be statistically tested by calculating the Cronbach's alpha coefficient of scales used to develop constructs. The survey in this study used four statements to calculate the construct of hopefulness, having a coefficient value of 0.848 (Sijtsma, 2009:114), which is classified as "good" using the "rules of thumb" interpretation by George and Mallery (2010:231).

### **7.8.2.3 Validity**

The validity of quantitative research is determined firstly by the validity of the data collection instrument and secondly, by the validity of the data analysis. Initially, the survey questionnaire was constructed and reviewed by four peer researchers and administered by facilitators of the ten focus group sessions. This occurred before the focus group sessions commenced during the third phase of data collection. The online survey was launched on the SmartCape website, requesting all users to complete the questionnaire. The combined sample size of these two surveys was 2424, and although it is not a random sample, it is representative of the SmartCape user population.

## **7.9 Limitations of the research**

The initial phase of data collection took place in a community in Khayelitsha in which many of the community members who visited the library were unemployed. This posed challenges to their participation in the study. Many users—who had agreed to be interviewed—never arrived for their appointment (Chapter 5.4.1.1), thus reducing the sample size for the interviews to twenty users and two library staff members.

In the planning phase a multiple case study was envisaged, involving three cases (public access initiatives) in the peri-urban area of Cape Town. However, at the time of selecting the sites to be included as cases, it was found that a number of these sites were no longer operational. Thus, this study uses the SmartCape initiative as a single case in a peri-urban area of Cape Town.

Since base-line data was not available when the study commenced, it is not possible to determine the exact impact of the ICT centre on the community, during the time they accessed and utilised the computers and the Internet at the centre.

It was not possible to undertake a longitudinal study since the study, by its very nature, would take too long to detect changes in communities or benefits accrued by communities using the public access centre.

Another limitation of this study is that it does not address negative or neutral contributions of ICT to development, which may result from broader use of ICT by communities.

## **7.10 Further research**

This framework can be tested for usability and applicability in other ICT4D settings, such as:

- including the identification of negative or neutral contributions of ICT to development
- testing the framework in PAC project-evaluation in rural settings; and
- testing the framework in other ICT4D evaluation projects, such as the *'Wi-Fi for Poor Communities'* project launched by the City of Cape Town in 2014.

## 7.11 Conclusion

This research was undertaken to understand the nature of benefits of ICT4D projects, and to develop a framework for benefits of these projects. The result is the Benefits Framework for ICT4D Public Access initiatives presented in Chapter 7.5.3. The Benefits Framework, informed by the Capability Approach, identifies personal and communal benefits of a measurable and non-measurable nature. It shows the relationship between benefits accrued and factors inhibiting or enhancing the ability to exploit choices and opportunities. The framework is the result of an extensive literature search together with both qualitative and quantitative field research investigating users' perceptions of the impact of ICT on their lives.

Chapter 1 opens with a quote from Pitroda, and it deserves to be repeated here:

*"[As] a great social leveller, information technology ranks second only to death. It can raze cultural barriers, overwhelm economic inequalities, even compensate for intellectual disparities. In short, high technology can put unequal human beings on an equal footing, and that makes it the most potent democratizing tool ever devised."* (Pitroda, 1993:2)

Pitroda (1993:2) credits ICT with the ability to "overwhelm economic inequalities". However, by 2014 ICT access (and its associated benefits) still eluded 51.4% of the world's population. As found in this study, the human development benefits of access to the Internet at public access centres should encourage governments and donor organisations to increase their efforts towards facilitating ICT access by increasing the number and sustainability of public access centres. This, in turn, would be a step towards reducing the digital divide in the world.

Undertaking this research study and intertwining its quantitative and qualitative methodologies brought a new understanding and appreciation of the paradigms embracing both these realms. It is envisaged that such intertwined methodologies could find further application in obtaining solutions to research problems, specifically but not exclusively, in the ICT4D domain.

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## APPENDIX A:

### Consent letter from Mr Nazeem Hardy to conduct interviews at Harare library

**From:** [Naziem Hardy](#)  
**To:** [Corrie Uys](#)  
**Subject:** RE: Request to do ICT4D research in Harare library Khayalitsha  
**Date:** 23 February 2012 10:42:44 PM  
**Importance:** High

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Dear Corrie

This email serves as confirmation of our acceptance of your research proposal and the intention to use Harare Library as part of your case study. Please note that the following conditions do apply:

- All requests to conduct the necessary research in the library has to be done via the Librarian-in-Charge at Harare Library, Ms Lulama Langeni. Her email address is [lulama.langeni@capetown.gov.za](mailto:lulama.langeni@capetown.gov.za) and she is also contactable on 021 417 0160
- All research conducted will not interfere with the daily operations of the library
- All research conducted with members of the public be with their prior consent
- The thesis/paper resulting from this research be made available to the Library & Information Services Department of the City of Cape Town
- A copy of the thesis/paper be delivered to the Library & Information Services Department of the City of Cape Town
- Your reply to this consenting email will serve as an acceptance to abide by these conditions

Please do not hesitate to contact me should you require any further assistance or clarity.

Regards,  
Nazeem Hardy

Library Marketing & Research Officer  
Department: Library & Information Service

Tel: 021 400 3933

Fax: 021 400 4076

Email: [naziem.hardy@capetown.gov.za](mailto:naziem.hardy@capetown.gov.za)

Website: [www.capetown.gov.za/library](http://www.capetown.gov.za/library)

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**From:** Corrie Uys [mailto:[uysc@cput.ac.za](mailto:uysc@cput.ac.za)]

**Sent:** 06 January 2012 02:15 PM

**To:** Naziem Hardy

**Subject:** Request to do ICT4D research in Harare library Khayalitsha

Dear Mr Hardy

I hope you and your family had a very blessed festive season. I also want to wish you a very prosperous and blessed 2012.

I spoke to you per telephone during the first half of December 2011 about this request.

I am currently registered as a doctoral student at the Cape Peninsula University of Technology. My research interest is in establishing a framework for evaluating benefits of ICT projects deployed in communities. My supervisor for this study is Prof Shaun Pather. I am attaching the research proposal for this study to this email. (I am also a staff member at this university)

I am not interested in evaluating ICT projects per se but rather in researching the question "how do you evaluate benefits of ICT projects in communities". This type of research relates very much to research done in IT projects run by companies, except that it is much easier to define IT benefits of projects run in structured companies than it is to define benefits of ICT projects deployed in informal social community settings.

I am therefore requesting your permission to visit the Harare library in Khayalitsha with the view of using the ICT section as a case study for my research. This would entail that I visit this library fairly regularly during the next nine or so months to observe, and to interview stakeholders; which would include staff members of the ICT section specifically and community members utilising this section of the library. It may also be necessary later in the year to administer a questionnaire to certain types of stakeholders. I would like the first visit to this library to be as soon as possible during January.

I would really appreciate it if I can obtain your permission to visit the library's ICT section utilised by community members and to include it in my case study.

Kind regards

Corrie Uys

CPUT Statistical Consultation Centre for Postgraduate Studies

Cape Peninsula University of Technology

[UysC@cput.ac.za](mailto:UysC@cput.ac.za)



## APPENDIX B

### Invitation and consent letters to be given to interview participants

Hello

My name is Corrie Uys, a doctoral student at the Cape Peninsula University of Technology (CPUT).

My research seeks to figure out

*"How does one evaluate benefits of ICT projects in communities?"*

I'm trying to find out what benefits ICT projects like telecentres, multipurpose centres having ICT facilities, etc., actually bring to a community. In my studies I hope to talk to many people from the community, to users of the centre, and of course to the staff. However, my research will probably not bring any direct benefits to the community or to members of the community.

My supervisor for this study is Prof Shaun Pather of the Faculty of Informatics and Design at CPUT (email: [pathers@cput.ac.za](mailto:pathers@cput.ac.za)). I look forward to meeting you.

Corrie Uys

Cape Peninsula University of Technology

email: [uysc@cput.ac.za](mailto:uysc@cput.ac.za)

Hello

My name is Corrie Uys, a doctoral student at the Cape Peninsula University of Technology (CPUT). My research seeks to figure out *"How does one evaluate benefits of ICT projects in communities?"*

I am **not** trying to evaluate the library itself, or the library staff, or the ICT centre in the library. I'm trying to find out what benefits ICT projects like these actually bring to the community.

In my studies I hope to talk to many people from the community, to library users, and of course the library staff. However, my research will probably not bring any direct benefits to the library or to members of the library.

My supervisor for this study is Prof Shaun Pather of the Faculty of Informatics and Design at CPUT (e-mail: [pathers@cput.ac.za](mailto:pathers@cput.ac.za)). I look forward to meeting you.

Corrie Uys  
Cape Peninsula University of Technology  
e-mail: [uysc@cput.ac.za](mailto:uysc@cput.ac.za)

---

**Interview Permission**

My name is Aphise Sheni and I am more than 18 years old. I would be happy to talk with Corrie and for her to include my opinions in her research. I understand that my name or personal details will not be disclosed.

A. Sheni  
Signature

1/1  
Date

073  
765  
je

**Invitation to take part in first second phase focus group:**

Do you use the SmartCape computers?

If so, please come and tell us about your experiences

Join a group to talk about the benefits, or not, of using the SmartCape computers in the library.

**When:** 18 or 19 October 2012, during the morning or afternoon.

**Where:** Harare Library Minor Hall

**How long:** About 1½ hours

**Who's invited:** Users of the computers in the ICT section of the library

**What's involved:** You will take part in a group discussion about the benefits and experiences and usage of these computers.

**What you get in return:** Light refreshments (tea/coffee and cookies) and an opportunity to influence research on public access computers.

Please sign up by completing this form and dropping it into the box on the front desk.

If you have questions or want more information please send an email to Corrie Uys at

[UysC@cput.ac.za](mailto:UysC@cput.ac.za)

Corrie Uys

Cape Peninsula University of Technology

---

Focus group permission

My name is \_\_\_\_\_ and I am more than 18 years old. I would be happy to join the focus group discussion with Corrie Uys and for her to include my opinions in her research. I understand that my name or personal details will not be disclosed.

**Date and time available:** Please tick (✓) all the time slots when you are available (you will only take part in one session):

	Thursday 18 <sup>th</sup> October	Friday 19 <sup>th</sup> October
Morning (11:00)		
Afternoon (14:00)		

\_\_\_\_\_

\_\_/\_\_/\_\_

\_\_\_\_\_

Signature

Date

Cellphone Number

## APPENDIX C

### 1. Interview Guide

1. Tell me about yourself: age, education, living situation, type of house you live in, who you live with, employment, dependent on whom, or who are dependent on you.
2. What do you do during the day; leisure time, etc. Weekends?
3. Tell me about your community around where you live (taking that the participant lives in the area of the library).
4. How often do you visit the library? What for? How do you get here? What do you like about the library?
5. What do you know about computers? Can you use them? How do you use them? When have you started using them? Have you used computers before you used these in the library? When, where, and what did you use it for?
6. What do you use the computers in the library for?
7. How often do you use the computers in the library? What do you do on them? Can you do more on computers after you started using the computers in the library?
8. Which programs do you use? Which websites do you visit?
9. How have the use of the computers in the library changed, or not changed, your life? How have you benefited?

## APPENDIX D

### Focus Group Interview Guide

#### Harare Library Research Focus Group Questions

*The aim of this project is to determine perceptions as to the usefulness, and benefits of the e-centre to users and community members.*

#### Focus group questions

##### Pre-session

I would like you to say your name and one sentence about yourself to introduce yourself to all of us.

(Ask this of each – do not follow a pattern in who you ask)

##### Main session.

##### Lets talk about the community:

How is this community different from other communities that you are familiar with?

How is this community similar to other communities that you are familiar with?

Prompts:

- What do you like about this community?
- What don't you like about this community?
- What would you like to change in the community?

##### Library:

What do you like about this library?

What don't you like about this library?

How often do you visit the library? Why?

##### SmartCape Computers in the library:

Let's talk about the impact of the SmartCape computers:



- How has using the computers in the library impacted on your life?
- How have the computers in the library impacted on the community?
- How have the computers in the library impacted on your family group?

Why do you use the computers in the library?

What knowledge have you gained by using these computers?

What are the benefits of having the computers in the library?

## APPENDIX E

### Third Phase Focus Group Survey Questionnaire

**Confidentiality Clause:** The information provided in this survey will be used for the purpose of the feasibility study only. This survey will remain confidential and the information you provide herein will not be distributed in any form. The information will only be used in a summarised, aggregated form in the feasibility report.

We thank you for your time, and your contribution to the study.

<b>Focus Group Venue</b>								
<b>DATE</b>	1	5	0	3	2	0	1	3
<b>TIME</b>	1	6	0	0				

#### Demographics

<b>1.1 Age</b>	<b>1.2 Gender</b>
Under 18	Male
18 to 24	Female
25 to 34	
35 to 44	
45 to 64	
65 and older	

<b>1.3A What is your current employment?</b>	Tick ✓	<b>1.3B Further detail</b>
At school		Grade?
At college or university		Programme?
Self-employed		Type of business?
Employed		Profession?
Unemployed		

<b>1.4 What is the highest school grade you have passed</b>	Grade _____
---	-------------

<b>1.5 Highest Post School Qualifications</b>	Tick ✓
Certificate	
Diploma	
Undergraduate Degree	
Post-graduate degree	
N/A	

#### Current Computer/Internet Use

Computer/Internet Use	Yes	No
<b>1.6A</b> Are you a computer user?		
<b>1.6B</b> Are you a internet user?		
If <b>yes</b> to 1.6B, do you help other people use the internet?		
If <b>no</b> to 1.6B, does someone else help you do things on the internet?		

**If you have not ever used or accessed the Internet, please select the "N/A" option for Questions 2, 3 and 4.**

<b>2. Internet Access</b>	Work	Home	Public Venue (e.g., library, internet café)	School/College /University	Mobile phone/tablet	N/A
I access the internet from (tick ✓ all that apply)						

	Easy – Don't need help	Some difficulty – need to ask for assistance sometimes	Difficult – need to ask for assistance often	Cannot use on my own	N/A
3. How easy is it to <i>use</i> the internet?					

4. Distance	0 km (have internet access at home or on a mobile device)	1-2km (easy walk)	2 to 5 km (long walk)	More than 5km (need transport)	N/A
How far do you usually travel to get access to the internet					

If you have not ever used a computer, please select the "N/A" option for Questions 5 and 6.

5. If you are a computer or an Internet user...	Years	N/A
5A For how many years, approximately have you used a computer?		
5B For how many years, approximately have you used the internet?		

6. Proficiency	Easy – Don't need help	Some difficulty – need to ask for assistance sometimes	Difficult – need to ask for assistance often	Cannot use on my own	N/A
6A How difficult is it to use a computer?					
6B How difficult is it to use a computer keyboard?					
6C How difficult is it to use the internet?					

7. Language			
7A What is your home language?			
	Quite easy	Some difficulty	Very difficult
7B How difficult is it for you to read and write English?			

8. How easy is it to use the computer to:	Easy – Don't need help	Some difficulty – need to ask for assistance sometimes	Difficult – need to ask for assistance often	Cannot use on my own	Don't know	N/A
8A Type documents						
8B Use spreadsheets (e.g., Excel)						
8C Do a visual presentation (e.g., PowerPoint, )						
8D Use imaging software (e.g. Corel, Adobe)						
8E Use music software (e.g. Sibelius, Finale, MuseScore)						
8F Play games						
8G Use social media (e.g., Facebook, Twitter, blogs, , LinkedIn)						
8F Create your own web-page						

How easy is it to use the internet to find information about:	Easy – Don't need help	Some difficulty – need to ask for assistance sometimes	Difficult – need to ask for assistance often	Cannot use on my own	N/A
9A Health					
9B Finding employment					
9C Your current work/job					
9D Government services & activities					
9E Education					
9F Entertainment					

9G From the items listed in questions 8 and 9 above – which is the MOST IMPORTANT use of the internet to you?

	Easy – Don't need help	Some difficulty – need to ask for assistance sometimes	Difficult – need to ask for assistance often	Cannot use on my own	N/A
10 How easy is it to use the internet to study? (e.g., UNISA or college courses)					

11. If you are an Internet user, how often do you use the Internet?	Tick
Almost everyday	
One to three times a week	
A few times per month	
A few times a year	
Never	

**Possible Future Computer/Internet Use**

Point of access preference From <i>where</i> you would you PREFER to access the internet from?	First choice	Second choice	Third choice
12A. A public centre (operated by government/municipality)			
12B. A cybercafé (run as a private business) (Internet café)			
12C. From home			

12D *What is the reason for your first choice?*

**Affordability**

13A How much would you be willing to pay for computer time on the internet ( <b>per hour</b> ) (e.g., at an internet café)?	
---	--

13B Would you be willing to pay more if you could have home use? (Y/N)			
13C How much would you be willing to pay for internet at home (per month)?			
13D How much would you be willing to pay if you had to buy a computer?			
13E How would you prefer to pay for internet access (per month)?	Prepaid	Pay-as-you-go	Contract

Devices	Y/N		Y/N
14A Do you own a mobile phone? (Y/N)		14B Can you access the internet from it? (Y/N)	
14C Do you have a computer at home? (Y/N)		14D Can you access the internet from it? (Y/N)	
14E Does the type of device you use matter? (Y/N)			

Device preference What is your preference to access the internet?	First choice	Second choice	Third choice
15A. desktop computer?			
15B mobile phone?			
15C other device? What device?: _____			

Importance of having access to a public centre	Go up	Go down	Stay the same	N/A
16 If public access computer venues were no longer available to you, do you think your usage of computers and the Internet would....				

In your current situation, how hopeful are you for the future	Very hopeful	Somewhat hopeful	Not hopeful	Not at all hopeful
17A for yourself				
17B for your family				
17C for your community				
17D for South Africa				

-- Thank you --

## APPENDIX F

Online Survey Questionnaire

*System will automatically collect date (ddmmyyyy), time (hh:mm using 24 hour clock), SmartCape user id*

Age  Under 18  18 to 24  25 to 34  35 to 44  45 to 64  65 and older

Gender  Male  Female

Current employment?  At school  At college or university  Self-employed  Employed  Unemployed

Education Highest school grade you have passed Choose an item.  
Highest Post School Qualifications Choose an item.

Do you help other people use the internet?  Yes  No

Does someone else help you do things on the internet?  Yes  No

I access the internet from (tick  all that apply)  Work  Home  Public Venue (e.g., library, internet café)  School/College/University  Mobile

If public access computer venues were no longer available to you, would you...?  Use the internet more  Use the internet less  Use the internet about the same

How easy is it for you to use the internet?  Easy Don't need help  Some difficulty Need to ask for help sometimes  Difficult Need to ask for help often  Cannot use on my own

How easy is it for you to use a computer?  Easy Don't need help  Some difficulty Need to ask for help sometimes  Difficult Need to ask for help often  Cannot use on my own

How easy is it for you to use a computer keyboard?  Easy  Some difficulty  Difficult  Cannot use on my own

	Don't need help	Need to ask for help sometimes	Need to ask for help often		
<b>How easy is it for you to find information about:</b>					
Health	<input checked="" type="radio"/> Easy	<input type="radio"/> Some difficulty	<input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
Finding employment	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
Your current work or job	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
Government services & activities	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
Education	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
Entertainment	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't search for this
If you use the internet to study online (e.g., UNISA or college courses, how easy is this?)	Don't need help <input type="radio"/> Easy	Need to ask for help sometimes <input type="radio"/> Some difficulty	Need to ask for help often <input type="radio"/> Difficult	<input type="radio"/> Cannot use on my own	<input type="radio"/> I don't study online

**How often do you use the internet?**

Almost everyday       1 to 3 times a week       A few times per month       A few times per year       Never

**How far do you usually travel to get access to the internet?**

0 Kilometres       1 to 2 Kilometres       2 to 5 Kilometres       More than 5 Kilometres

Have internet access at home      Easy walk      Long walk      Need transport

or on a mobile device

From where would you *prefer* to access the internet?      First Choice      Second Choice      Third Choice

Public centre (e.g., library, civic centre, youth centre)

Cybercafe (run as a private business)

From home

How much would you be willing to pay to use the internet *per hour* at an internet café?

- Less than F    R5 to R10    R11 to R15    R16 to R20    I cannot afford ANY amount

Would you be willing to pay *more than an internet cafe rate* if you could have home use?       Yes    No

How much would you be willing to pay *for internet at home (per month)*?

- Up to R50    R51 to R100    R101 to R150    R151 to R200    R201 to R250    R250 and more    I cannot afford ANY amount

How much would you be willing to pay if you had to buy a computer?

- Up to R500    R500 to R1000    R1001 to R1500    R1501 to R2000    R2001 to R3000    More than R3000    I cannot afford ANY amount

How would you prefer to pay for internet access

- PrePaid    Contract

Do you own:

If "yes," can you access the internet from it?    Is it WiFi capable?

	Yes	No	Yes	No	Yes	No
Computer (desktop or laptop)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet (e.g., Kindle Fire®, Nook® HD)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobile phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



What language do you speak at home?  
How difficult is it for you to read and write English?

Choose an item.

**Easy**

Don't need help

**Some difficulty**

Need to ask for help sometimes

**Difficult**

Need to ask for help often

How hopeful are you for the future?  
For yourself?

Very hopeful

Somewhat hopeful

Not very hopeful

Not at all hopeful

For your family?

For your community?

For South Africa?

## APPENDIX G

### Crosstabs and Chi-Square Tests

#### Q1.1 Age \* GroupAccess

Crosstab

			GroupAccess		Total
			No Access	Some Access	
Q1.1 Age	Under 15	Count	3	8	11
		% within GroupAccess	4.8%	9.2%	7.3%
	15 - 17	Count	1	17	18
		% within GroupAccess	1.6%	19.5%	12.0%
	18 to 24	Count	8	22	30
		% within GroupAccess	12.7%	25.3%	20.0%
	25 to 34	Count	16	21	37
		% within GroupAccess	25.4%	24.1%	24.7%
	35 to 44	Count	9	12	21
		% within GroupAccess	14.3%	13.8%	14.0%
	45 and older	Count	26	7	33
		% within GroupAccess	41.3%	8.0%	22.0%
Total		Count	63	87	150
		% within GroupAccess	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)	Point Probability
Pearson Chi-Square	32.052 <sup>a</sup>	5	.000	.000		
N of Valid Cases	150					

a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 4.62.

b. The standardized statistic is -5.056.

#### Q1.1 NewAge \* GroupAccess

Crosstab

			GroupAccess		Total
			No Access	Some Access	
Q1.1 NewAge	Under 18	Count	4	25	29
		% within GroupAccess	6.3%	28.7%	19.3%
	18 to 34	Count	24	43	67
		% within GroupAccess	38.1%	49.4%	44.7%
	35 or older	Count	35	19	54
		% within GroupAccess	55.6%	21.8%	36.0%
Total		Count	63	87	150
		% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	22.060 <sup>a</sup>	2	.000	.000		
N of Valid Cases	150					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.18.

b. The standardized statistic is -4.662.

### Q1.2 Gender \* GroupAccess

#### Crosstab

		GroupAccess		Total	
		No Access	Some Access		
Q1.2 Gender	Male	Count	18	34	52
		% within GroupAccess	31.6%	40.0%	36.6%
	Female	Count	39	51	90
		% within GroupAccess	68.4%	60.0%	63.4%
Total		Count	57	85	142
		% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.042 <sup>a</sup>	1	.307	.375	.200	
N of Valid Cases	142					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.87.

b. Computed only for a 2x2 table

c. The standardized statistic is -1.017.

### Q1.3A Employment \* GroupAccess

#### Crosstab

		GroupAccess		Total		
		No Access	Some Access			
Q1.3A Employment	At School	Count	4	27	31	
		% within GroupAccess	6.7%	31.4%	21.2%	
	At College or University	Count	1	8	9	
		% within GroupAccess	1.7%	9.3%	6.2%	
	Self-employed	Count	0	4	4	
		% within GroupAccess	0.0%	4.7%	2.7%	
	Employed	Count	6	12	18	
		% within GroupAccess	10.0%	14.0%	12.3%	
	Unemployed	Count	49	35	84	
		% within GroupAccess	81.7%	40.7%	57.5%	
	Total		Count	60	86	146
			% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	27.071 <sup>a</sup>	4	.000	.000		
N of Valid Cases	146					

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 1.64.

b. The standardized statistic is -4.857.

### NewEmployment \* GroupAccess

#### Crosstab

			GroupAccess		Total
			No Access	Some Access	
NewEmployment	Studying	Count	5	35	40
		% within GroupAccess	8.3%	40.7%	27.4%
	Employed	Count	6	16	22
		% within GroupAccess	10.0%	18.6%	15.1%
	Unemployed	Count	49	35	84
		% within GroupAccess	81.7%	40.7%	57.5%
Total		Count	60	86	146
		% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	25.559 <sup>a</sup>	2	.000	.000		
N of Valid Cases	146					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.04.

b. The standardized statistic is -4.989.

### SchoolEducation \* GroupAccess

#### Crosstab

			GroupAccess		Total
			No Access	Some Access	
SchoolEducation	No matric	Count	48	62	110
		% within GroupAccess	88.9%	71.3%	78.0%
	Have matric	Count	6	25	31
		% within GroupAccess	11.1%	28.7%	22.0%
Total		Count	54	87	141
		% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.034 <sup>a</sup>	1	.014	.020	.011	
N of Valid Cases	141					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.87.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.448.

```

IF (NewEmployment = 5 & SchoolEducation = 0) NewGroup=1.
EXECUTE.
IF (NewEmployment ~= 5 | SchoolEducation ~= 0) NewGroup=0.
EXECUTE.
SORT CASES BY GroupBios (D).
IF (NewEmployment = 3 & SchoolEducation = 0) NewGroup=1.
EXECUTE.
SORT CASES BY NewGroup (D).
CROSSTABS
/TABLES=NewGroup BY GroupAccess
/FORMAT=AVALUE TABLES
/STATISTICS=CHISQ
/CELLS=COUNT COLUMN
/COUNT ROUND CELL
/METHOD=EXACT TIMER(5).

```

## Crosstabs

### Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
NewGroup * GroupAccess	146	97.3%	4	2.7%	150	100.0%

### NewGroup \* GroupAccess Crosstabulation

			GroupAccess		Total
			No Access	Some Access	
NewGroup	Others	Count	24	62	86
		% within GroupAccess	40.0%	72.1%	58.9%
Unemployed - No Grade 12		Count	36	24	60
		% within GroupAccess	60.0%	27.9%	41.1%
Total		Count	60	86	146
		% within GroupAccess	100.0%	100.0%	100.0%

### Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)	Point Probability
Pearson Chi-Square	15.037 <sup>a</sup>	1	.000	.000	.000	
N of Valid Cases	146					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.66.

b. Computed only for a 2x2 table

c. The standardized statistic is -3.865.

## APPENDIX H

### Generalized Linear Models

#### Model Information

Dependent Variable	HopeAll_binary <sup>a</sup>
Probability Distribution	Binomial
Link Function	Logit

a. The procedure models Very hopeful for all as the response, treating Not very hopeful for at least 1 as the reference category.

#### Case Processing Summary

	Included (N)	Percent	Excluded (N)	Percent	Total	Total Percent
	2328	96.0%	96	4.0%	2424	100.0%

#### Categorical Variable Information

		N	Percent
Dependent Variable	HopeAll_binary	Not very hopeful for at least 1	1290 55.4%
		Very hopeful for all	1038 44.6%
		Total	2328 100.0%
Factor	Age	Under 18	315 13.5%
		18-24	439 18.9%
		25-34	633 27.2%
		35-44	535 23.0%
		45 to 64	360 15.5%
		65 or older	46 2.0%
		Total	2328 100.0%
	NewEmployment	At school/college/University	720 30.9%
		Self-employed or Employed	729 31.3%
		Unemployed	879 37.8%
		Total	2328 100.0%
	KeyboardProficiency	Easy - Don't need help	1890 81.2%
		Some difficulty - need to ask for assistance sometimes	383 16.5%
		Difficult - need to ask for assistance often	49 2.1%
		Cannot use on my own	6 0.3%
	Total	2328 100.0%	
	InfoEasy2	Easy searches for all	1074 46.1%
		Difficult for at least one	1254 53.9%
		Total	2328 100.0%
	POA_Preference	Public centre (e.g., library, civic centre, youth centre)	1258 54.0%
		Cybercafe (run as a private business)	59 2.5%
		From home	1011 43.4%
		Total	2328 100.0%
	Language	Afrikaans	415 17.8%
		English	1166 50.1%
		Xhosa	625 26.8%
		Other	122 5.2%
Total		2328 100.0%	

Goodness of Fit <sup>a</sup>	Value	df	Value / df
Deviance	492.301	380	1.296
Scaled Deviance	492.301	380	
Pearson Chi-Square	414.666	380	1.091
Scaled Pearson Chi-Square	414.666	380	
Log Likelihood <sup>b</sup>	-493.732		
Akaike's Information Criterion (AIC)	1021.463		
Finite Sample Corrected AIC (AICC)	1021.728		
Bayesian Information Criterion (BIC)	1119.260		
Consistent AIC (CAIC)	1136.260		

Dependent Variable: HopeAll\_binary

Model: (Intercept), Age, NewEmployment, KeyboardProficiency, InfoEasy2, POA\_Preference, Language

- Information criteria are in smaller-is-better form.
- The full log likelihood function is displayed and used in computing information criteria.

#### Omnibus Test<sup>a</sup>

Likelihood Ratio Chi-Square	df	p-value
115.488	16	.000

Dependent Variable: HopeAll\_binary

Model: (Intercept), Age, NewEmployment, KeyboardProficiency, InfoEasy2, POA\_Preference, Language

- Compares the fitted model against the intercept-only model.
- 

#### Tests of Model Effects

Source	Type III		
	Wald Chi-Square	df	p-value
(Intercept)	7.700	1	.006
Age	13.745	5	.017
NewEmployment	16.779	2	.000
KeyboardProficiency	14.417	3	.002
InfoEasy2	9.429	1	.002
POA_Preference	8.811	2	.012
Language	37.925	3	.000

Dependent Variable: HopeAll\_binary

Model: (Intercept), Age, NewEmployment, KeyboardProficiency, InfoEasy2, POA\_Preference, Language

Parameter Estimates

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	p-value
(Intercept)	-1.117	.9329	-2.945	.712	1.433	1	.231
[Age=1]	.155	.3525	-.536	.846	.194	1	.660
[Age=2]	.110	.3333	-.544	.763	.108	1	.742
[Age=3]	.339	.3213	-.291	.969	1.115	1	.291
[Age=4]	.079	.3219	-.552	.710	.060	1	.807
[Age=5]	-.170	.3272	-.811	.471	.270	1	.603
[Age=6]	0 <sup>a</sup>	.	.	.	.	.	.
[NewEmployment=1]	.031	.1360	-.236	.297	.052	1	.820
[NewEmployment=2]	.419	.1057	.211	.626	15.663	1	.000
[NewEmployment=3]	0 <sup>a</sup>	.	.	.	.	.	.
[KeyboardProficiency=1]	.408	.8791	-1.315	2.131	.215	1	.643
[KeyboardProficiency=2]	-.029	.8845	-1.763	1.704	.001	1	.974
[KeyboardProficiency=3]	-.127	.9311	-1.952	1.698	.019	1	.892
[KeyboardProficiency=4]	0 <sup>a</sup>	.	.	.	.	.	.
[InfoEasy2=1]	.277	.0902	.100	.454	9.429	1	.002
[InfoEasy2=2]	0 <sup>a</sup>	.	.	.	.	.	.
[POA_Preference=1]	.177	.0879	.004	.349	4.039	1	.044
[POA_Preference=2]	-.537	.2953	-1.116	.042	3.304	1	.069
[POA_Preference=3]	0 <sup>a</sup>	.	.	.	.	.	.
[Language=1]	-.142	.2146	-.563	.278	.440	1	.507
[Language=2]	-.059	.1985	-.448	.329	.090	1	.764
[Language=3]	.541	.2050	.139	.943	6.963	1	.008
[Language=4]	0 <sup>a</sup>	.	.	.	.	.	.
(Scale)	1 <sup>b</sup>	.	.	.	.	.	.

Dependent Variable: HopeAll\_binary

Model: (Intercept), Age, NewEmployment, KeyboardProficiency, InfoEasy2, POA\_Preference, Language

a. Set to zero because this parameter is redundant.

b. Fixed at the displayed value.



## APPENDIX I

### Code and Theme structure

Agency	Changed life	Choice	Community Involvement
Empowerment - create and email CV	Benefit of ICT centre - change lives for the better	Choice existence	Advocacy
Empowerment - online applications are possible	Opportunities	Choices made	Civic Engagement
Empowerment through being able to learn independently			Collective Efficacy
Empowerment through knowledge/information received			Community needs
Empowerment through learning new skills			Local Community Development
Self-Efficacy			
Self-Esteem			

Disabling	Economic Freedom	Enabling	Hope
Biography - Employment: Unemployed	Benefit of ICT centre - access to computers	Biography - Basic computer skills	Aspiration
Biography - Financial Situation	Benefit of ICT centre - communicate ( people, business, government)	Biography - belongs to a church	Hope
Community - weakness	Benefit of ICT centre - free to use	Biography - Pre knowledge of computers	
Community do not want charity	Benefit of ICT centre - not too far to travel	Community - strength	
Community needs	Benefit of ICT centre - saves time	Conversion factor - Environmental Enabling	
Conversion factor - Environmental Disabling	Biography - creating self-employment	Conversion factor - Personal Enabling	
Conversion factor: Social: Disabling	Biography - Employment: Employed	Conversion factor: Social: Enabling	
	Biography - Household Employment	Previous library user	
	Economic Impact	Reader	
	Importance of access		

ICT usage	Learning Opportunities	Opportunities
Benefit of ICT centre - access to computers	Benefit of ICT centre - assist in studies	Biography - Frequency of visiting ICT Centre
Benefit of ICT centre - Information	Benefit of ICT centre - becomes fluent in English	Biography - Length of time visiting ICT centre
Benefit of ICT centre - search for employment	Benefit of ICT centre - gives knowledge	Biography - Structure of a day
Benefit of ICT centre - search for entertainment	Benefit of ICT centre - Information	Opportunities
Benefit of ICT centre - search for government information	Benefit of ICT centre - makes learning accessible	
Benefit of ICT centre - use Email	Benefit of Library - increases reading skills	
Benefit of ICT centre - use internet for research	Benefit of library - reading increases English language skills	
Benefit of ICT centre - use social networks	Biography - Education	
Benefit of ICT centre - use wireless	Internet serendipity	
Community Development - community gets skilled in using ICT	New ICT user because of ICT centre	
Content creation	Social capacity building	
Innovation		
Usage Pattern: Use word processor, spreadsheets and internet		
Usefulness of ICT centre - use as "work office"		

### Social Capital

- Benefit of ICT centre - connect with lost friends
- Benefit of ICT centre - use social networks
- Benefit of library - meet new people
- Biography - Access to internet from cellphone
- Biography - Social Activities

Community assist each other in ICT centre

Personal Relations

## APPENDIX J

### Cluster Analysis

```
GET DATA /TYPE=XLSX
/FILE='C:\Users\luyesc\Documents\Scientific Software\ATLAS\i\TextBank\New All SuperCodes Cooc 4 May.xlsx'
/SHEET=name 'New All SuperCodes Cooc 4 May'
/CELLRANGE=full
/READNAMES=on
/ASSUMEDSTRWIDTH=32767.
EXECUTE.
DATASET NAME DataSet2 WINDOW=FRONT.
```

```
SAVE OUTFILE='C:\Users\luyesc\Documents\Scientific Software\ATLAS\i\TextBank\New All SuperCodes '+
'Cooc 4 May.sav'
/COMPRESSED.
```

```
CLUSTER Agency Empowerment Opportunity Reader ChangedLife Choice Communication Disabling
EconomicFreedom Enabling Hope ICTSkills ICTUsage CommunityInvolvement ReadingSkills
LearningOpportunities SocialCapital
/METHOD BAVERAGE
/MEASURE=SEUCLID
/ID=Themes
/PRINT NONE
/PRINT DISTANCE
/PLOT DENDROGRAM VICICLE.
```

### Cluster

[DataSet2] C:\Users\luyesc\Documents\Scientific Software\ATLAS\i\TextBank\New All SuperCodes Cooc 4 May.sav

### Case Processing Summary<sup>a</sup>

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
17	100.0	0	.0	17	100.0

a. Average Linkage (Between Groups)

Proximity Matrix

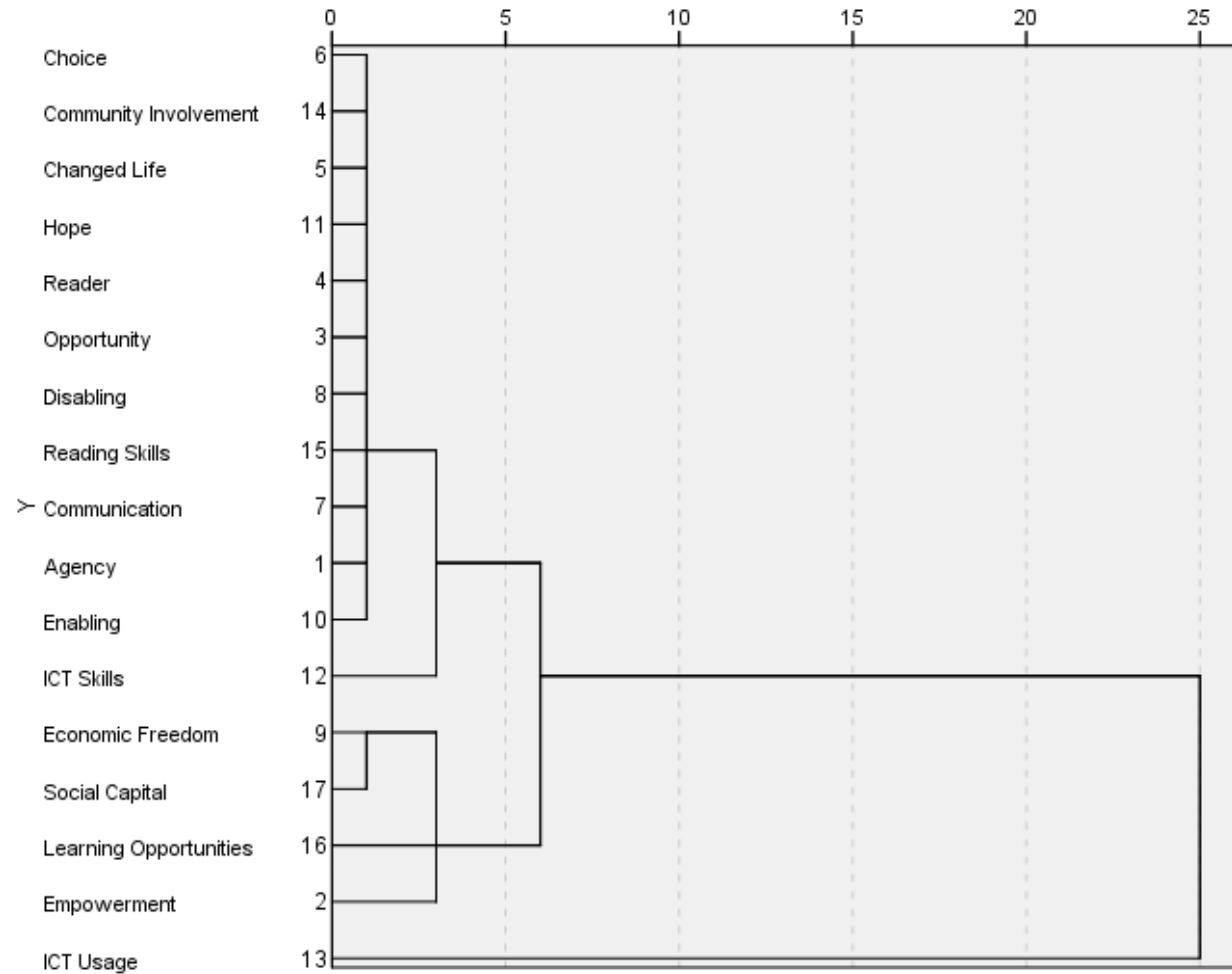
Case	Squared Euclidean Distance																
	1:Agency	2:Empowerment	3:Opportunity	4:Reader	5:Changed Life	6:Choice	7:Communication	8:Disabling	9:Economic Freedom	10:Enabling	11:Hope	12:ICT Skills	13:ICT Usage	14:Community Involvement	15:Reading Skills	16:Learning Opportunities	17:Social Capital
1:Agency		7324	1481	2002	1597	2195	3221	3719	7154	1222	2441	2955	47521	1524	4071	9372	5369
2:Empowerment	7324		10603	13640	12711	13923	14891	16953	5094	8742	14077	12359	48557	12260	18059	9166	5863
3:Opportunity	1481	10603		945	530	768	1544	1394	10961	1007	682	3600	54408	515	1918	11909	7208
4:Reader	2002	13640	945		619	703	1601	829	13140	1892	513	4763	54575	430	1085	14930	9865
5:Changed Life	1597	12711	530	619		404	1130	950	12767	1339	396	3568	52748	429	1290	13865	9376
6:Choice	2195	13923	768	703	404		904	598	14207	1631	428	4854	56464	327	938	15141	10030
7:Communication	3221	14891	1544	1601	1130	904		960	15925	1925	1096	6030	56120	1095	1816	15697	11110
8:Disabling	3719	16953	1394	829	950	598	960		17185	2803	450	6900	62088	795	364	18579	12466
9:Economic Freedom	7154	5094	10961	13140	12767	14207	15925	17185		10284	14365	8301	56473	11972	18751	5016	2007
10:Enabling	1222	8742	1007	1892	1339	1631	1925	2803	10284		1681	3853	46419	1526	3143	10350	7053
11:Hope	2441	14077	682	513	396	428	1096	450	14365	1681		4746	55850	489	808	15331	10184
12:ICT Skills	2955	12359	3600	4763	3568	4854	6030	6900	8301	3853	4746		48078	4241	7808	5899	5986
13:ICT Usage	47521	48557	54408	54575	52748	56464	56120	62088	56473	46419	55850	48078		55377	61142	52401	62436
14:Community Involvement	1524	12260	515	430	429	327	1095	795	11972	1526	489	4241	55377		1173	13508	8465
15:Reading Skills	4071	18059	1918	1085	1290	938	1816	364	18751	3143	808	7808	61142	1173		20981	14164
16:Learning Opportunities	9372	9166	11909	14930	13865	15141	15697	18579	5016	10350	15331	5899	52401	13508	20981		4323
17:Social Capital	5369	5863	7208	9865	9376	10030	11110	12466	2007	7053	10184	5986	62436	8465	14164	4323	

This is a dissimilarity matrix

Average Linkage (Between Groups)

### Dendrogram using Average Linkage (Between Groups)

Rescaled Distance Cluster Combine



## APPENDIX K

### Multidimensional Scaling

PROXSCAL VARIABLES=Agency Empowerment Opportunity Reader ChangedLife Choice Communication Disabling EconomicFreedom Enabling Hope  
ICTSkills CommunityInvolvement ReadingSkills LearningOpportunities SocialCapital  
/SHAPE=LOWER  
/INITIAL=SIMPLEX  
/TRANSFORMATION=RATIO  
/PROXIMITIES=DISSIMILARITIES  
/ACCELERATION=NONE  
/CRITERIA=DIMENSIONS(2,2) MAXITER(100) DIFFSTRESS(.0001) MINSTRESS(.0001)  
/PRINT=COMMON STRESS DECOMPOSITION  
/PLOT=STRESS COMMON.

### Proxscal

#### Credit

Proxscal
Version 1.0 by
Leiden SPSS Group, Leiden University, The Netherlands

#### Case Processing Summary

Cases	16	
Sources	1	
Objects	16	
Proximities	Total Proximities	120 <sup>a</sup>
	Missing Proximities	0
	Active Proximities <sup>b</sup>	120

a. Sum of all strictly lower-triangular proximities.

b. Active proximities include all non-missing proximities.

### Goodness of Fit

#### Stress and Fit Measures

Normalised Raw Stress	.02023
Stress-I	.14223 <sup>a</sup>
Stress-II	.22999 <sup>a</sup>
S-Stress	.04835 <sup>b</sup>
Dispersion Accounted For (D.A.F.)	.97977
Tucker's Coefficient of Congruence	.98983

PROXSCAL minimizes Normalised Raw Stress.

a. Optimal scaling factor = 1.021.

b. Optimal scaling factor = 1.050.

### Decomposition of Normalised Raw Stress

Object	Source	SRC_1	
		Mean	
Agency	.0333	.0333	
Empowerment	.0323	.0323	
Opportunity	.0141	.0141	
Reader	.0048	.0048	
Changed Life	.0066	.0066	
Choice	.0061	.0061	
Communication	.0065	.0065	
Disabling	.0263	.0263	
Economic Freedom	.0311	.0311	
Enabling	.0165	.0165	
Hope	.0068	.0068	
ICT Skills	.0162	.0162	
Community Involvement	.0085	.0085	
Reading Skills	.0535	.0535	
Learning Opportunities	.0482	.0482	
Social Capital	.0130	.0130	
Mean	.0202	.0202	

## Common Space

Final Coordinates

	Dimension	
	1	2
Agency	-.040	.034
Empowerment	1.038	.640
Opportunity	-.268	.007
Reader	-.412	.037
Changed Life	-.365	-.010
Choice	-.438	-.004
Communication	-.528	-.035
Disabling	-.608	.017
Economic Freedom	1.174	.057
Enabling	-.162	.034
Hope	-.451	.013
ICT Skills	.135	-.281
Community Involvement	-.351	.014
Reading Skills	-.699	.029
Learning Opportunities	1.200	-.523
Social Capital	.775	-.031

