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Community Technology Centres in Regional New South Wales: A Knowledge Based Analysis of ICT Enabled Development

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Community Technology Centres
in
Regional New South Wales:

A knowledge-based analysis of ICT enabled development

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

DOCTOR OF PHILOSOPHY

from

UNIVERSITY OF WOLLONONG

by

WILLIAM JOHN TIBBEN

MInfoTech (Hons); MInfoTech

School of Information Systems and Technology

2010
Author’s Certification

I, William John Tibben, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Informatics, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution,

William Tibben
14 December 2010
Dedication

To the ‘Point Street’ Tibbens

Jennifer

Anthony, Stephen, Helena and Daniel

and

my parents

Gerard, and Hindriktje Tibben
Abstract

Community Technology Centres (CTCs) represent a popular approach in addressing disparities that arise from the digital divide. This research uses a major government CTC program in the Australian state of New South Wales, called the NSW CTC Program, to address questions that relate to the effectiveness of CTCs in addressing social needs and in the generation of sufficient income to support their ongoing operations. The desire by program planners for CTCs to become fully-fledged businesses by the time government funding had ceased in June 2005 provides an opportunity to analyse an underlying philosophy that relied on community autonomy and private sector enterprise to facilitate social development. These two themes were strongly represented in official accounts of the NSW CTC Program where it was found that CTCs were generally judged as being ‘successful social enterprises’ that struggled to earn sufficient income.

In developing a framework in which the CTCs from the NSW CTC Program could be studied, Hall and Midgley’s work in Social Development Theory is used to identify three primary actors: community, private sector and government. The decision to focus on innovation within CTCs was derived from a suggestion by Gurstein to investigate the community-based technology centres as a source of local innovation that can ultimately be coordinated with innovation at the regional and national level.

Using this foundation the thesis pursues a line of enquiry that seeks to understand the extent to which innovation within CTCs contributed to perceptions of their success, on the one hand, and income generation on the other. An analytical framework based on Nonaka and Takeuchi’s Knowledge Creating Theory is developed to guide the collection and analysis of research data from three case studies.

The focus of the research was on the members of the Community Technology Centre Association (CTCA) established to champion the affairs of CTCs after the cessation of government funding. Data from the CTCA was used in conjunction with 17 cases to provide a detailed account of CTCs subsequent to the cessation of government funding in July 2005 until June 2008.
From these cases, three in-depth studies were undertaken to determine the efficacy of analytical constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. These analytical constructs highlight four aspects of their theory: Paradox, Epistemology, Ontology and Knowledge Spiral. These three cases were analysed to reveal and compare knowledge creating activities, their relevance to the community’s needs and their income-generating potential.

On this basis it was possible to link the propensity for income generation to the degree of codification of newly generated knowledge within the CTC. The relative level of uncertainty of problems place varying demands on knowledge creation where the need for tacit and explicit knowledge also varies. Complex problems characterised by high levels of uncertainty appear more reliant on the development of tacit knowledge than problems characterised by greater certainty that were more readily satisfied by explicit knowledge. Activities leading to the creation of explicit knowledge, as a precursor to codification, were found to be more amenable to income generation than activities dominated by tacit knowledge creation.

Based on Nonaka and Takeuchi’s Knowledge Creating Theory the thesis is able to assist CTCs to maintain their success as social enterprises in contexts of limited income support by delineating a clear division between worthwhile initiatives on the basis of their commercial viability. Being able to separate initiatives on this basis enables discrimination to be applied in the application of policies where commercial initiatives are left for the private sector to undertake while non-commercial initiatives, found to be unsuitable for private sector support, are identified for subsidised support from a benefactor such as government. Given the need for government to promote efficient economic practices, the identification of non-commercial initiatives enables government support to be appropriately targeted without upsetting the ‘level playing field’ of local economies.
Publications


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<th>Full Form</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<tr>
<td>ADSL</td>
<td>Asymmetric Digital Subscriber Line</td>
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<td>ATUG</td>
<td>Australian Telecommunications Users Group</td>
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<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CI</td>
<td>Community Informatics</td>
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<td>CTC</td>
<td>Community Technology Centre</td>
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<td>CTCA</td>
<td>Community Technology Centre Association</td>
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<tr>
<td>DCITA</td>
<td>Department of Communications, Information Technology and the Arts</td>
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<td>GKP</td>
<td>Global Knowledge Partnership</td>
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<tr>
<td>HTML</td>
<td>Hypertext Markup Language</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>IS</td>
<td>Information Systems</td>
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<td>Integrated Services Digital Network</td>
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<td>Information Technology</td>
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<tr>
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<td>International Telecommunications Union</td>
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Qld  Queensland
RTC  Rural transaction centre
RTI  Regional Telecommunications Inquiry (2002)
SA  South Australia
SECI  Socialisation, Externalisation, Combination, Internalisation
SI  Social Informatics
TAFE NSW  NSW Department of Technical and Further Education
TAPRIC  Telecommunications Action Plan for Remote Indigenous Communities
Tas  Tasmania
TSI  Telecommunications Services Inquiry
UN-ESCAP  United Nations Economic and Social Commission for Asia & Pacific
UNDP  United Nations Development Programme
UNESCO  United Nations Educational, Scientific and Cultural Organization
USA  United States of America
Vic  Victoria
WA  Western Australia
WTO  World Trade Organization
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Preface

Two frequently asked questions have emerged from conversations about this research project into Community Technology Centres in regional New South Wales (NSW). The first one relates to terminology where people ask what differences exist between Community Technology Centres (or CTCs) and telecentres or Internet cafes. The second question relates to their current usefulness in the light of the increasing spread of broadband and the use of mobile technologies; surely this has rendered their purpose obsolete, at least in Australia?

In response to the first question it is true that a raft of terms have developed over time and in different places. These include (but are not limited to), telecentres, teleservice centres, Internet cafes, online access centres and so on. Common to all of these is the public nature of these organisations and the access they provide to modern computer equipment and devices. In many cases, the Internet is available though this is not universally the case. One such example are Community Media Centres (CMCs) - a feature of many UNESCO projects - where a connection to the Internet is not necessary, as the focus of activity is on multimedia production. Hence, the purpose of these organisations varies significantly. Some are designed to promote economic development, others to promote democratic participation in communities, others to act as business incubators while others provide a service to tourists in popular holiday destinations. Hence, the means by which these organisations remain viable also varies; some rely on ongoing subsidies to support their operations while others, as independent businesses, operate on a commercial basis. In order to distinguish the CTCs of this study from the various manifestations of public access centres throughout the world, the term ‘community-based technology centre’ will be used to describe the latter.

The second question people ask concerns the projected longevity of CTCs - will they remain a feature on the landscape as broadband becomes more readily available? Based on the combined wisdom of CTC staff with whom I discussed this matter it appears that the CTC will remain a bandwidth provider of last resort for the foreseeable future. Despite the increasing availability of broadband in regional areas the lag that exists between bandwidth available in metropolitan areas and areas beyond will probably
remain a feature for years to come. As broadband access roughly tracks the demand of increasingly bandwidth-hungry applications it is reasonable to expect that this lag will mean that people outside of urban areas will need access to broadband not readily available at home should they want to take advantage of the latest software. Hence the role of the CTC in this regard will probably remain.

Another factor that gives rise to optimism when considering the longevity of CTCs concerns knowledge. Witnessing the release of latent creativity within local communities has been a most interesting aspect of the research. Central to the NSW CTC Program that gave life to the CTCs of this study was the requirement for communities to establish their own business plan and independently manage their CTC. Key individuals in each of the communities were required to guide the plan and teach others how to use computers. In doing so, CTCs have developed into a local institution for non-formal learning. As people turn to their CTC to seek advice about how to get their computer to print or the origins of black holes or when their ‘bitch is on heat’ CTCs have become a central actor in the information economy of these small towns throughout regional NSW.
Chapter 1 Introduction

1.1 Introduction

The digital divide is a term that describes situations where some people have much poorer access to information and communication technologies (ICTs) than others. Popular among strategies to overcome the digital divide is the use of community-based technology centres to provide public access to modern ICTs. Considered a multi-faceted problem, efforts to address the digital divide have been known to variously draw on the community, the private sector and government to sustain these initiatives. Of particular interest is the role that knowledge creation plays in the quest for sustainability of initiative that address the digital divide. This research investigates a case where community-based knowledge creation was found to have profound implications for income support of community-based technology centres. This issue is of critical importance to community-based technology projects around the world which are similarly challenged to generate income from socially valuable initiatives that have little commercial impetus.

The specific case that this thesis reports on is the NSW CTC Program. The NSW CTC Program enabled the establishment of Community Technology Centres (CTCs) in 55 locations in regional New South Wales (NSW), Australia between 2000 and 2005. In addition to 34 centres that existed prior to the program and were subsequently incorporated, the total number of CTCs that benefited from the NSW CTC Program was 89. The program was funded primarily by the Australian Government and to a lesser extent the NSW State Government. The purpose of the program was to provide small communities of generally 3000 people or less in regional NSW with public access to modern information and communications technologies (ICTs) and the Internet (NSW DoC, 2004, p. 5). The research investigates these CTCs from the time when government funding for the program ceased in June 2005 to June 2008.

The Joint Commonwealth and New South Wales Community Technology Program: Final project report (hereafter referred to as the Final project report) noted that CTCs had largely failed to develop sufficient income to support ongoing operations (NSW DoC, 2004, p. 3). The report also noted on the same page that CTCs had also evolved
into “highly successful social enterprises”. Despite these two findings, neither the national or state governments extended their commitment to the NSW CTC Program which ended in June 2005. Accordingly, support for the management and funding of these CTCs by national and state governments was withdrawn after this time.

Given the uncertainty over income generation the thesis uses the experience of these CTCs from June 2005 to reflect and theorise about strategies to enable CTCs to remain operational in a context in which insufficient income support exists. Interestingly, while the accounts of cases indicate a desire by communities for government re-engagement with CTCs, there was also a strong commitment to the maintenance and promotion of autonomy that these communities had enjoyed under the NSW CTC Program. Indeed, the NSW CTC Program was based on a fundamental principle of community autonomy to develop local solutions to local problems. The thesis demonstrates that this can be linked to the ‘success’ of CTCs that the writers of the Final project report observed. Accordingly, the desire for autonomous control of CTCs and new modes of government interaction comes from the accounts of the cases.

The two themes of community and government marry well with the theoretical work undertaken by Hall and Midgley in relation to Social Development Theory (Hall & Midgley, 2004; Midgley, 2003). Hall and Midgley also identify the private sector as the third important actor when considering Social Development. Accordingly, the research uses the concepts of community, the private sector and government to theorise about interactions within the CTCs of this study.

In addition to the concepts of community, the private sector and government, the research highlights the knowledge creating potential of CTCs. This follows a contention by Gurstein (2004) who argues that community-based technology centres are latent sources of innovative capacity. In seeking to analyse this contention further, Nonaka and Takeuchi’s Knowledge Creating Theory is used (Nonaka, 2000; Nonaka & Takeuchi, 1995; Takeuchi & Nonaka, 2004b). This theory is considered appropriate because it is able to investigate knowledge creation in the interactions between individuals and groups within and beyond the organisation. In this thesis, the CTC is represented as this ‘organisation’. In addressing the separate observations of CTCs as
successful social enterprises and their poor income-earning potential, the analytical
framework derived from Nonaka and Takeuchi’s Knowledge Creating Theory is
appropriate because it enables both commercial and non-commercial knowledge
creating activities, which are of benefit to the community, to be considered within the
one theoretical framework.

The remainder of this chapter provides a more detailed outline of the study. This
includes providing a summary of the NSW CTC Program and the related theories that
the thesis draws on. It then moves on to define the research goal that determines the
course of this study. Following this there is a discussion of methodology and the
significance of the research. The thesis structure and the content of each chapter are
then described. The chapter concludes with definitions of the key terms that are used in
the thesis.

1.2 Background

1.2.1 Community-based technology centres

Public places that enable people to experience shared use of modern ICTs, and often the
Internet, have served to address a variety of local needs in communities (Carvin &
Surman, 2006). Examples range from health and education to strengthening
participation in political processes. Named for convenience in this thesis as community-
based technology centres, the popularity of such initiatives stands as testimony to the
fact that computers and the Internet have become increasingly significant to individuals
throughout the world.

The earliest examples of the establishment of public access centres for computers and
related equipment can be found in accounts of the first telecottages in the Swedish town
of Faergelanda in 1987 (Fuchs, 1998). Stemming from the initiative of an adult
education organisation, computer training was provided to the rural communities of that
district (this was before the time when Internet connections became widely available). A
partnership was established between local government, private business, a health
services organisation and a rural development organisation to carry out this vision. Five
telecottages were established in the immediate and bordering local government districts.
It was apparent, even at this early stage of development, that these forerunners to modern day community-based technology centres were able to flexibly respond to a broad range of stakeholder requirements such as training, healthcare management and job recruitment.

Since that time commentators have observed a rapid increase in the use of community-based technology centres to address increasingly diverse and sophisticated needs. (Carvin & Surman, 2006, p. i). On the basis of experiences in Scandinavia, telecottages were identified early in the piece as an appropriate response to the isolation of rural areas in Australia (Harrison & Qvortrup, 1989). The popularity of community-based technology centres in development initiatives is apparent in the profile that these centres have assumed in a number of lead United Nations agencies such as UNESCO, UNDP, UN-ESCAP and the ITU. Similarly, community-based technology centres figure within the work of non-government organisations such as the Global Knowledge Partnership (GKP). Most significant among non-government organisations to the development of community-based technology centres is telecenter.org.

Within the ranks of developed countries Australia is by no means alone in the adoption of community-based technology centres for the purposes of social development. Examples of community-based technology centres can be found in the United States (Servon, 2002) and the United Kingdom (Gaved & Mulholland, 2005). A review of relevant commentaries on the work of community-based technology centres reveals that a broad range of social and economic goals are being served including: poverty reduction (Soriano, 2007); participation in civic processes (Sullivan, Borgida, Jackson, Riedel, Oxendine, & Gangl, 2002); provision of community health services (Hovenga, 2003); community renewal in urban areas suffering from high unemployment (Shearman, 2003); venues for informal education (Furuholt & Kristiansen, 2007); the

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3 For example, see [http://www.unapcict.org/ecohub/resources/handbook-for-telecenter-staffs](http://www.unapcict.org/ecohub/resources/handbook-for-telecenter-staffs) Accessed: 6 February 2010
development of information literacy (Menou, 2002); gender equality (Hassanin, 2009) and addressing the needs of marginalised ethnic groups (Slater & Tacchi, 2004). Common to these commentaries is the potential for community-based technology centres to facilitate new modes of social and economic interaction.

A common factor that motivates the establishment of community-based technology centres is the claim that poor access to ICTs and the Internet reinforces situations of social disadvantage. The underlying rationale is that people’s ability to participate in opportunities to promote their well-being can be severely constrained by poor access to information brought about by the absence of modern telecommunications technology (Milward-Oliver, 2005). Castells (2000, p. 71) argues that this leads to social exclusion which he defines in the following way.

*Social exclusion is the process by which certain individuals and groups are systematically barred from access to positions that would enable them to live an autonomous livelihood within the social standards framed by institutions and values in a given context.*

The term that is used to conveniently label the discrepancy that exists between those who have adequate access to ICTs and those who don’t is ‘digital divide’. While the specific origins of the term digital divide are not wholly clear, official recognition can be found in the landmark 1999 report by the United States agency, the National Telecommunications and Information Administration (NTIA), called *Falling Through the Net: Defining the Digital Divide* (NTIA, 1999). Since then, the term has been used by a number of disciplines as a convenient way to incorporate poor access to modern ICTs in discussions about social disadvantage.

The literature indicates that the ongoing sustainability of community-based technology centres has been a focus of discussion in many different geographic contexts (Jensen & Esterhuysen, 2001; Latchem & Walker, 2001; NSW DoC, 2004; Reilly & Gómez, 2001; Wellenhuis, 2003). Of note is that the continued operation of many community-based technology centres is not assured through ongoing support from public or private sources. Given the significant benefits that community-based technology centres aspire

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to deliver, the continuing viability of these centres represents a vitally important issue for practitioners, policy makers and academics alike. This is also the case for the community-based technology centres studied in this research, most of which found their genesis in the NSW Community Technology Centre (CTC) Program.

1.2.2 The NSW CTC Program

The NSW CTC Program was funded by the Australian Government under the Networking the Nation (NTN) scheme between 2000 and 2005 (NSW DoC, 2004, pp. 3-4). The NTN scheme funded parallel programs in all Australian states – New South Wales (NSW), Victoria (Vic), Queensland (Qld), South Australia (SA), Western Australia (WA) and Tasmania (Tas). These programs were jointly administered by respective state governments and the NTN Secretariat which represented the interests of the Australian Government’s Department of Communications, Information Technology and the Arts (DCITA). Specific funding for indigenous communities in remote areas was also administered cooperatively between state administrations and DCITA under the auspices of the Telecommunications Action Plan for Remote Indigenous Communities (TAPRIC).

The vision for the NSW CTC Program was “bringing communities and information technology together for the benefit of country NSW” (NSW DoC, 2004, p. 3). The NSW CTC Program set out to establish commercially viable CTCs in 55 regional communities with small populations of 3000 people or less (NSW DoC, 2004, p. 3&5). In addition to these, 34 ‘telecentres’ from earlier funding programs were also incorporated into the NSW CTC Program. A strong community commitment was necessary because each community was required to take full responsibility for the management of their own CTC (NSW DoC, 2004, p. 8). The business case for these CTCs relied on serving the ICT related needs of local communities through the provision of access to computers, broadband Internet and related equipment (NSW DoC, 2004, p. 8). This engendered a number of related commercial opportunities in the areas of education and training as well as service delivery for government instrumentalities at both the state and national levels (NSW DoC, 2004, pp. 28-32). Reflecting on the outcomes of the program, the writers of the Final project report noted that CTCs had delivered a diverse set of offerings. Those who were identified as being
beneficiaries of the scheme included local businesses, students, community organisations, individuals and identified groups in the community (NSW DoC, 2004, pp. 29-32).

The staged implementation of NSW CTC Program was designed to prepare CTCs for the ultimate cessation of public funding. Each community was required to submit a business plan that would guide the management of the CTC into the future (NSW DoC, 2004, p. 16&21). Even though three years was considered a sufficient time period for sustainability to be achieved, a number of factors affected the scheduled implementation of the scheme. For example obtaining suitable accommodation delayed commencement of operation in some localities (NSW DoC, 2004, p. 27). Drought and lack of time are cited as other factors that delayed implementation (NSW DoC, 2004, p. 3).

The most significant factor was that projected commercial returns, in most cases, did not eventuate. For example, the poor response from local businesses and government departments to the video conferencing service in nearly all CTCs is one anticipated commercial opportunity that was not realised (NSW DoC, 2004, p. 27). The primary challenge faced by CTC managers has been to resolve the obvious social benefits against the stringent economic realities of insufficient revenue generation (De Weaver & Ellis, 2006; NSW DoC, 2004, pp. 3-4). Despite this, the newly established CTCs struck a chord within many communities where there was a high degree of commitment and enthusiasm for these new institutions (De Weaver & Ellis, 2006). The high level of volunteer support and the obvious social benefits led some academics to cite the existence of social capital as justification for further government support in much the same way that schools and libraries are deserving of government support (Simpson, Daws, & Pini, 2004, p. 336). This reasoning ultimately fell on deaf ears as the planned date of June 2005 for the cessation of funding was maintained.

A final major initiative in the NSW CTC Program was the establishment of an umbrella body called the Community Technology Centres Association (CTCA). Funds were set aside for the employment of a full time executive officer as well as for the staging of two conferences (NSW DoC, 2004). The anticipated period in which these funds were to be expended was two years.
From July 2005 onwards, CTCs were required to generate sufficient resources to maintain ICT-related services to their immediate communities. The research investigates this phase of re-adjustment and development by drawing on the latest available data of the CTCA and the detailed experience of selected CTCs to better understand the challenges of achieving sustainability. The thesis highlights an apparent inconsistency in the *Final project report* that identified CTCs as “highly successful social enterprises” that nonetheless experienced difficulties in generating income to sustain their ongoing operations (NSW DoC, 2004, p. 3&4).

### 1.2.3 Theoretical Context

The task of locating this study within a relevant research context begins with this discussion on theory. In doing so it is acknowledged that many research communities, informed by a variety of theories, have an interest in the use of ICTs to address social and economic inequalities. The choice to place the research under the mantle of Information Systems (IS) research is justified by the nature of the NSW CTC Program that sought to use ICTs and organisations to promote development in regional areas of NSW. Myer (1997) states that IS research incorporates a diversity of methods which further suggests its suitability for this research because the thesis engages with four areas of theory development. These four areas are: Kling’s (2000) *Social Informatics* research framework; Hall and Midgley’s analysis of *Social Development* (Hall & Midgley, 2004; Midgley, 2003); research linked to Social Informatics called *Community Informatics* (Gurstein, 2008; Warschauer, 2003); and finally, the *Study of Innovation* (Arrow, 1962; Lamberton, 1996b; Macdonald, 1998; Mandeville, 1999; Nonaka, 2000; Nonaka & Takeuchi, 1995; Takeuchi & Nonaka, 2004b). Each of these areas will be described briefly.

In order to meaningfully relate the role of ICTs to the NSW CTC Program the research relies in part on the *Social Informatics* (SI) research framework championed by Kling (2000). Kling was active in the study of computerisation during the 1980s and 1990s where he highlighted the importance of social context in influencing the outcomes of ICT related initiatives (Kling, 1995). As the leading proponent of the SI research agenda, Kling was significant in developing perspectives and methods that incorporated organisational contexts in the analysis of ICT use. Central to his thinking was the
abandonment of the “standard tool model” where specific change can be predicated on the deployment of specific items of ICT-related software and hardware (Kling, 2000, p. 2). Rather, he observed that a range of incentives influenced the way people used ICTs and these were linked to the contingencies of the physical and social environment in which people lived and worked.

Even though the digital divide concept provided a clear rationale for policy makers to address issues of social disadvantage through the provision of ICTs, Kling, along with others, warned that the relationship was not straightforward. Kling advised policy makers and academics to think of the digital divide in terms of both physical access and social access (Kling, 2000, pp. 255-261). While the former refers to the provision of equipment and associated software to people, the latter refers to the provision of “social infrastructure” (p. 259) such as trainers, teachers, instructors, help-desk personnel and so on, who can attend to the difficulties people have in using ICTs. In a similar vein, Servon’s (2002) work with community-based technology centres in USA cities during the late 1990s revealed the multifaceted nature of the digital divide. She observed that “there [were] specific gaps within the larger gap, and those specific gaps [were likely to] have different drivers” (Servon, 2002, p. 41). She describes the nature of such gaps in terms of “race, gender, physical location, household structure, and age” (p. 42). Further complicating the issue of the digital divide, she claims that these various gaps change in response to changes in society.

Given the complexities associated with the concept of the digital divide the present study considers the role of public policy in the design and implementation of social development strategies such as the NSW CTC Program. In response, the thesis draws on Hall and Midgley’s theorising in relation to Social Development (Hall & Midgley, 2004; Midgley, 2003). Hall and Midgley (2004) identify and name three normative approaches that can be used to symbolise various social development strategies: the Populist approach; the Enterprise approach; and the Statist approach. These three approaches are used to address the influence of community, the private sector and government in the NSW CTC Program.
The study benefits from the insights of theorists and practitioners who associate themselves with an area of research called **Community Informatics** (CI). CI is defined by Gurstein (2007, p. 11) as the “application of information and communication technology (ICT) to enable and empower community processes”. Aligned to **Social Informatics** research by Warschauer (2003, pp. 162-172 & 206), CI seeks to promote the efficacy of ICTs in social development through the concept of “effective use” of ICTs. Gurstein (2003) explains the “effective-use” premise as aiming to “support local economic development, social justice and political empowerment; ensuring access to education and health services; enabling local control of information production and distribution; and ensuring the survival and continuing vitality of indigenous cultures”. Given the desirability of these goals, CI research views sustainability of such projects as critically important to practice (Gurstein, 2007, pp. 35-38). Indeed, sustainability of community-based technology centres is what drives Gurstein (2004) to identify innovation as a potentially fruitful line of enquiry which the present study pursues in its response to the question of sustainability of CTCs in the NSW CTC Program.

The fourth area of theory, **the Study of Innovation**, is designed to scrutinise activities within CTCs for their innovation-related attributes. The thesis relies on the work of innovation theorists that have used the work of Arrow (Arrow, 1962, 1974) to highlight the characteristics of information and the influence these characteristics have over innovation processes (Lamberton, 1996b; Macdonald, 1998; Mandeville, 1999). In order to provide an analytical framework in which issues of information and knowledge can be investigated, the Knowledge Creating Theory of Nonaka and Takeuchi (Nonaka, 2000; Nonaka & Takeuchi, 1995; Takeuchi & Nonaka, 2004b) is examined. The application of the analytical framework is intended to reveal the knowledge creating activities of people associated with CTCs.

### 1.3 Research Goal

This research is guided by a significant gap in knowledge identified and defined in the *Final project report*. While CTCs were found to be highly successful enterprises the ongoing operations of these enterprises were placed in jeopardy because of poor income support. Given the value of CTCs, the thesis seeks to determine a theory-based response
to this problem that provides guidance to the community, the private sector and government to engage with CTCs as a means to maintain the success of these CTCs as social enterprises.

To that end, the following statement articulates the primary research goal for this research;

\textit{to develop a theory-based rationale for ongoing interaction of community, private sector and government with CTCs that promotes their success as social enterprises in contexts of limited income.}

Justification for the use of Nonaka and Takeuchi’s Knowledge Creating Theory to provide this theory-based rationale is based on two reasons.

The first is that Nonaka and Takeuchi’s (2004) Knowledge Creating Theory is an appropriate response to the suggestion by Gurstein (2004) to view community-based technology centres as sources of innovation within local communities.

The second reason is that Nonaka and Takeuchi’s Knowledge Creating Theory was developed using observations of interactions at the organisational level. As this research also studies interactions at the organisational level the theoretical insights are appropriate for the scope of analysis undertaken here.

\section*{1.4 Methodology}

A two-part research design was developed to address the research goal defined in Section 1.3 (see Figure 1.1). The first part of the research design was aimed at developing an up-to-date assessment of the CTCs that were part of the NSW CTC Program. It did this by studying members of the CTCA. CTCs from the NSW CTC Program were granted automatic membership of the CTCA in the final stages of the NSW CTC Program to maintain coordination between CTCs. The thesis is able to draw on unpublished documentary sources to ascertain membership numbers and provide an account of the initiatives that member CTCs of the CTCA undertook up until June 2008. A selection of 17 cases drawn from the CTCA membership was used to examine in greater depth questions pertaining to community, the private sector and government.
The second aspect of the research design was an in-depth analysis of three of the cases selected from the last six cases. The application of in-depth analysis of these embedded cases enables theory development through a method Yin (2003, pp. 32-33) describes as “analytical generalisation”. Insights can be gained through the consistent application of theoretical principles which, in turn, enables comparisons to be made. It is in the assessment of similarities and contrasts between cases using theory that new insights can develop which in turn provides impetus for theory development.

The method by which Nonaka and Takeuchi’s Knowledge Creating Theory was applied to the case study was a two-step process. Firstly, analytical constructs were formulated in response to the analysis of Nonaka and Takeuchi’s Knowledge Creating Theory in Section 2.4. In the second step, detailed in Section 3.5.2, a series of guide questions were formulated that were applied to the case study accounts. Each of the questions reflects the primary attributes that delineated each of the analytical constructs.

The thesis acknowledges Mingers and Willcocks’ (2004, p. xv) concern that theoretical perspectives should not be adopted uncritically. The detailed explanation of Nonaka and Takeuchi’s Knowledge Creating Theory in Section 2.4.4 deals with significant points of
contention; namely the question of relevance of their theory to non-Japanese contexts and not-for-profit cases, and assumptions they make about the nature of knowledge.

Foreshadowing the outcome of this discussion, none of these issues were found to be on balance significant enough to prevent the analysis from using Nonaka and Takeuchi’s framework to analyse knowledge creation in CTCs.

Given the significance of ICTs in this study, the research instruments were directed at ascertaining the nature of ICT use within CTCs. CI and SI theorists’ reservations about defining deterministic relationships based solely on the use or non-use of ICTs will be apparent in the analysis of incentives that give rise to the use or non-use of ICTs in the CTCs of this study. Further, Sambamurthy and Subramani (2005, p. 2) state that ICTs are influential in shaping knowledge-related processes within organisations. Consequently, the study also looked at incentives to use ICTs to see whether they have a basis in knowledge-related processes as defined by the analytical constructs that are developed from Nonaka and Takeuchi’s Knowledge Creating Theory.

1.5 Explanation of Key Terms

In order to avoid misunderstanding, key terms used in this thesis are now explained.

1.5.1 Sustainability

The term ‘sustainability’ is a derivative of the adjective ‘sustainable’ which is defined by the *Oxford Dictionary for English* (second edition revised) as “able to be maintained at a certain rate or level”. When considered in a development context, Hearn et al. (2005, p. 20) explain that sustainability is a contested term as it can take on different meanings in line with the purpose of the facility under study as well as the philosophical grounding of the observer. In the context of this study, disagreement can arise over the inclusion of non-commercial considerations when assessing sustainability (Gurstein, 2001, p. 279; Simpson et al., 2004). The term sustainability as used in this thesis includes both commercial and non-commercial resources that aid in the ongoing support of the CTC. Being sustainable therefore is defined as an outcome in which sufficient resources can be garnered from the community through commercial provision of services or by non-commercial means (including payment in kind, subsidies from public
and private sources, volunteerism and good will) to enable continued operation of the CTC.

1.5.2 Technology

The research benefits enormously from those who have studied technology in relation to the social contexts from which it has emerged (Bijker, Hughes, & Pinch, 1989; Jasanoff, Markle, Petersen, & Pinch, 1995; MacKenzie & Wajcman, 1985). Despite the contribution that the social studies of technology have made, technology is still a term that can lead to confusion. This is reflected in Murphy’s discussion where he delineates three levels of understanding

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\text{[T]he simplest version views technology as involving only changes in artifacts (sic). A more sophisticated approach adds to the physical objects, labor and managerial skills...A third approach views technology as a ‘socio-technological’ phenomenon; that is besides involving material and artifact improvements, technology is considered to incorporate a cultural, social and psychological process as well (Murphy, 1967, cited in Al-Ali, 1995, p. 707)}
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In order to clarify how these different levels of understanding can be usefully and unambiguously incorporated in the analysis of CTCs, the study draws on Macdonald’s (1983) understanding of technology based on the word’s etymology which associates the term with knowledge. He states “[t]echnology is really the sum of knowledge - of received information - which allows things to be done, a role which frequently requires the use of machines” (Macdonald, 1983, p. 27). This statement will be used as the definition for technology within this thesis. This will also be the convention when the terms ‘information and communication technology’ or ‘ICT’ are used.

In situations where popular use suggests an understanding of the term that is associated just with artefacts (such as machines or equipment) it seems prudent not to assume more sophisticated definitions. In seeking to sensibly incorporate common usage of the term it is understood that, in the absence of contradictory evidence, people without academic training will tend to associate the term technology with artefacts. In order to simplify such distinctions the convention in survey instruments will be to use the term ‘IT’ or ‘information technology’ to refer to computers and related equipment that connects
these devices as networks. Similarly, ‘technology centres’ will be considered in the first instance as places that are distinguished by computers and related devices that are available for shared public use.

1.5.3 Knowledge and Information

The term Epistemology describes the area of philosophical enquiry that theorises about the nature, possibilities and limitations of human knowledge (Mautner, 1995, p. 174). The need to define knowledge and information is reflected in the variety of approaches that disciplines have adopted when attempting to meaningfully relate the concept of knowledge to their area of enquiry (Machlup & Mansfield, 1983).

As this research primarily draws on the work of Nonaka and Takeuchi for its theoretical analysis it follows that the conventions used by these authors should be maintained. Nonaka and Takeuchi (2004, p. 49) use a definition of knowledge being “justified true belief”. They wish to distinguish their understanding of knowledge from what they describe as the dominant Western philosophy which associates truth with having “absolute, static and non-human qualities” (p. 49). In contrast the emphasis they wish to give is reflected in their highlighting of the words “justified belief” where knowledge has a shared social quality. Knowledge creation from this perspective is a “dynamic human process of justifying personal belief toward the ‘truth’ ” (p. 49). This description alludes to “human action” which is another characteristic that Nonaka and Takeuchi associate with knowledge. Lastly they hold that knowledge is context-specific and relational. This means that the utility of the same person’s knowledge will vary from place to place.

“Context-specific” and “relational” are attributes of knowledge that Nonaka and Takeuchi (2004, p. 49) argue are shared with information. This is where people may attribute different meaning to the same information. They distinguish their understanding of information from that normally used by engineers, where information is equated with a signal and is studied for its syntactic qualities (Nonaka & Takeuchi, 2004, pp. 49-50). In contrast, Nonaka and Takeuchi hold that information also has semantic qualities.
They go on to observe (along with Machlup & Mansfield, 1983) that information can be distinguished from knowledge on the basis of its “flow-like” quality. Information also has the potential to alter the state or structure of existing knowledge. Nonaka and Takeuchi (2004, p. 50) explain:

*Information is a necessary medium or material for eliciting and constructing knowledge...Information is a flow of messages while knowledge is created by that very flow of information, anchored in the beliefs and commitments of its holder. This understanding emphasizes that knowledge is essentially related to human action.*

From Nonaka and Takeuchi’s perspective, context emerges as an influential factor when considering knowledge creation. This is because contingent circumstances create the need for problem solving and in turn give impetus to knowledge creation. When considering context, it may be tempting to draw links between knowledge and the physical environment in which the actions of individuals occur. While they acknowledge that in most cases this is appropriate, this does not account for the possibility of knowledge creation between people who use ICTs to exchange information because they live in different parts of the world (Nonaka & Toyama, 2004, pp. 101-102). They use the Japanese philosophical concept of ‘ba’ to qualify this understanding of context which is defined as a “shared time and space for emerging relationships among individuals and groups” (Nonaka, Konna, & Toyama, 2001, p. 19). Such time and space relationships can be characterised by physical quantities (such as an office) or ‘virtual space’ (such as a teleconference) or ‘mental space’ (shared experiences, ideas or ideals). Importantly, knowledge is not viewed as something that can exist just in one person’s cognition but rather has a shared quality that is manifest in the situated actions of individuals working together.

### 1.6 Significance of the Research

The primary significance of the research relates to the insights it delivers about the use of ICTs by communities in the creation of knowledge. Consequently, the research is of interest to the branch of Information Systems research called Community Informatics (CI) because of its potential to address the need for methods that are able to systemically study the inherent complexity of ICT use by communities. As the research
seeks to develop a response that will enhance the sustainability of community-based technology centres the outcomes of the study are also directed at achieving practical goals. The choice of innovation as the theme to guide the process of theory development is also relevant to CI as it was Gurstein’s (2004) vision for coordinated levels of innovative capacity between community, regions and nation based on community-based technology centres that motivates the use of Nonaka and Takeuchi’s Knowledge Creating Theory.

The research also has potential significance to those with an interest in Social Development. The use of community, the private sector and government to organise the analysis of CTCs has its origins in the work of Social Development theorists Hall and Midgley (2004, pp. 36-37). As a consequence, the study responds to their call for theory that is better able to incorporate the various ideologies that influence the nature of Social Development policies.

In view of the emphasis that this research gives to knowledge creation, it also has significance for theorists who have argued that there has been insufficient recognition of knowledge processes in development initiatives. For example, Boulding (1966, pp. 2-5) states that post World War II development initiatives had generally failed to achieve their intended outcomes because of poor appreciation of knowledge within economic development theory. In a similar vein and more than forty years later, Lamberton (2001) observed that poor recognition of knowledge and information has led to poor development outcomes. Alluding to the propensity of government programs to provide telecommunications equipment Lamberton (1996a, p. 38) reasoned that a “telecommunications infrastructure” should not be equated with an “information infrastructure”. His intention is to look beyond the hardware and engage with information and knowledge processes. The present study responds to these concerns by making more visible the knowledge creating activities of CTCs and by establishing the value of these activities within a broader economic and social context.

1.7 The Study

The remaining part of the thesis consists of five chapters that report on the investigations and analysis that was undertaken.
Chapter 2 begins by providing a detailed description of the NSW CTC Program and the national policy context at the time the program was established. The significance of Hall and Midgley’s theoretical development in relation to social development is explained and links are drawn between the NSW CTC Program and their theory. Given inadequate support from the private sector this exposes the need for further investigation to find ways that better support the important social development role that these CTCs perform. Following up on a proposal from Gurstein, Chapter 2 proceeds to investigate innovation as a concept that could provide a theory-based rationale that could assist community, the private sector and government in their interaction with CTCs in order to maintain their success as social enterprises when there is limited income support. The knowledge creation theory of Nonaka and Takeuchi is identified as a suitable theoretical perspective that enables innovation activity to be scrutinised in the context of a CTC. The outcome of this analysis is seven research questions (RQ1-7) to guide the development of an appropriate research design.

Chapter 3 outlines the research design for the collection and analysis of research data. Document analysis and multiple case study method figure prominently in this discussion. A number of principles outlined in the literature are used to develop a protocol that contributes to the reliability and validity of the research design. It is also within the context of research design that explanations about the ethical aspects of the research are given.

The next chapter, Chapter 4, provides a response to research questions RQ1-3 and presents information from both CTCA membership data and 17 cases drawn from the CTCA membership. Dominating this data is the realisation that only a minority of CTCs have attained commercial independence, while the majority continue to be supported by local government in various ways. This provides further incentive to undertake in-depth case studies to better address the research goal.

Chapter 5 details three in-depth case studies that deal with the analysis of research questions RQ4-6. Each case begins with information that enables familiarity to be gained with the case. The analytical constructs are then applied to the case study accounts (RQ4) which, in turn, enables consideration of the success of each CTC in
their community and the difficulties they experience earning revenue from the perspective of knowledge creation (RQ5). Finally, the question of ICT use for each of the three cases (RQ6) is given consideration. In concluding this chapter a response to the final research question RQ7 is given. This response details the theory-based rationale that the research goal desires.

Chapter 6 addresses the significance of the research in relation to the generalisability of the findings of Chapter 5. It does this by considering the remaining 14 cases that were studied. It is in the context of a discussion about the limitations of the research that the thesis reflects on Nonaka and Takeuchi’s Knowledge Creating Theory and other theories that were used in the research, namely; CI research and Hall and Midgley’s Social Development Theory.
Chapter 2 Literature Review

2.1 Introduction

This chapter primarily seeks to establish a suitable theoretical context in which the NSW CTC Program can be systematically investigated. To that end the first part of the chapter provides an account of the NSW CTC Program and the national policy context that existed at the time. In noting similarities between the NSW CTC Program, its policy context and Hall and Midgley’s (2004) Social Development Theory the thesis proceeds to establish the concepts of community, the private sector and government as analytical constructs to analyse research data in later chapters. The research draws on the work of Gurstein (2004) to highlight the concept of innovation as a suitable theoretical context to address the primary research goal (see Section 1.3). Nonaka and Takeuchi’s (1995, 2004) Knowledge Creating Theory is used to provide the means by which the concept of innovation can be explored. Four analytical constructs are derived from Nonaka and Takeuchi’s work to operationalise this theory within this study. The chapter concludes with the articulation of seven research questions that are used to guide the subsequent collection and analysis of research data.

2.2 The NSW CTC Program from a Social Development Perspective

2.2.1 The NSW CTC Program

The Planning Phase

In seeking to understand the issues that influence the development of sustainability in CTCs, the thesis begins by recounting the history of the NSW CTC Program as described by the Joint Commonwealth and New South Wales Community Technology Program: Final Project Report referred to for convenience as the Final project report (NSW DoC, 2004). The chapter subsequently draws connections between the program and national government policy that existed at the time. This in turn will enable the NSW CTC Program to be situated in the theoretical context of Social Development as outlined by Hall and Midgley (2004)
The NSW CTC Program was one of a number of CTC programs that the Australian Government funded through its Networking the Nation (NTN) program (NSW DoC, 2004, p. 3). The NTN funding program was established from funds created by the partial sale of the government-owned telecommunications company called Telstra. An allocation of $9.5 million was made to the NSW CTC Program from NTN funds (NSW DoC, 2004, p. 3). A further $7.2 million was provided by the NSW Government to manage the implementation of the program. The lead state government agency was the NSW Office of Information Technology (NSW OIT) which subsequently formed a partnership with the NSW Department of State and Regional Development from March 2000 (NSW DoC, 2004, p. 6).

The experience of NSW with community-based technology centres prior to the NSW CTC Program was mainly derived from 34 rural ‘telecentres’ and ‘telecottages’ during the 1990s (NSW DoC, 2004, p. 6 & pp. 22-23). Many of these were established under the auspices of the primary industry and agriculture portfolios in both the state government and national government. Having experienced mixed success, the functioning telecentres were found to be useful test beds in the early stages of the implementation of the NSW CTC Program.

The NSW CTC Program was designed to create commercially viable community owned and operated businesses in small, regional communities throughout NSW (NSW DoC, 2004, p. 20). The major capital cities of NSW – Sydney, Gosford, Wollongong, Newcastle and their suburbs – were excluded from the scheme (see Figure 2.1). Communities outside of these areas with populations of up to three thousand people were eligible to apply for funding to establish a CTC (NSW DoC, 2004, p. 5). The scheme was therefore targeted to assist communities in regional NSW that traditionally had difficulty accessing modern telecommunications infrastructure and the ICTs that complemented such infrastructure (NSW DoC, 2004, p. 8). The vision statement for this program was ‘Bringing communities and information technology together for the benefit of country NSW’ (NSW DoC, 2004, p. 3). In June 2005, 55 CTCs had been established through regional and remote NSW. In addition to this, 34 existing telecentres had been incorporated into the NSW CTC Program (NSW DoC, 2004, pp. 22-23).
The benefits that were expected to flow from access to telecommunications networks and associated ICTs were threefold (NSW DoC, 2004, p. 8). Firstly, people would be given the freedom to use this new communication medium for a range of personal needs such as training, information gathering and communication with other people. The second expected benefit was economic and social development. The prospect of connecting regional towns with “emerging information economies” at the state, national and global level was considered to be of particular importance (NSW DoC, 2004, p. 11). The third benefit was a more general aspiration for social equity by reducing disparities brought about by unequal access to telecommunications.

*The Implementation Phase: Stages 1 to 4*

The implementation of the NSW CTC Program occurred over four stages (De Weaver & Ellis, 2006, p. 1). Referring to Table 2.1, the first three stages are the focus of this chapter and cover the activities that contributed to the establishment of CTCs and the eventual cessation of government funding in June 2005. Stage 4 will become the focus of the empirical investigation described in the following chapters.
Table 2.1 Four stages of the NSW CTC Program (De Weaver & Ellis, 2006, p. 1)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Dates</th>
<th>Activity at Stage</th>
<th>Staffing Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 June 2000 - 31 January 2001</td>
<td>Planning and development</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>1 February 2001 - 30 June 2004</td>
<td>Implementation and roll out</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>1 June 2004 - 30 June 2005</td>
<td>Transition</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>1 July 2005</td>
<td>CTC Association</td>
<td>1</td>
</tr>
</tbody>
</table>

One notable feature of the planning and development stage of the program was the wide-ranging consultation that took place prior to the submission of the strategy paper, *Final Discussion Paper 30*, to the NTN secretariat who were responsible for the initial allocation of national government funds to state governments. In addition to the information drawn from the experience of established telecentres in NSW, research into community-based technology centres in the USA, Canada and other locations in Australia was undertaken (NSW DoC, 2004, p. 6). Organisations with an interest in telecommunications access to regional areas were also consulted. For example, the NSW State Library assisted with consultations (NSW DoC, 2004, p. 13). The existing NSW.net scheme was also involved in discussions so as to realise opportunities through co-location of premises and the sharing of bandwidth and data services. In total these consultations provided valuable information to the planners from the NSW OIT.

Another significant feature of the planning and development stage was the effort to inform communities of the impending opportunity for better access to telecommunications networks and ICTs. The NSW OIT organised a roadshow that toured regional areas of Australia prior to the submission of the *Final Discussion Paper 30* to the NTN Secretariat (NSW DoC, 2004, p. 6). As well as to inform communities about the services and opportunities that a CTC could offer there was a need for the NSW OIT to identify the ICT-related needs of communities.

The program was notable for the allocation of key staff members to ensure that sufficient local input was available when designing the nature of services that would be offered by CTCs (NSW DoC, 2004, p. 11). This was reflected in the Community
Technology Centre Support Unit that was established to assist in the coordination and management of community consultation and grant application. (NSW DoC, 2004, p. 14). Some staff were located in the capital city of NSW, Sydney, where the Manager and Business Strategy Manager were located. Another office was located in the central western regional city of Bathurst. The people who worked from this office included the Community Development Manager, Business Planning Office, IC&T Officer, Marketing and Promotions Manager, Web Manager and Help Desk Officer and two Projects Officers for Learning Centres and Computer Re-use.

Further indicating the importance attached to community engagement, 12 regionally based CTC Community Coordinators were also appointed. Their primary purpose was to assist communities in determining local needs, submitting the relevant paper work which included initially a rigorous business plan and then a grant application (De Weaver & Ellis, 2006, p. 3; NSW DoC, 2004, p. 14). Prior to submission of grant applications CTC Community Coordinators consulted extensively with individuals and groups in communities as well as liaising with the Community Technology Support Unit.

Engagement with stakeholders and interested parties continued in the form of an expert consultative panel called the NSW Community Technology Reference Group which included a range of government, educational and industry groups (NSW DoC, 2004, p. 13). These groups included the Australian Telecommunications Users Group (ATUG); Local Government and Shires Association; NSW Ageing, Disability and Home Care; NSW Department of Women, TAFE NSW; Charles Sturt University; the State Library of NSW; NSW Farmers Association; and other similar organisations.

Another significant requirement that was dealt with in Stage 1 of the NSW CTC Program was the formation of the CTC Funding Panel to manage the disbursement of government funds. This funding panel comprised the Executive Director of the NSW OIT; the manager of the NSW Community Centre program and representatives from the NSW Premier’s Department; NSW Local Government and Shires Association; NSW Roads and Traffic Authority and ACT Chief Minister’s Department (NSW DoC, 2004, p. 14). The final signoff for funding occurred when the results of the CTC Funding
Panel were approved by the NSW Minister of Information Technology and the NTN Secretariat (NSW DoC, 2004, p. 17).

Having established the organisational structure, Stage 2 of the program between January 2001 and June 2003 was characterised by widespread activity throughout communities in regional NSW to obtain funds for the purchase of equipment, securing premises and the employment of a manager. The existing telecentres were able to take early advantage of funding because most had established management committees and local community support in place. These centres were also of benefit to the NSW CTC Program managers because they were able to provide early feedback about how well procedures were working (NSW DoC, 2004, p. 6).

However, for most communities, the experience of applying for community grants was a new one (De Weaver & Ellis, 2006, p. 18). The process of developing a funding application required the formation of a working group from interested individuals and organisations in the community. Each group was required to identify a local organisation that would support the proposed CTC. The application process consisted of two parts: first, an Expression of Interest was lodged and if successful an Application for Seed Funding was then completed and submitted (NSW DoC, 2004, p. 17). The regional coordinators were crucial to the success of this part of the program as they were required to compensate, as best as they could, for the variable knowledge and skills that existed in communities (De Weaver & Ellis, 2006, p. 18).

It was made clear to management committees from the outset that CTCs were required to become business entities that did not need support from Government after June 2005. An essential component of the application process was the development of a three-year business plan which provided the primary basis for assessing the merit of the community’s strategy. Applications were initially scrutinised by the Program Support Unit’s staff for obvious errors or omissions (NSW DoC, 2004, p. 17). Once these had been checked and given the Program Support Unit’s recommendation, applications were forward on to the CTC Funding Panel.

The kinds of things that were eligible for purchase were computers and associated equipment, telecommunication services, furniture, utilities (electricity and water),
advertising and marketing, administration costs (accounting fees, business planning) consumables, human resource costs (employment of staff) and signage (NSW DoC, 2004, p. 15). A structured training program called Get Into IT was instituted to provide training to community members who, in the main, had very little exposure to ICTs. Reliance on online training modules indicated a belief that networking of services between CTCs would be a significant factor that would ultimately contribute to the sustainability of these CTCs.

The range of new services and opportunities that were introduced to NSW regional areas was diverse. Referring to Table 2.2 it can be seen that improvements had been made in terms of people’s ability to communicate for a wide range of purposes including study, training tele-commuting, online government services and e-commerce opportunities.

The deed of funding agreement with the NTN Secretariat was finalised in October 2003 (NSW DoC, 2004, p. 21). From that point on, the program entered its third stage in which support staff were reduced in an attempt to encourage CTCs to become self sufficient from the assistance provided by Regional Coordinators and the Support Unit. In recognition of a number of unforeseen events that delayed the implementation of the scheme in some areas, the services of four support staff were maintained until June 2005 (NSW DoC, 2004, pp. 23-24). Such circumstances included a state-wide drought, the difficulty in procuring suitable premises and poor coordination with other government entities (NSW DoC, 2004, p. 27). In addition to extending support to enable ongoing website and business development, agreement was also given for the extension of funding for ISDN line rental (approximately $12,000 per year per centre) to enable the videoconferencing network to be maintained (NSW DoC, 2004, pp. 26-27).

The final stage of the scheme, Stage 4, began in July 2005 with the establishment of the CTCA (De Weaver & Ellis, 2006). The CTCA was charged with maintaining communication between CTCs and coordinating activities. They also took over the development of the Quality Supplier Framework which was an initiative designed to better specify and market the collective capabilities of the members CTCs and telecentres. Funding was supplied for a CEO and two conferences.
Table 2.2 A Selection of Services Offered by CTCs in 2004 (NSW DoC, 2004, pp. 18-19)

- Access to computers and software for personal, study and professional purposes
- Provision of computer and Internet awareness training programs
- Local call Internet access for the local community
- Access to Internet services such as web hosting, email, ISP services
- Access to online government services for people unable to access services from home, work or educational institution.
- Access to online and face-to-face targeted education programs conducted by Australian and State government agencies. (For example, Department of Disability and Aged Care training for service providers in remote areas)
- Facilities for access to distance education and training services, including high-speed access to online education courses and videoconferencing. (For example, through partnerships with university distance education units)
- Co-location with other important local resources such as Rural Transaction Centres, Government Access Points, Adult and Community Education facilities, Tourism Information Centres, regional development and local government organisations
- Business services for local businesses and community organisations.
- Facilities to support e-commerce incubator programs
- "Hot desking" for employees involved in teleworking.
- Technology advice and support services to local businesses and farmers
- Information and research services for local businesses and farmers
- IT serviced office for business, including start-up business
- Meeting room facilities providing access to technology such as data projectors, computers with presentation software, videoconferencing
- Provision of virtual call centre facilities
- Sale of information technology books and materials, software and hardware including as an agent of a business in a larger regional area
- Tele-law using videoconferencing facilities

Besides this, no other form of government support was provided. A board elected from the membership of CTCA governs the activities of the CTCA to this day. No direct or indirect oversight of the activities of the CTCA was required by government, thereby making the CTCA and its membership fully independent.

Assessment of Outcomes

The impact of CTCs on regional NSW as indicated in Table 2.2 are consistent with the positive assessment that the authors of the Final project report gave about the contribution of the NSW CTC Program to regional communities. Local communities
had been given a considerable boost in terms of their ability to access and use ICTs, particularly broadband, which was still largely unavailable in many of these communities. This in turn created an impetus for local people to become trained in the use of ICTs and to use ICTs in their homes and businesses. The large scale investment in CTCs also created the conditions for an ongoing support network across the state of NSW. As a consequence CTCs were judged to be “highly successful social enterprises” (NSW DoC, 2004, p. 3). The authors of the *Final project report* felt confident that significant benefits had been delivered to communities to better negotiate social and economic outcomes as indicated by the following statement.

*The development of social capital and the direct return to the New South Wales economy are difficult to determine without further research. However, it can be assumed there is substantial return to New South Wales in terms of skills development in information technology, usage and access to online information and transactional services, employment, volunteer hours, skills training and development. The increase in usage of services provided within the CTC environment suggests savings in social service provision (NSW DoC, 2004, p. 3).*

Despite this the NSW CTC Program experienced a number of problems; primary among these was the limited income-generating potential of CTCs which in turn undermined efforts to achieve sustainability.

One issue identified was the overly optimistic timeline of three years that was envisaged for CTCs to achieve sustainability (NSW DoC, 2004, p. 4). The reality was that insufficient time was given for business opportunities to gain maturity. This was particularly true for the video conferencing services provided by CTCs. Insufficient demand for video conferencing services by business and government agencies could be partly explained by ignorance of the potential of such services (NSW DoC, 2004, p. 27). Given time and appropriate marketing, the report writers were confident that video conferencing would be profitable.

Another issue that was related to the limited time frame of the funding was the difficulty associated with making a transition from public funding to an independent business. As one IT Development Officer noted, part of this difficulty related to managing community perceptions about a range of issues (NSW DoC, 2004, p. 25). One issue that
was confusing was the concept of fee-for-service as opposed to free provision of services by government. Another area of confusion arose about future viability of the CTC when it became necessary to reduce the hours of paid employment to local workers.

Further complicating the transition from public funding to independent business were competitive neutrality provisions which were designed to promote a ‘level playing field’ in the provision of services in a commercial environment (NSW DoC, 2004, p. 26). Ironically this provision served to limit the activities of some CTCs. As a consequence many CTCs were prevented from offering any service (not only telecommunications) that another business in town provided because the public funding of CTCs was seen to undermine a competitive market for these services. While the concept was straightforward, some managers were faced with a complex business environment where their efforts to develop an independent business were constrained by the limited options they were allowed to pursue (lest they suffer the ire of other businesses and local politicians).

The availability of managers with the skill-set required to handle the challenges of CTC management was also a constraint on achieving sustainability (NSW DoC, 2004, p. 25). Given the complex and constrained business environment, it was difficult to attract suitably experienced candidates purely on the basis of a salary of $35,000 and no prospect of a long-term job. As well as the limited salary, the isolation of most CTCs worked against attracting skilled people from capital and regional cities. Rather, the Final project report suggests that CTC managers were frequently at a point in their careers where they wanted to give something back to the community or were recently graduated university students seeking to gain a toehold in the job market. In a similar vein, it was difficult to get suitably experienced management committee members to oversee the management of the CTCs. Some who had benefited from training they had received from the NSW CTC Program had been offered more attractive opportunities elsewhere and had left (NSW DoC, 2004, p. 26). This investment in skills training was effectively lost to the CTC program.
Research carried out by De Weaver and Ellis (2006) towards the conclusion of Stage 3 of the NSW CTC Program provides an alternative view to that of the writers of the Final project report. Their online survey of CTC managers, carried out between March 2005 and June 2005, is interesting for the community focus that they were able to bring to understanding the NSW CTC Program (De Weaver & Ellis, 2006, p. 19). They were able to make assessments based on an 85% response rate of the fifty-five CTCs that received their survey. They concluded that the results of their survey, in general, supported the assessments of the Final project report (De Weaver & Ellis, 2006, p. 25).

A majority of respondents supported the contention that the program had met the goals of providing access to ICTs and promotion of economic development. A total of 64% of respondents agreed that the program had had a positive impact on the economic development of their communities (De Weaver & Ellis, 2006, p. 24). Communities were also enthusiastic in pursuing a variety of strategies to promote the future viability of their CTCs. This included revision of business plans, addition of new services in response to community demand, formation of partnerships with other regional stakeholders, the addition of training programs and the cooperation with the Support Unit to introduce programs designed to increase revenue (De Weaver & Ellis, 2006, p. 23). Further indicating the positive feelings of communities towards their local CTC was the degree of volunteer support that was received. They found that 34 of the responding CTCs had between one to three volunteers while 10 CTCs had between four and eight volunteers (De Weaver & Ellis, 2006, p. 22).

In line with the assessment of the Final project report, CTC managers agreed that the funding timeline of three years was too short to develop a mature business. For example, 36 of them indicated that their CTC had not achieved the results they had hoped for in their first year of operation (De Weaver & Ellis, 2006, p. 21). In fact more than half of the CTCs surveyed exceeded their first year budget. Despite the difficulties most respondents felt that the business planning process was a necessary and valuable tool for future planning.

As well as insufficient time, another resource in short supply was expertise. Supporting the original decision of program planners to provide regional coordinators to assist
individual CTCs, De Weaver and Ellis’ survey indicated that a majority of 34 CTC committees would not have been able to complete the CTC Application paperwork without the assistance of the Regional Coordinator (De Weaver & Ellis, 2006, p. 20). The training of managers to provide them with the necessary skill set to effectively meet the challenges of running a CTC was difficult to achieve. De Weaver and Ellis (2006, p. 22) report that a majority indicated the need for additional training for managers to improve managerial and technical expertise. Management committees were also identified in this research as suffering from insufficient expertise. This was compounded by other problems such as irregular meetings, little business experience, poor discipline in executing the business plan and insufficient time or interest from the management committee (De Weaver & Ellis, 2006, p. 22). In summary these factors influenced the responses of CTCs to problems in their local communities and the efficacy of these responses.

Organisations that championed the CTCs were often an important factor that compensated for poor expertise (De Weaver & Ellis, 2006, p. 20). In 13 instances such organisations were local government councils. Other championing bodies included local training organisations, business enterprise centres, neighbourhood centres, tourism information centres and a museum. At the time of the survey, 36 CTCs reported that their partner organisation was still involved (De Weaver & Ellis, 2006, pp. 20-21). Examples of the kind of assistance these organisations provided included ongoing financial assistance, lending of equipment and staff, administrative support and the provision of premises.

De Weaver and Ellis’ research also adds new detail about the limitations of communities that was not apparent in the Final project report. Some difficulties in executing the business plan were reflected in the need to use a different management model to the one suggested by program planners. While the plan required the employment of a full-time manager, some centres employed part-time managers (De Weaver & Ellis, 2006, p. 22). In some cases volunteers filled that roll while in others the championing organisation took responsibility for management. In another case, De Weaver and Ellis (2006, p. 21) report that the championing organisation – a local government council - used the CTC to further its own plans to counter amalgamation
with a neighbouring local government area. The challenge of maintaining technical equipment was cited by De Weaver and Ellis (2006, p. 21) as a significant problem - close to half of the respondent CTCs were constrained by ongoing technical problems.

One area in which De Weaver and Ellis’ survey is at odds with the Final project report concerns calls from CTC managers for ongoing support from government (De Weaver & Ellis, 2006, p. 25). The immaturity of these CTCs as new businesses and the need for more expertise were the most significant reasons for the calls for support. De Weaver and Ellis state:

Although, the three year business plan that each community had to prepare was the key factor in evaluating a community's application, the business planning process, and the skills required, were not covered in the final report nor were some of the technical issues that left communities frustrated and unable to deliver key components of their business plans (p. 19).

De Weaver and Ellis report that CTC managers were dismayed with the apparent inconsistency in the reasoning of the program planners (p. 25). The government’s support for regional development in the program’s initial stages was at odds with its steadfast refusal to consider ongoing financial support to ensure that the goal of economic development was nurtured into the future.

Discussion of the NSW CTC Program’s implementation

The Final project report acknowledges that the difficulties which CTCs experienced in earning sufficient revenue to support ongoing operations was a reflection of the limitations of local economies. As the report writers looked to the future they identified “outside sources of income” such as service provision to corporate or government sectors as being important (NSW DoC, 2004, p. 32). Brokered services were identified as a potentially rich source of income for CTCs. Consequently the Quality Supplier Framework (described previously) was identified in the Final project report as the key strategy to bolster future income-generating potential of CTCs. The Quality Supplier Framework was transferred to the CTC Association (CTCA) once the employment of the remaining support staff from the NSW CTC Program finished in June 2005.
As the NSW CTC Program was partly aimed at overcoming poor availability of broadband in regional NSW it is noteworthy that there appeared to be some divergence in views about the future prospects for broadband delivery. The *Final project report* contended that the provision of broadband would become cheaper as time progressed (NSW DoC, 2004, p. 26). While the implications from this assertion are not wholly clear this raises the question as to whether the ongoing viability of CTCs will be further reduced as broadband becomes available directly to individual residences in regional areas.

Notably absent from the considerations in the *Final project report* for external funding was ongoing support from government by way of public subsidies. As detailed above, De Weaver reports that calls were made by CTC managers for ongoing support from government. The lack of response was consistent with the intent of the program given the goal to establish CTCs as independent businesses. The report writers identified the Australian Government’s Department of Transport and Regional Services as a potential source of ongoing funding. Beyond this, no further suggestions for future funding strategies emerged.

In view of the investment of $16.7 million and the 73,545 registered users of CTCs it is curious that the failure of the program to meet its primary target of full sustainability by project end did not evoke a more considered response from the writers of the *Final project report* either in terms of practical advice or suggestions for research. Primary among the apparent anomalies in the *Final project report* was the outstanding success of CTCs as social enterprises and their limited income producing potential. The fact that the success of the NSW CTC Program in achieving community acceptance and a high level of creative endeavour was placed in jeopardy because of poor economic sustainability remains an issue that appears to have not been seriously considered by the report writers. This seems a curious omission particularly as the failure of sustainability had the potential to undo the successful achievement of other goals; most notably the program’s third stated goal of social equity.

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8 Three examples of this can be found in a subsequent report from the Online Council Working Group (OCWG, 2005, p. 19). The Online Council Working Group is discussed in Section 2.2.2.
The primary research goal of the thesis detailed in Section 1.3 seeks to address this apparent anomaly. To that end, the next section situates the NSW CTC Program in the national government’s policy framework of the time to determine whether this curious aspect of NSW CTC Program was related to the policy context of the time.

2.2.2 National Government Policy Context

In drawing links between the NSW CTC Program and government policy it is noteworthy that Australia’s telecommunications environment had undergone a period of significant change. In seeking to characterise this period of change the thesis deals with these changes using three time periods: prior to 1997; 1997-2002; and 2003-2005. The following commentary reveals a common theme in that both the national government placed increasing reliance on the private sector to support and deliver communication services and, simultaneously, sought to limit government to a role of customer to these private service providers (Joseph, 1993).

This shift in telecommunications policy reflected seismic changes that were occurring more generally in public policy development in federal government bureaucracies. Describing this new policy context as “economic rationalism”, Pusey (1991) argues that the influence of university economics courses over the nation’s senior public servants was influential for this shift from Keynesian economics to neo-liberal market economics.

National Policy Environment: Pre 1997

In terms of placing the NSW CTC Program into a historical context it is useful to begin with events prior to 1997. The introduction of Australia’s Telecommunications Act (1997) marked the culmination of two decades of changes associated with the liberalisation of the telecommunications sector that led, among many things, to the privatisation of the incumbent and government-owned telecommunications company, Telstra. Some of the money derived from the sale of shares in Telstra was used to fund the NSW CTC Program through the NTN scheme. However, there is more to the liberalisation process than the funding of the program that is important to this thesis. In concert with the sale of Telstra a range of new public policy initiatives were instituted which profoundly changed the nature of telecommunications service delivery in
Australia. The beginnings of these changes can be traced back to the mid-1970s when competition was gradually introduced into telecommunications which hitherto had been organised on the basis of a government-owned post and telecommunications (P&T) monopoly (Grant, 2004, pp. 3-6).

The liberalisation of telecommunications in Australia coincided with a global trend in which many governments allowed competition and the privatisation of government-owned telecommunications organisations. The Uruguay Round of multilateral trade negotiations was central to this global trend during the early 1990s. One significant outcome for trade negotiations during the early 1990s was that telecommunications was deemed as a tradeable service (Ruggiero, 1995). In order for countries to be party to the World Trade Organization (WTO), they were required to become a signatory to the Basic Telecommunications Agreement which committed Australia to the introduction of full competition in the delivery of telecommunications services (Grant, 2004, pp. 88-89).

Significant doubt about the consequences of these changes to rural, regional and remote areas existed among critics of the changes. As Moyal (1984) explains, the raison d'être for government ownership and monopoly provision of telecommunications services in Australia was the expense of providing telecommunication services to small communities that were separated by large distances. The associated changes were greeted with scepticism that feared the private sector would be unwilling to meet Universal Service provisions because sections of the community, such as regional and remote areas of Australia, were seen to be less profitable (Campbell, 2000; Goggin, 2002; Joseph, 1993).

National Policy Environment: 1997-2002

The introduction of the Telecommunications Act (1997) led to the formulation of a timetable for the privatisation of Telstra in three stages (Grant, 2004, pp. 14-15). The first sale of Telstra shares occurred in November 1997 while the second sale of Telstra shares occurred in October 1999. The third sale of Telstra shares in June 2003 coincided with the national government losing majority ownership of the company.
Funds were set aside from the first sale in 1997 to assist in research and development of telecommunications services under the NTN program. The purpose of this fund was to “bridge the gap between urban and non-urban Australia in terms of the range, availability and cost of telecommunications and information technology services” (DCITA, 2005a, p. 2). Over $250 million was earmarked to promote economic and social development by tackling deficiencies in telecommunications services in regional, rural and remote Australia (McGrath, Marcus, Fraser, Stroud, & Watson, 2006). These deficiencies included: infrastructure and services; training and skills development; and planning and strategy development. After the second sale of shares in Telstra in 1999, an additional $174 million was made available to NTN. A notable portion of NTN projects were designed to address Internet access. This part of the scheme was known as the “Social Bonus Program” (DCITA, 2005a, p. 4; McGrath et al., 2006). It was this aspect of the NTN scheme that led to the NSW CTC Program.

A related event in the chronology leading up to the formation of the NSW CTC Program was an enquiry called the Telecommunications Services Inquiry in 2000 (TSI, 2000). The purpose of the enquiry was to investigate the impact of privatisation of Telstra on those sections of Australian society viewed as being at risk. The Inquiry’s report, commonly referred to as the Besley Report, noted the extraordinarily high proportion of submissions from rural and remote areas of Australia; 30% of submissions came from people who represented just 6% of the total population living in areas where access was moderately difficult or worse (TSI, 2000, pp. 1-2). The theme of these submissions related to poor telephone services and poor access to the Internet. The Inquiry concluded that insufficient competitive pressure was being placed on Telstra to deliver an acceptable level of service and recommended that the Universal Service provisions of the Telecommunications Act (1997) be revamped to encourage other providers to invest in these areas. Notably, Besley’s vision was based on the private sector working within a competitive environment.

Another theme of policy reports at the time was the importance of communities as being the source and architects of their renewal and growth. DCITA sponsored a number of reports that investigated the theme of communities in the new liberalised environment of telecommunications. The publication called New Connections: Toolkit for New
Telecommunication Network Models in Regional Australia is one example of this (DCITA, 2001). This report outlines a number of models by which telecommunication services could be delivered to regional areas. The underlying rationale of the investigation is that communities could improve the level and nature of telecommunications services by taking greater responsibility and control in developing plans that relied on the private sector rather than government (DCITA, 2001).

The emphasis on community and the private sector are fundamental to the NSW CTC Program. Notable in the NSW CTC Program was the aspiration for strong community support and commercially focussed solutions to online access in regional NSW; this is a clear reflection of the second model described in the DCITA toolkit (DCITA, 2001). This stands in curious contrast with the Western Australian (WA) telecentres case study which featured on-going state government funding for the employment of a staff member in each locality (DCITA, 2001, pp. 87-89). As the NSW Government did not pursue the option of continued funding for the NSW CTC Program it seems reasonable to assume that the NSW Government consciously rejected the WA option.

As well as advancing new models of telecommunications delivery, it is also possible to see increasing attention to the Internet as a telecommunications service in official national government publications. The report titled Australian Communities Online by the National Office of the Information Economy (NOIE) provided a comprehensive summary of the level of online connectivity that Australian society experienced (NOIE, 2002). Using the 2001 Census data from the Australian Bureau of Statistics (ABS) which included for the first time questions about people’s use of the Internet, it was possible to provide a benchmark for international comparisons. It also provided a discriminating view of who was online and who was not, based on a number of ABS attributes such as location and demographic information. Perhaps unsurprising was the finding that levels of Internet access were lower in regional areas than in the cities. While this is clearly a reflection of lower broadband penetration rates in regional Australia, the demographic analysis also revealed barriers of a social nature. For example, high education level and higher earning capacity were also strong indicators of Internet use.
The NOIE report is also notable for the attention given to ICTs as a means of promoting the function of communities, particularly isolated communities. The report makes reference to the term “smart communities” (NOIE, 2002 p. iii) as a means to emphasise the need for communities to make use of ICTs by “making connections between groups that might not normally exchange information” (NOIE, 2002 p. iii). The report alludes to a transformation in the lives of communities and encourages support for people who put themselves forward as leaders. It is apparent that government thinking had moved beyond a narrow conception of the digital divide to one that included sophisticated notions of community and alternative modes of development in regional and remote Australia.

The identification of the Internet as a tool for development in the NOIE report is another feature reminiscent of the NSW CTC Program. In conjunction with the emphasis given to the private sector as an engine for development and the release of latent resources within local communities, it can be seen the NSW CTC Program resonated strongly with national government policy at that time.

*National Policy Environment: 2003-2005*

The period from 2003 to 2005 is notable for the benefit government was able to receive from the experience that had been generated in the NTN scheme. The end of this period also coincided with the government’s stated completion of the NSW CTC Program and withdrawal of support for the CTCs that were part of this program.

A second inquiry into telecommunications services, called the Regional Telecommunications Inquiry (RTI), was established on 16 August 2002 in the lead-up to the third sale of Telstra shares in 2003 (RTI, 2002 p. vii). The Inquiry report was commonly called the Estens Report. The report is significant for its identification of community-based technology centres (referred to as online access centres or OACs) and the concern that many of these centres were not able to remain operational subsequent to the withdrawal of government funding (RTI, 2002 p. xxii).

Recommendation 5.5 from the RTI (2002 p. xxiii) stated:
All tiers of government should work together to support online access centres in regional, rural and remote Australia, and to enable these important community facilities to remain viable.

The national government accepted the recommendation and, in response, tasked the Online Council Standing Committee (OCSC) to address this recommendation. The OCSC was comprised of national and state government ministers and departmental officials with portfolio responsibility for online services. The OCSC was required to investigate “strategies to maintain online access centres, including those in remote Indigenous communities” (OCWG, 2005 p. 5). Throughout 2004 and early 2005 investigations were carried out by a working group appointed by the OCSC called the Online Council Working Group (OCWG) which culminated in the publication of the working group’s final report in July 2005 (OCWG, 2005).

As the NTN scheme was scheduled for completion in June 2005, the final report from the OCWG represented an appraisal of the work that had been done to establish community-based technology centres throughout Australia, of which the NSW CTC Program was an example. The OCWG’s final report represents a significant point in an interesting and important phase of an ICT-related public policy development and execution.

As the OCWG was able to draw on the experience of each of the states in the establishment of community-based technology centres it was possible to compare strategies (OCWG, 2005, pp. 11-12). The NSW CTC Program was noted for the support that was provided to communities during the establishment of CTCs throughout NSW. In WA the ongoing support of telecentres by the state government, who funded a single management position in each of its telecentres, was recorded. In Queensland, the themes of learning and knowledge were respectively apparent in the establishment of ‘Learning Network Queensland’ and the ‘Indigenous Knowledge Centres’. The number of variant themes in the accounts of each state’s achievements demonstrated the flexibility of community-based technology centres to meet the specific needs of each state.

The report outlined seven strategies for consideration by the OCSC (see Table 2.3). These strategies were segmented into tiers to indicate the relative ease in carrying out strategies with regards to available resources and time frame (OCWG, 2005 p. 13). Tier
strategies represented actions that could be taken immediately while Tier 2 and Tier 3 objectives represented longer-term goals.

The OCWG was impressed by the range of initiatives undertaken by OACs in their local communities. They noted that these initiatives cut across all levels of government – national, state and local - suggesting the need for responses from each of these levels. Coordination between these levels of government was therefore a feature of the strategies that were advanced.

The OCWG came to the conclusion that OACs were unable to generate sufficient revenue from local sources and required ongoing assistance. In coming to this conclusion, the OCWG (2005 p. 17) sketched out the dilemma for both OACs and government in developing brokered services. Brokered services are where OACs provide a service to a government department for a fee. On the one hand, payments for delivery of services varied considerably between government departments making negotiation difficult for individual OACs. From the perspective of government departments, the uncertainty about the quality of service that OACs provided proved to be another impediment. Foreshadowing the establishment of the CTCA in NSW, the absence of a peak representative body that was able to reliably coordinate the initiatives of OACs was seen as a significant barrier to progress in this area. The OCWG concluded this discussion by noting that some government departments were miserly in their payments. This, in turn, made such income-earning opportunities unattractive when considering the costs associated with staffing, depreciation, premises and so on. The OCWG further advised that government had an important role to play perhaps mostly in adopting greater flexibility in their approach to OACs. A “range of models” should be considered in relation to the needs of individual communities and their OACs (OCWG, 2005 p. 6).

In addressing future issues, the OCWG indicated that OACs were relevant to a number of strategic requirements for rural, regional and remote areas. These included the development of social capital, the need to build ICT skills and capabilities, the penetration of broadband, and access to online government services. In summary, OACs were relevant to the delivery of many important social initiatives.
The NSW CTC Program was identified as having made sizeable steps to the achievement of some of the seven strategies listed previously. For instance, the whole project was cited as an example of Strategy 2 (see Table 2.3) by virtue of the NSW CTC Program secretariat that the NSW Government had funded in the previous two years, 2003-2005 (OCWG, 2005 p. 20). This compliment was qualified by the news that the NSW State Government had indicated that no further funding of the secretariat or the NSW CTC Program was planned beyond June 2005.

Table 2.3 Online Council Working Group’s proposed strategies (OCWG, 2005 p. 13)

<table>
<thead>
<tr>
<th>Tier 1</th>
</tr>
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<tbody>
<tr>
<td>All levels of government (national, state and local) to:</td>
</tr>
<tr>
<td>1) continue and increase work with relevant agencies in their jurisdiction to encourage greater delivery of their services through OACs, taking into account the different State models.</td>
</tr>
<tr>
<td>2) identify existing funding programs that could be accessed by existing centres to help address any immediate funding needs – these programs to be promoted to centres.</td>
</tr>
<tr>
<td>3) explore how relevant existing programs can be made more flexible to support existing online access centres, e.g. re-engineering of existing program structures.</td>
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<table>
<thead>
<tr>
<th>Tier 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4) Australian Government to capture and disseminate useful and practical information to assist the Management Committees on online access centres.</td>
</tr>
<tr>
<td>5) All levels of governments to commence a “stock take” of existing centres to get a better understanding of the current status of the centres. It is envisaged that the stock take would make use of relevant mapping and spatial data tools.</td>
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<table>
<thead>
<tr>
<th>Tier 3</th>
</tr>
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<tr>
<td>6) States and local governments to develop initiatives to foster and sustain community participation.</td>
</tr>
<tr>
<td>7) All tiers of Government to develop initiatives to foster private sector participation through local businesses.</td>
</tr>
</tbody>
</table>

Similarly, the scheme was viewed as being significant in the promotion of community participation; the theme of Strategy 6 (OCWG, 2005 p. 27). As private sector participation was a significant component of the NSW CTC Program it was also cited as an example of Strategy 7 (OCWG, 2005 pp. 34-35). Even so, the OCWG surmised that
private sector participation in OACs was insufficient to achieve sustainability even in NSW (OCWG, 2005 p. 36-37).

The report by the OCWG was evaluated by the federal and state ministers on the OCSC who endorsed the findings of the report as indicated in the following communiqué.

*The Online Council recognised that OACs have been instrumental in delivering public access to the Internet, raising community awareness of new developments in ICT, and providing a local venue for ICT training and skills development. The Council also acknowledged the significant role OACs have performed in meeting a range of social and economic needs in regional, rural and remote communities. Many of these centres have become community and learning hubs providing educational, health, employment and business services (Hevesi, 2005).*

The OCSC went on to note that a number of government jurisdictions were required to play a role in raising awareness of OACs with relevant departments at national and state levels so as to enable better coordination between tiers of government (Hevesi, 2005). DCITA’s web portal (www.telinfo.gov.au) was also identified as a resource that had been made available to OACs to assist them in their activities. While the federal minister left the door open for further funding consideration, no specific commitment was made to provide the assistance the OCWG stated as being necessary for ongoing viability of OACs (OCWG, 2005 p. 6). NSW Government officials indicated that no further funding was planned for the NSW CTC Program by the NSW State Government (OCWG, 2005 p. 15). Missing from the communiqué was recognition of OACs as being integral to a number of important outcomes such as social capital, ICT capability training and broadband access. The communiqué from the OCSC represented the national and state governments’ final response to recommendation 5.5 from the *Estens Report*.

In summary it was clear that the position of national and state governments was consistent with the outcomes of the *Final project report* from the NSW CTC Program (NSW DoC, 2004). It can be concluded that the lack of ongoing commitment to support CTCs in NSW was a position that was consistent with national government policy at that time. Having established this consistency between the NSW CTC Program and
government policy, the thesis proceeds to consider theories of Social Development policy to locate the NSW CTC Program within a theoretical context.

2.2.3 Social Development Theory

The work that Hall and Midgley have undertaken in creating a theoretical framework to consider Social Development policy provides an effective context in which to consider the NSW CTC Program (Hall & Midgley, 2004; Midgley, 2003). In seeking to better clarify the attributes of various Social Development strategies, Hall and Midgley (2004, pp. 26-28) identify different values and objectives at play. As values and objectives that underpin various strategies may not be immediately obvious they argue that rational assessment and debate of these issues cannot be achieved without normative theories that identify hidden aspects of Social Development. This leads them to propose three normative approaches to Social Development.

The three normative approaches Hall and Midgley (2004, pp. 28-37) define are: the Statist approach; the Enterprise approach; and the Populist approach. At the heart of their theory of Social Development is the identification of ideologies that give voice to the values and assumptions of each of these approaches. Three ideologies are described: collectivism, individualism and populism (p. 28). By articulating the values and assumptions of each ideology as revealed in the various normative approaches, rational debate about improvement is facilitated. It is with this intention that the thesis proceeds to describe and analyse the three normative approaches of Statist, Enterprise and Populist to better understand the NSW CTC Program.

The Statist approach to Social Development can be located historically as being most prominent in the decades after World War Two (Hall & Midgley, 2004 p. 29). The primary attribute of the Statist approach is the central role that governments play in improving social conditions by “introducing a range of social services to meet social needs and raise living standards of ordinary people” (p. 28). The underlying ideology that Hall and Midgley indentify is collectivist which holds the view that “the best society is one in which people cooperate to meet their common needs” (p. 28).
Criticisms of the Statist approach challenge the assumption that governments always act in altruistic ways to better the lives of individuals within society (Hall & Midgley, 2004, pp. 29-30). Two themes to such criticisms emerged. On the one hand critics argue that government development programs do not sufficiently encourage personal responsibility and encourage laziness and indolence. Other critics argue that government bureaucracies were often found to be indifferent and insensitive and were out of touch with their citizens. These two streams of criticism are significant in that impetus was given to the subsequent development of both Enterprise and Populist approaches respectively.

The second approach defined by Hall and Midgley (2004 p. 31) is the Enterprise approach which stresses “the primacy of the market in social welfare”. What this means is that Social Development policies are designed to be in harmony with the theory of the market economy. People who subscribe to the primacy of the market are described by Hall and Midgley as ‘neo-liberals’. Their fundamental ideology is that all individuals are primarily motivated by selfish desires. Social Development projects that subscribe to the Enterprise approach are noted for encouraging individual responsibility and hard work. As a consequence, the Enterprise approach places more emphasis on local entrepreneurship, commercial activities and the private sector than the other two approaches (Midgley, 2003, p. 840).

Criticism of the Enterprise approach is partly motivated by ethical concerns that economic exploitation of people who are locked in unequal power relationships may result. Also of significance, particularly to this study, are situations of ‘market failure’ which refers to situations in which the working of the market undermines the attainment of a desirable social outcome.

The Populist approach to development is characterised by attempts to make development responsive to the needs of people. Hall and Midgley define the Populist approach in terms of:

*active community mobilization mediated via a range of institutions as a means of articulating people’s needs and enhancing their participation in the process of policy design and implementation (p. 36).*
In seeking to focus on people, the underlying ideology of the Populist approach is one that values individuals and their immediate personal relationships with other people. Consequently, it stands between selfish individualism of the Enterprise approach and the impersonal nature of government institutions found in the Statist approach.

One important and relevant manifestation of the Populist approach is the emphasis some development proponents place on community. Described by Hall and Midgley (2004, p. 33) as “communitarians” they believe that

*community is the prime locus of people’s activities and they stress the importance of communities in promoting a sense of belonging, fostering integration and meeting social needs.*

Criticism of the Populist approach relates to unsavoury manifestations of populism such as nationalism that leads people, for example, to engage in destructive action against groups based on their ethnicity.

In reflecting on the three normative theories to development, Hall and Midgley state that the three approaches differ in their perceptions of how “the world works and how its problems are best tackled” (p. 36). They map out a vision for a “holistic social policy” that brings together the strengths of each of the normative approaches that they have defined. More specifically they argue for greater government involvement in “economic and social investment and to regulate the private sector”. They also see that the value in promoting Enterprise approaches related to the improvement of “service provision via the use of economic incentives”. The value of Populist approaches lies in “active community mobilization” as a means to better articulate people’s needs as well as enhance “their participation in the process of policy design and implementation”.

The thesis moves on to consider these three normative approaches in relation to the NSW CTC Program.

### 2.2.4 The NSW CTC Program and Social Development Theory

On the basis of the definitions given for the three approaches to development, the Enterprise approach appears to best describe significant attributes of the NSW CTC Program. One feature of the NSW CTC Program that resonates strongly with Hall and
Midgley’s analysis was the emphasis placed on private sector activity to achieve sustainable operations. The fundamental tenet that CTCs were to develop sufficient revenue flows in the stipulated time frame indicated a belief in the function of local markets. Another feature of the NSW CTC Program consistent with the Enterprise approach was the strict timetable for the withdrawal of government funding. The devolution of control and funds to local management committees early in the implementation phase of NSW CTC Program also indicated the belief that local creativity and entrepreneurship would be realised in successful business opportunities. In summary, evidence in the NSW CTC Program of both market integration and local entrepreneurship, both hallmarks of a neo-liberal economic ideology, fits the evidence of an Enterprise approach as described by Hall and Midgley.

Commentary by academics supports the contention that the Enterprise approach is an appropriate characterisation of the NSW CTC Program. For example, De Weaver and Ellis (2006, p. 17) adopt a critical position on government policy in relation to the NSW CTC Program for the reason that the “economic rationalist policies of both the state and federal governments” blinded the government to the most significant challenge. With clear links to the dominant mode of thinking in government circles detailed by Pusey (1991), Moore (2004) links this with similar trends overseas.

_Economic rationalism is the theory or practice of a government using narrow definitions of efficiency and productivity (including privatisation, deregulation, and low government spending) as measures of economic success, without regard to government's traditional economic responsibilities to the public sector and the welfare state._

This idea is consistent with the description of neo-liberalism in other countries as used by Hall and Midgley (2004, pp. 31-32).

Another indication of the Enterprise approach in national government policy at the time can be found in Farr and Papendrea’s (2004) investigation of community-based technology centres in remote areas of Australia. They state that sustainability refers to:

_The ability to maintain ongoing operations of a community online access centre without recourse to long-term financial assistance from government after its initial set-up period (p. 4)._
It is clear from this definition that government had no on-going funding commitment to CTCs in remote Australia after the initial establishment period as was also the case for CTCs in NSW. The role of government was to be limited to one of ‘customer’. A similar observation was made by Simpson et al. (2004) of the related NTN-funded CTC program in rural Queensland.

However, the NSW CTC Program is also notable for its purposeful inclusion of local community-based organisations in the establishment and running of CTCs. Despite the emphasis on commercial outcomes it appears that the strong community base for the NSW CTC program also resonates with descriptions that Hall and Midgley outline in relation to the Populist approach to Social Development. This was reflected in a number of ways. Firstly, community members were actively included in the establishment phases of the CTC program through invitations to contribute ideas to the travelling road show. Management committees for CTCs were drawn from the local community. The devolutions of funds and control to these management committees underscored the desire to adequately equip communities and facilitate the timely withdrawal of government from local CTCs. The observations of academics similarly reflected the benefits that communities were experiencing. The evidence pertaining to both Enterprise and Populist approaches to social development reveals the unique character of the NSW CTC Program because commercial initiatives were to spring from local communities. This was in line with the government ideology at the time that depicted communities as architects of their own success (DCITA, 2001).

As an example, commentators used the concept of social capital to characterise the social benefits of community-based technology centres (Geiselhart, 2004; Simpson, 2005). Winter (2000, p. v) defines social capital as the “relationships of trust and reciprocity” that bind families, groups and communities together. In describing the workings of rural access centres in Queensland, Simpson (2005, p. 80) defines social capital in the following way.

\[ \text{Social capital is used to describe beneficial outcomes that can be derived from ‘multiplying’ existing community assets, such as trust, reciprocity and cooperation, shared values and norms, pro-activity and leadership, and a strong sense of community that can result from interaction and participation in strong social networks in a community.} \]
Geiselhart (2004, pp. 11, 27, 28, 38 & 65) in her report to the OCWG indicates that community-based technology centres are important in the development of social capital throughout Australia.\(^9\)

Further emphasising the social benefits of community-based technology centres, Geiselhart (2004, p. 3) argues that community-based technology centres were poised to elevate regional Australia into a second stage of “digital development”. Accordingly, she recommended that Australia’s Universal Service Obligation (USO) be extended to include online access in which community-based technology centres would play a pivotal role.

Hence, the observation by the writers of the *Final project report* for the NSW CTC Program that CTCs were highly successful enterprises finds support from academic commentary at the time. Indeed the research goal to develop a theory-based rationale that is able to inform strategies that maintain the success of these CTCs is consistent with the anxiety of De Weaver and Ellis and Simpson et al. who feared the loss of such benefits once funding for CTCs ceased.

It is noteworthy that some suggestions to address this problem were reminiscent of the Statist approach defined by Hall and Midgley. For example Simpson et al (2004) liken the community-based technology centres in rural Queensland to government schools and hospitals. Their suggestion is significant because it alludes to a more fundamental argument about market failure. Albon and York (2006 p. 369) explain that market failure is a recognised policy and economic concept that refers to the inefficiencies that arise when there is:

\[
\text{a gap between what ‘society’ is prepared to pay for [a service] and the cost to the ‘economy’ of supplying that [service].}
\]

In summary, the public interest is not served when insufficient commercial incentive exists for the delivery of a service that is beneficial to society at large. Government traditionally plays a significant role in filling the funding gasp to ensure delivery of the

\(^9\) Official government endorsement of social capital as a concept may have influenced writers to explore this concept to seek further government assistance for community-based technology centres. Social capital was highlighted by a number of government entities such as the Productivity Commission (APC, 2003), Australian Bureau of Statistics (ABS, 2004) as well as DICTA (DCITA, 2005b).
relevant service. Examples of such situations include hospitals, schools, the defence force and the judicial system (Ng, 2004). Hence Simpson et al.’s example of schools and hospitals is consistent with an understanding that government should intervene to rectify the shortcomings of the market.

Despite this justification, and as previously indicated, government was not led to provide further funding support for CTCs in NSW. In resisting such pressure the government signalled a significant departure from past practice because assumptions about government’s role in development no longer held. This is in part evident in Albon and York’s explanation of government’s role in addressing problems of market failure in the mobile phone market. They argue that government support is no longer a mandatory requirement to correct for market failure (Albon & York, 2006 p. 371). If suitable alternatives exist that fill this gap it is wholly appropriate that these strategies be applied in preference to support from government. Notably, this is consistent with the Enterprise approach defined by Hall and Midgley (2004, p. 32).

Given the positive social outcomes that were evident in the work of CTCs it is not wholly clear that local communities would have welcomed the kind of government take-over of centres suggested by the examples of schools and libraries as intimated by Simpson et al. (2004, pp. 335-336). Given the discovery and release of latent resources within the community that had contributed to the noted success of CTCs, to say there was a desire by practitioners for a return to a Statist mode of development is not consistent with the evidence at hand.

Turning attention to the research goal (that is seeking to define a theory-based rational that assists CTCs to remain successful in situations of insufficient income support) the discussion leads to an understanding that further work is required to better balance the relative strengths of the three approaches to development defined by Hall and Midgley. The examination takes particular note of Hall and Midgley’s (2004, p. 36) desire to develop holistic development policy where they discuss the need to re-engage government in ways that support the autonomy of community and the function of private enterprise in the economic delivery of services. This is of critical importance.
given the difficulties that CTCs experienced in generating sufficient revenue to support their ongoing operation.

2.3 Exploring Innovation as a Theory-based Rationale to Support CTCs

2.3.1 CTCs as a venue for community-based innovation

The chapter moves on to explore the concept of innovation to provide a theory-based rationale to support CTCs. Gurstein (2004, p. 5) outlines a justification that engages government with community-based innovation enabled through “local technology centres”. He justifies this idea on the basis that governments have had a long history in supporting innovation at the technological frontier as means to boost economic development. Gurstein (2004, p. 3) argues that the reasoning is also applicable in relation to innovation at the community level. The economic justification for such an investment is the development of local innovation capacity that is able to complement innovation capacity at the regional and national level (Gurstein, 2004, p. 8).

The motivation for Gurstein’s suggestion can be understood in relation to an area of research and practice called Community Informatics (CI). CI is defined by Gurstein (2007, p. 11) as the “application of information and communication technology (ICT) to enable and empower community processes”. Central to the research focus of CI is the challenge of developing ICT-based responses that are sustainable in both the community’s desire and capability to assimilate ICTs and the viability of economic and institutional arrangements that give support to community-centred ICT projects (Gurstein, 2007, p. 23 & 36). So, the dominant themes of CI - community, ICTs and sustainability - resonate with the themes of the NSW CTC Program.

Gurstein challenges people to re-examine their understanding and assumptions about innovation. Use of the term innovation in a policy context is popularly associated with developing new knowledge at the technological frontier. It is the exploitation of such knowledge that increases a country’s competitive advantage in the global economy. As a consequence, Gurstein observes that governments provide public money to support the creation of new knowledge through research and development programs in universities.
and private research development organisations in the hope that such knowledge will pay dividends in the future.

Gurstein (2004, pp. 4-5) goes on to claim that the innovative processes at the technological frontier are analogous to the way that communities respond to change in their local environments. For example, he points out that both groups are required to identify and acquire relevant information in order to solve problems. This is reflected in the need for communication between people. Meetings, informal interpersonal networks, publications, newsletters and the like as well as the use of ICTs to facilitate such communication can be cited as evidence of the commonality of these problem solving processes between formal research communities and local communities. Neither community can claim exclusive provenance of these processes as they seek to create knowledge in problem solving.

The second part of Gurstein’s (2004, p. 16) argument is to claim that investment in community-based innovation is of benefit to the wider economy. This aspect of his vision is based on a ‘bottom-up’ analogy of innovation where innovative efforts at the national level are supported by coordinated centres of innovation at the regional and local levels. He identifies a central role for local technology centres in such a framework. He believes that local technology centres have the potential to equip individuals with the necessary skills in problem solving that will eventually percolate into group level capability within communities and regions. Practical examples of this he cites are e-health initiatives; community based resource management; community governance; and locally based community watch programs (Gurstein, 2004, p. 10). It is for this reason that he is able to argue that the innovative work of technology centres in communities represents another area of innovation in the economy that is worthy of government support.

2.3.2 Innovation Studies

The identification of innovation by Gurstein resonates with studies of innovation, particularly as it relates to development. A significant issue that is at the heart of the innovation-related study in development is the question of novelty. To many innovation researchers, the term innovation primarily refers to the development of new knowledge
(Bell & Pavitt, 1993). In such circumstances, innovation is associated with high profile research and development programs at the technological frontier that aim to develop knowledge that is objectively new. New in this sense means that this knowledge has not been expressed previously. Related to this form of innovation is the associated term of ‘diffusion’ which refers to the dissemination of such knowledge in the form of information, (for example, processes, procedures and so on) or finished products (for example, machines and equipment).

This distinction has proved an unhelpful one when moving away from the technological frontier into development contexts. In the latter circumstance, people are faced with challenges of learning knowledge and techniques even though they may not be objectively new. Development experts contend that, from the perspective of individuals, the newness of an idea is not an objective reality but is dependent on their personal experience of uncertainty. As Rogers and Shoemaker (1971, p. 19) state, “[i]f the idea seems new to an individual, it is an innovation”. Gurstein (2004, p. 4) expresses a similar sentiment when he states “…’innovation’ is not strictly ‘novelty’, as for example, how the term is used in patent law, but rather about ‘novelty here’…”.

Bell and Pavitt’s (1993) comprehensive study of Technological Capability development in developing countries goes a step further by demonstrating that the diffusion of technology to new contexts generates truly novel situations. Accordingly, problem solving is not only required to overcome ignorance of knowledge developed elsewhere but is also required to create new knowledge (in an objective sense) to address local novelty. They conclude that the uncertainties associated with technology transfer require innovative processes that are akin to those required when dealing with the uncertainties at the technological frontier.

Of particular relevance to Gurstein’s vision detailed in the previous section (2.3.1) is the seminal paper by Arrow (1962) on poor private sector support for innovation. Innovation theorists have used the work of Arrow to draw attention to important characteristics of information and knowledge that influence innovation processes (Lamberton, 1996b; Macdonald, 1998; Mandeville, 1999). Arrow (1962, p. 612) argues that, in a context of uncertainty, private enterprise will naturally be risk-averse and
under-invest in innovation. The reasons why the private sector will under-invest in knowledge production stem from the difficulty in mitigating risks. As innovation is generally judged to be a social good that enables society to progress to high levels of development, the failure of the market to adequately support inventive activity is cited as evidence of the market’s failure to fully support innovation. This argument is consistent with the concept of market failure as discussed in Section 2.2.4. However, Arrow (pp. 612-614) identifies a significant complication when mitigating risk. With the reduction of risk the incentive to succeed and avoid harm is reduced. Arrow’s reasoning suggests that these two requirements - mitigation of risk while maintaining the incentive to succeed – represent a difficult balancing act.

The application of these ideas from Arrow is dependent on two requirements. The first relates to whether the work of CTCs can be understood as being innovation. The second requirement is that the work of CTCs is judged to be of social value.

2.3.3 Nonaka and Takeuchi’s Knowledge Creating Theory

In order to facilitate the investigation of the concept of innovation in relation to the NSW CTC Program, an analytical framework is required. Foreshadowing the need to develop an appropriate research design, the analytical framework provides specific constructs that guide the collection and analysis of research data. As multiple theoretical perspectives on innovation exist, the analytical framework brings clarity to the research process by providing a basis on which comparisons can be made so that theory building can take place.

The analytical framework is drawn from the work of Knowledge Management theorists Nonaka and Takeuchi. The inspiration for Nonaka and Takeuchi’s Knowledge Creating Theory was the desire to know more about the success of Japanese companies in innovation during the 1970s and 1980s. As explained by Jashapara (2004, pp. 170-174), knowledge management incorporates a wide range of interests. In characterising such diversity Jashapara holds that one extreme of knowledge management seeks to increase efficiency of knowledge use within relatively stable contexts. The other extreme is linked explicitly to the promotion and management of innovation in a context of rapid
change. It is the latter description of knowledge management that this thesis will draw on.

In providing a broad characterisation, De Michelis (2001, p. 129) describes Nonaka and Takeuchi’s work as being concerned with the development of “pragmatic knowledge”. Explaining further, he states:

\[ T \]hey are interested not in knowledge per se but in the processes through which knowledge is continuously created, modified, updated: the emphasis therefore is on the practice through which the members of workgroup or a whole organization increase their ability to perform individually and collectively (p. 129).

As detailed in Section 1.3, Nonaka and Takeuchi’s work enjoys considerable exposure in the literature. Consequently, the potential for engagement between people working within ICT for development communities and Management is increased because of its wide recognition.

2.4 Developing an Analytical Framework for the Research

2.4.1 Analytical Constructs

In order to investigate the veracity of Nonaka and Takeuchi’s Knowledge Creating Theory as a potential rationale that is able to address the research goal of the thesis detailed in Section 1.3, it is necessary to distil fundamental ideas by which the research data can be analysed. The following discussion details four Analytical Constructs that give voice to the primary aspects of Nonaka and Takeuchi’s theory.

2.4.1.1 Paradox

At the core of Nonaka and Takeuchi’s Knowledge Creating Theory is the pragmatic need to resolve a problem. They use the term ‘paradox’ to indicate the presence of two or more contending ideas (Takeuchi & Nonaka, 2004a, pp. 2-5). They describe paradox in terms of “contradictions, inconsistencies, dualities, polarities, dichotomies and opposites” (Takeuchi & Nonaka, 2004a, p. 3). The need to address the paradox provides the impetus for knowledge creation.
According to Nonaka and Takeuchi the means by which new knowledge is created is through a process described as synthesis (Takeuchi & Nonaka, 2004a, pp. 5-10). Synthesis is achieved through a process based on Hegel’s concept of dialectical thinking depicted in Figure 2.2 and described as follows.

The starting point of the dialectical movement is thesis. The next stage is for this thesis to show itself to be inadequate or inconsistent [Ta in Figure 2.2]. It is the opposite or negation of the first stage and hence is known as the antithesis (Tb). The second stage then also shows itself to be inadequate or inconsistent. So it results in a third stage known as synthesis (Tc). It is at this stage that the previous thesis and antithesis are reconciled and transcended. However, over time, even synthesis will turn out to be one-sided in some other respect. It will then serve as the thesis for a new dialectical movement and so the process continues in a zigzag fashion and spiralling manner as shown in the figure [italics in original] (Takeuchi & Nonaka, 2004a, pp. 5-6).

The process of synthesis requires the ability to sense and articulate emerging possibilities which, in turn, leads to the creation of new ideas. The term “self transcending” is used to describe the ability of people to move beyond their current frame of understanding to a new one (Nonaka et al., 2001, p. 18). Nonaka and Takeuchi identify direct experience, physical proximity, shared experience and discussion as being important when synthesising new knowledge (Nonaka et al., 2001, pp. 14-16; Takeuchi & Nonaka, 2004a, pp. 8-9). All of these conditions enable the synthesis of ideas in order to respond to the paradox at hand. The presence of another person who is able to reflect, clarify and offer new insights through conversation is fundamental and critical to the process of knowledge creation. There is also a need to communicate such ideas to other people in order to eventually confirm and clarify one’s ideas. Interestingly this brings to the fore a distinction between individual learning and social learning. To Nonaka and Takeuchi (2004, p. 53) the learning processes of individuals is best understood as occurring within a broader social context.
This highlights the importance of physical proximity in the early stages of knowledge creation. Physical proximity is found to be a factor in a significant number of the case studies that Nonaka and Takeuchi describe. This is because they identify a number of attributes associated with personal social interaction as being a feature of resolving problems. For example, Nonaka et al. (2001, p. 18) use the expressions “empathise”, “direct experience” and “reaches out beyond the boundaries of one’s existence” to describe some of the attributes that characterise the interpersonal nature of these interactions.

The Japanese philosophical concept of ‘ba’ seeks to describe the context in which synthesis of ideas takes place (Nonaka & Toyama, 2004, p. 102). The term ba broadly describes a ‘place’ in which knowledge creation and use occurs. Specifically, Nonaka et al. describe ba as being “a shared time and space for emerging relationships among individuals and groups to create knowledge” (Nonaka et al., 2001, p. 101; Nonaka & Konno, 1998, p. 40). While ba most obviously refers to interactions that occur in a physical space and time it is not strictly limited by physical proximity. Nonaka and Takeuchi point to other contexts in which early stage knowledge creation occur such as those mediated by ICTs over distance. The keys to such interactions are described as shared mental models such as “shared experiences, ideas, and ideals” (Nonaka & Konno, 1998, p. 40). While physical proximity is useful in a practical sense, for this research the analysis should also be sensitive to the other possibilities that Nonaka describes. For example, people may use ICTs in a virtual ‘space’ to emulate the physical
proximity normally required for face-to-face conversation, synthesis and knowledge creation.

2.4.1.2 Epistemology: the SECI model

In order to understand the epistemological aspect of Nonaka and Takeuchi’s Knowledge Creating Theory it is necessary to explain a number of basic contentions about the structure of knowledge as understood by Nonaka and Takeuchi. Nonaka and Takeuchi (2004, p. 49) define knowledge creation as a “dynamic human process of justifying personal belief towards "truth". While the process of synthesising new knowledge through direct experience reveals an important aspect of problem solving, the need to exploit and manage such interactions so as to bring about collective social benefit to the organisation, or indeed to a society, lies at the core of Knowledge Management. Accordingly, one important concept that underpins this study is knowledge as having two forms called tacit knowledge and explicit knowledge.

**Tacit and Explicit Knowledge**

Nonaka and Takeuchi base their understanding of tacit knowledge and explicit knowledge on Polanyi’s (1967) monograph *The Tacit Dimension*. Nonaka and Takeuchi (2004, p. 51) state:

*tacit knowledge is personal, context specific, and therefore hard to formalise and communicate. Explicit or codified knowledge on the other hand refers to knowledge that is transmittable in formal systematic language.*

They stress that Polanyi believes that human beings acquire knowledge by “actively creating and organising their own experiences” (p. 51). On that basis Nonaka and Takeuchi maintain that the sum total of human knowledge can only be *partly* represented by words and numbers indicating the importance of personal knowledge and skill to the concept of knowledge. This leads Nonaka and Takeuchi to quote Polanyi’s famous statement ‘we know more than we can tell’. As will be discussed, the linking of Polanyi with Nonaka and Takeuchi’s work has been the source of debate within the literature
In seeking to further delineate tacit knowledge from explicit knowledge, Nonaka and Takeuchi emphasise the role of experience in knowledge creation. Their intention is to break down the traditional separations between mind and body, reason and emotion, subject and object. Rather than merely observing objects, Nonaka and Takeuchi point out that the experience of involvement with such objects is a rich source of knowledge. This leads to tacit knowledge creation, some of which may be expressible in words and numbers, but much of it can’t.

Nonaka and Takeuchi (2004, p. 52) assign two attributes to tacit knowledge (see also Nonaka & Konno, 1998, p. 42). One attribute refers to the technical elements of tacit knowledge that pertain to know-how, crafts and skills. The other attribute is referred to as its cognitive elements. Citing the work of Johnson–Laird (1983), these elements refer to mental models that people use to understand the world: schemata, ideals, perceptions, beliefs and values. The articulation of mental models is an important element in creating new knowledge. Indeed, Nonaka and Takeuchi (2004, p. 66) describe knowledge management in the organisation as managing the mobilisation of tacit knowledge.

In order to summarise Nonaka and Takeuchi’s understanding of tacit and explicit knowledge, Table 2.4 is reproduced. It is important to realise that these concepts are difficult to define and are subject to some ambiguity. Hence the categories and descriptions as described by Nonaka and Takeuchi using the qualifying words of “tending towards”. It can be seen that tacit and explicit knowledge are judged to be complementary by Nonaka and Takeuchi. Such is this complementary nature, Nonaka and Takeuchi (2004, pp. 53-54) assert that one can be converted into the other. Accordingly they describe this process as “knowledge conversion” (p. 53). The experiential and social nature of knowledge creation brings to the fore the importance of social context.
Table 2.4 Attributes of Tacit and Explicit Knowledge (Nonaka & Takeuchi, 2004, p. 53)

<table>
<thead>
<tr>
<th>Two types of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacit knowledge (subjective) tending towards…</td>
</tr>
<tr>
<td>Knowledge of experience (body)</td>
</tr>
<tr>
<td>Simultaneous knowledge (here and now)</td>
</tr>
<tr>
<td>Analog knowledge (practice)</td>
</tr>
<tr>
<td>Explicit knowledge (objective) tending towards…</td>
</tr>
<tr>
<td>Knowledge of rationality (mind)</td>
</tr>
<tr>
<td>Sequential knowledge (there and then)</td>
</tr>
<tr>
<td>Digital knowledge (theory)</td>
</tr>
</tbody>
</table>

The SECI model: Socialisation, Externalisation, Combination and Externalisation

Tacit knowledge and explicit knowledge are used by Nonaka and Takeuchi (2004, pp. 54-65) to develop a four part model depicting four ‘conversion modes’ between the two knowledge forms (see Figure 2.3).

![Figure 2.3 Four-part SECI Model (Nonaka & Takeuchi, 2004, p. 55)](image)

The descriptors given to each of these conversion modes are Socialisation, Externalisation, Combination and Internalisation - the first letters of each of these descriptors are used to form the acronym ‘SECI’. The rationale behind the framework

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10 The related term of codified knowledge, more common in innovation systems research, shares many of the attributes of explicit knowledge (for example see Turpin, Yanhua, Jian, & Xin, 1995, p. 64). By definition codified knowledge refers to knowledge that can be written or illustrated by data, words, diagrams or pictures. Lamberton (2007) comments on the existence of these two terms stems from alternative research trajectories and suggests that the significance of these terms for definitional purposes should not be ‘over-estimated’.
from a management perspective is to recognise processes that lead to codification of knowledge to enable transfer from the individual, as creator of such knowledge, to the organisation. In practice this refers to tacit knowledge being made explicit so that it is more amenable to networking throughout the organisation and beyond.

**Socialisation**

The first of the conversion modes described is tacit knowledge to tacit knowledge (Nonaka & Takeuchi, 2004, pp. 54-57). This mode is named Socialisation because it is characterised by individual to individual interaction between people in close physical proximity. As discussed in Section 2.3.2.1 the impetus for this conversion mode is a paradox leading to the need to share personal tacit knowledge. More specifically this refers to the sharing of ‘mental models’ or technical skills through experience of copying and discussion. As already discussed, the social process of sharing, reflecting, assessing and offering new insights leads to what Nonaka and Takeuchi describe as the synthesizing of existing knowledge by individuals to create new knowledge. The significant factors that characterise the Socialisation process are that it is one to one, relies on direct experience and is time-specific.

**Externalisation**

The development of explicit knowledge from tacit knowledge represents a key conversion process called Externalisation (Nonaka & Takeuchi, 2004, p. 59). When knowledge becomes explicit Nonaka and Takeuchi observe that it becomes more amenable to networking throughout the organisation. In many of the case studies provided by Nonaka and Takeuchi, Externalisation results in the codification of such knowledge by the writing of text or the drawing of diagrams.

When it is not possible to gain sufficient clarity of ideas they observe that people resort to the use of metaphors and analogies to conceptualise and articulate for others what they are thinking. Nonaka and Takeuchi describe metaphors as providing the means by which two previously unrelated concepts can be associated. “[I]ntuition” and “holistic imagery” are found to be antecedents to the creation of metaphors (pp. 59-61). Analogies, by contrast, are driven by more rational thought processes that aim to eliminate contradictions and achieve “structural similarities”. This drive for greater
clarity ideally leads to the creation of “models” which are characterised by “systematic language, coherent logic…[and the]… absence of inconsistencies” (p. 60). In summary, Nonaka and Takeuchi advise that evidence of Externalisation can be found in the use of “metaphors, analogies, concepts, hypotheses or models” as people attempt to conceptualise and articulate what they are thinking (p. 57).

**Combination**

Combination describes knowledge creation processes where existing explicit knowledge is combined to create new explicit knowledge (Nonaka & Takeuchi, 2004, pp. 61-63). Once again, an important aspect of this activity is providing accessibility of this knowledge to a greater number of people. Combination processes are indicated by “sorting, adding, combining and categorising” of information (p. 61). The flow of activities reflects greater systemising and integration into the broader knowledge processes of the organisation. They refer to this as combining of “middle range concepts into grand concepts” (p. 62) so that knowledge development conforms to organisational goals and vision. They associate middle managers with Combination because they are generally required to develop methods of operation that support the organisation’s general vision which, in turn, normally involves the need to adapt and integrate existing explicit knowledge. In one example of Combination, they refer to an MBA education where various sources of explicit knowledge are combined and sorted in order to create new knowledge (p. 61).

Nonaka and Takeuchi argue that explicit knowledge may also be embodied in physical products (p. 17). For example, the release of a new model car represents the combination of knowledge from numerous knowledge creating processes that ideally fit into the manufacturer’s image and corporate vision. This is also consistent with the definition of technology used in this thesis (see Section 1.7.2) where Macdonald (1983) likens technological artefacts with knowledge.

**Internalisation**

In contrast to the desire to transfer knowledge to an increasing number of people, the process of Internalisation seeks to emphasise individual learning as a critical part of the knowledge creation process (Nonaka & Takeuchi, 2004, pp. 63-65). Accordingly, the
flow is from organisation to individual. In developing tacit knowledge it is necessary for the individual to embody whatever explicit knowledge sources are available. Nonaka and Takeuchi (2004, p. 63) use the words “learning-by-doing” and “experience” to communicate the importance of direct experience in Internalisation. Another example of this process is apprentices learning from skilled craftspeople through observation, imitation and practice. In a business context, on-the-job training shares many characteristics of Internalisation. The process of applying this knowledge results in a transformation in that new (tacit and personal) knowledge is created within the person.

Accordingly, the source from which new knowledge is obtained may not be limited to explicit knowledge. For example, people may also learn through copying the actions of more skilled mentors which is made up of tacit knowledge. As a consequence, the context in which knowledge creation occurs may influence the nature of knowledge creating activity. The importance of context is a notable feature of Nonaka and Takeuchi’s advice to managers in that the management of context may guide knowledge creation. For example, they relate the story of the Matsushita company which reduced working hours to give people more time to think creatively (Nonaka & Takeuchi, 2004, pp. 64-65).

2.4.1.3 Ontology

The third significant construct of Nonaka and Takeuchi’s Knowledge Creating Theory is Ontology. Ontology refers to distinctions that are drawn between knowledge creating activity carried out by individuals and groups of varying sizes within the organisation and outside the organisation. This scale of knowledge creating activity is characterised by the descriptors ‘individual’, ‘groups’, ‘organisation’ and ‘inter-organisation’ (see Figure 2.4). Nonaka and Takeuchi state organisational knowledge creation is a “process starting at the individual level and moving up through expanding communities of interaction that crosses sectional, departmental divisional and organisational boundaries” (pp. 66-67).

The two constructs of Epistemology and Ontology are portrayed as the axes of a two dimensional graph (see Figure 2.4). The horizontal axis indicates the scale of Ontology on which individual, group, organisation and inter-organisation knowledge creation is
depicted. The vertical axis indicates a range between tacit and explicit knowledge in which knowledge is transformed from one to the other. The interaction between these two axes can be used to represent the nature and scale of knowledge creating activity within any given context. This recognises individuals as the source from which new knowledge springs. The organisation provides the context and resources in which such individuals exist and the means by which other people are able to learn of and use new ideas. As increasing numbers of people adopt new knowledge, Nonaka and Takeuchi argue that the organisation “amplifies” new knowledge (p. 51).

Figure 2.4 Two primary constructs: Epistemology and Ontology (Nonaka & Takeuchi, 2004, p. 48) (Reprinted with permission of John Wiley & Sons, Asia)

2.4.1.4 Knowledge Spiral

The fourth Analytical Construct of Knowledge Spiral refers to a specific mode of interaction between the epistemological aspects and the ontological aspects of knowledge creation (Nonaka & Takeuchi, 2004, pp. 65-67). The epistemological aspects of the Knowledge Spiral are described by the four SECI conversion modes while the ontological aspects are described by the scale of knowledge creating activities as these may relate to individual, groups, organisation and beyond.
The next two diagrams (Figure 2.5 and Figure 2.6) portray the construct of the Knowledge Spiral. In Figure 2.5 the spiral can be seen to link the quadrants of the SECI model in a cyclic fashion but importantly not as a circle. In order to see the significance of the spiral one has to imagine a third dimension vertically from the page indicating increasing ontological scale. The ever-widening cyclic trajectory of the spiral indicates an increasing scale of Ontology or, put more plainly, increasing numbers of people (as it figuratively moves away from the plane of the page).

![Knowledge Spiral Diagram](image)

**Figure 2.5 The Knowledge Spiral featuring Epistemology (Nonaka & Takeuchi, 2004, p. 66)**

(Reprinted with permission of John Wiley & Sons, Asia)

This concept is alternatively depicted in Figure 2.6 where it can be seen that the trajectory of the curve as it moves left to right indicates increasing scale of the Ontology dimension or increasing size of the groups involved as knowledge is transformed between tacit and explicit states. Nonaka and Takeuchi claim that these transformations between tacit and explicit knowledge occur in a set sequence as indicated by the cyclic transitions of the spiral around the four parts of the SECI model.
Nonaka and Takeuchi provide a number of case study examples that support the integrated nature of innovation using their constructs of epistemology and ontology. One that will be briefly detailed here is the example of Honda’s car called the ‘Tall Boy’. Nonaka and Takeuchi (2004, p. 63) describe a path of development that began with brainstorming sessions both within the office and informally during social occasions. The concepts of ‘Automobile Evolution’, ‘Tall Boy’ and ‘man-maximum, machine minimum’ represent metaphors that they associate with Externalisation. These metaphors and analogies provided partially articulated representations of the thinking of individuals and groups to aid in communication and further innovative activity. Nonaka and Takeuchi considered the development of prototypes as evidence of Combination. The identification of prototypes in relation to Combination suggests that physical artefacts are representative of explicit knowledge (Nonaka et al., 2001, p. 17).

Finally, to encourage experimentation – a hallmark of Internalisation activity - one of Honda’s chief executives devised the maxim ‘Let’s Give It a Try!’ (p. 65). This proved to be influential in giving people the freedom to exercise their creativity and led to the development of a unique and successful car design.
2.4.1.5 Discussion: knowledge creation as an organisational process.

In summary, Nonaka and Takeuchi (2004, pp. 80-82) provide a five phase model that builds in the concepts of Paradox, Epistemology, Ontology and the Knowledge Spiral (see Figure 2.7).

The first phase of sharing tacit knowledge describes the one-to-one interactions of the Socialisation phase. In order to facilitate this kind of interaction Nonaka and Takeuchi (2004, pp. 80-82) emphasise the context or field of interactions to ensure individuals can interact with each other face-to-face.

![Organisational knowledge-creating process (Nonaka and Takeuchi, 2004, p. 81)](Reprinted with permission of John Wiley & Sons, Asia)

The second phase of creating concepts can be related to the Externalisation conversion mode of the SECI model where concepts or “shared mental models” are expressed by way of metaphors or analogies (Nonaka & Takeuchi, 2004, pp. 80-82).

The third phase, justifying concepts, is the period where concepts are justified as being “truly worthwhile for the organisation and society” (p. 81). This phase is distinguished
from the censorship that individuals impose on themselves in suggesting ideas but represents the justification of ideas explicitly at the organisational level to ensure that these ideas fulfil organisational intent or that the concepts “meet the needs of society at large” (p. 81). They argue that such justification may be based on concrete measures such as profit or loss but can also be based on qualitative measures such as the ‘man-maximum, machine-minimum’ vision that guided the Honda Tall Boy project.

The fourth phase, building an archetype, refers to the recognition that concepts have achieved a degree of concreteness (p. 82). This is where justified concepts are converted into something tangible. Archetypes may be represented by a prototype for a new product or may be a model for a new organisational process. As these archetypes are created by combining explicit knowledge from other sources, this explanation pertains to the Combination part of the SECI model.

The final phase of the process, cross levelling knowledge, gives voice to the iterative nature of knowledge creation where the archetype becomes the starting point for further discussion and knowledge development at another ontological level (larger groups of people or different groups of people). This is indicated by the feedback loop that connects to each of the previous stages through the sharing of tacit knowledge.

2.4.2 Enabling Conditions for knowledge creation

In order to provide direction for managers who want to develop more effective knowledge management outcomes for their organisations Nonaka and Takeuchi (2004, pp. 68-80) record a common set of enabling conditions that can be instituted by managers to engender knowledge creation.

2.4.2.1 Intentions

Nonaka and Takeuchi (2004, pp. 68-70) found that the intentions of individuals and managers are influential in shaping the outcomes of knowledge creation. At the personal level, individuals who are motivated sufficiently to undertake the difficult task of thinking through the problems (paradoxes) that dominated the problem solving efforts of the company are more effective contributors to knowledge creation. Similarly, the
organisations that display a commitment to knowledge creation by providing sources of information to employees are more effective in the management of knowledge creation.

2.4.2.2 Autonomy

The granting of autonomy to individuals recognises that a certain degree of freedom needs to be provided to employees if they are to feel confident that they can experiment with their creativity without fear of chastisement (Nonaka & Takeuchi, 2004, pp. 70-73). This is a difficult aspect of knowledge creation to manage because recognition needs to be given to the fact that individuals will be primarily motivated by their own curiosity and desire to satisfy more personal goals. However, this needs to occur within the general problem solving goals of the organisation. When these two goals diverge, it is possible that the granting of autonomy may lead to suboptimal outcomes.

2.4.2.3 Fluctuations and Creative Chaos

This condition refers to the incentives that changing conditions or perceived chaos give to knowledge creation (Nonaka & Takeuchi, 2004, pp. 74-76). These conditions ideally induce or strengthen commitment of individuals to deal with an uncertain environment. The distinction that separates these two conditions is that creative chaos is the experience of a real crisis. Nonaka and Takeuchi go on to make two significant qualifications. The first is that the existence of chaos does not naturally lead to positive outcomes. Without proper reflection such chaos may be destructive (Nonaka & Takeuchi, 2004, p. 76). The other qualification is that fluctuations may not only be triggered by random autonomous events but can be instituted through purposeful action by management.

2.4.2.4 Redundant Information

Nonaka and Takeuchi (2004, pp. 76-78) admit that redundant information may seem counter-intuitive to managers who see the creation of efficiency as paramount. Redundant information refers to the existence of information that goes beyond immediate operational requirements. The value of redundant information, from a knowledge creating perspective, is to facilitate the inclusion of new knowledge during synthesis. This may lead to understanding of ideas that companions may want to express but are constrained in articulating such knowledge. Redundant information can also lead
to the creation of unusual channels of communication. As such channels may counter official hierarchical channels, they may lead to new and novel perspectives. Nonaka and Takeuchi admit that the management of redundant information is qualitative in that some freedom must be extended to enable these informal channels to flourish.

2.4.2.5 Requisite Variety

Availability of a requisite variety of information develops greater information handling capabilities in staff (Nonaka & Takeuchi, 2004, pp. 78-80). Exposure to unfamiliar information types forces individuals to consider new perspectives. In order to maximise opportunities for dealing with the contingencies of the external environment Nonaka and Takeuchi advise that the requisite variety of information sources reflect or are drawn from the external environment in which the organisation exists.

2.4.3 CTCs and Nonaka and Takeuchi’s Knowledge Creating Theory

Nonaka and Takeuchi’s Knowledge Creating Theory provides a number of concepts that can be used to gain a better understanding of knowledge creation within CTCs. The rich descriptions that Nonaka and Takeuchi provide have potential for addressing in detail whether CTCs create knowledge, the nature of such knowledge creation, barriers to knowledge creation and most importantly, ways to engage with CTCs on the basis of knowledge-creating activities.

Four Analytical Constructs are derived from Nonaka and Takeuchi’s Knowledge Creating Theory to assist in the analysis of CTCs in this study (see Section 2.3.2).

2.4.3.1 Paradox

The first Analytical Construct of Paradox concerns the need for problem solving in situations in which current knowledge is inadequate or inconsistent (Section 2.3.2.1). Nonaka and Takeuchi identify a paradox as being the motivator for knowledge creation.

2.4.3.2 Epistemology

The second Analytical Construct relates to what Nonaka and Takeuchi describe as the epistemological dimension of their theory (Section 2.3.2.2). Epistemology in Nonaka and Takeuchi’s work refers to the transformations that occur between tacit and explicit
knowledge. This leads to the four-part SECI model comprising Socialisation, Externalisation, Combination and Internalisation. Evidence of these transformations will provide insight into the nature of knowledge creating activities that have occurred in CTCs.

2.4.3.3 Ontology

The third Analytical Construct is that of Ontology which describes how knowledge can be communicated from individuals to groups to the organisation and beyond (Section 2.3.2.3). This concept will enable the scale of knowledge creation within CTCs and the broader community to be systematically observed and assessed.

2.4.3.4 Knowledge Spiral

The fourth Analytical Construct of Knowledge Spiral describes the interaction between the two constructs of Epistemology and Ontology (Section 2.3.2.4). The Knowledge Spiral in part refers to the cyclic nature of transitions between tacit knowledge and explicit knowledge when innovation occurs. The diffusion of such knowledge to increasingly larger groups of people means that the circle never joins as knowledge is transformed from one form to the next but forms a spiral. The extent to which these processes are evident in CTCs will provide important information about knowledge creation.

The analysis will provide a way to determine whether knowledge creation is occurring in CTCs. The nature of such innovation will also be apparent in the responses generated to each of the constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. In addition, it will be possible to make judgements about the participation of the community, the private sector and government in relation to knowledge creating activities.

While there is no prior expectation that managers will have purposely implemented conditions conducive to knowledge creation, the existence of such conditions may act as complementary indicators about knowledge creation. It is for this reason that the Enabling Conditions that Nonaka and Takeuchi were used to assess whether such conditions existed in CTCs (see Section 2.3.3).
Taken together, the four Analytical Constructs and the five Enabling conditions constitute an Analytical Framework that the present study was able to apply to investigate knowledge creation within the CTCs of this research.

Given the centrality of ICTs to the function of CTCs it follows that consideration be given to the use of ICTs in the creation of knowledge as described by Nonaka and Takeuchi. They make specific reference to ICTs in their discussion on SECI. References to ICTs are most apparent in the discussion pertaining to Combination where the combining of explicit knowledge is evident in “computerised communications networks...[and] ... databases” (Nonaka & Takeuchi, 2004, p. 61).

It is not difficult to extrapolate from such thinking to other conversion modes in which explicit knowledge is present. For example, during Externalisation it would seem reasonable that people would use ICTs to codify personal knowledge in words, numbers and diagrams. Similarly during Internalisation ICTs may be convenient to enable explicit knowledge to be made available.

Support for this extrapolation can be found in discussion about the fundamental construct of ba (Nonaka et al., 2001; Nonaka & Konno, 1998). Even though ba is most commonly observed in a fixed physical space-time relationship, Nonaka and Konno (1998, p. 40) suggest that ba also exists as a shared space for knowledge creation even when people are not physically co-located. Knowledge creation in such circumstances is enabled through the use of shared mental models. By describing ba as existing in “virtual space” Nonaka and Konno (1998, p. 41) imply that people must communicate using ICTs while engaging in knowledge creation over distance.

The sustainability of knowledge creation processes that rely on ICTs brings the analysis back to Gurstein’s (2004) identification of innovation. Given Gurstein’s emphasis on community and the ways in which ICTs are used by communities to undertake innovation, localised knowledge creation in the CTCs of this study will be of interest.
2.4.4 Known qualifications and limitations

Some of the criticisms that Nonaka and Takeuchi have received in the literature seek to limit the application of their theory. Consequently, this section considers whether such critiques should prevent the application of their theory in this study. While it is not feasible to address every criticism, the discussion here deals with significant issues that have the potential to rule out Nonaka and Takeuchi’s Knowledge Creating Theory as a possible analytical framework.

Some authors, such as Glisby and Holden (2003), claim that the emphasis that Nonaka and Takeuchi give to Japanese companies within their case studies rules out application of their theory for non-Japanese cases. Weir and Hutchings (2005) respond to this claim by arguing that the framework is useful for comparative purposes rather than seeking to emulate the success of Japanese companies by slavishly following their management practices. For example, they use Nonaka and Takeuchi’s Knowledge Creating Theory in order to compare the knowledge management practices of Chinese and Arabic companies demonstrating that the constructs have applicability beyond Japanese organisations.

Another possible objection concerns the obvious difference between case study organisations that Nonaka and Takeuchi rely on, Japanese and American-based corporations, and the CTCs of this study. This contention is addressed by the argument that Gurstein puts forward in relation to the similarity of innovative processes when comparing people working at the technological frontier and those working in local communities. Both contexts can be distilled to groups of people who are required to use a range of strategies to deal with the uncertainty of their respective situations. Accordingly, the fundamental experience of problem solving in the face of uncertainty is cited as the primary justification that makes Nonaka and Takeuchi’s Knowledge Creating Theory appropriate to this study.

The final issue relates to definitions of the two-part nature of knowledge that Nonaka and Takeuchi subscribe to referred to as the ‘knowledge continuum’. This debate is primarily of significance to management theorists because it concerns the role of social context and social practices in the creation of knowledge. Reflecting on the previous
two objections, concern about cultural contexts of Japanese corporations give way to questions of epistemology. One aspect to this debate focuses on Nonaka and Takeuchi’s attempt to connect their theory with Western philosophical thought. For example, Ray (2008) accuses Nonaka and Takeuchi of “casuistry” (p. 248) and those that subscribe to their theory as naive “proselytes” (p. 242). Ray argues that Nonaka and Takeuchi have essentially reversed the famous statement of Polanyi ‘we know more than we can tell’ to “to tell what [we] know” (p. 243). In contrast, Gueldenberg and Helting (2007) are less dismissive of Nonaka and Takeuchi’s efforts to accurately describe tacit knowledge creation. As Gueldenberg and Helting (2007, p. 120) surmise, Nonaka and Takeuchi’s attempt to connect with Western philosophical thought leaves them wanting in a philosophical context though they conclude that “the framework developed by Nonaka and his colleagues has the potential for offering a comprehensive and deep understanding of knowledge and knowledge management”.

Another aspect to this debate relates to management practice in the creation of tacit knowledge (Essers & Schreinemakers, 1997; Tsoukas, 2003). Knowledge Management theorists Cook and Brown (1999), while supportive of Nonaka and Takeuchi’s work, challenge their conceptual understanding of tacit knowledge and explicit knowledge. In seeking to add robustness to Nonaka and Takeuchi’s work, Cook and Brown (1999, p. 394) question the transformations between tacit knowledge and explicit knowledge described in the SECI model. Within Cook and Brown’s (1999, pp. 381-383) conceptual framework, tacit knowledge and explicit knowledge are considered as distinct entities that have no natural connection leading to conversion from one into the other. Cook and Brown (1999, p. 397) maintain that tacit knowledge and explicit knowledge are generated in their own right through interaction by individuals and groups of individuals with the physical world.

The point of contention that can be discerned from this brief review of these critiques rests on the relationship between tacit knowledge and explicit knowledge and whether tacit knowledge is partially amenable to expression through speech, gestures, diagrams and so on, or, whether it is wholly tacit and not amenable to any attempt to be made explicit (Gourlay, 2006). In acknowledging this contention the possibility that the application of constructs derived from Nonaka and Takeuchi Knowledge Creating
Theory may lead to inconsistencies in the analysis of research data is recognised. Foreshadowing discussion of case study research methods in Section 3.3, the discovering of inconsistencies is an important part of theory development. Given Gueldenberg and Helting’s and Cook and Brown’s general support for the work of Nonaka and Takeuchi the thesis proceeds to adopt the four Analytical Constructs and five Enabling Conditions that have been identified with the view of incorporating the views of critics when considering the question of limitations and further research in the final chapter.

2.5 Thesis Research Questions

A number of research questions (RQ1-7) are now outlined that address the primary research goal of developing a theory-based rationale that assists CTCs to remain successful in the face of insufficient income support (Section 1.3). These research questions guide the collection and analysis of research data. The research questions can be divided into two groups. The first three research questions (RQ1-3) are designed to gather information about the CTCs from the NSW CTC Program after June 2005. Given the new context after June 2005, where government funding was no longer available to support these CTCs, the primary purpose of these questions is to determine whether the analysis undertaken in this chapter needs qualification in the light of more recent information. The last four research questions (RQ4-7) are primarily designed to develop the theory-based rationale stated in the primary research goal. To that end, the Analytical Constructs derived in Section 2.3.4 will be applied to three case studies and assessed for their utility in developing the theory-based rationale.

The first research question (RQ1) seeks to determine the number of CTCs that have remained in operation as reflected in the membership of the umbrella organisation called the Community Technology Centres Association (CTCA). The CTCA was established at the conclusion of the NSW CTC Program to perform the role of centrally coordinating the activities of CTCs that were part of the NSW CTC Program.

RQ1. How has the membership of the CTCA changed since the cessation of funding in June 2005?
In order to understand what these remaining CTCs have done to maintain their operations the research identifies initiatives that were undertaken by CTCs.

**RQ2. What initiatives have been undertaken by CTCs (as reflected in the CTCA membership) to maintain services since the cessation of funding in June 2005?**

The previous two questions lay the foundation for the third research question which seeks to understand these initiatives in the light of the three primary development actors defined by Hall and Midgley, namely community, private sector and government (see Section 2.2.3). The question of community is qualified by the need to assess the maintenance of autonomy which was found to be of primary importance in the literature review in Section 2.2.4.

**RQ3. What insights do these initiatives suggest in relation to the issues of:**

- autonomy of local communities;
- the involvement of the private sector in these CTCs; and
- the involvement of government in these CTCs?

After incorporating more recent information into the thesis, the purpose of the research questions moves to theory building. These questions are written specifically for Nonaka and Takeuchi’s Knowledge Creating Theory where the four Analytical Constructs, described in Section 2.4.3, and the five Enabling Conditions, described in Section 2.4.2, are applied to the analysis and considered in relation to the primary research goal detailed in Section 1.3.

**RQ4. Does the application of the Analytical Framework (four Analytical Constructs and five Enabling Conditions) derived from Nonaka and Takeuchi’s Knowledge Creating Theory provide a credible framework for understanding the diverse initiatives in the case study CTCs?**

The next question seeks to understand the ways in which these initiatives contribute to the ongoing operation of the CTC. The purpose is to recognise knowledge creating activities; some of which may not be immediately amenable to commercial exploitation.
This goes some way to explain the apparent gap between CTCs as successful social enterprises and the factors that affect revenue earning potential.

RQ5. Do these knowledge-creating activities address the apparent gap between the success of CTC as social enterprises and the difficulties they experience in earning income?

Given the information systems focus of this thesis, the next research question seeks to delineate the ways that ICTs are used and whether this use can be associated with knowledge creation.

RQ6. In what ways are ICTs used and can these be related to Nonaka and Takeuchi’s Knowledge Creating Theory?

In response to Hall and Midgley’s call for “holistic development policy” (see Section 2.2.3) the thesis contends that there is a need to better engage community, the private sector and government with CTCs in the face of insufficient income support. The following research question seeks to develop a theoretical justification to achieve such engagement from the insights delivered from the previous research questions.

RQ7. Given the consistent application of Nonaka and Takeuchi’s Knowledge Creating Theory to the case studies, what theoretical insights can be derived that are able to assist the community, private sector and government to interact with CTCs in ways that promote their success as social enterprises in contexts of limited income support.

2.6 Conclusion

This chapter began by reviewing the NSW CTC Program. One significant aspect of this review was the provision of information that gave voice to the notion of CTCs as “successful social enterprises”, as described in the Final project report (NSW DoC, 2004, p. 3). It was also possible to gain a deeper understanding of the difficulties CTCs experienced in generating income. In order to establish theoretical links with the NSW CTC Program the national policy context in which the NSW CTC Program existed was described. It was found that a high degree of consistency could be found between the
NSW CTC Program and the national policy context of Australia at that time. On this basis it was argued that Hall and Midgley’s normative approaches to Social Development were appropriate for the analysis of the NSW CTC Program. Out of this analysis the primary research goal was qualified by the finding that ways were required to better engage government in the support of CTCs while promoting autonomy of CTCs to address issues of community concern.

The chapter outlined Gurstein’s rationale on innovation as presenting a promising course of action to better understand the relationship between the effectiveness of CTCs, in a social sense, and their ability to generate income. Nonaka and Takeuchi’s Knowledge Creating Theory was chosen to be the specific source of the innovation-based analytical framework. Four Analytical Constructs and five Enabling Conditions were derived from Nonaka and Takeuchi’s Knowledge Creating Theory to guide the collection and analysis of research data about the initiatives of CTCs that were once part of the NSW CTC Program. Finally, seven research questions were developed to guide the investigation. The first three research questions (RQ1-3) were designed to incorporate updated information about the CTCs into this study. The remaining four research questions (RQ4-7) aim to use Nonaka and Takeuchi’s Knowledge Creating Theory as the theory-based rationale that is able to address the conundrum of maintaining CTCs as successful social enterprises in situations of insufficient income generation by better engaging the community, private sector and government with CTCs.
Chapter 3 Methodology

3.1 Introduction

The purpose of this chapter is to set out the various procedures that were undertaken to address the seven research questions formulated in the previous chapter. The seven questions can be separated into two parts (see Table 3.1). Research questions RQ1-3 aim to bring an updated perspective of the CTCs described in the literature review. Research questions RQ4-7 aim to develop theoretical insights into the primary research goal of assisting community, the private sector and government to interact with CTCs in ways that promotes their success as social enterprises in contexts of limited income.

Table 3.1 Thesis Research Questions

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<th>Research Questions Part 1</th>
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<tbody>
<tr>
<td>RQ1 How has the membership of the CTCA changed since the cessation of funding in June 2005?</td>
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<tr>
<td>RQ2 What initiatives have been undertaken by CTCs (as reflected in the CTCA membership) to maintain services since the cessation of funding in June 2005?</td>
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<tr>
<td>RQ3 What insights do these initiatives suggest in relation to the issues of:</td>
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<td>• autonomy of local communities;</td>
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<tr>
<td>• the involvement of the private sector in these CTCs; and</td>
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<tr>
<td>• the involvement of government in these CTCs?</td>
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<tr>
<th>Research Questions Part 2</th>
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<tr>
<td>RQ4 Does the application of the Analytical Framework (four Analytical Constructs and five Enabling Conditions) derived from Nonaka and Takeuchi's Knowledge Creating Theory provide a credible framework for understanding the diverse initiatives in the case study CTCs?</td>
</tr>
<tr>
<td>RQ5 Do these knowledge-creating activities address the apparent gap between the success of CTC as social enterprises and the difficulties they experience in earning income?</td>
</tr>
<tr>
<td>RQ6 In what ways are ICTs used and can these be related Nonaka and Takeuchi’s Knowledge Creating Theory?</td>
</tr>
<tr>
<td>RQ7 Given the consistent application of Nonaka and Takeuchi’s Knowledge Creating Theory to the case studies what theoretical insights can be derived that are able to assist the community, private sector and government to promote the success of CTCs as social enterprises in contexts of limited income support.</td>
</tr>
</tbody>
</table>
The steps undertaken in this chapter to develop a suitable design for the research begin with a discussion of the varying influences different philosophies have on research design. Two significant areas of research are identified as guiding the overall development of the research design. These were Information Systems (IS) research and Community Informatics (CI) research. This chapter then explains the intention to adopt an interpretive approach. This is then followed by an explanation of the qualitative foundations of the research design, the two part nature of the design to address research questions RQ1-3 and RQ4-7 respectively, and the dominant methods employed; document analysis and case study. Having provided an overview of the research design the chapter then proceeds to detail the methods used for data collection and the techniques by which data was analysed and then reported (Section 3.4). The following section (3.6) details the measures that were employed to promote the trustworthiness of the interpretations. This section also details the procedures that were used to ensure that the research was conducted at a recognised ethical standard.

3.2 Situating the Research

3.2.1 Information Systems (IS) research methods broadly defined

The task of developing an appropriate method to respond to the research questions is influenced by a number of factors. As Metcalfe (1996, p. xi) reasons, the successful completion of a research project is ultimately determined by the “approval of a knowledgeable audience”. Such approval is an important indicator of the reliability and validity of such research.

Given the range of Information Systems (IS) methods on offer, Mingers and Willcocks (2004, pp. xiv-xv) suggest that IS researchers inform themselves of the philosophical contexts from which theories emerge and to adopt a critical stance in order to understand the strengths and limitations of their chosen approach. For instance, both quantitative and qualitative research traditions are represented in IS research. As Myer (1997) explains, the former represents a mathematically based research tradition that is derived from the natural sciences. The underlying assumption here is that natural laws govern the behaviour of all systems in nature including social systems (Metcalfe, 1996, pp. 18-38). The latter represents a common choice for those studying social and cultural
phenomena. The underlying assumption here is that so numerous are the possible manifestations of interactions in social relations that qualitative research provides a more illuminating understanding of the research problem than the quantitative methods do (Myers, 1997). However, the quantitative-qualitative dichotomy can be too starkly defined and separated (Creswell, 2003). By using a mixed methods approach it is possible to employ quantitative methods to support assertions developed from qualitative reasoning, and vice versa, as a means to develop more robust responses to research questions (Creswell, 2003, pp. 15-17).

Triangulation is signalled at this point as a general strategy that has been used to promote the reliability and validity of the research. Triangulation is a strategy that seeks to use “multiple methods and sources of data in the execution of a study” (Mathison, 1988, p. 13). As Mathison (1988, p. 14) goes on to explain, dissimilarity need not be limited to data types (triangulation of data) or methods (methods triangulation) but can also include different evaluators (evaluator triangulation). The specific methods of triangulation used in this research will be explained in Section 3.4 where the topic of research data collection is discussed and Section 3.6 where the trustworthiness of the research is discussed.

In seeking to classify the nature of research, Myer (1997) delineates three possibilities: positivist, interpretive and critical. He explains that positivist research works under an assumption that reality can be objectively observed and recorded and is entirely independent of the observer. Interpretive research acknowledges the influence that language, consciousness and shared meaning has in social interactions not only among participants in the research but also with the researcher. Schwandt (2000, p. 193) distinguishes interpretive research on the basis that researchers “emphasize the contribution of human subjectivity (i.e., intention) to knowledge without sacrificing the objectivity of knowledge”. Critical research seeks to examine asymmetries of power within social groups as explanations for social situations particularly those that contain social disadvantage and structural inequalities (Walsham, 2005, p. 113).

Of these three philosophical perspectives the interpretive perspective is most relevant to this thesis. This is consistent with the two primary theories discussed in the Chapter 2,
namely Hall and Midgley’s (2003) Social Development Theory and Nonaka and Takeuchi’s (2004) Knowledge Creating Theory. The work of both pairs of theorists can be readily associated with interpretive research because there is an acceptance of the subjectivity of knowledge in both theories.

Walsham (2005, p. 114) argues that interpretive research has potential for extension into critical research. For him, the choice of whether to extend the analysis into critical research is a question for the researcher to address. In this research there is recognition that the theories that underpin the analysis are open to criticisms as already discussed in Sections 2.2.3 and 2.4.4. Certainly, the work of Hall and Midgley (2003), given their identification of inequalities that can arise from both Statist and Enterprise approaches to Social Development, is amenable to a critical analysis. However, given the fundamental task of assessing the value of a theory of innovation to better understand the challenges of CTCs in regional NSW, the present research is not primarily directed at discovering whether the existence of unequal power relationships lies at the heart of the research question.

Another issue that requires clarification is the one of establishing an appropriate ‘distance’ between researcher and research subjects (Schwandt, 2000, p. 193; Walsham, 2006, pp. 321-322). At one end of this scale, the ‘dispassionate and detached’ researcher has difficulty in accessing detailed information that the researcher is not privy to. At the other end of the scale, the researcher who is fully immersed in the research situation as a participant has difficulty in maintaining objectivity. Walsham (2006, pp. 321-322) argues that this question is a matter of degree rather than a dichotomy where the experience of the researcher and her reflexive self awareness are key to better understanding the research. He goes on to say that in most situations the choice of research locations and subjects will shape the nature of involvement of the researcher.

In the case of this research, the need to access as many cases as possible in a limited time was influential in guiding the methods of data gathering and analysis. While this is the subject of detailed discussion in the remaining sections of this chapter, the limit of two days at each location was not sufficient to become fully immersed in each location’s activities. As a consequence the level of analysis and nature of data gathering
was tailored to address the limitations of time. To facilitate interaction, a three hour course in HTML was offered to each CTC by the researcher. It is also acknowledged that observations and related interpretations will, to some extent, be shaped by personal knowledge and experience. This issue is given further consideration in Section 3.6 where trustworthiness of interpretations is discussed.

3.2.2 IS Research in the community: Community Informatics

Having established the broad parameters of Information Systems research, its application in the community domain through Community Informatics research is now considered. Community Informatics (CI) is closely related to Social Informatics (SI) research where there is a common interest in the complexities of ICT-use by people. Where the former seeks to focus on ICT-use and benefits within communities the later covers a broader agenda where ICT use by institutions in society is studied (Gurstein, 2007, p. 43).

Social Informatics is defined by Kling (2000, p. 246) as “the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts”. In seeking to understand patterns of ICT adoption and its consequences, Kling suggests that researchers should look for evidence in the social environment. The alternative approach that Kling criticises is one that oversimplifies the relationship between cause and effect. By characterising ICTs as a tool Kling (2000, p. 249) states that many important social influences on the adoptions of ICTs are ignored such as incentives, social relationships and knowledge. Kling (2000) outlines the “socio-technical” model of ICT adoption which seeks to engage with the complexities of ICT use in real world situations. Further, Kling (2000, p. 259) calls for systematic research that is able to respond to such complexities in order to inform public policy and professional practice.

The issue of complexity provides a convenient segue into the topic of Community Informatics which also holds that the adoption of ICTs by people involves complex socio-technical relationships (de Moor, 2009a; Stillman, 2010). To distinguish SI from CI, the latter has a specific interest in the use of ICTs by communities (Gurstein, 2007, p. 43). The concept of ‘effective-use’ defines a broad range of requirements that CI
researchers see as important in the goal to support communities through their adoption of ICTs (Gurstein, 2003). These include “local economic development, social justice and political empowerment; ensuring access to education and health services; enabling local control of information production and distribution; and ensuring the survival and continuing vitality of indigenous cultures” (Gurstein, 2003). Coupled to the desire to see transformations within communities through the use of ICTs, CI also recognises the challenge of achieving viability of economic and institutional arrangements that give support to community-centred ICT projects but also in the community’s desire and capability to assimilate ICTs (Gurstein, 2007, p. 23 & 36). It is in response to the variety of problems that communities face, that de Moor (2009a) states that the use of ICTs by communities can be messy but can lead to innovative and unanticipated outcomes (Stillman, 2010). Along with Kling, both de Moor (2009a, 2009b) and Stillman (2010) see the need for CI researchers to engage in systematic research to address such complexity.

Hence four themes emerge as important from this brief review of SI and CI research. The first relates to the need to deal with the complexity of socio-technical processes of ICT adoption in communities. The extent to which the application of the Analytical Constructs and the Enabling Conditions from Nonaka and Takeuchi’s Knowledge Creating theory enable the systematic analysis of such complexity will provide one important indicator of the significance of this research.

The second theme of effective use reflects the emphasis that CI research and practice gives to achieving benefits for the community. Accordingly, the research will be assessing the ways in which community-based ICT initiatives provide benefits to the communities in which these are located.

The third theme that emerges as important from CI research is the issue of sustainability. Sustainability is significant because it is directly relevant to the research goal of the thesis which seeks to maintain the success of CTCs in contexts where insufficient income support exists.

CI research recognises the importance of practitioners and other participants. CI research practice seeks to promote the development of grassroots expertise in the use of
ICTs to address problems at the local level (Gurstein, 2007, pp. 28-30). Accordingly, research in the CI domain requires that attention be given to promoting the involvement of research subjects in order to speed up the delivery of research benefits to target populations. As Wiseman Nkuhlu contends, communities need to play an active role as “architects of their own sustainability” rather than rely on the “words of benevolent guardians”.11 The expectation of the CI community is that active consideration will be given to research subjects not as passive beneficiaries of research but also as active contributors. Previous mention of the delivery of a HTML course in the previous section was, in part, inspired by a need to give something back to the CTCs that participated in this research.

3.3 Research Design

The research design covers the identification of suitable methods, the collection of research data, the analysis of research data and reporting of this analysis. The task of developing such a design was divided into two sections reflecting the two-part nature of the research questions (Figure 3.1). Research questions RQ1-3 seek to determine what has occurred over the three years since the cessation of government funding to the NSW CTC Program. To that end, the research was designed to develop an updated description of the activities and attributes of CTCs that contribute to or detract from their ongoing operations. Research questions RQ4-7 focus on theory building. Using analytical constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory a number of important insights were developed to understand the relationship between CTCs as ‘highly successful social enterprises’ and the difficulties they experience in earning income. The detailed nature of these descriptions and these insights allow development of theory that can be used to inform interventions by government that better support CTCs.

As can be seen in Figure 3.1, two primary methods were employed to address research question RQ1-7: document analysis and case study method.

Document analysis was used to obtain the annual membership details from the umbrella organisation that represents the majority of CTCs in regional NSW called the Community Technology Centres Association (CTCA). The analysis of documents is a method most commonly associated with historiography. Traditionally in historiography, documents are categorised into primary and secondary sources (McCulloch, 2004). Historiography was effective in responding to RQ1-3. The data from the annual collection of information from member organisations by the CTCA is contemporary to the time period under review. Accordingly, such evidence is considered to be a primary source in a historiographical analysis.

The second primary method used to address the research questions was case study method (Creswell, 1998; Myers, 1997; Remenyi, Money, Price, & Bannister, 2002; Stake, 1995; Yin, 2003). Creswell (1998, p. 61) describes case study research as being an “exploration of a “bounded system” or a case (or multiple cases) over time through detailed, in-depth collection involving multiple sources of information rich in context”.

The efficacy of case study method stems from its value in the study of complex social situations. For example, Yin (2003 p. 5) contends that the case study method is appropriate for the study of contemporary events that the researcher has little control
over. Myers notes that situations in which the relationship between phenomena and context are intertwined further suggests the application of case study method (Myers, 1997).

The opportunity to draw on a number of cases in this study opened up the possibility to move from a single case study research design to a multiple case study research design. This provided the analysis with a richer diversity of experiences and events to draw on. Creswell (1998, p. 120) argues that it is in the contrasts between cases that the generation of insights can be more incisive. One significant attraction of multiple case studies is that this method seems to generate a more compelling argument than a single case study (Stake, 2006, pp. vi-vii; Yin, 2003, p. 46). That is not to suggest, as Flyvberg (2006) argues, that a single case study has no place in theory development.

Two genres of multiple case study method were applied to address research questions RQ1-3 and RQ4-7 respectively. The application of the multiple case method to research question RQ1-3 was designed to maximise opportunities to discover important factors in local communities that were germane to the operations of their CTC but not represented in the documentary evidence from the CTCA. Collection of accounts from research sites continued until it became apparent that the research data were yielding increasingly less significant insights. Glaser and Strauss (1967, pp. 61-62) describe this situation as one of “theoretical saturation” and can be used to justify the cessation of research data collection. Remenyi et al. (2002, pp. 10-15) describe the use of multiple cases in this context as developing a “global perspective” on a research problem.

With questions RQ4-7, the purpose of the research moves from description to theory building. This calls upon another genre of multiple case study research where the number of cases is reduced to enable a deeper analysis of each case. Yin (2003, pp. 42-43) refers to this as an “embedded case study”. Further, cases are selected to explore phenomena of interest using a technique called “purposeful sampling” (Creswell, 1998, pp. 118-120).

In order to maximise the efficacy of the analysis, diverse cases were chosen (Creswell, 1998, p. 123). The potency of such analysis stems from one of two outcomes: firstly to confirm existing theory; or secondly, to provide a basis for the extension of such theory.
to incorporate divergent data. Indeed, the application of analytical constructs from Nonaka and Takeuchi’s Knowledge Creating Theory in this research was undertaken in full awareness that points of divergence were likely to occur rather than finding an exact replication of the examples found in Nonaka and Takeuchi’s studies. This in turn led to discussion pertaining to theory building.

The means by which theory is developed from case study accounts is through analytical generalisation. Analytic generalisation is defined by Yin (2003, pp. 32-33) as a process where “previously developed theory is used as a template with which to compare the empirical results of a case study”. In this case “dissimilar results are predicted for predictable reasons” (Yin, 2003, p. 47). Accordingly, the cases chosen for this study exemplify such differences (Creswell, 1998, p. 119).

Yin (2003, p. 32) likens analytical generalisations to experiments in which “replication logic” is used to make comparisons between cases. In this research, the analytical framework derived from Nonaka and Takeuchi’s Knowledge Creating Theory is the replication logic. The Analytical Constructs derived from Nonaka and Takeuchi provided a rationale that was used to explain diverse characteristics of each of the case studies. In turn, the consistency by which diverse circumstances can be explained provides the basis on which the generalisability of the research may be addressed for theory building (Yin, 2003, p. 37). Importantly, the purpose of this method is not the unearthing of a ‘formula’ that will guarantee success for CTC managers.

3.4 Research Methods

3.4.1 Collection of research data

The collection of research data described in the previous section included obtaining relevant documents from the CTCA, undertaking interviews with CTC personnel, obtaining information from customers and volunteers through surveys. The following discussion explaining the ways research data was selected is supported by Appendix B which explains the associated instruments while Appendix D contains the forms used in the collection of data.
3.4.1.1 Document Analysis

Drawing on the discussion in Section 3.3, it can be seen that the documents used in this thesis fall into the category of primary documents. These documents consisted of an unpublished report and internal membership data from the CTCA (see Appendix A). The unpublished report, titled *CTC Statistics for 2005/06 Financial Year* provided information about the number of CTCs that were operational at the beginning and end of the financial year 2005-2006. Internal membership data, referred to in this thesis as *2007-2008 CTCA Membership Returns*, covered the financial year 2007-2008.

The information that was gleaned from the documents provided by the CTCA was used to address research questions RQ1-3. Table 3.2 and Table 3.3 indicate the categories of information that were used in these documents and the research questions to which they were applied.

While these documents reveal information that responds directly to the research questions, the documents are by no means inert. For example, the analysis of *2007-2008 CTCA Membership Returns* revealed that it was a working document that had minor errors and explainable inconsistencies were evident (see Appendix A.1). The list of confirmed members did not tally with the data sheet of members’ details. This is because some centres had not sent their membership details in even though they had sent payment. Others had verbally indicated continued membership but had not sent payment for membership dues.

3.4.1.2 Interviews

Semi-structured interviews were used to gather information from CTC managers and volunteers. According to Rubin and Rubin (2005), interviews are a rich source of information. Not only are researchers able to gain potential access to the totality of a respondent’s experience in a subject area, it is also possible to gain the interviewee’s insights and opinions that aid in the analysis of the problem.
### Table 3.2 Association between CTC Statistics for 2005/06 Financial Year and research questions

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<thead>
<tr>
<th>CTC Statistics for 2005/06 Financial Year</th>
<th>Information collected and why</th>
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<tr>
<td>Centre identification</td>
<td>This information was used to determine the number of centres in operation in July 2005 and in June 2006 in order to address research question RQ 1</td>
</tr>
<tr>
<td>• Identifying details</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3.3 Association between 2007-2008 CTCA Membership Returns and research questions

<table>
<thead>
<tr>
<th>2007-2008 CTCA Membership Returns</th>
<th>Information collected and why</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Centre identification</td>
<td>This information was used to determine the number of centres in operation in July 2007 and in June 2008 in order to address research question RQ1</td>
</tr>
<tr>
<td>• Identifying details</td>
<td></td>
</tr>
<tr>
<td>2. Staff &amp; Volunteers</td>
<td>This information was used to determine the level of volunteer support that existed as a strategy that enabled ongoing operation of the CTC (addressed research question RQ2)</td>
</tr>
<tr>
<td>• Full Time (hrs/week)</td>
<td></td>
</tr>
<tr>
<td>• Volunteer Operation</td>
<td></td>
</tr>
<tr>
<td>• Part-time/Casual (Hrs/week)</td>
<td></td>
</tr>
<tr>
<td>• Volunteers (hrs/week)</td>
<td></td>
</tr>
<tr>
<td>3. Agencies</td>
<td>In response to research question RQ2 this information was used to determine initiatives conducted on behalf of government as a strategy that enabled ongoing operation of the CTC. This information was also required for discussion in research question RQ3c</td>
</tr>
<tr>
<td>• Centrelink</td>
<td></td>
</tr>
<tr>
<td>• Medicare</td>
<td></td>
</tr>
<tr>
<td>• ATO</td>
<td></td>
</tr>
<tr>
<td>• RTC</td>
<td></td>
</tr>
<tr>
<td>• Other</td>
<td></td>
</tr>
<tr>
<td>4. Organisation Description</td>
<td>No associated research question except for “Avg People Service/week”</td>
</tr>
<tr>
<td>• Mainstreet Location</td>
<td>Relevant to research RQ1</td>
</tr>
<tr>
<td>• Disabled Access</td>
<td></td>
</tr>
<tr>
<td>• Public Liability</td>
<td></td>
</tr>
<tr>
<td>• Avg People Serviced/week</td>
<td></td>
</tr>
<tr>
<td>5. Financial Information</td>
<td>This information was relevant to research question RQ3b but was subsequently found to be of limited value and was not used.</td>
</tr>
<tr>
<td>• Income</td>
<td></td>
</tr>
<tr>
<td>• Total Expenses</td>
<td></td>
</tr>
<tr>
<td>• Equity</td>
<td></td>
</tr>
</tbody>
</table>
6. Community Profile  
- Seniors / Aged  
- Youth  
- Disabled  
- Indigenous  
- Multicultural  

This information was used to determine initiatives that related to community groups as a strategy that enabled ongoing operation of the CTC (addresses research question RQ2). This information was also required for discussion in research question RQ3a.

7. Centre Services & Learning Environment  
- Self Catering  
- Provide Catering  
- Video Conferencing  
- ISDN IP  
- Data Projector  
- Printing (Small- Bulk-B & W Colour)  
- Computer Training  
- Accredited Training  

This information was used to determine business support activities as a strategy that enabled ongoing operation of the CTC (addresses research question RQ2).

8. Programs Administered  
- Local Govt  
- State  
- Federal  
- Youth / Seniors  
- Business  
- Indigenous  
- Community  
- Other  

This information was used to determine a range of relevant initiatives as a strategy that enabled ongoing operation of the CTC (addresses research question RQ2). This information was also required for discussion in all three aspects of research question RQ3.

The semi-structured interview is characterised as being half way between structured interviews - where the interviewee is required to respond to questions in a set order - and the unstructured interview - where the interviewee is given the freedom to address research issues in the order they see fit (Myers & Newman, 2007, p. 4). To that end, the research used an instrument to prompt the interviewer to ask for information that was deemed important but the order of obtaining such information was relatively unstructured. It was only towards the end of each visit (visits lasted from one to two days) that specific questions were asked in order to fill remaining gaps. The majority of interviews were audio recorded. In the few cases where interviewees felt uncomfortable with audio recording or technical faults occurred detailed notes of the interview were recorded during the interview.

Information collected from interviews was used extensively to address research questions RQ1-7. Referring to Table 3.4 it can be seen that managers were asked to
provide information about opening times, equipment, income-earning initiatives as well as the numbers of volunteers who worked at the CTC. Managers and staff were interviewed to ascertain what regular activities and one-off events were undertaken in their CTC and the role such activities played in their local strategy to maintain services and more particularly to address local problems. This information was directly relevant to research question RQ2. In relation to these activities managers and volunteers were asked about factors pertaining to community autonomy, involvement of the private sector (local business) and government agencies in the life of their CTCs. This was directly relevant to research question RQ3. Finally, managers were asked to comment on knowledge development in their CTC by referring to a list of activities describing areas of ICT-related knowledge development (see Appendix B.2 for a detailed description of the instrument used to guide data collection during interviews).

The questions used in the interviews were developed over time through literature review research and interaction with CTC managers and staff. A preliminary visit to a CTC local to the researcher’s university took place in December 2005 which enabled familiarity to be gained with an operating CTC. Initial validation of topics and questions was undertaken at the 2006 ‘Inspire’ Community Technology Centres Conference hosted by the CTCA, 18-19 September 2006. Through interviews with key CTC staff and volunteers it was possible to gain confirmation about the nature of questions presented in interviews and surveys and to eliminate others that were found to be irrelevant. Final validation occurred during the first visits to research sites where the clarity of questions to respondents was assessed.

From Table 3.4 it can be seen that the level of detail provided in these interviews enabled initiatives to be analysed for research questions RQ4-7. This was complemented by an additional level of probing that investigated a range of factors that were germane to Nonaka and Takeuchi’s Knowledge Creating Theory. This level of probing did not begin in earnest until an appropriate analytical framework had been developed during the first 11 cases.

A copy of the interview instrument that was used during visits to research sites can be found in Appendix D.
Table 3.4 Association between interview instrument and research questions

<table>
<thead>
<tr>
<th>Interview Instrument</th>
<th>Information requested and why</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1</strong></td>
<td>CTC name, opening hours and willingness for follow up interview</td>
</tr>
<tr>
<td></td>
<td>Problems and issues of concern in the local community</td>
</tr>
<tr>
<td></td>
<td>Population statistics</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td>Sources of income and other forms of material support and their significance to the CTC</td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td>Contribution of volunteers</td>
</tr>
<tr>
<td></td>
<td>Manager’s assessment of the economic viability of the CTC over the next 12 months.</td>
</tr>
<tr>
<td><strong>Section 4</strong></td>
<td>Activities, events and achievements are recorded for the ways</td>
</tr>
<tr>
<td></td>
<td>• IT was used in this activity</td>
</tr>
<tr>
<td></td>
<td>• the learning opportunities that were presented; and</td>
</tr>
<tr>
<td></td>
<td>• whether this activity addressed an area of concern to the community.</td>
</tr>
</tbody>
</table>
Managers were asked whether knowledge had been developed as a consequence of people’s involvement at the CTC. This question was designed to get specific information about knowledge development. These questions were common to the Volunteer Survey and the Customer Survey and were used to discover possible anomalies between the accounts of managers, volunteers and customers.

### Section 5

3.4.1.3 Surveys

Surveys are suited to the collection of both quantitative and qualitative research data (Metcalfe, 1996, p. 135). Accordingly, surveys were used to mainly collect quantitative research data though some provision was made to collect qualitative data. ‘Tick-a-box’ questions were formulated in ways that sought to not only provide quantitative data but to also enable comparison and corroboration with information gathered through interviews. Open-ended questions were also used where responses were required to questions that could not be sensibly categorised in a list of answers for the respondent to select. For example, open-ended questions were used to obtain information that related to the personal experiences of individuals in their use of CTC facilities. Such questions helped to develop an understanding about the significance of the CTC to the lives of individuals.

The design of the questionnaire was informed by Dillman (2000) who emphasises the importance of visual design to assist respondents to efficiently navigate the instrument, comprehend the purpose of questions and to provide accurate responses to such questions. Font size and bold face were used in the surveys of this research to aid in readability and navigation (see Appendix D). Care was taken to ensure that instructions and questions were simple enough for older children and teenagers to follow. In cases where clarification was necessary, examples were provided to enable readers to make an informed response.

Surveys were used to gather information from both volunteers and customers. Volunteer surveys were designed to add detail to research question RQ2 to better understand volunteers as a resource that assists CTCs to remain operational. Table 3.5 summarises
the nature of information gathered and the purpose of this information. Information that was gathered included factors that motivated involvement in the CTC and the nature of rewards that volunteers received from their involvement. Further explanation of the Volunteer Survey instrument along with a copy of the instrument can be found in Appendix B.3.

Table 3.5 Volunteer Survey for data collection

<table>
<thead>
<tr>
<th>Volunteer Survey</th>
<th>Information requested and why</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1</strong></td>
<td>Knowledge and skills that volunteers bring to the CTC</td>
</tr>
<tr>
<td></td>
<td>This information was used to gain an appreciation of the knowledge and skills of volunteers that CTCs benefit from.</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td>Knowledge and skills that volunteers have developed in the CTC</td>
</tr>
<tr>
<td></td>
<td>This information is used to better understand factors that motivate volunteers to contribute their time.</td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td>Other local organisations that benefit from the volunteer’s involvement in the CTC</td>
</tr>
<tr>
<td></td>
<td>This question was designed to gain an indication of the benefit other organisations in the community received because of the CTC</td>
</tr>
<tr>
<td><strong>Section 4</strong></td>
<td>Reasons for the volunteer’s initial and continued participation in the CTC</td>
</tr>
<tr>
<td></td>
<td>This information was considered useful in determining the likelihood of continued participation of volunteers in the analysis of research questions RQ2</td>
</tr>
<tr>
<td><strong>Gender and age details</strong></td>
<td>This was used to gain an understanding of the sections of the community that lend their support to their local CTC</td>
</tr>
</tbody>
</table>

The aims of the Customer Survey are summarised in Table 3.6. Customer surveys for Cases 1-11 were designed to obtain five sets of information: frequency of use of the CTC; whether the CTC had been involved in knowledge development of the respondent; what they would miss most should the CTC close; the purpose of the visit on the day they completed the survey; and the gender, age and residency information of the respondent.
<table>
<thead>
<tr>
<th>Customer Survey</th>
<th>Information requested and why</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1</strong></td>
<td>Frequency of visits per month</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td>Has knowledge development occurred?</td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td>Three factors that customers value most about their CTC</td>
</tr>
<tr>
<td><strong>Section 4</strong></td>
<td>This part of the survey asks the purpose of the customer’s visit on the day the survey was completed, whether respondents lived in the area or not, gender and age details</td>
</tr>
<tr>
<td><strong>Section 5</strong></td>
<td>Frequency of Use: Facilities and Services</td>
</tr>
<tr>
<td><strong>(Cases 12-17 only)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Final</strong></td>
<td>Open ended question</td>
</tr>
</tbody>
</table>
For Cases 12-17 an additional section was included. This additional section was designed to quantify the use of applications and devices that were gleaned from interviews carried out in Cases 1–11. The devices and applications that were surveyed were as follows: email, word processing, spreadsheet and presentation software; online chat and instant messaging; webpage design software; photograph enhancement and printing; video or audio editing; facsimile (fax) machine; scanner; and games. Respondents were also given the opportunity to nominate an application or device not contained in the previous list. The final question of the customer survey was an open-ended question asking respondents to state any relevant thoughts.

The Customer Survey was designed to assist in the answering of research question RQ3. Referring to Table 3.6 indication is given to the use of respondents’ information to research question RQ3a. The customer surveys that were distributed to Cases 11-17 were also used to address research questions RQ4-7 for the in-depth case studies. The additional section in the customer surveys that were distributed to Cases 11-17 was used to address research question RQ6 (see Section 5 in Table 3.6). Further explanation of the customer survey instrument along with a copy of the instrument can be found in Appendix B.4.

3.4.1.4 Diary of observations and reflections

The use of diaries to record the observations and reflections of the researcher is a technique drawn from two areas of research called ethnography and action research (Tacchi, Slater, & Hearn, 2003, p. 1). As well as recording observations as they occur, the diary is a convenient way to record detailed accounts of the lived experience of the researcher. By observing actions it is possible to generate knowledge through “informed reflection” (Tacchi et al., 2003, p. 2). This method is appropriate for an interpretive philosophical perspective as discussed in Section 3.2 as it recognises that the experience of the researcher will also shape reactions and thoughts to observations that are made.

The researcher recorded notes on observations and reflections in a diary throughout each visit. These notes were typed up into continuous prose as a commentary each evening using the notes written during interviews. As many of the interviews were
recorded using an audio recorder it was possible to develop a summary commentary at each location.

3.4.2 Fieldwork

3.4.2.1 Selection of research sites

The criterion that primarily guided the selection of research sites was diversity of cases. The protocol that was employed to achieve this variety was to study as many CTCs as possible within the time available in geographically dispersed locations in regional NSW (Creswell, 1998, p. 123). The reasons for this arrangement were twofold: firstly there was a need to investigate a sufficient number of cases to develop a consensus about factors determined by the research questions RQ1-3; and secondly it was to ensure that sufficient variety of cases existed to promote the efficacy of the in-depth case study analysis in relation to research questions RQ4-7.

To promote the collection of research data from diverse cases, 17 sites were studied in both coastal and rural regions stretching from the southern border to the northern border of NSW.\(^\text{12}\) Approximately one out of every four CTCA members was studied. The selection of 17 sites was determined to be sufficient once it became apparent that themes were developing in relation to the primary issue of income-earning initiatives within CTCs. This condition has been used by case study theorists to justify cessation of research data collection on the basis that little new information was being discovered (Closs, Jacobs, Swinka, & Scott, 2008, p. 602; McCutcheon & Meredith, 1993, p. 245).

The distance between CTC locations resulted in a variety of socio-economic contexts. Along with their geographic locations, Table 3.7 indicates that CTCs can be distinguished by the top five industries of employment in each locality (ABS, 2006).\(^\text{13}\) Another factor that was found to vary significantly was population which ranged between 100 people and 10,300 people. Fifteen cases had unemployment rates

\(^\text{12}\) CTCs in the Remote regions of NSW as defined by the Australian Remoteness Index of Australia (ABS, 2001) were not included in the selection of cases as they were not germane to the Regional focus of the thesis.

\(^\text{13}\) In order to maintain anonymity of responses Census data have been rounded off to avoid identification through data matching in the following ways: Population is to the nearest hundred; Industries of Employment – nearest whole percentage point; Median Age – nearest multiple of five; Unemployed - nearest whole percentage point; and Individual Median Income – nearest multiple of five dollars.
exceeding the national average of 5.2%. These ranged from 6% to 30% unemployment. Unemployment was below the Australian national average (4%) at just one location while one other location was on par with the Australian average. Median individual incomes were uniformly below the national average of $466 per week, ranging from $240 per week to $390 per week. The median age of local population was mostly higher than the national average of 37 years of age. Fourteen of the locations exceeded the national average ranging from 40 to 60 years of age. Of the remaining three locations, two were on par with the national average and one recorded a median age below the national average of 35 years. Thus the CTCs selected covered a diversity of both geographic and socio-economic characteristics.

A sub-set of cases was selected in response to research questions RQ4-7. Three case studies were selected from Cases 12-17 to explore the efficacy of constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. Following Creswell’s (1998, p. 120) advice, contrasting cases were chosen to exemplify the potency of theory in explaining the diverse attributes of the cases.
Table 3.7 Summary of research sites (ABS, 2006)

<table>
<thead>
<tr>
<th>Location No. and Area</th>
<th>Location Name Pseudonym</th>
<th>Regional Population</th>
<th>Top five Industries of employment</th>
<th>Median Age</th>
<th>Unemployed (%)</th>
<th>Individual Median Income ($/week)</th>
<th>Problems nominated by CTC manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 South Coast</td>
<td>Aldinga Waters</td>
<td>3,170</td>
<td>1. Residential Care Services 7%, 2. Accommodation 5%, 3. Clubs 5%, 4. School Education 4%, 5. Cafes, Restaurants, Takeaway Food 4%</td>
<td>60</td>
<td>13</td>
<td>275</td>
<td>Law and order; Youth unemployment; High number of retirees</td>
</tr>
<tr>
<td>2 South Coast</td>
<td>Baden Bay</td>
<td>10,300</td>
<td>1. School Education 6%, 2. Cafes, Restaurants, Takeaway Food 5%, 3. Res. Building Construction 4%, 4. Supermarket and Grocery 4%, 5. Accommodation 3%</td>
<td>45</td>
<td>10</td>
<td>335</td>
<td>High number of retirees who have moved into the area; Unemployment with the downturn of fishing industry</td>
</tr>
<tr>
<td>3 South East</td>
<td>Calamba River</td>
<td>3010</td>
<td>1. Logging and Timber Dressing 5%, 2. Cafes, Restaurants, Takeaway Food 5%, 3. Accommodation 5%, 4. School Education 5%, 5. Supermarket and Grocery 4%</td>
<td>45</td>
<td>8</td>
<td>340</td>
<td>Unemployment with the downturn of fishing industry and forestry</td>
</tr>
<tr>
<td>4 South East</td>
<td>Deavenport</td>
<td>1930</td>
<td>1. Cafes, Restaurants, Takeaway Food 9%, 2. Accommodation 6%, 3. Clubs 5%, 4. School Education 4%, 5. Residential Care Services 3%</td>
<td>50</td>
<td>10</td>
<td>305</td>
<td>Unemployment with the downturn of fishing industry; Local Aboriginal community</td>
</tr>
<tr>
<td>5 South East</td>
<td>Erindale</td>
<td>1210</td>
<td>1. Forestry and Logging 8%, 2. Logging and Timber Dressing 7%, 3. Sheep, Beef Cattle and Grain Farming 7%, 4. School Education 8%, 5. Local Government Admin. 7%</td>
<td>45</td>
<td>5</td>
<td>390</td>
<td>Transition from cattle to pine forest farming</td>
</tr>
<tr>
<td>6 South East</td>
<td>Ferngrove</td>
<td>1110</td>
<td>1. Cafes, Restaurants, Takeaway Food 6%, 2. School Education 6%, 3. Sheep, Beef Cattle and Grain Farming 5%, 4. Local Government Admin. 5%, 5. Hospitals 4%</td>
<td>45</td>
<td>4</td>
<td>370</td>
<td>Loss of services; Youth boredom; Micro-business development</td>
</tr>
<tr>
<td>Location No. and Area</td>
<td>Location Name Pseudonym</td>
<td>Regional Population</td>
<td>Top five industries of employment</td>
<td>Median Age</td>
<td>Unemployed (%)</td>
<td>Individual Median Income ($/week)</td>
<td>Problems nominated by CTC manager</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------</td>
<td>---------------------</td>
<td>----------------------------------</td>
<td>------------</td>
<td>----------------</td>
<td>------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>7 Central West</td>
<td>Houghton</td>
<td>8250</td>
<td>1. School Education 6%</td>
<td>40</td>
<td>7</td>
<td>385</td>
<td>Drought - no one has any money to spend</td>
</tr>
<tr>
<td>8 Central West</td>
<td>Lemont</td>
<td>3600</td>
<td>1. Sheep, Beef Cattle and Grain Farming 7%</td>
<td>35</td>
<td>7</td>
<td>370</td>
<td>Drought; IT equipment legacy; Commercial neutrality</td>
</tr>
<tr>
<td>9 Central West</td>
<td>Miandah</td>
<td>380</td>
<td>1. Sheep, Beef Cattle and Grain Farming 12%</td>
<td>50</td>
<td>11</td>
<td>300</td>
<td>Drought; Loss of services</td>
</tr>
<tr>
<td>10 Central West</td>
<td>Nalby</td>
<td>945</td>
<td>1. School Education 9%</td>
<td>40</td>
<td>19</td>
<td>260</td>
<td>Drought Youth boredom</td>
</tr>
<tr>
<td>11 Central West</td>
<td>Obalisk</td>
<td>4650</td>
<td>1. School Education 8%</td>
<td>40</td>
<td>11</td>
<td>325</td>
<td>Drought Family breakdown and youth boredom within Indigenous community</td>
</tr>
<tr>
<td>12 Mid-north Coast</td>
<td>Parkdale</td>
<td>975</td>
<td>1. School Education 6%</td>
<td>35</td>
<td>20</td>
<td>275</td>
<td>Law and order; Family breakdown and youth boredom within Indigenous community</td>
</tr>
</tbody>
</table>
Table 3.7 (cont’d) Summary of research sites (ABS, 2006)

<table>
<thead>
<tr>
<th>Location No. and Area</th>
<th>Location Name Pseudonym</th>
<th>Regional Population</th>
<th>Top five industries of employment</th>
<th>Median Age</th>
<th>Unemployed (%)</th>
<th>Individual Median Income ($/week)</th>
<th>Problems nominated by CTC manager</th>
</tr>
</thead>
</table>
| 13 New England        | Rangemoore              | 1625                | 1. Sheep, Beef Cattle and Grain Farming 13%  
2. Local Government Admin. 5%  
3. School Education 5%  
4. Road Freight Transport 5%  
5. Supermarket and Grocery Stores 4% | 40         | 6              | 360                              | Drought; Isolation due to poor transport centres to regional centre |
| 14 Northern Rivers    | Siestaway               | 350                 | 1. Cafes, Restaurants, Takeaway Food 11%  
2. Postal and Courier & Delivery Services 8%  
3. Architectural, Engineering Services 7%  
4. Specialised Food Retailing 6%  
5. Sheep, Beef and Grain Farming 6% | 40         | 30             | 240                              | High unemployment; Drug culture; High number of retirees |
| 15 Northern Rivers    | Tidal River             | 2630                | 1. School Education 7%  
2. Specialised Food Retailing 4%  
3. Cafes, Restaurants, Takeaway Food 4%  
4. Hospitals 3%  
5. Clubs 3% | 45         | 10             | 330                              | Social disadvantage of older retiree population |
| 16 Northern Rivers    | Viewbank                | 2730                | 1. School Education 7%  
2. Hospitals 5%  
3. Road Freight Transport 3%  
4. Meat and Meat Product Manufacturing 3%  
5. Supermarket and Grocery Stores 3% | 45         | 11             | 315                              | Unemployment; Isolation from regional centre; Indigenous social disadvantage |
| 17 North West         | Wageman                 | 130                 | 1. Sheep, Beef Cattle and Grain Farming 18%  
2. Meat and Meat Product Manufacturing 7%  
3. Manufacturing 7%  
4. Residential Building Construction 7%  
5. Land Development Site Preparation 7% | 45         | 15             | 235                              | Connectivity; Isolation |
| Australian Average    |                         |                     | 37                                  | 5.2        | 466            |                                   |                                  |
In line with purposeful sampling the selection of three embedded cases was guided by three selection factors. The first factor was that the selected cases were financially independent. This decision was made to counter one possible contention that the attributes of a research site may be a direct consequence of poor management or misadventure.

The second factor was the potential they presented in illustrating pertinent aspects of Nonaka and Takeuchi’s Knowledge Creating Theory. Three choices were made on the basis of the SECI knowledge model which is germane to the Epistemological research construct that was derived in Section 2.4.1.2. Each of the selected cases was chosen to exemplify one aspect of the SECI model: Externalisation, Combination and Internalisation respectively. The fourth mode of Socialisation - by its nature describing one-to-one interaction between individuals - was found not to warrant a separate case even though it is of fundamental relevance to each of the chosen cases. The significance of these three modes were that some modes of operation were more amenable to commercial exploitation than others, which is significant when considering the ability of CTCs to remain operational in a strictly commercial environment.

The final factor in the choice of cases concerned validity. As the response rates between CTCs varied, cases that displayed a higher degree of corroboration through triangulation of data sources were preferred. Having six potential cases to choose from enabled this kind of discrimination to be employed. This is addressed in greater detail under Section 3.6.

3.4.2.2 Timetable of visits to research sites

The timetabling of the visits to the 17 locations is detailed in Table 3.8. The proximity of the CTCs to each other did influence sites chosen for analysis but this did not result in significant homogeneity in factors chosen for analysis within the one visit.
Table 3.8 Timetable of visits to research sites

<table>
<thead>
<tr>
<th>Trip</th>
<th>Dates</th>
<th>Locations Visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 May – 4 May 2007</td>
<td>Aldinga Waters, Baden Bay</td>
</tr>
<tr>
<td>2</td>
<td>13 May – 15 May 2007</td>
<td>Calamba River, Deavenport</td>
</tr>
<tr>
<td>3</td>
<td>30 May -2 June 2007</td>
<td>Erindale, Ferngrove</td>
</tr>
<tr>
<td>4</td>
<td>4June – 8 June 2007</td>
<td>Houghton, Lemont, Miandah, Notley, Obelisk</td>
</tr>
<tr>
<td>5</td>
<td>19 June – 22 June 2007</td>
<td>Parkdale, Rangemoore</td>
</tr>
<tr>
<td>6</td>
<td>5 July – 12 July 2007</td>
<td>Siestaway, Tidal River, Viewbank, Wageman</td>
</tr>
</tbody>
</table>

The visits to CTCs spanned two days in the majority of cases. The initial part of these visits was focussed on discussion with the CTC manager. On many occasions introductions to volunteer staff ensued which led to opportunities to speak with them either individually or as a group. A full list of interviewees and the respective dates of their interviews as well as their respective locations can be found in Appendix C. In order to record information from volunteers who were not present during the visit, Volunteer Surveys were left behind for them to complete. Similarly, Customer Surveys were also left behind for customers to complete over the following weeks.

A summary of the research process can be found in Figure 3.2. The diagram indicates the development of research instruments began with the CTCA conference 2006 “Inspire” Community Technology Centres Conference. Following that, the first two CTCs were important to discovering possible anomalies in the questions that were posed to managers, volunteers and customers.
Selection of candidate case studies

Development of interview and survey questions:
1. Preliminary visit to two CTCs (Dec. 2005 and Nov. 2006); and
2. CTCA Conference, September 2006

Modify interview and survey protocols in response to participant feedback

Data Collection – Interviews, Surveys & Diary

Case Studies 1-2

Data Collection – Interviews, Surveys & Diary

Case Studies 3-11

Case Studies 12-17

Three cases selected for in-depth analysis

CTCA Documents

Analysis of CTCA Data and Case Study Data

Thesis response to RQ1 RQ2 and RQ3

In-depth analysis of three cases using the analytical framework derived from Nonaka and Takeuchi’s Knowledge Creating Theory

Thesis response to RQ4, RQ5 and RQ6

Figure 3.2 Research process
Accordingly changes were made to the interview instrument in response to such feedback. This is in line with Myers and Newman (2007, pp. 16-17) who advise flexibility in the research design to minimise confusion and misunderstanding of research participants. Figure 3.2 goes on to show that the first 11 cases are separated from the final six cases (12-17) from which the three in-depth studies were drawn.

The analysis found in the lower portion of Figure 3.2, is the subject of discussion in the next section.

### 3.5 Analysis and Reporting of Research Data

The results of the analysis of research questions RQ1-3 and RQ4-7 are found in Chapters 4 and Chapter 5 respectively. The following discussion explains the steps that were taken to analyse the research data and subsequently report the analysis in these two chapters.

#### 3.5.1 Research Questions RQ1-3

The analysis of research questions RQ1-3 focussed on the assessment of CTCA documentation and data from the 17 cases. The primary purpose of this analysis was to discover whether CTCs that were part of the NSW CTC Program were able to remain operational from July 2005 to June 2008 and how they achieved this. Addressing research questions RQ1-3 in order, the thesis drew upon CTCA documentation and the accounts of the cases as indicated in the following explanations.

##### 3.5.1.1 Research Question RQ1

The analysis of the membership of the CTCA begins with ascertaining the number of CTCs that were still functioning in July 2008. Research question RQ1, as stated in Section 2.5, is as follows:

**How has the membership of the CTCA changed since the cessation of funding in June 2005?**

Using Document Analysis, unpublished documents from the CTCA were used to discover the trend in membership changes from 2005 to June 2008 (see Section 3.4.1.1).
The reporting of the analysis of research RQ1 was structured by the two documentary sources that were used to provide the relevant CTC data. As these documents were produced at different points in this time period it was possible to display membership totals as a time-based table.

3.5.1.2 Research Question RQ2

The initiatives that have been undertaken by CTCs that have remained functional were deemed to be important because of their income-earning history. Research question RQ2 seeks to capture this information by asking:

**What initiatives have been undertaken by CTCs (as reflected in the CTCA membership) to maintain services since the cessation of funding in June 2005?**

In order to assess what strategies had been put in place to maintain CTC services the research initially looked to the CTCA data. Scrutiny of 2007-2008 CTCA Membership Returns revealed that a range of activities had been undertaken. In order to gain some understanding of the relative representation of these activities, they were grouped into five areas of: government, training, hosting of community groups, multimedia production and business support services (see Appendix A). The strategy of using volunteers to support the work of CTCs was widely represented in the CTCA data which enabled the relative contribution volunteers made to CTCs to be determined.

The data from the cases enabled more detailed scrutiny of both activities and volunteers (see Section 3.4.1.2). It was from the 2008 membership of the CTCA that the cases were drawn. From the data derived from interviews with managers it was possible to ascertain the income-earning potential of different activities. This data was once again grouped using the five areas used to aggregate activities found in the CTCA data. On this basis it was possible to compare and discriminate between activities on the basis of income support each activity was able to provide. Interviews with managers also allowed information to be gained about any subsidies that their CTC may have benefited from.

Data from interviews with volunteers and from the volunteer surveys was used to understand the contributions they made to the operation of their CTC. Other data was
gathered that related to the factors that motivated their involvement with their CTC as well as their age and gender details. Interviews with volunteers also allowed comparison and corroboration of data provided by interviews with managers.

Not apparent in the CTCA data but obvious in accounts was the use of subsidies from public and private sources to support the ongoing operation of CTCs. It was possible to identify a variety of methods by which subsidies were able to provide on-going material support to CTCs. Given the interest in the private sector and government in research questions RQ3, of particular interest to the analysis was whether such sources of support came from the private sector or from government.

3.5.1.3 Research Question RQ3

By gathering information after the cessation of government funding in June 2005, the analysis addresses the significance of these insights in relation to each of the primary actors of community, private sector and government in research questions RQ3 which states:

What insights do these initiatives suggest in relation to the issues of:

a. autonomy of local communities;

b. the involvement of the private sector in these CTCs; and

c. the involvement of government in these CTCs?

Data from research sites was analysed in two ways to better understand how CTCs enable communities to exercise autonomy. Customer surveys were first used to ascertain the factors that motivated individuals within local communities to use their local CTC. Customers were also asked to indicate whether the CTC had been a place in which they had developed new knowledge and skills and to indicate in what area this development had taken place. In addition to this, data about where respondents lived, their age and gender were also reported.

A community-wide perspective was also adopted when considering the question of autonomy. Strategies that CTCs had developed were analysed in relation to the
problems that were identified as being significant to the community as a whole. This presented an opportunity to consider the ways in which the management structures of CTCs had facilitated or constrained the development of local strategies that addressed community problems.

The private sector’s role in the operations of these CTCs was then investigated. This aspect of research question RQ3 was analysed using the research data presented by managers in interviews. The future viability of the CTC as a business was considered as was the business management processes that CTCs had developed. The study broadened its scope at this point to consider private sector organisations in the town. First, the role that the CTC had played in bringing ICT support to the region’s businesses was considered. Second, the steps managers had taken to integrate the CTC into the broader economy of the town were discussed. The analysis then considered the ongoing support that other businesses had provided to the CTC.

The final aspect of research RQ3 focused on the role of government in the operations of the cases. This part of analysis began by considering whether the suggestions for a coordinated response by government, as recommended by the Online Ministerial Council in 2005, had been realised (Hevesi, 2005). The analysis also reflected on the NSW CTC Program’s determination to establish a new mode of operation for government in social development projects. As the NSW CTC Program was intent on limiting the government to a role of business customer, the analysis reflects on whether this aspiration was realised.

3.5.1.4 Reporting structure for research questions RQ1-3

The structure that is used in Chapter Four to report on the analysis of research questions RQ1-3 is detailed in Table 3.9. It can be seen that the structure closely follows the order of topics as explained in the previous section.
### Table 3.9 The Structure of Chapter 4 used to report on questions RQ1-3

<table>
<thead>
<tr>
<th>Research Question RQ 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CTC Statistics for 2005/06 Financial Year</td>
<td></td>
</tr>
<tr>
<td>2. 2007-2008 CTCA Membership Returns</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question RQ 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 2007-2008 CTCA Membership Returns</td>
<td></td>
</tr>
<tr>
<td>Initiatives</td>
<td></td>
</tr>
<tr>
<td>Volunteer Contributions</td>
<td></td>
</tr>
<tr>
<td>2. Report on 17 Cases</td>
<td></td>
</tr>
<tr>
<td>Initiatives (Interviews)</td>
<td></td>
</tr>
<tr>
<td>Volunteer Contributions (Interviews and volunteer surveys)</td>
<td></td>
</tr>
<tr>
<td>Subsidies (Interviews)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question RQ 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Autonomy of Community</strong></td>
<td></td>
</tr>
<tr>
<td>1. Individual Use of CTCs (Customer Surveys)</td>
<td></td>
</tr>
<tr>
<td>2. CTC in the Community (Interviews)</td>
<td></td>
</tr>
<tr>
<td><strong>b. Private Sector</strong></td>
<td></td>
</tr>
<tr>
<td>Data presented in relation to RQ1 and RQ2 and interviews with managers and volunteers</td>
<td></td>
</tr>
<tr>
<td><strong>c. Government</strong></td>
<td></td>
</tr>
<tr>
<td>Data presented in relation to RQ1 and RQ2 and interviews with managers and volunteers</td>
<td></td>
</tr>
</tbody>
</table>

### 3.5.2 Research Questions RQ4-7

The analysis of research questions RQ4-7 signals a significant change in methodology as three embedded cases drawn from the 17 research locations were studied in greater depth. As explained previously in Section 3.3, an alternative genre of case study method is applied to enable a more detailed investigation for the purposes of theory building. This requires different processes to be used in the analysis of research data and the reporting of cases.

The analysis of research data is primarily guided by the research questions RQ4-7 that were developed in Section 2.5. The Analytical Constructs and Enabling Conditions derived from Nonaka and Takeuchi’s Knowledge Creating Theory were germane to the analysis of the in-depth cases which begins with Research Question RQ4.
3.5.2.1 Research Question RQ4

Research question RQ4 has two parts to it that require the analysis to consider firstly the Analytical Constructs and secondly Enabling Conditions. Research Question RQ4 is stated as follows:

**Does the application of the Analytical Framework, (four Analytical Constructs and five Enabling Conditions), derived from Nonaka and Takeuchi’s Knowledge Creating Theory, provide a credible framework for understanding the diverse initiatives in the case study CTCs?**

*Analytical Constructs*

In order to ascertain whether the initiatives of the case study CTCs were consistent with the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory, a series of sub-questions were developed to evaluate these primary constructs. The application of these questions to the case study accounts operationalises these constructs which, in turn, enables links to be drawn between Nonaka and Takeuchi’s Knowledge Creating Theory and the case study accounts.

The first Analytical Construct that was identified from the analysis in Section 2.4.1.1 was **Paradox** and the impetus it provides to knowledge creation. Nonaka and Takeuchi define Paradox as situations in which there is “inadequate or inconsistent” knowledge (Takeuchi & Nonaka, 2004a, p. 5). The question that tests the existence of a paradox is: **Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for activity within the CTC?**

The second Analytical Construct of **Epistemology** has a number of parts, reflecting the four-part nature of the SECI framework that Nonaka and Takeuchi describe (see Section 2.4.1.2).

**Socialisation** is that part of the SECI framework that represents the point in which knowledge is created through the synthesis of people’s thoughts through one-to-one interaction in a physical space. Demonstration, copying or discussion may form the basis on which people share tacit knowledge in response to the existence of a paradox.
The question that tests whether activities within a CTC are best associated with the Socialisation is: **Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?**

The related aspect of **Externalisation** is characterised by articulating tacit knowledge through dialogue and collective reflection using metaphors, analogies and models. As tacit knowledge becomes explicit, documentation may be produced to facilitate communication of this knowledge to groups of individuals. In order to understand whether activities within a CTC are best associated with this aspect of Nonaka and Takeuchi’s SECI framework the following question was asked: **Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?**

The third part of the SECI knowledge model, which is **Combination**, is characterised by the sorting, combining, editing and networking of explicit knowledge. Combination is also characterised by the integration of concepts that are developed into grand concepts. The relevant guide question to determine if CTC activities are best associated with Combination is: **Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?**

The fourth part of the SECI framework is **Internalisation**, which is a process of converting explicit knowledge into tacit knowledge through the experience of applying explicit knowledge in combination with direct experience. The emphasis is on the learning of individuals through their own direct experience in conjunction with the application of explicit knowledge. The question that enables judgements as to whether activities are best associated with Internalisation is: **Do people use explicit knowledge when learning-by-doing or formal learning?**

The Analytical Construct of **Ontology** concerns individual and group involvement in the CTC and outside the CTC, and enables judgements to be made about the scale of knowledge creation in relation to numbers of people (see Section 2.4.1.3). Nonaka and Takeuchi distinguish Ontology on the basis of individual, group, organisation and inter-organisation. In order to make these descriptors more relevant to the CTCs under
scrutiny they were modified in the following way: individual, group, CTC, community (see Figure 3.3). In the case of the change of ‘Organisation’ to ‘CTC’ this can be justified on the basis that the CTC represents the organisation under scrutiny. The term ‘Community’ replaces the descriptor of ‘Inter-organisation’ to allow external relations between the CTC and community to be considered. This change was made to include both informal groupings as well as formal organisations in the analysis.

The question that enables activities to be judged relative to the construct of Ontology is: Which descriptors as described on the ontological scale (Individual, Group, CTC and Community) are best identified with observed activities?

The Knowledge Spiral enables consideration of interaction between the three constructs of Paradox, Epistemology and Ontology (see Section 2.3.2.4). The purpose of this construct is to observe whether there is any interaction between the other three constructs along the lines suggested by Nonaka and Takeuchi. Strictly speaking such a dynamic is characterised by related activities that follow the cyclic trajectory around the SECI quadrants in conjunction with increasing scale of Ontology. To that end the guide questions which seeks to elicit this kind of information is: Do observed activities share relationships that indicate sequential transitions around the SECI framework? Are these ordered transitions characterised by increasing degrees on the Ontology scale?

The following table, Table 3.10, summarises the ‘guide questions’ that operationalise the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory.
Table 3.10 Guide questions used to operationalise Analytical Constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Guide Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Paradox.</td>
<td>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</td>
</tr>
<tr>
<td>2. Epistemology</td>
<td></td>
</tr>
<tr>
<td>2.1 Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td>2.2 Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td>2.3 Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td>2.4 Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td>3. Ontology</td>
<td>Which descriptors as described on the ontological scale (individual, group, CTC and community) are best identified with observed activities?</td>
</tr>
<tr>
<td>4. Knowledge Spiral</td>
<td>Do observed activities share relationships that indicate sequential transitions around the SECI framework? If so are these ordered transitions characterised by increasing degrees on the Ontology scale?</td>
</tr>
</tbody>
</table>

Discussion

Do the four Analytical Constructs provide a credible framework for understanding the selected examples?

Enabling Conditions

Nonaka and Takeuchi observe that managers influence the nature of knowledge creation by the conditions they create within their respective organisations (see Section 2.3.3). In seeking to establish whether the Enabling Conditions derived from Nonaka and Takeuchi’s Knowledge Creating Theory are consistent with the case study accounts, the analysis also considers the role that CTC managers have played – either by design or by accident – in the creation of conditions that are conducive to knowledge creation. Once again, a number of guide questions were used to investigate each of the following Enabling Conditions that can be established by managers: Intentions; Autonomy; Fluctuations and Creative Chaos; Redundant Information; and Requisite Information.
Nonaka and Takeuchi found that positive **intentions** of individuals were influential in shaping the outcomes of knowledge creation. The CTC-specific guide question for this condition is: **Are staff and volunteers willing to contribute to making a CTC a better place?**

The granting of **autonomy** to staff and volunteers by managers recognises that a degree of freedom needs to be provided to staff and members in order for them to feel confident that they can experiment with their creativity without fear of chastisement in order to assist the organisation to be innovative. The guide question for this condition is: **Do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?**

This Enabling Condition of **Fluctuations and Creative Chaos** refers to the impetus that changing conditions or perceived chaos gives to knowledge creation. These conditions ideally induce or strengthen commitment of individuals to deal with an uncertain environment. The guide question for this condition is: **Can changing conditions within the CTC or external environment be associated with activities that lead to knowledge creation?**

**Redundant Information** refers to the existence of information that goes beyond immediate operational requirements to broaden possible knowledge-creating responses in problem solving. The guide question for this condition is: **Are there a variety of information sources that go beyond the immediate operational requirements of the CTC?**

The Enabling Condition of **Requisite Variety** refers to situations in which a range of information sources are available in to assist in developing comprehensive responses to novel situations. An availability of a requisite variety of information develops greater information handling capabilities in staff. Nonaka and Takeuchi add that this variety should mirror the external environment because it develops better responsiveness of the organisation to its immediate environment. The guide question for this condition is: **Is there a diversity of expertise that mirrors the external environment?**
A summary of the guide questions used to investigate whether Enabling Conditions for knowledge creation exist is found in Table 3.11.

Table 3.11 Guide questions used to analyse Enabling Conditions

<table>
<thead>
<tr>
<th>Concept</th>
<th>Guide Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intentions</td>
<td>Are staff and volunteers willing to contribute to making a CTC a better place?</td>
</tr>
<tr>
<td>2. Autonomy</td>
<td>Do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?</td>
</tr>
<tr>
<td>3. Fluctuations and Creative Chaos</td>
<td>Do changing conditions within the CTC or external environment lead to knowledge creation?</td>
</tr>
<tr>
<td>4. Redundant Information</td>
<td>Are there a variety of information sources that go beyond the immediate operational requirements of the CTC?</td>
</tr>
<tr>
<td>5. Requisite Variety</td>
<td>Is there a diversity of expertise that mirrors the external environment?</td>
</tr>
<tr>
<td>Discussion</td>
<td>Do the five Enabling Conditions provide a credible framework for understanding activities in this CTC?</td>
</tr>
</tbody>
</table>

3.5.2.2 Research Question RQ5

Once these guide questions were applied to the relevant case, the analysis then assessed the utility of the Analytical Constructs and Enabling Conditions to understand the CTC as a social enterprise and its income performance.

**RQ5. Do these knowledge-creating activities identified in research question RQ4 address the apparent gap between the success of CTCs as social enterprises and the difficulties they experience in earning income?**

This research question was used to address the dual findings of the Final project report where CTCs were found to be highly successful social enterprises that had difficulty in earning revenue (NSW DoC, 2004, p. 3). In seeking to develop a theory-based rationale to address this problem, RQ5 takes the first step in considering whether the knowledge creating activities of CTCs can be used to link the apparently disparate goals of being a successful social enterprise and generating revenue. RQ5 achieves this by firstly addressing the influence these knowledge creating activities have in forming a
perception that the CTC is a successful social enterprise. The analysis then moves on to
consider whether these knowledge creating activities are also amenable to generating
income.

3.5.2.3 Research Question RQ6

In moving the focus of the analysis to the use of ICTs, Research Question RQ6 asks:

**In what ways are ICTs used and can these be related to knowledge creation?**

This research question was initially addressed by summarising information about ICT
use reported in the Customer Survey as well as the information reported by managers
and volunteers. The use of ICTs in knowledge creation as determined in the analysis of
research question RQ5 enables the analysis to draw links between ICT use and
knowledge creation.

In order to better define the ways that ICTs were used, the analysis will draw on the
insights from theorists within the related areas of Social Informatics (SI) and
Community Informatics (CI), as detailed in Section 3.2.2. The primary challenge
detailed by proponents of both SI and CI is the need to respond to the complexity of
socio-technical relationships with a method that enables systematic analysis of the
research data. One important requirement for CI researchers is whether CTC initiatives
have enabled ICTs to be **effectively used** for the benefit of the community. Another
important requirement of CI germane to the research goal of the thesis is the question of
sustainability. The complexity of socio-technical relationships makes it difficult to
develop a comprehensive understanding of sustainability. Accordingly, this research
question assesses the analysis of research questions RQ4 and RQ5 to see whether it
brings greater order to the complexity of the cases, thereby enabling the questions of
effective use and sustainability to be considered in the respective case study
communities.

3.5.2.4 Research Question RQ7

The final research question addresses the need for a theory-based rationale as stated in
RQ7:
Given the consistent application of Nonaka and Takeuchi’s Knowledge Creating Theory to the case studies what theoretical insights can be derived that are able to assist the community, private sector and government to promote the success of CTCs as social enterprises in contexts of limited income support.

This research question addresses the primary research goal. The extent to which the research can claim consistent application of the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory will provide the basis on which new theoretical insights can be claimed. The response to this question considers the three case studies. In the following chapter, the thesis considers the remaining 17 case studies. This forms the basis for concluding arguments that relate to the generalisability of the results.

3.5.2.5 Reporting structure for research questions RQ4-7

The reporting of in-depth cases that address research questions RQ4-7 followed a pattern that was drawn from Creswell (1998, pp. 186-189). Creswell (p. 186) advises case study researchers that it is necessary to bring the reader in to a “vicarious experience” of the case by informing them of the unique contextual factors that distinguish the case in question. It is in the understanding of these unique features that the contrasts between cases are more easily distinguished which in turn heightens the potency of insights that the application of theory generates. The thesis structures the reporting of the three in-depth case studies in the following way.

The first part of the reporting of each embedded case will assist the reader to gain familiarity with the CTC by providing a vignette about the researcher’s personal experience of the case. The analysis will then proceed to present a body of “relatively uncontested data” in order to provide an extensive description of the case (Creswell, 1998, p. 186). This includes reporting on census data, information derived from interviews and the information provided by respondents to customer surveys.

The second part of reporting of the case will present key issues that enable the reader to understand the complexity of this particular case. The purpose of this part of the commentary is to provide a focussed example of the more general situation described in
the Final project report that described CTCs as successful social enterprises that struggled to earn sufficient income. Information derived from interviews with managers will be of prime significance here.

The analysis will then move on to the third part in which issues are probed in greater depth. This is where the Analytical Constructs and Enabling Conditions derived from Nonaka and Takeuchi’s Knowledge Creating Theory, as per research question RQ4, will be addressed through the application of guide questions (Table 3.10 and 3.11).

The fourth part of the reporting of the case study addresses research question RQ5. This analysis uses the information from research question RQ4 to come to an understanding of CTCs as successful social enterprises and the difficulties they experience in generating income.

The analysis will then devote some attention to research question RQ6 to gain understanding about the specific role of ICTs in these observations. The information about ICT use gleaned from Customer Surveys and the observations of managers and volunteers will be initially reflected upon. To the extent that ICT use can be linked to the analysis of initiatives as per research question RQ4, the analysis will seek to draw links between knowledge creation and ICT use. The analysis proceeds to reflect on these findings in relation to the concerns of theorists in Social Informatics and Community Informatics.

In concluding Chapter 5, the thesis draws together findings of the three case studies to reflect on research questions RQ4-7. In response to research question RQ7, a theory-based rationale is advanced that addresses the need to maintain the success of CTCs in contexts of limited income support. This response to research question RQ7 establishes a foundation for discussion and concluding thoughts in the final chapter of the thesis. Table 3.12 provides a summary of the reporting structure that Chapter 5 uses to investigate each of the three case studies chosen for the analysis.
Table 3.12 The structure of Chapter 5 that is used to report on research questions RQ4-7

<table>
<thead>
<tr>
<th><strong>Gaining familiarity with the case</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The first part of the reporting of the case is directed at gaining familiarity with the case. This will be achieved by opening with a vignette about the researcher’s personal experience of the case then proceed to present a body of relatively uncontested data that develops an appreciation of the unique factors that characterise this case. Data is derived from interviews with CTC manager and staff and customer surveys.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Understanding the complexity of the case</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Key issues that contribute to the complexity of the case will be then detailed. The overall purpose of this section is to provide focussed examples of the difficulties managers experience in keeping their CTCs operating.</td>
</tr>
</tbody>
</table>

**Research Question RQ 4**

Two examples are analysed using the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory.

Case study accounts are then scrutinised for five Enabling Conditions.

**Research Question RQ 5**

The response to this question seeks to resolve the separate observations that CTCs are highly successful social enterprises that struggle to earn sufficient income.

**Research Question RQ 6**

This thesis summarises ICT use as reported in customer surveys and interviews with managers and volunteers in relation to knowledge-creating activities described in research question RQ4.

The ways ICTs are used is assessed in the light of theoretical concerns from Social Informatics and Community Informatics theorists.

**Research Question RQ 7**

On the basis of findings for research questions RQ4-6, the thesis advances a theory-based rationale to assist the community, private sector and government to promote the success of CTCs as social enterprises in contexts of limited income support.

Chapter 6 links the three embedded cases and the remaining 14 cases studied in order to address the primary research goal of developing a theory-based rationale that assists CTCs to remain successful in situations of limited income support. The thesis then goes on to discuss the limitations of the research which forms the basis for a concluding discussion about Community Informatics research (de Moor, 2009a, 2009b; Gurstein, 2001, 2003, 2004, 2007; Stillman, 2010) and Social Development Theory (Hall & Midgley, 2004; Midgley, 2003). The final discussion outlines potential areas of future research that can be identified as a consequence of the analysis.

### 3.6 Trustworthiness of Findings

A number of strategies were employed to promote the trustworthiness of findings. These strategies were informed by the advice provided by various authors about case
study research design (Creswell, 1998; Glaser & Strauss, 1967; Remenyi et al., 2002; Yin, 2003), triangulation (Mathison, 1988; Stake, 2006) and semi-structured interviews (Myers & Newman, 2007).

3.6.1 Triangulation

Triangulation was important in ensuring the collection of accurate research data. The first evidence of triangulation can be seen in the use of alternative methods to collect data. Data from document analysis was compared with information elicited through the cases to provide triangulated responses to research questions RQ1-3. This is described by Mathison (1988, p. 14) as ‘method triangulation’. Within each case the use of interviews and survey methods provided alternative methods by which to gather research data. A second type of triangulation was employed where data from different sources was elicited even though one method was employed. This is described by Mathison (1988, p. 14) as ‘data triangulation’. These multiple sources of evidence comprised CTC managers and volunteer staff. Method and data triangulation in combination provided a means by which the accounts of individuals could be corroborated thereby increasing the accuracy of research data used to answer the research questions (Creswell, 1998, p. 213).

Stake (2006, p. 35) makes the point that triangulation is an ongoing process in which researchers should question their interpretation throughout the research taking into consideration other possible interpretations. The following guidance is provided.

1. If the description is trivial or beyond question, there is little need to triangulate.
2. If the description is relevant and debatable, there is some need to triangulate.
3. If the data are critical to a main assertion, there is much need to triangulate.
4. If a statement is clearly a speaker’s interpretation, there is little need to triangulate the quotation but not its content (Stake, 2006, pp. 36-37).

In adopting this guidance from Stake, the strength of conclusions that were drawn in this study was qualified by the strength of corroboration that could be demonstrated. For example, instances where evidence was relatively uncontested and easy to independently observe were not subjected to triangulation. Evidence that was not
possible to independently verify was subject to corroboration from other sources or data triangulation. On the occasions where research data was not easy to corroborate through data triangulation, conclusions were qualified accordingly.

### 3.6.2 Case study methods

As explained in Section 3.4.2.1, the selection of case studies was a two-stage process. The first step in the selection of cases was designed to gain sufficient information about the income-earning initiatives of the CTCA membership that resided in regional areas of NSW. Cases were purposefully selected initially to gain geographic diversity by choosing both coastal and inland locations from the southern border of NSW to its northern border. Out of the 54 members of the CTCA, 17 cases were chosen for study. This represented about 30% of the CTCA membership. The decision to cease the study of further CTCs was primarily driven by the finding that no significant new information was coming to light about income producing initiatives. While each new CTC provided an interesting and unique story about their response to local issues, the need to gain coverage and information about income producing initiatives became less pronounced as accounts from CTC managers began to develop a ring of familiarity. Glaser and Strauss (1967, pp. 61-62) describe such a situation as “theoretical saturation”. This condition has been used by theorists to justify cessation of research data collection (Closs et al., 2008, p. 602; McCutcheon & Meredith, 1993, p. 245).

The second step in the selection of the three cases for in-depth study from the 17 available studies was driven by the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. As explain in Section 3.4.2.1 this was considered necessary in order to better explore the utility of this theory in relation to the research problem. In this situation, the three cases were chosen to examine differing case study characteristics as delineated by Nonaka and Takeuchi’s SECI knowledge model.

Another consideration for choosing the three in-depth cases related to the robustness of research data within each study. One example of this was the response rates for Customer Surveys which varied from place to place. It made sense to choose cases that enabled the broadest set of data to be available for analysis.
Table 3.13 summarises the tactics that Yin advises for case study methods. It can be seen that the use of triangulation, as discussed previously, contributes to construct validity. Yin (2003, p. 34) defines construct validity as “establishing correct operational measures for the concepts being studied”. Yin (p. 35) argues that this aspect of case study research is especially vulnerable to criticism. In order to build construct validity, he advises that clear linkages be evident from research problem to research questions to the reporting of the analysis. In the present study, one can see that the relationship between the research goal and the research questions has been detailed in Section 2.5. The development of analytical techniques to appropriately address these research questions and report on them has been detailed in Section 3.5.

Table 3.13 Summary of Yin’s strategies to promote the trustworthiness of case study methods

<table>
<thead>
<tr>
<th>Test</th>
<th>Case Study Tactic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct validity</td>
<td>Use multiple sources of evidence</td>
</tr>
<tr>
<td></td>
<td>Establish a chain of evidence</td>
</tr>
<tr>
<td></td>
<td>Have key informants review draft case study report</td>
</tr>
<tr>
<td>Internal validity</td>
<td>Explanation building</td>
</tr>
<tr>
<td>External validity</td>
<td>Replication logic</td>
</tr>
<tr>
<td>Reliability</td>
<td>Use of case study protocol</td>
</tr>
<tr>
<td></td>
<td>Develop case study database</td>
</tr>
</tbody>
</table>

Another strategy that was used to eliminate possible inaccuracies was to gain feedback from key informants about the case study accounts. Even though care was taken to ensure that recording of information was accurate and appropriate to the requirements of the research questions, feedback from key research participants provided an important checking function that promoted accuracy of the research data and the transparency of the research process. The CTC managers associated with the three in-depth studies assisted by reviewing the reports on their CTCs (see Appendix D).

The question of internal validity is particularly relevant to research questions RQ4-7 which ask whether the Analytical Constructs, derived from Nonaka and Takeuchi’s Knowledge Creating Theory, can explain the complexity of the data in the embedded
case studies. The analysis of this data uses a technique called “explanation building” which seeks to identify a set of casual links using a narrative (Yin, 2003, p. 36 & 120).

Clear articulation of theoretical propositions is one suggestion provided to promote internal validity. In this thesis research questions RQ4-7 enable an ordered progression of ideas that link the Analytical Framework of Nonaka and Takeuchi to the research data (Section 3.5.2). The use of sub-questions within research question RQ4 enables the Analytical Constructs and associated Enabling Conditions to be individually addressed.

Conversely, external validity is described by Yin as the ability to ensure that research is “generalisable beyond the immediate case study” (p. 37). In relation to the first stage of the research, generalisability of the investigation is directed at extending the findings from the 17 cases to the full membership of the CTCA of 54 CTCs. The use of theoretical saturation provided the impetus to cease collection of research data as little new information was being yielded. In the second stage of the research, generalisability is factored on the ability of theory to explain diverse circumstances. Reference to the use of replication logic in multiple cases seeks to ensure consistent application of theory to each of the cases. As explained previously, this requirement is facilitated by the use of Analytical Constructs and Enabling Conditions that are derived from Nonaka and Takeuchi’s Knowledge Creation Theory and detailed as guide questions in Table 3.10 and Table 3.11. Finally, the discussion in the last chapter addresses the issue of generalisability by discussing the implications of the research for other CTCs, limitations and the significance of the research for the theories that informed the research.

The use of a well-articulated protocol formalises aspects of the research processes that in turn promote reliability. Reliability refers to the repeatability of a study (Yin, 2003, pp. 37-38). Simply put, will another researcher collect the same research data given the same case, instruments and protocols? The steps undertaken to achieve a transparent protocol can be seen in the explanations about data sources and the kind of information collected (Section 3.4) and the analysis of the data (Section 3.5). The research questions provided guidance in defining the kind of information that was required and its subsequent analysis. By way of example, the development of questions for semi-
structured interviews and survey questions reflect the research questions. This in turn enabled evidence to be organised in a way that was consistent with the requirements of the study as found in its primary research goal. Even so, reliability may be affected by interpersonal factors between interviewer and interviewee. While remedies exist to address such factors, it is even more necessary for the research design to demonstrate clear linkages between the research questions and the protocols and instruments used to collect research data.

Apart from the technical aspects that are designed to promote the trustworthiness of the research, case study method has the advantage of better connecting with readers through the story-based nature of the case study reports. The story is identified by Remenyi et al. (2002, pp. 7-16) as a potent tool for developing authenticity along with other stated measures. The story-based nature of case studies pertains to the self-contained nature of the case that reflects the lived experience of individuals. In the development of a meaningful understanding of the case, the reader is better able to appreciate its nuances as well as judge the relevance and veracity of theoretical insights. Creswell (1998, pp. 186-187) concurs by suggesting the need for readers to develop a “vicarious experience” of the case through vignettes. As detailed earlier in Section 3.5.2.5, the thesis draws on this advice by introducing each in-depth case study with a personal anecdote from the researcher.

3.6.1 Semi-structured interviews

Strategies were also developed in order to best exploit interviews to elicit accurate information. The potential of the semi-structured interview method is best realised if weaknesses and vulnerabilities of this method are acknowledged and in turn factored into the research design. In order to account for such vulnerabilities the thesis used the insights of IS research theorists Myers and Newman (2007) to guide the conduct of interviews.

Myers and Newman (2007, pp. 4-5) explain that some of the vulnerabilities of semi-structured interviews relate to commonplace factors such as misunderstanding or the limitations of time, resources, and language. Other vulnerabilities stem from the social dynamics that govern interpersonal exchanges. These include trust, the perceived
artificiality of the exchange and pressure on research participants to appear knowledgeable. Dissonance may result from a range of relationship issues such as gender, position, culture, and so on. In response to these potential problems the study incorporated seven guidelines that Myers and Newman (2007, pp. 15-17) suggest.

**Situating the researcher**

Steps were taken to inform research participants of the purpose of the research, the researcher’s background and his institution. Myers and Newman believe that it is important that readers and interviewees alike understand the relationships between the interviewer and research subjects. This promotes transparency of the research. This was primarily facilitated through the provision of written material that detailed the nature of the research, the information required and the researcher’s institutional affiliations. This information is discussed further in relation to ethics considerations (Section 3.6).

**Minimising social dissonance**

Social dissonance refers to conflicts that may interfere in the collection of information. Myers and Newman’s (2007, p. 22) remedy for this is portrayed in terms of “minimising social distance” by managing first impressions, dressing appropriately and being sensitive to possible sources of tension that may stem from factors such as culture, gender, rank or age. In seeking to effectively respond to this issue the author took steps to dress in accordance with local norms (casual clothing), interview respondents in the context in surroundings of their own choosing (normally an office or tea room), allow respondents the freedom to choose whether to have their interview recorded by an audio recorder, and allow respondents to set the pace and direction of interviews in the early stages of the meeting. Even though the author was aware that his gender and cultural background might present a source of dissonance this did not present itself as an explicit issue that required attention.

**Representing a variety of voices**

The primary contact for interviews was the CTC manager. Alternative sources of information were available in all locations. On most occasions opportunity was given to volunteer staff to participate in interviews. This provided an option of clarifying information that was initially delivered by the manager. It also elicited new information
that could be subsequently raised with the manager for additional comment. Volunteers who did not wish to be interviewed or those who were not present during the researcher’s visit were offered the option of filling out a survey.

**Everyone is an interpreter**

Recognition of the opinions and interpretive ability of participants was given. For example, managers were asked to provide insights into what factors they thought made a sustainable CTC. Aspects of the analytical framework were discussed with respondents in order to gauge their understanding of issues. Myers and Newman (p. 17) argue that research subjects and readers along with the interviewer are “creative interpreters of their worlds”. This idea echoes the principles of Community Informatics research as discussed in Section 3.2 in that recognition is given to the active role that research subjects should play in contributing to research outcomes.

**Use of mirroring in questions and answers**

The researcher was trained in active listening techniques and had gained two years’ experience of this technique in telephone counselling. Such techniques are consistent with Myers and Newman’s suggestion for the use of mirroring in questions and answers (p. 17). The use of mirroring refers to the practice of the interviewer using words and phrases of the interviewee. This allows interviewees to express what is important to them rather than being suppressed through the researcher’s phraseology and research agenda. Open questions rather than closed questions were employed during the investigations in order to encourage disclosure of information.

**Flexibility**

To ensure that preconceived notions of the researcher did not constrain disclosure, participants were encouraged to speak freely. Managers and volunteers were asked to recount regular activities, special events and achievements. Such questions were found to be less threatening in that respondents were able to relate information in which they had significant knowledge often using stories. This again addresses aspects of Community Informatics research which seeks to give research participants greater influence over the nature of research in which they participate (discussed in Section 3.2).
Confidentiality of disclosures

The confidentiality of responses was governed by the guidelines that were approved by the researcher’s institution. Participants were informed about the measures that had been instituted to protect their confidentiality. These included the coding of responses, ensuring that identifying information was removed from published accounts of the research (for example census data was rounded off so that locations could not be identified by this information) and the secure storage of interview data. Myers and Newman state that the confidentiality of interviews is important in order to encourage full disclosure of information. The following section (Section 3.7) provides a detailed account of how confidentiality of disclosures was managed.

All of these guidelines, which are listed in Table 3.14, are consistent with the ideas expressed in the previous discussion on triangulation. Moreover, these guidelines are also consistent with the earlier discussion on Community Informatics (CI) research (see Section 3.2) which seeks to involve research subjects as active participants and beneficiaries of research. It is also apparent that parts of Myers and Newman’s advice foreshadow later discussion of research ethics considerations in Section 3.7. Accordingly, the use of interviews to gather information was consistent with efforts to promote trustworthiness of the findings and the aspirations of CI research as well as the ethical use of research methods.

3.7 Research Ethics

In the previous section, confidentiality of disclosures was cited as one strategy that promoted the gathering of accurate research data. The process of ensuring confidentiality of responses was managed through the human research ethics approval process of the University of Wollongong. The purpose of this process is primarily directed at protecting the welfare and rights of the participants in the research. Ensuring confidentiality of responses is one of a number of measures that are designed to avoid possible harm to individuals.
Table 3.14 Consistency of semi-structured interview method with aspects of this research.

<table>
<thead>
<tr>
<th>Seven guidelines for Qualitative Interviews (Myers and Newman, 2007)</th>
<th>Areas addressed by guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situating the researcher.</td>
<td>Accuracy of research data</td>
</tr>
<tr>
<td></td>
<td>Ethical conduct of research</td>
</tr>
<tr>
<td>Minimising social dissonance</td>
<td>Accuracy of research data</td>
</tr>
<tr>
<td>Representing a variety of voices.</td>
<td>Accuracy of research data</td>
</tr>
<tr>
<td></td>
<td>(data triangulation)</td>
</tr>
<tr>
<td>Everyone is an interpreter.</td>
<td>Inclusion of research participants (CI)</td>
</tr>
<tr>
<td>Use of mirroring in questions and answers.</td>
<td>Accuracy of research data</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Inclusion of research participants (CI)</td>
</tr>
<tr>
<td>Confidentiality of disclosures</td>
<td>Accuracy of research data</td>
</tr>
<tr>
<td></td>
<td>Ethical conduct of research</td>
</tr>
</tbody>
</table>

For the purposes of this research three separate applications were submitted to the Human Research Ethics Committee (HREC) at the University of Wollongong. The aspects of the research that were covered by these three applications were: interviews with managers and volunteers; customer surveys; and volunteer surveys. In each case research participants were provided with two important documents that were approved by HREC. The first was called a ‘Participant Information Sheet’ that contained information in simple English about the research project. Items that were detailed included: the nature of information that was being requested; the anticipated time commitment that would be required; the procedure for withdrawing from the research project; and contact information of both the researchers and relevant University of Wollongong personnel. The second document was the consent form, which required the participant to indicate by way of signature that they had been fully informed of what was required from them and to acknowledge that they had been given the opportunity to ask questions. A special version of the information cover sheet for the customer survey was developed for people who were younger than 18 years of age to ensure that parental consent was obtained before such people were permitted to complete the survey. The final part of the human research ethics approval process was a final report that was required to highlight whether any changes had been made to the research protocol and
whether any unanticipated events had had a harmful effect on research participants.
Copies of these forms can be found in Appendix D.2.

3.8 Conclusion

This chapter covered a number of issues that were instrumental in guiding the collection
of research data, the analysis of data and the reporting of this analysis. In doing so, the
thesis has acknowledged that the methods employed exist within broader philosophical
contexts. In acknowledging the interpretive philosophical approach that this thesis has
adopted, a number of assumptions have been detailed. The research design was firstly
required to incorporate more recent information before engaging in theory building. The
following two chapters reflect the two-part nature of the research design; Chapter 4
provides an updated perspective of the CTCs in the CTCA membership and Chapter 5
undertakes the theory building aspects of the thesis by describing and analysing three
in-depth case studies.
Chapter 4  Investigation of the CTCA: 2005 to 2008

4.1  Introduction

This chapter reports on the collection and analysis of information in response to Research Questions RQ1-3 (see Table 4.1). This information is drawn from documents provided by CTCA and the accounts of the 17 CTCs selected for study; it can be found in the Appendices. Using the information from both sources, this chapter develops an understanding of the experience of the CTCs from the NSW CTC Program from July 2005 to June 2008. More specifically it is possible to gain a detailed understanding of factors that contribute to their purported success as social enterprises on the one hand and the difficulty they experienced in earning sufficient income.

The chapter begins with a report and analysis of CTCA data in response to research question RQ1. The chapter continues using CTCA data to address research question RQ2 by identifying strategies that have been employed to maintain operations. It is at this point that data from the 17 cases is introduced to provide a more detailed description of such strategies and to assess both their income-generating potential and their significance to the local community. Research question RQ3 combines the findings of research questions RQ1 and RQ2 with customer surveys and information from interviews to provide a response to the three issues identified by the literature review, namely the question of local autonomy, the role of the private sector and the involvement of government in the life of CTCs.

<table>
<thead>
<tr>
<th>Table 4.1 Research Questions RQ1-3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research Questions Part 1</strong></td>
</tr>
<tr>
<td>RQ1. How has the membership of the CTCA changed since the cessation of funding in June 2005?</td>
</tr>
<tr>
<td>RQ2. What initiatives have been undertaken by CTCs (as reflected in the CTCA membership) to maintain services since the cessation of funding in June 2005?</td>
</tr>
<tr>
<td>RQ3. What insights do these initiatives suggest in relation to the issues of:</td>
</tr>
<tr>
<td>a. autonomy of local communities;</td>
</tr>
<tr>
<td>b. the involvement of the private sector in these CTCs; and</td>
</tr>
<tr>
<td>c. the involvement of government in these CTCs?</td>
</tr>
</tbody>
</table>
4.2 Research Question RQ1

In response to RQ1 two sources of data were used to develop a picture of membership changes over the period July 2005 to June 2008. The first source of data was an unpublished report by the CTCA titled *CTC Statistics for 2005/06 Financial Year*. This report provided a figure for operational CTCs in July 2005 and 2006 respectively. The second source of data was membership information contained in the *2007-2008 CTCA Membership Returns* which provided information about the number of CTCs in July 2007 and July 2008. Both of these documents can be found in Appendix A.

Membership data from the CTCA indicates that the total membership of the organisation at July 2008 stood between 54 and 60 members (see Table 4.2). From this number, 49 organisations had confirmed continuing membership through payment of the annual fee. Four CTCs had verbally indicated continuing membership but had not supplied the appropriate fees. Six of the CTCs from the 2007 membership had not indicated what their intentions were. Two CTCs were confirmed as not extending their membership; one because of closure while the second had decided to pursue operations independently of the CTCA. The *2007-2008 CTCA Membership Returns* indicate that 8,241 people throughout regional NSW are serviced by the CTCA membership on a weekly basis.

Compared to the numbers of CTCs at the cessation of funding in July 2005, it can be seen that from July 2005 to July 2007 membership decline was of the order of 25% (down from 82 to 62). As indicated in Table 4.2, it is clear that the greatest decline in membership occurred between July 2006 and July 2007 where membership fell from a total of 80 members to 62 members. Membership further fell in the 2007-2008 period to 54. A small number of CTCs remained operational even though they chose not to renew their membership.
Table 4.2 CTCA Membership July 2005 to June 2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Confirmed members</th>
<th>Verbally confirmed</th>
<th>Undecided</th>
<th>Cancellations</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2005(^a)</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 2006(^a)</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 2007(^b)</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 2008(^b)</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) CTC Statistics for 2005/06 Financial Year
\(^b\) 2007-2008 CTCA Membership Returns

Figure 4.1 Decline in CTCA Membership 2005 - 2008

Hence, the overall decline of membership of the CTCA from July 2005 to June 2008 is 34%. The overall trend in membership decline is consistent with the Regional Telecommunications Inquiry in 2002 (RTI, 2002) that led to the investigation by the Ministerial Council into OACs as detailed previously in Section 2.2.1. Even though the predicted decline did eventuate, on a more positive note, the decline appears to have
been arrested. Most recent information obtained from CTCA Member Support administrator indicated that membership in July 2009 was 56, a slight increase on the previous year’s membership numbers (Kemp, 2009).

4.3 Research Question RQ2

Research question RQ2 leads the analysis to identify initiatives which CTCs have employed to maintain their operations. The thesis reports on this question by firstly scrutinising the CTCA data which provides two significant insights by revealing the initiatives that CTCs have undertaken and the contribution that volunteers make in support of their local CTC. The thesis then goes on to report on the 17 cases to provide additional detail about these strategies.

4.3.1 Report on 2007-2007 CTCA Membership Returns

4.3.1.1 Initiatives

Data from 46 CTCs found in the 2007-2008 CTCA Membership Returns reveal a broad range of initiatives as part of their strategy to remain operational. A total of 258 initiatives were reported. These initiatives were grouped into five categories to broadly reflect the nature of these activities (See Appendix A.2). These five grouping were:

- government services;
- training services;
- hosting of community groups;
- multimedia production; and
- business support services.

Referring to Table 4.3 it can be seen that CTCs deliver a range of services on behalf of all three tiers of government (national, state and local).
Table 4.3 CTC Initiatives *(2007-2008 CTCA Membership Returns)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Initiatives</th>
<th>Number of CTCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National</strong></td>
<td>Australian Taxation Office</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Centrelink</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Medicare</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Community engagement program (indigenous)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Others (environmental, crime prevention, rehabilitation service)</td>
<td>3</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td>Access NSW</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Department of Fair Trading</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Health centres</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Other(housing, car pooling scheme, Countrylink agency)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td>Tourism office</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Library</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Collect rates</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Community meetings</td>
<td>1</td>
</tr>
<tr>
<td><strong>Training Services</strong></td>
<td>Use of ICTs (seniors)</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Use of ICTs (youth)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Use of ICTs (cyber safety)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Use of ICTs (small business)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Use of ICTs (work-for-the-dole)</td>
<td>2</td>
</tr>
<tr>
<td>Hosting of Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Computer repair (work-for-the-dole)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Office admin (work-for-the-dole)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hiring of facilities to employment services for training (work-for-the-dole)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Use of ICTs (software such as Adobe Photoshop)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Use of ICTs (all ages/not specified)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Hiring of facilities to private adult education providers</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Learner Driver Scheme</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Information Service (business, grants, local etc)</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multimedia Production</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seniors</td>
<td>5</td>
</tr>
<tr>
<td>Youth (Games LAN party)</td>
<td>6</td>
</tr>
<tr>
<td>Youth (homework)</td>
<td>2</td>
</tr>
<tr>
<td>Indigenous</td>
<td>4</td>
</tr>
<tr>
<td>Business</td>
<td>1</td>
</tr>
<tr>
<td>Women, mothers, playgroups</td>
<td>4</td>
</tr>
<tr>
<td>All ages (not specified)</td>
<td>7</td>
</tr>
<tr>
<td>Other e.g. chess, music, car poolers, genealogy, remedial massage</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Business Support^14</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Newsletters/Newspapers</td>
<td>7</td>
</tr>
<tr>
<td>Printed publications</td>
<td>3</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>1</td>
</tr>
<tr>
<td>Website hosting and ecommerce</td>
<td>9</td>
</tr>
<tr>
<td>Art/photo exhibition</td>
<td>2</td>
</tr>
<tr>
<td>Narrowcast radio</td>
<td>1</td>
</tr>
<tr>
<td>Secretarial services</td>
<td>4</td>
</tr>
</tbody>
</table>

^14 Centres did not specifically report on the provision of computer access and Internet access, printing and scanning facilities and so on but are assumed to exist as a service that CTCs fundamentally provide.
National government departments are represented in the 2007-2008 CTCA Membership Returns by the Australian Tax Office (20), the government welfare agency, Centrelink (18), and the public health insurance scheme, Medicare (6). Instances of other federal government services that CTCs administered included programs targeted at indigenous communities (community engagement programs, crime prevention programs, and environmental protection programs) and a bush rehabilitation program.

Among the services CTCs provided to the NSW State Government, Access NSW was prominent with 17 instances reported in the data. There is reason to believe that this figure was under-reported because each CTCA member through its membership of the CTCA was provided with a small amount of funding and a computer to provide this service. The NSW Department of Fair Trading used CTCs in two instances to provide a shopfront for its services to the local business community. Two centres hosted community health nurses. Other examples of NSW State Government services were housing assistance, car-pooling and the train-ticketing agency, Countrylink.

The third tier of government, Local Government, is also represented in the initiatives that CTCs undertook. Four CTCs reported that they managed their local tourism offices and two CTCs participated in the management of the local library. Other miscellaneous tasks performed by CTCs for Local Government included the collection of council rates and hosting community meetings.

Also prominent in the CTCA data are training-related services. Highly nominated by CTCs was the provision of training to seniors (21). This was in part a reflection of annual funding from the state government for one week of training for this age group. Other identifiable groups to which training was provided for include youth (6), and the unemployed via ‘work-for-the-dole’ courses. These include ICT training (2), the repair of computers (3) and training in office administration (3). Moreover, employment agencies also hired facilities from CTCs to conduct work-for-the-dole training (2). CTCs also appear to have been active in the provision of cyber-safety training (6).

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15 ‘Work-for-the-dole’ is a common term that refers to the requirement of those who receive unemployment benefits from the national government to undertake steps to find work. In this case participating in recognised training is considered an acceptable activity that benefit recipients can cite in support of their fortnightly application for ongoing payment of benefits.
There is also evidence of training courses in specific software packages such as Adobe Photoshop (5). The remaining training initiatives cover a broad range of groups and needs (9). These include training for small businesses, people with disabilities and indigenous people. Some CTCs hire their facilities to private training providers (2) and interestingly, one provides practical training for learner drivers. Included in this group of initiatives are information services (4) where people are able to obtain information about business and community grant schemes and the like.

CTCs also can be seen to host a wide variety of groups from their local communities. Groups that focus on the interests and needs of seniors (5) and youth groups (7) are prominent in the data. These groups appear to perform an informal training role for ICTs as many are designated as ‘computer clubs’ in which people can seek advice about computer software and hardware. Youth groups can be seen to service two needs; computer games (5) and school homework (2). Other identifiable groups in the data are indigenous (4), business (1), women-mothers-playgroup (4) and all age (not specified) groups (7). Reflecting the ability of CTCs to address a range of specific needs the data reveals an interesting variety of other activities including chess, car poolers, music, art and genealogy. One CTC even reported that remedial massage services were provided - presumably in response to those in the community who suffered from muscle injury or tightness.

Another significant area of activity indicated by the CTCA data is multimedia production, which includes the creation of community newsletters (5), publication of books (3), the production of CD ROMs (1) and management of websites and web portals for ecommerce (9). Other listed initiatives that are related to this category are art and photograph exhibitions and narrowcast radio broadcasting. The variety of initiatives indicated suggests that a high degree of creative activity occurs within CTCs.

The final category found in the CTCA data is business support services. Four CTCs also reported that they provided secretarial services to the local business community. In addition to this, it was assumed that all respondent CTCs provided public access to computers, the internet, printers, faxes and the like in line with their primary function.
The initiatives that CTCs undertake appear to be important in understanding factors that contribute to the ongoing ability of CTCs to remain operational. Some of these initiatives appear more obviously associated with generating income. This is apparent in the services that CTCs deliver on behalf of government departments to regional communities as was described in the *Final project report* as “brokered services” (NSW DoC, 2004, pp. 3 & 27-28). Table 4.3 also indicates that CTCs play a prominent role in the delivery of training to the community, particularly to those who are unemployed, and earn income as a consequence of the training. The hosting of groups appears to also fulfill a training need but seems less readily associated with earning income and more readily associated with the maintenance of social life in these communities. Given the availability of the tools that produce multimedia products evidence of newspaper production, art and photo exhibitions, web hosting, DVD and CD-ROM production and the like suggests that the opportunities that new ICTs present are being exploited within many regional communities though income-generating capacity is not clear. The relatively small number of items reported in relation to business support services is partly explained by reporting of related initiatives under training. Nonetheless, given the emphasis on the private sector by the NSW CTC Program planners, the small number of reported initiatives that are obviously associated with the private sector is noteworthy.

4.3.1.2 Volunteers

Data from the *2007-2008 CTCA Membership Returns* reveals that volunteers represent one significant strategy that CTCs have employed to maintain operations (see Appendix A). As detailed in the literature review, volunteers are significant because they reduce the need to generate income to pay people to undertake work for the CTC (De Weaver & Ellis, 2006, p. 22; NSW DoC, 2004, p. 3). Out of the 46 CTCs that submitted membership data, 38 CTCs benefited from the support of 389 volunteers (see Table 4.4). In total, volunteers contributed over 1,728 hours per week to these CTCs. On average volunteers conservatively contributed 45.5 hours per week to each CTC, which equates to approximately 1.25 full time positions for each CTC or $43,750 per annum to
Accordingly, volunteers were found to make significant contribution to the ongoing ability of these CTCs to remain operational.

### Table 4.4 Summary of Volunteer Contributions (2007-2008 CTCA Membership Returns)

<table>
<thead>
<tr>
<th>No. of CTCs with volunteers</th>
<th>Total no. of volunteers (estimated)</th>
<th>Total Hours (estimated)</th>
<th>Volunteer Hours/CTC (estimated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>389</td>
<td>1728</td>
<td>45.5</td>
</tr>
</tbody>
</table>

In order to gain a more detailed understanding of the significance of these initiatives and the volunteers the chapter moves on to report on the 17 cases addressing, firstly, the question of initiatives and secondly, factors that motivate the involvement of volunteers.

#### 4.3.2 Report on the 17 Research Sites

The broad range of initiatives reported in the CTCA data was also reflected in the activities discovered in the 17 CTCs. The accounts provide a more detailed view of such initiatives in relation to income generation and their social significance.

**4.3.2.1 Initiatives**

The income-earning significance of initiatives and their importance to the community was derived from interviews with managers and volunteers. The specific source of this information can be found in the interview instruments where managers were asked to provide a judgement about the significance of initiatives for their income-generating potential.

The four responses provided to managers were designed to gain an indication of the potential impact should a source of income cease to exist. The responses managers were asked to nominate for each initiative in their CTC were:

- a major source of revenue (the CTC’s viability would be threatened if this source of income ceased to exist);
a moderate source of revenue (the CTC would be placed under financial pressure but could continue to function should this source of income cease to exist);

a minor source of revenue (the operation of the CTC would not be significantly affected if this source of income ceased to exist) and;

not applicable (the nominated source of income is not relevant to this CTC).  

The collective responses of managers to these questions are summarised in Table 4.5. The initiatives have been ordered using the categories found in Table 4.3: government services, training services, the hosting of groups, multimedia production and business support services. The case data can be seen as reflecting the diversity of initiatives contained in the 2007-2008 CTCA Membership Returns.

**Government Services**

Consistent with the 2007-2008 CTCA Membership Returns, the case accounts indicate the presence of a range of government services. Most prominent national government representatives in Table 4.5 are Centrelink, Australian Taxation Office (ATO) and Medicare.

Four managers nominated Centrelink as a major source of income. These CTCs at Calamba River, Parkdale, Rangemoore and Wageman are designated “Access Points” which allows unemployed people to submit forms which are sent by facsimile to Centrelink for processing. This service provided an income of $5,000 - $30,000 per year. In the course of the site visits, it became apparent that Centrelink did not have a consistent arrangement with CTCs. In some localities Centrelink had entered into arrangements with a variety of other local organisations such as post offices and neighbourhood centres and, in one location, a competing community-based technology centre.

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17 The option of “Not Applicable” applies to instances in which examples suggested by the researcher on the interview instruments were not relevant to the case study CTC.
<table>
<thead>
<tr>
<th>Category</th>
<th>Initiatives</th>
<th>Income Earning Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>Centrelink Access Point</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Australian Taxation Office</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Medicare</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Community engagement program</td>
<td>0</td>
</tr>
<tr>
<td>State</td>
<td>Access NSW</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>NSW Department of Fair Trading</td>
<td>0</td>
</tr>
<tr>
<td>Local</td>
<td>Visitors Bureau</td>
<td>2</td>
</tr>
<tr>
<td>Training Services</td>
<td>CTC managed training(^a)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CTC managed work-for-the-dole training(^b)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Facility Hire to employment services and adult education providers</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Training (seniors, veterans,)</td>
<td>0</td>
</tr>
<tr>
<td>Hosting of Groups</td>
<td>Seniors (computer clubs for seniors)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Youth (LAN parties, homework clubs)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Special Interest Groups (^c)</td>
<td>0</td>
</tr>
<tr>
<td>Multimedia Production</td>
<td>Community Newsletters/Newspapers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Print &amp; CDROM</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>DVD and CD Editing</td>
<td>0</td>
</tr>
</tbody>
</table>
### Business Support Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Count 1</th>
<th>Count 2</th>
<th>Count 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Services</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Narrowcast radio</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Computer and Internet Access (Fees)</td>
<td>0</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Office technology services&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Office/Secretarial Services</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Video Conference</td>
<td>1</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Small business advice</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

### Related Business Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count 1</th>
<th>Count 2</th>
<th>Count 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Office</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alliance with Local IT Company</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Rent from co-tenant</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Wireless broadband</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Santa Claus photos</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

<sup>a</sup> Includes courses in basic medium high level computer use; software such as MS Publisher and Adobe Photoshop; and small business development courses.

<sup>b</sup> Includes computer training, office training and computer refurbishment.

<sup>c</sup> Includes genealogy, photography, car pooling.

<sup>d</sup> Includes facsimile, printing, laminating, binding, hole punching, stapling, guillotining.

The ATO and Medicare paid CTCs to make available printed material such as brochures and forms. For example, Medicare paid in the order of $200 per year to each CTC to display printed material. The ATO paid $1000 per year. In one CTC a volunteer indicated that she was paid by the ATO to assist people to submit their tax returns online using CTC facilities. The CTC did not receive any direct contribution for this service. None of the CTC managers indicated that this service was a major source of income that was critical to the ongoing operation of their CTC. All CTC managers interviewed indicated that Medicare services were a minor source of income.

The only brokered service for state government departments that was evident in the accounts was one provided on behalf of the Department of Fair Trading. Local businesses were able to obtain and submit forms at the local CTC in Houghton to register the names of their business, apply for special assistance grants and so on. The CTC received $10 for every completed form that was submitted. All of the CTCs visited...
benefited from Access NSW, a state government initiative that provided a computer and a $500 annual payment to each of the centres. The understanding was that this computer was available solely for customers who wished to use state government services available through the Access NSW web portal.

As for brokered services for local government, two of the cases, Lemont and Siestaway, received income from local government to manage a tourist bureau. In Lemont the CTC manager was engaged as a local government employee. In Siestaway, the management of the tourism office was conducted as a business arrangement between CTC management and the local government authority. Managers found that there were synergies in providing a tourist bureau and public computer access. However, both cases experienced difficulties. In Lemont, competitive neutrality provisions had complicated attempts of CTC staff to develop a local community newsletter as an alternative income source for the CTC. In Siestaway, the volume of customers, due to the popularity of the town with tourists, had overwhelmed volunteers and this had generated some angst, so much so that, plans were underway to relinquish the tourism office income stream to concentrate once again on meeting local community needs.

Other local government services were apparent but were not reported as a source of income. In the three locations of Erindale, Ferndale and Miandah there was an in-kind exchange of resources where CTC staff managed the library for periods when the librarian was not present in exchange for the housing of the CTC and payment of utility costs.

These initial examples give an insight into the strategy of brokered services which was identified in the *Final project report* as an important source of future income for CTCs (NSW DoC, 2004, pp. 3 & 27-28). Even though government departments from the national government have embraced CTCs as a convenient mechanism by which information resources such as pamphlets can be distributed to regional areas the income support that this has provided to CTCs has had a minor impact on keeping the CTCs operational. The exceptions are those that have a Centrelink Access Point agreement, which provides a substantial share of the salary of the CTC’s manager. The opportunity to run visitor bureaus on behalf of local government also appears as another form of
government support though the focus of CTC initiatives is understandably skewed towards providing information to tourists rather than locals. The example of the community engagement program in Parkdale is also interesting in that this CTC took on responsibility for administering a government program targeted at improving social outcomes for Aboriginal people in the locality. This initiative was judged to be of moderate income support. Also of moderate income support was the one example of the NSW Department of Fair Trading’s use of a CTC to broker services on its behalf.

The requirement for CTCs to be come fully weaned from government support was seen as a definitive break from former practice where government was expected to provide ongoing support for projects that had social value.

The story of Siestaway CTC is interesting in that the goal of commercial independence was achieved when the CTC management committee agreed to run the local visitors bureau as a contracted service to local government. The popularity of the town as a tourist destination ensured a constant flow of customers most days of the year. As well as being able to access computers to check email and the like, tourists were also able to ask for directions and obtain pamphlets. This arrangement was consistent with the vision of the NSW CTC Program planners in that the CTC had successfully negotiated its transition into an independent commercial business in providing a “brokered service” on behalf of government. However, it was clear from interviews and comments from volunteer surveys that a high level of dissatisfaction bordering on hostility existed. Many people appeared to resent the time that was spent servicing customers for the CTC who, in the majority cases, only wished to know the location of the closest lavatories. Some had felt exploited because they had not been given ICT training as promised. The connection with the local community was quite tenuous in that there was little time to address community needs. Reference to previous initiatives such as homework clubs and DVD movie productions suggested that these had been set aside to service the needs of outsiders. Indeed, many locals now never venture into the CTC.

Box 4.1 Vignette: Government Involvement in CTCs

Training

Also prominent among initiatives reported by CTCs is training (see Table 4.5). The case accounts reveal that ICT training represents a major and significant source of income to many of the CTCs. In line with the distinctions drawn between training modes in the 2007-2008 CTCA Membership Returns (see Table 4.3) distinctions are made in the accounts between:
training offered by the CTC as a commercial service to the public;

training offered as a service to an employment services provider for work-for-the-dole programs;

the hiring of CTC facilities to employment services organisations; and

the hiring of facilities to adult education providers.

In the first case, where training is an initiative managed and delivered solely by the CTC as a commercial service to the community, it can be seen that five CTCs were able to indicate that this service was of major (1) or moderate (4) income-earning significance. The delivery of such training follows a basic pattern where local trainers are engaged on a contract basis to conduct courses. The staging of a course is generally dependent on the attainment of sufficient class sizes. Managers include a margin in course fees to provide compensation for the CTC to cover expenses such as utility costs. The range of courses provided varied significantly; basic level to high level computer use, software packages such as Microsoft Publisher and Adobe Photoshop as well as courses in small business development. Baden Bay CTC was fortunate to be able to offer training to retirees who had moved to the area from Sydney. They were wealthy enough to afford training and the CTC, as a consequence, had developed a lucrative income stream from this group.

The second significant area of training activity from a revenue-raising perspective was provision of training services to unemployed people under work-for-the-dole programs. In some cases employment agencies contracted the CTC to carry out this training where courses in computer training, office administration, and computer refurbishment were offered. In Calamba Bay CTC, the manager organised her trainees to undertake an oral history project that documented the memories of participants in the region’s once-important forestry industry on a CD-ROM. In Houghton and Viewbank CTCs, work-for-the-dole trainees were employed as receptionists for the CTC.

Another mode of income generation was the hiring of facilities to an employment services organisation to conduct computer training courses as part of the work-for-the-
dole scheme. Lastly, CTCs were also discovered to have hired out their facilities to adult education providers. This provided a major source of income source to Notley and Viewbank CTCs.

Case accounts were able to place in context the data derived from 2007-2008 CTCA Membership Returns as seen in the high frequency of ICT training courses for seniors in Table 4.3. Scrutiny of case accounts reveals that the high frequency of reporting of this initiative to the CTCA uniformly occurred as a consequence of an annual grant from the NSW Department of Family and Community Services during Seniors Week (in late March). While this initiative had had a significant effect in terms of the exposure of the elderly to ICTs it was of limited significance as a source of income for CTCs as the training was a one-off yearly event that occurred over a couple of days.

Training courses, as a source of income, are not a suitable solution for all CTCs. The extent to which such courses can be converted into revenue for the CTC appears dependent on contingent economic circumstances of the CTC. Localities that have a greater capacity to pay for training emerged as a more productive context to deliver training courses. For example Baden Bay CTC was located in a community of recently arrived retirees and was able to provide training courses on a commercial basis. The affluence of this group was translated into courses that were well supported by these retirees. In other cases CTCs were not able to deliver such courses on a commercially sustainable basis. Areas that were economically depressed due to the demise of local industry (for example, Deavonport on the South Coast where government buy-out of fishing licences was underway) were notable for the demand they experienced for training courses provided that such courses were free. In other cases such as Miandah, towns did not have the numbers of people to make the staging of a training course a viable proposition. The creativity of Calamba Bay and Lemont CTCs was apparent in their response to this problem by starting computer clubs (mainly for seniors) in which members paid a donation on their attendance where they were able to have ICT-related questions answered by the manager or volunteers. This initiative is listed under ‘Hosting of Groups’ in Table 4.5.
When asked for an opinion about ongoing demand for training programs, managers generally saw a need well into the future. As ICT skill levels improved in the community some noted increased demand for more advanced training. It follows that those who mastered basic techniques were ready to move on to more sophisticated levels of computer use. Another reason for ongoing demand for training relates to the difficulty that some people have in grasping basic ICT concepts. As the CTC manager from Siestaway noted, some people “just don’t seem to get it [computer operations].” Then there are the ongoing changes that occur in the specific features of programs as a consequence of software development which, in turn, generate further demand for training. As Ferndale CTC manager surmised, the demand for training was assured despite increasing prevalence of personal computers in the home. This is because the “knowledge-gap” is ongoing - as people learn something new, other areas of ignorance emerge. CTCs appear well-placed to address this need well into the future.

Training courses in Ferndale CTC were found to fill a local need in the community to develop ICT related skills in a range of areas. These included basic computer interactions such as creating, saving and organising files, training in specific software packages such as Microsoft Word, Microsoft Excel, Adobe Photoshop. A retired secondary school teacher had become the primary trainer using her background in teaching to train course participants in the use of ICTs. The financial arrangement of the course was to insist on a minimum number of participants to ensure that the costs of using facilities (heating, lighting) and the trainer’s time were covered. Once course numbers exceeded the minimum amount excess funds were placed in the CTC’s account for use by the CTC. Interestingly, the budgeting for courses did not include depreciation costs of computers. The manager held out hope that replacement computers would come by way of a capital grant from government or by other government sponsored projects they anticipated winning in the future.

Box 4.2 Vignette: Training in CTCs

Hosting of groups

Consistent with the 2007-2008 CTCA Membership Returns, the accounts reveal that CTCs hosted groups that can be associated with demographic characteristics (such as seniors or youth) or specific needs within the community (such as businesses, playgroups, music and so on) or sometimes both (homework clubs for young people). Not so clear from the CTCA data was the motivation to form such groups, the role of
ICTs in these groups or the significance of such groups to the broader community. The case accounts enabled closer scrutiny of such initiatives within CTCs to enable a more detailed understanding of these factors to be developed.

The difficulties of older people in developing computer related skills are exacerbated by limited savings and their capacity to pay for training courses. While Baden Bay CTC has been able to capitalise on its wealthy retirees because of its proximity to Sydney, the story is quite different in more isolated CTCs that service retirees who have worked and retired in the area. The prevalence of computer clubs found in the case accounts was to assist senior members of the community such as this in their use of computers. The nature of such gatherings were informal where people came together at set times during the week so that people could ask questions. Members pay a weekly attendance fee of a few dollars and can then benefit from one-to-one ICT training from CTC volunteers. It was also cheap to run as there was no need to employ a trainer - managers and volunteers were on hand to provide such assistance. Implicit in this arrangement was the understanding that the capabilities of managers and volunteers limited the complexity of problems that could be presented.

This demand for ICT training is understandable in the light of seniors having missed out on training opportunities in ICTs during their working years. In one story from the manager at Baden Bay CTC a retired couple had been given a computer by their grown-up children which then spurred them on to learn how to use it in order to maintain email contact with their grandchildren. Even those who were conversant with computers prior to their retirement found that this exposure was insufficient because it was quite specific to their former employer’s requirements.

Youth groups are also common within research sites. Youth boredom is one challenge of regional towns that some CTCs have responded to by allowing the CTC to be used as a place for young people to meet. LAN clubs are one example of an activity staged by CTCs that are designed to provide a positive framework for interaction and that have ICTs as a focus. In such cases the need for computer training is not the main impetus for meeting but the enjoyment of playing shared computer games that are networked together with the local area network or extended further out to the Internet. Homework
clubs are another example that had an explicit focus on young people. In Siestaway, the CTC had in the past developed a relationship with the local school where homework activities were developed in coordination with the CTC. Once students had completed their set tasks they were given a “credit” that allowed them to play a computer game or to save for a future occasion.

CTCs were also found to host groups based on a common interest or hobby that was relevant to the use of ICTs. One such example was genealogy groups in Baden Bay and Erindale. Genealogy research is facilitated by access to the Internet so the facilities at CTCs are ideally suited to this initiative. Similarly photography clubs also found an appropriate home for their activities in Baden Bay, Deavonport and Erindale CTCs. Photography also featured in the previous section on training services once again revealing a connection between social groups and formal training.

As indicated in Table 4.5 the income-earning history for the hosting of groups is quite limited for CTCs. However, this does not seem to have presented a barrier to the establishment and ongoing operation of such groups. The hosting of groups was generally considered a worthwhile initiative for the positive social interactions that enabled people to become more adept at the use of computers and associated technologies. To that end, the hosting of social groups by the CTC had in many cases served the purpose of training but in a way that was informal, cost-effective and reinforcing of social relations within the community.
During school holidays Ferngrove CTC staged midnight to dawn movie events for teenagers making use of its large screen television. Youth boredom being a problem in regional areas, the manager’s efforts to stage fun events for young people was considered a positive initiative by townsfolk. A variation on this theme was LAN parties where teenagers competed with each other using computer games over the Local Area Network (LAN). The bandwidth at this CTC also enabled them to compete with other gamers around the world using the Internet in the game of World of Warcraft. Andrew, one of these teenagers, was amused when he recounted the night they were all disconnected from the server by the gaming company system administrator presumably because of the level of network traffic originating from the CTC. Recounting the fun they had in the past it seems that some of the boys had outgrown computer games. They had assumed the role of system administrators for the CTC and had officially become volunteers spending their school holidays performing maintenance on the machines such as updating virus protection and upgrading networking equipment.

Box 4.3 Vignette: Hosting of Groups in CTCs

Multimedia Products

Reference to Table 4.5 indicates that the income-earning history of multimedia production is quite variable. Some CTCs had developed major and significant revenue streams by publishing community newsletters and newspapers. This has provided a viable model for revenue generation. There is a natural synergy between the ICT facilities at CTCs and newspaper production as well as local business people who are generally willing to pay for advertising and the local community’s interest in news of local stories and events. Some of these CTCs have also formed a business partnership with the local printery.

Other CTCs have devoted time and resources to the production of other information products such as books and CD-ROMs. Tourism and local history figure prominently in these examples. In Calamba Bay CTC, one volunteer was able to develop her ICT skills by producing a CD-ROM of local scenery and birdlife which was sold to customers many of whom were tourists. Another project at this CTC sought to capture on CD-ROM the early history of the local timber industry. At Ferngrove, one elderly resident with connections to a well-known family of the area many years ago has devoted time each day to write her autobiography where interesting accounts were being recorded about the locality many decades ago. In Miandah, the historical theme had national
significance where the contribution of local men to the Light Horse Brigade during World War One was documented in a printed publication. Similarly in Tidal River CTC, the role of a local aerodrome in the training of pilots during World War Two was recorded in a hard covered book. In Parkdale, the life history of a local identity from the Aboriginal community was explained through a photographic exhibition. Just from these few examples it is possible to see the CTC as playing a central role in bringing together the creative endeavours of community members inspired by local circumstances and needs.

In most cases these projects earned sufficient money to cover costs of materials. The time-consuming nature of multimedia production, even when revenue positive, meant that managers and volunteers were required to contribute a significant amount of time to these projects without payment. As a consequence, multimedia productions, with the exception of community newspapers, tended to be one-off rather than ongoing. Despite insufficient commercial incentive to undertake such an initiative, managers and volunteers spoke positively of these projects as being worthwhile and an important contribution to the recorded history of the locality. Usually, the completed book or CD ROM was made available for sale in the CTC or was exhibited in the local library.

Other multimedia products that were spoken of by managers included CDs and DVDs. Once again, these projects tended to require a significant investment in time. Even when these initiatives were conducted within a commercial context (for example the editing of an aerobics DVD in Parkdale and film trailers in Ferngrove) the nature of such initiatives was one-off and there was little impetus to undertake further projects along these lines. Once again, while people enjoyed the experience of developing these multimedia products none were converted into an ongoing revenue streams for the CTC.

Website development was also noticeable in case accounts. The revenue earning potential of websites was found to be disappointing in all the case accounts (see Table 4.5). At one end of the scale were static websites that list local services and attractions and provide access to an online version of the community newsletters, such as found in Aldinga Waters. A similar example of this type of static website was found in Deavonport which also made available online training modules for ICT skill
development. Three CTCs, Calamba Bay, Lemont and Parkdale were actively developing their own websites into a community web portal as community domain names became available from domain name authorities. Email addresses were also offered to community members and businesses as was web-hosting services. The response to these offers was disappointing. The availability of free email addresses from hotmail.com and yahoo.com has reduced the attractiveness of local community based emails. In terms of website hosting, once again, online offerings such as MySpace, Facebook, Bebo and other social networking applications have reduced the attraction of the local CTC’s server to host personal web pages. The manager at Parkdale CTC was particularly disappointed that local business had not responded positively to the offer of website hosting. He complained that most local businesses do not have a much of a vision for an online presence and seem to limit their use of the World Wide Web to “surfing” and accessing services as a customer.

That is not to say that this situation will continue so into the future. The case accounts of Erindale CTC reveal a sophisticated attempt to introduce an e-commerce web portal. This portal enabled access to three service areas: local government services, business and community groups. This website was seen to be germane to the transformation of the local economy from traditional timber and agricultural activities to cottage industries. The significance of the portal to the process of economic change was evident in the CTC manager’s ex-officio membership of the local chamber of commerce. While this initiative had stimulated interest, the web portal had not provided sufficient income for the employment of a CTC manager. This was a disappointment to the manager who has performed research into the viability of the CTC. Even if the portal were able to attract and retain an extra 1% of the town’s gross turnover it would be more than sufficient to support the portal and a manager.

In general, the creation of multimedia products in CTCs was the source of notable activity in cases. With the exception of community newsletters and newspapers multimedia production had not been translated into either major or moderate streams of income. While some disappointment was expressed that this had been the case the experience of creating multimedia product was generally viewed as worthwhile particularly when local people or events were at the heart of these projects.
Ferngrove CTC was used by a New York-based producer of music videos, (and a former resident), to stay in contact with his collaborators while visiting his parents who lived close by. The manager of the CTC had consciously chosen high-end PCs to enable video and sound editing so the endorsement of this equipment by a renowned producer was of particular note to local youth. This was of significance to the young people who felt a real and exciting connection with a centre for global cultural developments from the relative obscurity of their country town.

Box 4.4 Vignette: Multimedia Use in CTCs

Business Support Services

With two exceptions, the provision of Business Support Services did not figure prominently as either a major or moderate source of income for the studied CTCs. In seeking to attain commercial viability, all of the accounts reported public access to ICTs and the Internet on a user-pays basis. It can be observed that income-earning history of this initiative is, to a large extent, explained by the nature of the economies in which each of the CTCs reside. Some CTCs, for example Calamba River’s and Deavonport’s, were located in popular tourist destinations which were able to generate income by offering Internet services to travellers keen to maintain contact with family and friends, download photos from digital cameras or conduct online business transactions such as banking and accommodation booking. On the other hand, CTCs, such as Miandah and Wageman, had difficulty in generating income because the surrounding community was small (less than 500 people) and off the main tourist routes. Itinerant business people were also users of CTCs though not frequently. They normally used their laptops to retrieve and send emails, access company servers and print documents. In all CTCs the user-pays model of providing public computer access to the community was found to generate insufficient income. As a consequence CTCs were forced to look for other sources of revenue.

All but two of the CTCs provided office technology services such as printing and laminating facilities for the general public. Printing of business cards and advertising posters were common services. The creation and printing of the order of service for funerals figured regularly in the accounts. It was common for local businesses to use the CTC as a back up should their own equipment (printers and facsimiles, for example)
fail. Aldinga Waters, Calamba Bay and Rangemoore CTCs provided secretarial support to local businesses. Miandah CTC was able to derive a major income source for the organisational and administrative services it provided to an annual regional event. Income was earned by four of the CTC managers who would undertake ICT troubleshooting within a customer’s home. These managers charged a fixed rate of around $25-35 an hour for such visits.

Even though 11 of the centres had video conferencing facilities these services languished from lack of demand in all but one case. The one exception to this was Tidal River CTC that was able to provide this service to a local sugar-refining factory, which, as part of a national corporation, used the facility for a weekly videoconference with head office. As full commercial rates were paid, this enabled the CTC to maintain its ISDN (Integrated Services Digital Network) line not only for the video conferencing application but for all other broadband services the CTC used. All of the other CTCs with video conference facilities had moved from ISDN broadband access to the much cheaper broadband alternative of ADSL (Asynchronous Digital Subscriber Line). This move to ADSL access created problems in the provision of video conferencing services. This became apparent during the collection of research data. The planned use of video conferencing during a “Women in Business” training course sponsored by a rural-based corporation had to be abandoned when technical difficulties were experienced due to the change these CTCs had made from ISDN broadband to ADSL broadband.

Finally, one CTC was notable for providing business development advice. Even though NSW CTC Program planners considered this to be of significant value to the development of regional economies in practice it was represented poorly in case accounts.
Calamba Bay CTC had invested in a laminator that was able to laminate large A1 posters. This capability brought many different organisations through its doors ranging from the local sawmill, solicitors and church groups. The manager’s concern for her community included an understanding of the problems facing local businesses. The local economy is challenged by the decline in the fishing and forestry industries, once the town’s employment mainstays. As incomes of community members weaken, many businesses struggle to remain viable. She spoke about the need for cooperation between businesses so that each is able to maximise their returns. As a consequence, she sees no value in the CTC taking custom from other businesses. She gives her time freely to the local chamber of commerce preparing documents for upcoming meetings as well as recording the minutes. The only charge made by the CTC to the chamber is for the costs of printing.

Box 4.5 Vignette: Business Support Services Offered by CTCs

The final section of Table 4.5 lists the associated businesses that some CTCs had developed in addition to CTC-related initiatives. The degree of support derived from these other business activities varied considerably. At the top end of the scale, Wageman CTC was able to derive support from the business it ran for Australia Post. At the other end of the scale the example of ‘Santa photos’ at Rangemoore was directed at promoting the CTC rather than at earning income.

In closing, Table 4.5 and the accompanying commentary provide a summary of the revenue raising potential of various initiatives undertaken by the studied CTCs. Some CTCs have spread their reliance on income over a number of sources as opposed to relying on just one source. This reduces the risk of the CTC to unexpected changes in the local business context as the failure of one line of business activity will have less impact if other activities are able to continue producing income, albeit at a lower level.

The perceived value of initiatives is certainly influenced by their income-earning history but not solely. The highlighting of initiatives that are not amenable to the production of income indicates that other criteria for value were in operation. To that extent, the poor income-earning history of some initiatives does not accurately reflect their value to CTC customers and the community at large.
This provides substantial support for the contention at the heart of the research goal that CTCs were generally considered as successful enterprises that struggled to earn sufficient revenue. The next two sections (4.3.2.2 and 0) investigate the value of initiatives that appear to be driven by social factors rather than by commercial factors. These two sections deal with the support that is derived from volunteers and subsidies respectively.

4.3.2.2 Volunteers

The use of volunteers in the majority of studied CTCs was another strategy found to be effective in keeping these CTCs operational. As indicated in Table 4.6, 13 of the cases benefited from the contribution of volunteers. The time that the 116 volunteers contributed to the studied CTCs was calculated at 553 hours in total which averaged out to 42.5 hours per week for each CTC. These proportions are in line with the broader membership of the CTCA data where 38 of the 49 CTCs detailed in the 2007-2008 CTCA Membership Returns benefited from volunteers where it was found that volunteers on average contributed to each CTC 47.6 hours per week.

<table>
<thead>
<tr>
<th>Table 4.6 An assessment of volunteer contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>CTCs with Volunteers</td>
</tr>
<tr>
<td>Average Hours/Week</td>
</tr>
</tbody>
</table>

Information provided by volunteers who responded to the Volunteer Survey indicated that females were in the majority. Out of the 23 respondents to the volunteer survey, 17 were female and 5 were male (see Table 4.7). Table 4.7 also indicates that CTCs rely on people over the age of 40 years to volunteer their time, with the average age of volunteer respondents at 50 years of age. In total, respondents to the survey contributed approximately 231 hours per week to their respective CTCs.
The nature of duties performed by volunteers was found to be diverse. High on the list of responsibilities (described in interviews with volunteers) were front desk activities which included assisting people with ICT operations and supervision of children. Some were involved in supervising and coordinating other staff as well as keeping the CTC’s accounts. Some volunteers had been given special tasks such as the editorship of a community newsletter.

The data derived from surveys that volunteers completed indicated that the great majority of volunteers spent time imparting knowledge to customers (see Table 4.8). High on the list of skills that volunteers taught were basic level and medium level IT functions where 22 and 18 volunteers respectively agreed that they had assisted customers in these areas. Also high on this list, volunteers reported that they were able to assist people to develop skills in their participation of community groups (20). Another item of note was the help that volunteers provided in relation to the use of IT in the management of groups and businesses.

When given the opportunity to nominate other areas of learning not listed in the survey, four people provided additional examples of skills that they had shared. These included: bookkeeping; business organisation; and a visionary outlook. One volunteer wrote that he had much more to give stating that the simple nature of questions asked by customers had not seriously tested his knowledge to date.
Table 4.8 Knowledge and skills that volunteers provide to their local CTC

<table>
<thead>
<tr>
<th>Knowledge and skills volunteers have <em>brought</em> to this CTC</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..</td>
<td>22</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2 … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).</td>
<td>18</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3 … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).</td>
<td>9</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>4 … how to participate in a community group.</td>
<td>20</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5 … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.</td>
<td>11</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>6 … how to manage a community group (take a leadership role such as leader or trainer).</td>
<td>16</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7 … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list)</td>
<td>17</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>8 … how to use IT to participate in online community groups such as Bebo, My Space, YouTube, game communities and so on.</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>9 … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).</td>
<td>14</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10 … how to use IT to better manage a business.</td>
<td>16</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Interviews with volunteers indicated that the motivation that led them to voluntarily teach ICT skills appeared to be factored on an underlying belief that such skills were of general benefit to their community. Table 4.9 records a selection of statements from surveys pertaining to the motivation of respondents where the connection between ICT training and benefit to the community is also clear to see. Out of the 23 returned surveys only one contained a negative comment about this volunteer’s CTC.
Table 4.9 Why volunteers were initially motivated to help at their local CTC

To be of assistance to the community. Since joining as a volunteer I have been able to help both young and old.
I enjoy teaching people (older people) to use technology.
Knowledge sharing. Satisfaction of helping others.
I enjoy learning new technology skills.
Friendly people, interest in computers internet etc and eagerness to learn more about them.
I started as part of a work for the dole project but stayed after completing the required time for this project because it was friendly environment and I could further develop my skills.
I found that there was a great need for my services and I was able to learn new skills. improve electronic literacy.
Interest in community affairs and helping improve facilities for local residents. History.
To make use of working life skills
Community

The factors that motivated volunteers to continue their involvement with the CTC suggested that the CTC had contributed to their sense of wellbeing at a number of levels. The selection of responses in Table 4.10 reflects the themes of skill development through ICT training and positive social interaction. (See Table E.5 for a full list of responses.)

Table 4.10 Why volunteers continue their involvement

There's always more to learn!
I enjoy the company.
Friendly people and atmospheric. I can continue to develop skills for repairing computers and this will hopefully help me gain employment.
Great place to work with.
Can make it a win-win for personal satisfaction and use. Aim to better the community with a better focus.
To keep basic services such as computer use printing internet office help, laminating etc which is not available in town due to lack of transport and geographic isolation to save travelling to [regional centres].
No one else will do it!
Uppermost in many volunteers’ minds was that the CTC was an effective organisation in which to promote skill development. This can be seen in the following selection of comments from volunteers when given the opportunity to provide open-ended responses to assist with the research (see Table 4.11).

Table 4.11 A selection of open-ended responses from volunteers

CTCs are an essential asset to a small community such as [ours].

The CTC is a wonderful facility for a little town like [ours]. Instead of going out of town for IT it is great to be able to keep business in town.

I hope the government will finally accept responsibility for the idea that they've spent so much commercial resources on and finally invest them with a future.

CTCs are an essential asset to a small community such as [our town].

It was also apparent that volunteers gained benefits from their involvement beyond satisfaction of helping others. Surveys similarly indicated that volunteers benefited from skills development afforded to them in the CTC. Asked to comment on the same areas that were used to gauge their contribution to the CTC it was found that volunteers developed knowledge in a number of areas as indicated in Table 4.12. During interviews, free access to broadband was cited several times as a factor motivating involvement. Echoing the theme of positive social interaction a couple of interviewed volunteers found the CTC an effective way to develop friends as they were newly arrived in the area.

The opportunity to nominate areas that had not been listed in the survey was taken up by five volunteers. Areas of knowledge that had been developed included: business training, particularly account keeping software (for example, MYOB)\(^\text{18}\); customer service; and teaching skills.

\(^{18}\) MYOB is the name of a popular accounting package. MYOB is an acronym for the statement “mind your own business”.
Table 4.12 Knowledge and skills that volunteers have developed in their local CTC

<table>
<thead>
<tr>
<th>Knowledge and skills that volunteers have learnt…</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..</td>
<td>15</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2 … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).</td>
<td>15</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3 … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).</td>
<td>10</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4 … how to participate in a community group.</td>
<td>18</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5 … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>6 … how to manage a community group (take a leadership role such as leader or trainer).</td>
<td>11</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>7 … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list)</td>
<td>13</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>8 … how to use IT to participate in online community groups such as Bebo, My Space, YouTube, game communities and so on.</td>
<td>5</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>9 … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).</td>
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<td>5</td>
</tr>
<tr>
<td>10 ... how to use IT to better manage a business.</td>
<td>16</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

To further emphasise the benefits of the CTC to the local community nearly all of the volunteers indicated that they were able to use the skills they had learnt at the CTC in other community organisations or in their own. Eighteen respondents indicated that they were able to use CTC-derived knowledge at home, in business and in other community organisations.

Consistent with the data from the 2007-2008 CTCA Membership Returns, volunteers were vital to the ongoing operation of the majority of cases. It is also apparent that factors motivating volunteer involvement in their local CTC are their enjoyment derived
from learning new skills as well as social contact. As volunteers are sometimes involved with other organisations in the community (both community and business) they also represent a conduit of ICT skill development to these organisations. Poignantly, some volunteers appear to be engaged in a struggle to maintain the ongoing existence of their towns as indicated in Box 4.6.

Miandah CTC was instructive for the way the CTC became a place in which a number of important social interactions between volunteers took place in a town that was suffering from considerable stress from ongoing drought. The volunteers were elderly females who were partners of local grain growers who were dealing with insufficient rain on their properties. The local town had suffered from the withdrawal of services where limited income in the local community had a flow-on effect. The closure of the supermarket had led to the departure of a local family. The removal of children from the school led to the relocation of a teacher from the local school. Poor service provision had led the remaining teacher to move to a regional centre which further exacerbated the problem.

It was in this context that the volunteers from this CTC displayed a high commitment to ensuring the CTC remained open, particularly for local children after school. Most afternoons, prior to the children’s arrival, the volunteer women collectively learned about MS Publisher. One volunteer commented that MS Publisher was of value for the production of orders of services for funerals and other events. The availability of the Internet and a range of associated software options such as email and Skype have given another woman the ability to maintain contact with her children who live in Sydney and London.

When the children arrived after school they were required to undertake their homework tasks before being given permission to play computer games. It was interesting to see the informal authority of these women as they helped children to work through their exercises, all the time reminding children to maintain good posture while at the computer. The sight of two girls sending messages to each other via MSN as they sat next to each other drew the amused response of one volunteer who could not understand why the girls did not bother to engage in a “normal conversation”.

Box 4.6 Vignette: Volunteer Commitment to Their CTC
4.3.2.3 Subsidies

The case accounts also contained information about the subsidies that CTCs received from both public and private sources. One significant example of this was the subsidised software that all members of the CTCA were able to buy through the Microsoft Unlimited Potential Program. This program enabled CTCs to obtain at no charge operating system software and a suite of software applications (word processing, spreadsheet, presentation, publishing and web browsing) called Microsoft Office.19

In contrast to the original goal of the NSW CTC Program, it was found that the overwhelming majority of studied CTCs relied on subsidies, mainly from local government, to remain operational. Out of the 17 cases, 14 CTCs benefited from subsidies. In all cases, these subsidies were considered to be of moderate or major significance as a source of either “in-kind” or actual income. Referring to Table 4.13, it can be seen that subsidies were provided mainly by local government. The nature of such subsidies varied. Most common among cases were in-kind subsidies where the council provided premises for the CTC (Locations 2, 3, 4, 5, 6, 8, 9, 10, 14, and 15). This included situations in which the CTC was located in or next to the library which then included the provision of electricity and broadband as well as access to library facilities such as photocopiers (see Locations 4, 5, 6, 7, 8, 9). In three such cases, the manager was paid by the local council and was a member of council’s staff (Location 5, 8 and 9). In other cases the provision of premises was only as an in-kind contribution and the provision of utility costs including broadband, electricity and water was funded by the CTC (Location 2, 3 and 10). The final form of subsidy was a direct cash contribution for partial assistance with rent (see Location 1) or for use within the CTC’s operating budget (see Location 7). Only one CTC enjoyed support from a state government department (Location 12). This CTC was located in a youth centre that was run by the NSW Department of Community Services. Two CTCs enjoyed subsidies from non-government sources, one of which was located in the local Progress Association hall on a rent-free basis (Location 17). Only one CTC reported a subsidy from a private source where a local businessman set the rental for the CTC premises well below market rates (see Location 7).

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19 The Microsoft Corporation provides this subsidised software as part of its corporate citizenship responsibilities. See http://www.microsoft.com/about/corporatecitizenship/en-us/about/
Table 4.13 Sources and types of subsidies found in case accounts

<table>
<thead>
<tr>
<th>Subsidy Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17</td>
</tr>
<tr>
<td>In-kind provision of premises from local government</td>
<td>x x x x x x x x x x x</td>
</tr>
<tr>
<td>In-kind provision of utilities (electricity, broadband etc) and office equipment</td>
<td>x x x x x x x x x</td>
</tr>
<tr>
<td>Manager paid by local government</td>
<td>x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Direct cash contribution (grant) from local government</td>
<td>x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Local government summary</td>
<td>x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>State government</td>
<td>x x x x x x x x x x x x x x x</td>
</tr>
<tr>
<td>Non-government subsidy source</td>
<td>x x x x x x x x x x x x x x x</td>
</tr>
</tbody>
</table>

4.3.3 Discussion: Research Question RQ2

In response to research question RQ2, the analysis indicates that a variety of strategies have been employed to keep CTCs operational. Most initiatives appear to be related to specific needs and opportunities within communities. For example, CTCs located in popular tourist destinations benefit more from passing tourists requiring Internet access than do CTCs located in places where such custom is light. High unemployment rates in some research sites are reflected in the training courses that CTCs are able to offer and derive income from work-for-the-dole and related schemes. In other instances, the specific expertise of CTC staff is reflected in the production of community newsletters and newspapers.
Most poignantly illustrated in the case accounts is the difficulty in developing sufficient income streams from ICT related initiatives. With the exception of Centrelink the level of support from brokered government services is generally considered of minor income-earning significance. In relation to training, the affluence of local community members appears to be a significant factor in determining the income-generating potential of training courses. In the absence of subsidised training through contracts from employment agencies, subscription to training courses appears to be dependent on the financial circumstances of community members. With the exception of newspaper production, the appeal of multimedia production quickly dissipates when the effort required to complete projects is compared to returns which are limited due to market size. The business that the private sector provides to the CTC is quite limited. Businesses are appreciative of the services that CTCs provide but have found little reason to incorporate CTCs into their business plans. Rather, the services that CTCs provide are often viewed as a “back-stop” when equipment such as printers fail or one-off requirements for laminating forces the use of CTC facilities.

The analysis indicates that the income-producing potential of initiatives is not the sole criteria on which the value of activities is judged. The high incidence of social groups in the case accounts indicate that people benefit from such activities even though there are insufficient commercial reasons to stage such activities. This is also reflected in the contributions that volunteers make to CTCs. The satisfaction that volunteers receive for providing valued services to the community appears as a strong motivation to continue assisting their local CTCs. Volunteers are also found to benefit personally from the learning opportunities that their work in the CTC brings.

The existence of subsidies, mainly from local government, can also be explained using a similar rationale. The benefits that accrue to the local community from the initiatives that CTCs provide are recognised in the assistance that local government administrations provide by way of in-kind and cash contributions. In summary, the value of such activities are not immediately realisable as income but are recognised more generally as being of significant value to the community. The danger in adopting a focus on income-producing initiatives is that activities that are recognised as being of significant social value are excluded from serious consideration. This is consistent with
the observations made by the report writers at the conclusion of the NSW CTC Program when CTCs were judged to be highly successful social enterprises that struggled to earn sufficient revenue.

4.4 Research Question RQ3

Research Question RQ3 seeks to determine the significance of initiatives detailed in Section 4.3 in relation to three factors: the autonomy of local communities; the role of the private sector and the involvement of government. The first factor of autonomy was argued to be of significance for two reasons (see Section 2.2.4). The first related to the emphasis that the planners of the NSW CTC Program put on the local community as the source from which new ideas for development would emerge. This was subsequently found to be an aspect of the program that managers and academics valued highly when assessing future directions of the NSW CTC Program as it drew to a close in June 2005. The second reason relates to the identification of community by Hall and Midgley in their Social Development Theory. The autonomy of communities therefore was argued to be of major significance when assessing the efficacy of CTCs in promoting social development.

4.4.1 Autonomy of local communities

Implicit in the understanding of community autonomy explained in Chapter 2 was that communities respond best to initiatives if they are able to exercise control over the functions that the CTC performs in their local communities. To that end, the study addresses this aspect of Research Question RQ3 by initially reporting on the customer survey which reveals information about how the CTC was used by individuals. The chapter then goes on to consider CTCs as an organisation in the broader context of the community.

4.4.1.1 CTCs and the Individual

The research was able to draw on customer surveys and interviews with managers to report on the use of CTCs by individuals in the community.
The customer surveys recorded provide an opportunity to develop an understanding of what purposes customers used CTCs for. In developing an understanding of the significance of CTCs in people’s lives it was possible to address the question of how well the CTC was able to serve the needs of individuals within local communities. The number of survey respondents was 146. Out of this number 137 identified themselves as being local to the CTC in which the survey was completed. The average age of respondents was 40 years and included 89 females and 52 males (five people did not volunteer this information). The distributions of ages can be found in Table 4.14. Consistent with the age distribution of volunteers (see Section 4.3.2.2), females in the 40 to 60 year old age bracket were well represented in the respondents to the customer surveys. There was also a strong showing of both females and male respondents in the age bracket 20 years or younger.

<table>
<thead>
<tr>
<th></th>
<th>20 years or less</th>
<th>21-30 years</th>
<th>31-40 years</th>
<th>41-50 years</th>
<th>51-60 years</th>
<th>61-70 years</th>
<th>71+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>20</td>
<td>6</td>
<td>12</td>
<td>22</td>
<td>19</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>11</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

It is timely to reflect on the number of older people (40 years or older) who responded to the survey when compared to younger age groups. When one considers the higher-than-average median age range in the research sites detailed in Table 3.7, it can be seen that the over-representation of older people in surveys is not inconsistent with official census data. Given that only customers of CTCs were surveyed one expects that the customer survey responses would be biased to the perspective of those customers as compared to the remainder of the community who did not use the CTC. This apparent bias is acceptable within the context of the research questions which did not require a poll to be taken about the CTC’s popularity in the broader community.

When asked to nominate three primary factors that would affect respondents should the CTC close respondents gave a diverse set of answers (see Table 4.15). Most strongly represented in the data was the use of the Internet/broadband (21%). Respondents also indicated that social interaction was something that many would miss most (18.2%).
Other factors that figured prominently in Table 4.15 were email (19.2%), training (10.2%), office services (8.3%), computer applications (7.4%), IT advice (6.2%), multimedia (4.9%) and Government services (4.0%). The remainder of the list makes for interesting reading for the variety of factors that people value from their local CTC.

Table 4.15 What customers would miss most about their CTC

<table>
<thead>
<tr>
<th>Most valued CTC Services</th>
<th>Relative Proportion (n= 324)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet/broadband</td>
<td>21.0% (68)</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>18.2% (59)</td>
</tr>
<tr>
<td>Email</td>
<td>10.2% (33)</td>
</tr>
<tr>
<td>Training</td>
<td>10.2% (33)</td>
</tr>
<tr>
<td>Office Services (printing, faxing, copying, secretarial services, etc)</td>
<td>8.3% (27)</td>
</tr>
<tr>
<td>Computer Applications (e.g. word processing)</td>
<td>7.4% (24)</td>
</tr>
<tr>
<td>IT Advice</td>
<td>6.2% (20)</td>
</tr>
<tr>
<td>Multimedia</td>
<td>4.9% (16)</td>
</tr>
<tr>
<td>Gov Services</td>
<td>4.0% (13)</td>
</tr>
<tr>
<td>Other (not IT) Advice</td>
<td>2.5% (8)</td>
</tr>
<tr>
<td>eBay, Internet Banking</td>
<td>2.2% (7)</td>
</tr>
<tr>
<td>Web2.0</td>
<td>1.5% (5)</td>
</tr>
<tr>
<td>Games</td>
<td>1.2% (4)</td>
</tr>
<tr>
<td>Business Advice</td>
<td>0.6% (2)</td>
</tr>
<tr>
<td>School/uni</td>
<td>0.6% (2)</td>
</tr>
<tr>
<td>Other (Dancing and Power source)</td>
<td>0.6% (2)</td>
</tr>
<tr>
<td>Footy Tipping</td>
<td>0.3% (1)</td>
</tr>
</tbody>
</table>

Respondents also indicated that the CTC had been a place of learning for them. When asked whether they had learnt anything as a consequence of their visits to the CTC, 126 people answered in the affirmative, three people were not sure and 19 people answered in the negative. Seeking to indentify those areas of learning, respondents were asked to
state their levels of agreement to the same set of statements that were presented to volunteers (see Table 4.16). Once again, respondents were also given the opportunity to add other skills in case the presented list of alternatives was not comprehensive.

All of the listed skill categories in Table 4.16 enjoyed majority support from respondents with the exception of one skill category. The skills associated with using social networking sites such as Bebo, My Space and Youtube (statement 8 in Table 4.16) were rated lowest with 48% of responses displaying positive support for these skills. At the other end of the scale, the three strongest areas of skills development (statements 1, 2 and 4), were rated positively by 80% or more of the respondents. These statements related to basic and medium levels of IT skills. Interestingly, the social aspects of CTC involvement were also represented strongly where 99 people indicated that the CTC had been a place where they had learnt skills in community group participation. The six remaining statements in order of support were: how to use IT to communicate information to the public (statement 9); higher level IT skills (statement 3); how to take part in electronic commerce (statement 5); and how to use IT to better manager a community group (statement 7); how to manage a community group (statement 6); and how to use IT to better manage a business (statement 10).

Some customers took the opportunity to suggest other areas of learning that they had experienced as a consequence of their involvement in the CTC. These are summarised in Table 4.17. Many of these suggestions indicate specific social contexts and activities in which new areas of ICT use have been learned.
Table 4.16 Knowledge and skills that customers have developed in their local CTC

<table>
<thead>
<tr>
<th>Knowledge and skills learnt at this CTC</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc.</td>
<td>102</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>2 … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).</td>
<td>94</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>3 … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).</td>
<td>78</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>4 … how to participate in a community group.</td>
<td>99</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>5 … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.</td>
<td>73</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>6 … how to manage a community group (take a leadership role such as leader or trainer).</td>
<td>65</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>7 … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution lists)</td>
<td>68</td>
<td>37</td>
<td>20</td>
</tr>
<tr>
<td>8 … how to use IT to participate in online community groups such as Bebo, My Space, YouTube, game communities and so on.</td>
<td>61</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>9 … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).</td>
<td>85</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>10 … how to use IT to better manage a business.</td>
<td>63</td>
<td>41</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 4.17 Other knowledge and skills that customers have developed in their local CTC

- Make business cards, laminating, book binding, slide show
- Customer relations, handling cash register
- Using IT as a mediary (sic) for community
- [Computer] Networks
- Teaching skills
- Secretarial procedures
- Internet safety
- Allows access to online business opportunities and education
Respondents were also given the opportunity to provide open-ended comments about their CTC. Out of the 50 who took this opportunity the tone of such comments was almost overwhelmingly supportive of the CTC. A selection of such comments can be found in Table 4.18.

<table>
<thead>
<tr>
<th>Table 4.18 A selection of open-ended response from customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTC is indispensable to the community. Many locals make use of it.</td>
</tr>
<tr>
<td>CTC is an important asset to a small town and would be sadly missed if closed down.</td>
</tr>
<tr>
<td>Don’t know what I would have done without this service. It’s been a great support to me. It will help people to survive and prosper.</td>
</tr>
<tr>
<td>A fantastic community facility that has became an integral part of our community.</td>
</tr>
<tr>
<td>Looking forward to learning more and in time being able to email my daughters.</td>
</tr>
<tr>
<td>The CTC is the best thing that happened to [my town] as I have learnt to use computers in ways that I had never imagined.</td>
</tr>
</tbody>
</table>

The positive comments from customers should not be construed as representing an endorsement by the whole community of the work of the CTC. Indeed, given the precarious state of many CTCs some may have felt the need to overstate their support in order secure further government funding. Such positive comments are not, of themselves, intrinsic to the information needs of the research intrinsic to the information needs of the research hence do not undermine the efficacy of the research in responding to the research questions.

The information provided by managers during interviews was also relevant to understanding the significance of their CTCs in the lives of individual community members. By virtue of their role, many of the managers were aware of the personal circumstances of some people’s lives and were able to provide moving accounts of how their CTC was able to make a positive contribution to the challenges that some people experienced (see Box 4.7).

Also evident in the case accounts are the steps that CTCs take to prevent harmful experiences, particularly to children. This represents a common requirement for all the
members of the CTCA. This included specific prohibitions against the use of CTC facilities for viewing or downloading of pornographic material, to intimidate or threaten others or online gambling. A number of managers expressed some disquiet at the images some younger people accessed but generally used on-the-spot supervision by volunteers or themselves to manage and limit exposure to such sites. Despite the potential for income generation none of the CTCs studied offered ‘adults-only’ services - such as access to gambling sites - to adults.

At Ferngrove CTC one volunteer, who once had a reputation for being anti-social and a vagrant, had displayed a remarkable change in attitude to himself and to other townsfolk. This person lives by himself some distance from town in an isolated area in a tent. He has no electricity. His involvement with the CTC has been credited with the positive changes he has made in the way he interacts with others. He now has learnt sufficient about computer operations to regularly volunteer his time to assist customers of the CTC. The provision of a subsidised second hand laptop from the CTC has enabled him to commit his life story as a war veteran to words. This appears to have been a cathartic experience that has contributed to his changed demeanour. The provision of a solar cell, also negotiated by the Ferngrove CTC manager, enables him to charge his laptop so that he can use this in his isolated abode. During interviews with this person, who is quite friendly and jovial, it was difficult to understand the negative feelings that this person had once incited in the community.

Another example of the ways CTCs have been valuable in including people is the story of a teenage boy in Erindale who, even though being extremely bright, was unable to attend school. He finds it a real challenge to interact with his classmates who also have problems interacting with him, so have taken to bullying him. His regular attendance at the CTC enables him to fuel his keen intellect and provide some respite to his mother who now struggles to find learning activities to sufficiently stimulate him. The option of sending him to a school for gifted and talented students would mean that he would need to leave town, something that cannot be considered given his level of maturity. So, in the meantime, the CTC provides a welcome alternative for this family.

Notley CTC manager related a poignant story of a teenage girl who visited the CTC on a daily basis to exchange emails with her mother who lived some distance away. She was particularly fearful of the CTC closing down because should this event occur it would effectively prevent her from maintaining a close relationship with her mother who had become estranged from her father.

**Box 4.7 Vignette: CTCs making a difference in some people’s lives**
In summary, the customer surveys and interviews with managers provide a detailed perspective of the CTC from the point of the view of the individual. It is interesting to note that the respondents were mainly local and overwhelmingly positive. As a response to the issue of community autonomy that was identified as a central plank of the NSW CTC Program, it can be seen that CTCs maintained a focus on addressing the needs of local people after June 2005. It is also noteworthy that the vast majority of customers had nominated the CTC as a place in which they had learnt new knowledge and skills. Hence there is evidence to claim that CTCs have continued with their function as ‘successful social enterprises’ as described in the Final project report (NSW DoC, 2004).

4.4.1.2 CTCs as an Organisation in their Local Communities

The ability of CTCs to respond to the needs of the community extended beyond providing individuals with access to ICTs and a friendly social environment. The goals of the NSW CTC Program were also to address local problems within regional communities.

The most obvious connection that can be drawn between CTC initiatives and problems can be seen in the issue of isolation that, by definition, affect regional towns. As detailed in Section 4.3.2.1 CTCs provide a range of alternatives to needing to travel to major centres. Examples range from providing an ability to search for jobs, undertake correspondence courses, provision of local library services, form-deposit services on behalf of government departments and so on.

Referring to Figure 4.2, it is possible to see more specifically how CTCs have responded to local problems. For example, it can be seen that a number of CTCs have responded to their local problem of unemployment by providing training courses and other training opportunities. It can be seen that work-for-the-dole programs are nominated seven times in Figure 4.2 in places where unemployment is a problem of community-wide concern (Locations 1, 2, 3, 4, 7 16, & 17). CTCs are found to provide a number of forms of work-for-the-dole training which include the development of ICT-related skills in both software and hardware as well as office administration. The
function of a Centrelink Access Point for the receipt and processing of forms is another example of the linkage between unemployment, isolation and a CTC initiative.

The provision of training in the use of ICTs can also be seen to serve the needs of people who have previously had little exposure to ICTs. This was particularly apparent in the different kinds of opportunities CTCs provided to seniors. In some cases formal training courses were provided on a fee-for-service basis (Location 2) while in other places, training for seniors was delivered through less formal computer clubs (Location 3 and Location 8). Similarly with the problem of youth boredom, CTCs have instituted a number of initiatives to provide a positive environment for young people to meet and interact using ICTs (for example, see Locations 5, 6, 7, 8, 10, 11 & 16).

Some CTCs have taken steps to respond to declining economic conditions of their towns. As described previously, this was evident in Erindale CTC that had developed a sophisticated e-commerce community portal that is designed to assist the region’s adjustment to new forms of economic activity away from forestry and cattle farming. Similarly, other CTCs have sought to interest business in developing a web presence. Even though these initiatives are yet to become commercially viable they are notable for their innovation as such measures have never been tried previously within the membership of the CTCA.
### 1. Aldinga Waters

**Local problems and opportunities**
- High retiree population
- Unemployed young people
- Holiday Destination

**Local Responses**
- IT training for seniors
- Community newspaper
- Work-for-the-dole IT training
- Production of tourism CD-ROM.

### 2. Baden Bay

**Local problems and opportunities**
- High number of affluent retirees who have moved to the area.
- Unemployment with the downturn of fishing industry.

**Local Responses**
- CTC managed IT training
- Work-for-the-dole IT training

### 3. Calamba River

**Local problems and opportunities**
- Loss of fishing and forests industry
- Popular tourist destination
- High number of local retirees

**Local Responses**
- Centrelink Access Point:
- Work-for-the-dole training (Local history publication on CD-ROM);
- Secretarial services for Chamber of Commerce (gratis)
- CD ROM Production of local birdlife
- Computer clubs/courses for seniors

### 4. Deavonport

**Local problems and opportunities**
- Unemployment with the downturn of fishing industry.
- Local Aboriginal community
- Small scale accommodation businesses

**Local Responses**
- Work-for-the-dole training (Office admin)
- Proposed multimedia production
- Website hosting and development

---

**Figure 4.2 Case CTC’s responses to local problems**
### 5. Erindale

**Local problems and opportunities**
- Transition from cattle to softwood farming

**Local Responses**
- E-commerce community-business-government web portal
- Training courses women in business; seniors; and youth

### 6. Ferngrove

**Local problems and opportunities**
- Youth boredom
- Limited employment opportunities
- Loss of local services (e.g., travel agent)

**Local Responses**
- Youth Games nights
- DVD, CD, CD-ROM editing (Music, movie)
- CTC managed Training courses
- Micro-business development e.g., computer repair business
- Labour exchange
- Assist customers to access online services

### 7. Houghton

**Local problems and opportunities**
- Business Development
- Drought, reduced incomes, unemployment
- Older population
- Difficulty in purchasing computer consumables

**Local Responses**
- NSW Department of Fair Trading Agency
- Small business training
- Hire facilities to training provider
- Work-for-the-dole training (Office Admin)
- University of the Third Age
- Computer consumables

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**Figure 4.2 (cont’d) Case CTC’s responses to local problems**
### 8. Lemont

**Local problems and opportunities**
- Loss of local services
- Older population
- Youth boredom

**Local Responses**
- Visitor Bureau
- Online community newsletter
- Printing of posters, business cards etc.
- Computer clubs/courses for seniors
- Youth LAN parties/games nights

### 9. Miandah

**Local problems and opportunities**
- Drought – limited town income
- Loss of services
- Older population
- Small historic community in crisis

**Local Responses**
- Secretarial services for annual regional event
- Business alliance with IT company in regional centre
- Printing of posters, funeral orders of services etc
- Free informal training courses
- History publications

### 10. Notley

**Local problems and opportunities**
- Drought; unemployment
- Loss of services
- Youth boredom

**Local Responses**
- Hire facilities to training provider
- Community Newspaper
- Youth drop-in centre

### 11. Obelisk

**Local problems and opportunities**
- Youth boredom and delinquency; family breakdown; unemployment

**Local Responses**
- Youth centre
- Free access for youth and unemployed
- ICT based community programs responsible use of IT, cyber-safety

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Figure 4.2 (cont’d) Case CTC’s responses to local problems
12. Parkdale

Local problems and opportunities

- Unemployment
- Isolation
- Local indigenous community under stress
- Constrained business context

Local Responses

- Centrelink Access Point
- Online access to services
- Community alliance program
- Website hosting
- Wireless broadband innovation
- Community newsletter

13. Rangemoore

Local problems and opportunities

- Unemployment
- Isolation due to poor transport to regional centre

Local Responses

- Centrelink Access Point
- Online access to services
- Community newspaper
- Santa Claus photo sessions during festive season

14. Siestaway

Local problems and opportunities

- Popular tourist destination
- Area is popular with artists

Local Responses

- Visitors bureau
- DVD, CD CD-ROM editing (music, movie)

Figure 4.2 (cont’d) Case CTC’s responses to local problems
### 15. Tidal River

**Local problems and opportunities**
- Sale of local historic RAAF base for housing development
- Protection of local habitat for flora and fauna
- Local sugar refinery

**Local Responses**
- CTC is affiliated with museum displaying memorabilia from local air base
- Production of books and CD ROMS:
  - local history (airbase) and
  - local flora and fauna.
- Fortnightly video conference for local company

### 16. Viewbank

**Local problems and opportunities**
- High unemployment
- Isolation
- Youth boredom

**Local Responses**
- Hire facilities to training provider
- Work-for-the-dole training (office admin. and computer refurbishment)
- Learner driver scheme
- Car pooling scheme
- Narrow cast radio station

### 17. Wageman

**Local problems and opportunities**
- Very small community
- Isolation
- Lack of services
- Unemployment

**Local Responses**
- Related business (post office)
- Online access to services
- Centrelink Access Point;
- Work-for-the-dole training (office admin)

---

Figure 4.2 (cont’d) Case CTC’s responses to local problems
The autonomous management structure that was established at the beginning of the NSW CTC Program is still evident in all of the studied CTCs. The Final project report highlighted the importance of the expertise of managers and the difficulty in attracting appropriately skilled people in a context of modest salaries and geographical isolation (see Section 2.2.1). Out of the 17 managers interviewed for this study 10 had arrived (or returned) to the area in the recent past after careers in corporate or government environments in capital cities throughout the world. To that end, a majority of cases benefited from managers with significant professional expertise.

It was also possible to see a relationship between the expertise of such managers and the nature of programs that were instituted. In Houghton, the manager’s past role as IT coordinator in a corporate setting in Asia was clear in his close relationships with local business people and the emphasis he placed on ICT use within business. The proclivity of Ferngrove CTC’s manager to discover and successfully secure grant-funding opportunities reflected his prior experience working in university research, where research funding relies on government and industry grants. In the case of Calamba River’s CTC, the recording and documenting of an oral history from local elderly residents by young unemployed people as part of a work-for-the-dole program could be linked to the former profession of the manager as a teacher. Despite the diversity of experiences that managers bring to their CTC, one quality required of all CTC managers, according to the chairperson of Parkdale’s CTC management committee, was a demonstrated commitment to, and understanding of, the local community. From her experience, this was one factor absent from past CTC managers who saw their appointment during the period of government funding prior to June 2005 as a stepping stone to positions in state and federal government.

Similarly, the expertise of management committees was also found to be of significance in some locations. The management committee in Parkdale was purposely chosen to represent significant business and social interests in the town. As a collective, the management committee made a commitment to improve the social opportunities of the town in the face of considerable disadvantage of the local indigenous population. In contrast, the management committee in Erindale had stopped performing its role of oversight and had left the manager to run the CTC as he saw fit. De Weaver and Ellis
also noted this practice when assessing the outcomes of the NSW CTC Program (see Section 2.2.1). In such circumstances, managers enjoyed greater freedom to develop initiatives within the CTC in conjunction with committed volunteers.

However, it was apparent that a variety of arrangements existed in terms of the level of guidance that management committees provided to managers and the harmony of such relationships. For example, in the case of Aldinga Waters, the management committee and manager were at odds over the number of pages that the community newsletter produced by the CTC should contain. With growing demand from advertisers, the task of producing a weekly publication worried some management committee members who felt that the weekly commitment would soon overwhelm the volunteers who undertook this work.

One factor that worked against the autonomy of CTCs was the influence that championing organisations had over the initiatives of its CTC. For example, Houghton CTC was championed by a business-training organisation and was (unsurprisingly) aimed at providing services to local business rather than community groups. The CTC was notable in that there was a marked absence of activities directed at groups other than business. Additionally, this CTC did not encourage or rely on volunteers. In some cases championing organisations imposed specific limitations on initiatives. This was apparent in competitive neutrality limitations that were imposed on CTCs that were sponsored by local government. As a consequence these CTCs were prevented from pursuing commercial opportunities that competed with other businesses in town. In the case of Lemont CTC, a community newspaper idea had to be restricted to an online version because another business in the town was carrying out this function. Ironically, the manager of the rival newspaper was a former manager of the CTC who had discovered the value of this idea while working at the CTC! Hence, it can be seen that the autonomy of the CTC was limited by the requirement that subsidised government organisations should not compete with the private sector.

4.4.1.3 Discussion: CTCs in the promotion of community autonomy

In summary, it can be seen that cases reported on here enjoyed a significant degree of autonomy to pursue initiatives. This autonomous nature of the management structure of
CTCs that was instituted during the implementation of the NSW CTC Program can be linked to this observation. It is also apparent that most of these initiatives addressed local problems. This autonomy can be extended to individual community members as detailed in customer surveys. Responses from customers indicated that they have also been able to pursue a variety of initiatives that would not have been possible if the CTC had not been established. Given these three observations the thesis is able to conclude that CTCs maintained a focus on the promotion of community autonomy after June 2005 until June 2008. However the case accounts indicate that such autonomy was not unbridled because the nature of initiatives undertaken by CTCs was shaped by contingent circumstances. Such limitations were associated with the expertise of managers and attitudes of management committees and of the organisations that championed individual CTCs.

In Section 2.2.4 social capital was identified as a concept that is able to describe the positive interpersonal and reciprocal interaction between staff, volunteers and customers within a CTC. As explained, the idea is useful where there is a need to emphasise the value of cooperative relationships. Rather than just limiting the analysis of sustainability to material factors such as money, the concept of social capital enables cooperative relationships to be also considered. It is clear from the case accounts that many CTCs would not have been able to remain operational if the cooperative relationships that social capital describe were absent. Therefore, the concept of social capital remains relevant in the light of evidence derived from the period July 2005 to June 2008.

In summary, the ongoing development of initiatives in response to contingent circumstances has led to opportunities for personal and collective knowledge development. As people have been required to address new situations at a personal and community level the CTC has played an important role in facilitating opportunities for learning which in turn leads to knowledge creation.

4.4.2 The involvement of the private sector

The second part of research question RQ3 refers to the private sector. As part of the NSW CTC Program, CTCs were initially intended to become independent businesses and the private sector was reasoned in Section 2.2.1 to play a significant role in this
process. The private sector was also identified as playing a leading role in the enterprise approach to Social Development defined by Hall and Midgley (see Section 2.2.3). The analysis of the cases enables an understanding to be developed about the ways these CTCs functioned as an organisation in the local economy. In seeking to explore these functions, the thesis proceeds to: firstly, describe the relationships CTCs shared with other private sector organisations in the local community; and secondly, to detail information about the internal challenges of managing CTCs as a business.

4.4.2.1 Relationships with other private sector organisations.

The primary means by which CTCs managed their relationships with other private sector organisations as well as individual community members was through a business plan. As explained in Section 2.2.1, the business plan was a fundamental requirement of the inaugural management committees to secure funding for their proposed CTC. Managers agreed that the business planning process instituted early in the establishment phase of the NSW CTC Program had served the centres well in planning for further initiatives. The manager at Lemont CTC commented that the business plan had become a ‘touchstone’ where they have been able to test different scenarios. Across all the cases, managers displayed a strong commitment to cost containment. To that end, the focus on developing a business plan and responsible business management during the initial phases of the NSW CTC Program had held CTCs in good stead in the period from July 2005 to June 2008.

In relation to the provision of commercial services to other businesses, the experience of the case CTCs has been disappointing. The poor uptake of video conferencing services reported in the Final project report was confirmed in case accounts. Just one of the CTCs, Tidal River, was able to develop sufficient demand for their video conferencing service to justify its ongoing availability. The remaining CTCs that had video conferencing facilities did not plan to replace the equipment should it fail.

As reported previously access to broadband technologies has proved to be a catalyst for new modes of business in some locations. For example, the development of a sophisticated e-commerce portal in Erindale brought together local council, local business and community groups to one central web location. However this example
stands in contrast to the general tenor of case accounts which indicate that local business had not embraced the opportunities the CTC had provided for web hosting services.

Managers displayed a willingness to integrate their CTCs into the town’s economy. Consistent with this observation, managers did not seek to poach business from other businesses. For example, CTCs such as Rangemoore and Houghton, work with the local printery where they provide a niche printing capability for those who require just small print runs. Such work was directed to the CTC by the printery as the limited print run made such jobs uneconomical for the printery and vice versa. Similarly, Aldinga Waters CTC was found to provide business to the local printery through the publication of the community newsletters and newspaper. In cases such as Lemont and Miandah, because they were closely associated with local government, competitive neutrality provisions had limited the development of business opportunities. The management skills required to develop the CTC as half-business and half-public service presented unique challenges to the relevant CTC managers which previous experience in either the public or private sector had not equipped them for.

Other indications that CTC managers were considered valid members of the private sector were seen in the role CTC managers played in their local chambers of commerce. Erindale CTC manager was made an ex-officio member of his local chamber of commerce because of his work on the community web portal. Other managers, such as in Calamba River, participated in their local chambers of commerce by providing administrative support by taking and distributing minutes. In summary, all of the cases indicated that all of the CTC’s made a modest but valued contribution to their local economies.

CTCs were found to have made a significant contribution to the integration of ICTs into local businesses. CTCs were often a source of advice for business owners wishing to purchase new equipment or for those who were experiencing problems with their computing equipment or software. Miandah CTC facilitated the purchase of computers from trusted local suppliers. Of note, business owners do not figure prominently in the attendee lists of training courses. Tidal River CTC manager reasoned that local businesses struggle to remain profitable and there was insufficient time to devote to
training. Local businesses have also benefited from CTCs to the extent that they provide an alternative should the business’ equipment fail. Itinerant business and government workers also figure in the accounts of managers as users of CTC facilities. Though not great in number they were reported to need access to the Internet and other CTC facilities such as printers. Frustratingly, none of these factors represented, singularly or in combination, a significant source of revenue for CTCs.

4.4.2.2 Challenges of managing the CTC as a business

Given the relative success CTCs enjoyed in developing relationships with the business community the analysis moves on to consider the internal challenges of managing a CTC as a business. One relevant understanding that was developed during interviews with CTC managers was their perception of the future economic viability of their CTC. They were asked to predict the business conditions for their CTCs over the coming 12 months using a three level scale of ‘precarious’, ‘vulnerable’ and ‘comfortable’. Referring to Table 4.19 it can be seen that a majority of managers (10) indicated that their CTC was just surviving and were vulnerable to changing circumstances while two listed their situation as precarious. Five indicated that their position was comfortable.

<table>
<thead>
<tr>
<th>How would you assess the financial position of your CTC?</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfortable – the outlook is positive</td>
<td>5</td>
</tr>
<tr>
<td>Vulnerable – we are just surviving</td>
<td>10</td>
</tr>
<tr>
<td>Precarious – we are facing closure</td>
<td>2</td>
</tr>
</tbody>
</table>

A number of factors influenced perceptions of economic viability. Prime among these was the need for many CTCs to pay for their manager. Interestingly, one of the CTCs listed as comfortable, Baden Bay CTC, was run by full-time volunteer management. In the course of the research this CTC had sufficient funds to employ a part-time manager. Conversely, one of the centres listed as precarious, Erindale, was changed to a full time volunteer operation during the course of this research as there were insufficient funds for a paid manager.
Other factors that weighed heavily on managers’ minds were rent and utility costs (water, electricity, broadband). Of less immediate concern was the need to replace computers at some future time. Recognition of changing software requirements requiring computers with more memory, processor speed, storage and peripherals coupled to increasing bandwidth requirements indicated that money would have to be found at some future point to update equipment and network services.

As discussed in Section 4.3.2.1, case accounts indicate that the development of major or significant income streams are difficult to achieve. Consistent with this, few managers volunteered information about plans they had for capital replacement. The concept of depreciation – that is putting money aside for future replacement capital purchases - was considered marginal to immediate concerns of meeting rent, utility and wage commitments. Ferndale CTC manager confided a wish that government would step in to undertake replacement of computers. Alternatively, managers hoped that they would be successful in winning funding for a government program that would include the purchase of new computers.

4.4.2.3 Discussion: CTCs and the private sector

The review of the cases indicates that the goal of developing CTCs as viable independent businesses as originally planned in the NSW CTC Program was not fully realised. On the one hand it is difficult to see how CTCs could avoid the obdurate forces of economic decline that were closing down many businesses in many regional areas. As Ferndale’s CTC manager quipped:

_A solution to market failure [CTCs] are meant to be a market success!_

One senses that even in the successful CTCs this success is fragile and that CTCs must remain vigilant in maintaining income streams from their respective communities. For example a decision by Centrelink to withdraw agency status from relevant CTCs would generate a major change in their self-sufficient status. Consequently, CTCs with a number of moderate income sources were less vulnerable to change than a CTC that relied on just one major source of income.
It can also be seen that maintaining income streams is also dependent on continued service to the community. Notably, the emphasis on business development in the NSW CTC Program had given impetus to a wide range of idea generation that generally addressed local needs, as evident in Figure 4.2. Thus, the connection drawn between private sector activity and entrepreneurialism by Hall and Midgley (see Section 2.2.3) is consistent with the case accounts here. The unleashing of latent creative talent evident in the case CTCs in pursuit of solutions to local problems is consistent with the view expressed in the Final project report where they were described as ‘successful social enterprises’. The irony lies in the fact that this approach falls short in securing sufficient income to enable CTCs to continue with these socially worthwhile initiatives. Rather than looking for causes in managerial failings for deficient income streams to CTCs, the evidence from the cases covered in this study indicate that, despite the value of CTC initiatives to the general community, insufficient commercial incentives existed to ensure sufficient generation of revenue. These appear to be related to small market size and generally subdued economic activity but could also be related to the innovative nature of CTC initiatives in these communities, as suggested by Gurstein (see Section 2.3).

4.4.3 The involvement of government

The third part of research question RQ3 concerns government involvement in the CTCs of this study. The following analysis firstly recaps the provision of services that CTCs provide on behalf of various government organisations. However, given the difficulty in fully developing CTCs into independent businesses, the research looked at the response of government. The desire to re-engage government support for CTCs is one that stems from the feedback obtained from CTC managers and volunteer staff, as well as academic commentary, which was explored in Section 2.2.4. This view stands in contrast to the intention of the NSW CTC Program to remove government involvement in the operation of CTCs and to limit government’s role to one of customer.

4.4.3.1 Government as a customer to CTCs

Analysis of the CTCA data in Section 4.3.1.1 reveals that CTCs deliver a number of services on behalf of government departments. A number of national government
departments such as Centrelink, the ATO and Medicare are represented in Table 4.3 as being such departments. As discussed in Section 4.3.2.1 the significance of such support in terms of income to CTCs varies. Those who have managed to negotiate an agency agreement with Centrelink to receive and process forms on its behalf benefit significantly in that the payment from Centrelink for these services represents a major source of income to those CTCs. In the main, however, the funds that CTCs received for the provision of information for the ATO and Medicare are considered by all but one CTC as of minor income-earning significance (see Table 4.5). Some CTCs have been able to derive significant income and other resources through their management of government programs such as the community engagement program aimed at indigenous communities.

As far as income derived from the state government is concerned the most prominent is the Access NSW service which every CTC makes available. CTCs are given a computer and approximately $500 per year to provide this service. Houghton CTC provides services for the NSW Department of Fair Trading and receives a commission for each form that is deposited with the CTC (see Table 4.5).

At the local government level, the CTCs provided a number of services such as tourist information, collection of rates and hosting of local council groups (see Table 4.5). It is noteworthy that in Siestaway, the one CTC in which significant discontent among volunteers was evident, management of the town’s visitors’ bureau had been undertaken under contract from local government. Given the popularity of the town with tourists, volunteers had become so overrun with questions from visitors wishing to know where the local toilets were that they had become quite despondent about the prospect of using ICTs to bring about beneficial change to the local community or to improve their own knowledge of ICTs.

4.4.3.2 Anomalies of government participation in CTCs

Despite the intention of the NSW CTC Program to remove governments from direct operational responsibility for CTCs, the cases reveal that many CTCs rely on local government for ongoing support. Section 4.3.2.3 revealed that out of the 17 cases, 12 cases receive significant support from local government sources. This runs counter to
the thinking of NSW CTC Program planners who sought to avoid on-going government support of CTCs.

A number of other anomalies were also apparent in the cases. The actions of some government bureaucrats were such that they were unaware of the strictly commercial relationships that they were meant to facilitate between government and CTCs. At Parkdale there was an expectation that the CTC provide services to the local council on a cost-free basis. These included making available library books, pamphlets and council forms. As this particular CTC did not rely on subsidies the request was not one the CTC was obligated to fulfil. While each of the tasks did not in themselves represent an overwhelming burden, the fundamental irony of the situation amused the manager. As the chairperson of Parkdale management committee commented:

the government expects us to provide all of these services but they want us to do it for free!

In the case of Viewbank CTC, the manager complained that he had been overrun with volunteers who were recipients of national government pensions. This was a consequence of changes to the rules governing the payment of benefits where the number of hours benefit recipients were required to contribute voluntarily to the community as part of their ‘reciprocal obligation’ had increased. Such was the increase in numbers of volunteers, (most of whom had little interest in the CTC), the manager complained he had little time to manage the CTC because of the need to supervise these people who displayed little inclination to work. Far from encouraging the CTC to become self sufficient, government had effectively added an overhead that took away from the manager’s time to develop new income-generating initiatives.

4.4.3.3 Discussion: CTCs and government

The provision of services on behalf of government departments was one of the recommendations of the Online Council Working Group (OCWG) in its inquiry into the sustainability of online access centres (see Section 2.2.1). The OCWG’s report recommended that government departments find more ways to use CTCs for the delivery of their services to the public. In summary, this study finds that these
recommendations resulted in positive contributions to CTCs in NSW but not to the extent of ensuring income security for most CTCs.

The case accounts reveal differing opinions about the ideal level of government involvement. The managers from Parkdale and Rangemoore CTCs, who were fully self sufficient, valued their independence from government highly. The freedom from competitive neutrality provisions had simplified their management tasks considerably and they were not keen to return to a situation in which they were limited in pursuing business opportunities.

However, the majority of managers called for assistance from government. It is important to realise that the managers valued the independence of their CTCs to pursue initiatives in response to local needs and were not requesting that governments take-over the operation of their CTCs. As the CTC manager from Houghton put it, some “strategic assistance” from government would go a long way to providing support for CTCs. Suggestions for such assistance ranged from support for the employment of a paid manager to replacement of computers and other equipment. These suggestions are notable in that they seem to strike a balance in that day-to-day operational responsibilities would remain with the local management structures of the CTC while the expectations for assistance were conservative.

4.5 Discussion of RQ1-RQ3

Research questions RQ1-3 sought to include information about the ways CTCs have responded to the cessation of funding from the national and state governments after June 2005. As discussed in Section 2.5 this information was considered important in responding to the research goal because the chapter’s response to RQ1-3 has provided important information about why CTCs were considered successful enterprises and factors that constrain income generation.

In reflecting on the analysis undertaken in relation to RQ1and RQ2 a significant amount of background information was provided to contextualise the subsequent analysis of RQ3 (see Table 4.20). In relation to RQ1 a significant decline in CTC numbers had occurred as predicted by commentators in 2004-2005 (see Section 2.2.1). However, it
was noted in the analysis of Section 4.2 that the decline appears to have stabilised where the membership of the CTCA in June 2009 was 56. The response to RQ2 detailed a range of strategies that CTCs had used to maintain their operations (Section 4.3). These were analysed in relation to initiatives and their income-earning potential, the use of volunteers for in-kind provision of CTC staff and the significant value of subsidies given to the great majority of cases by local government.

The three-part response to RQ3 is of analytical import when considering the research goal from the three perspectives of community, private sector and government, as detailed in Hall and Midgley’s Social Development Theory (see Section 2.2.4). In relation to the autonomy of community it can be seen that CTCs have largely maintained a focus on problems of a local nature as determined by local CTC management committees and managers. The case accounts reveal that such responses were shaped significantly by the past expertise of managers and the constraints imposed by the organisations that championed individual CTCs. Consequently, the autonomy of CTCs was not unbridled in that the contingencies of local circumstances were of significant influence. However, it was clear that the centre of decision-making power resided in local communities. The centrality of community to the NSW CTC Program can be seen as continuing beyond June 2005 in the continuation of autonomous management structures which maintained a focus on responding to local problems, often in creative ways. Accordingly, the description of CTCs as ‘successful social enterprises’ was still an appropriate one to use in relation to CTCs in June 2008.

It was found that involvement of the private sector in the operations of CTCs was important to their operation for a number of reasons. The first insight generated through the analysis in Section 4.4.2 was that the economic outlook of the great majority of cases ranged from vulnerable to precarious. Secondly, the management of CTCs was characterised by responsible economic management that was guided by a credible business plan with a strong emphasis on cost containment. The third aspect of the analysis in relation to private sector involvement was related to the limited potential of local economies to realise the income streams required to maintain a minimal level of income support to CTCs for staffing and the payment of rent and utility costs.
The failure of private sector enterprise to provide sufficient support for CTCs up until June 2008 was partly reflected in the need for local government to provide support to many of the studied CTCs. These two findings – insufficient private sector support and local government support of CTCs – provides \textit{prima facie} evidence for the need for further work in developing strategies to better support CTCs. Even though government was found to be active in providing limited income streams to CTCs as customers the arguments of market failure as detailed in Section 2.2.4 remain relevant. The question as to whether the research should limit its line of investigation just to government is also relevant given the initial desire of the NSW CTC Program planners to eliminate government as an ongoing sponsor of CTCs. To that end, and despite the strong historical precedence of government involvement to correct for market failure, the analysis does not presuppose that a government-sponsored response should be the natural outcome of the study’s theoretical development in the next chapter.

<table>
<thead>
<tr>
<th align="left">RQ1. How has the membership of the CTCA changed since the cessation of funding in June 2005?</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">After a period of significant decline from the peak number of 82, numbers of CTCs had stabilised at 56 in 2008.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th align="left">RQ2. What initiatives have been undertaken by CTCs (as reflected in the CTCA membership) to maintain services since the cessation of funding in June 2005?</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">A range of strategies were detailed that included income-earning initiatives, contributions by volunteers and subsidies, mainly from local government.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th align="left">RQ3. What insights do these initiatives suggest in relation to the issues of:</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">a. community autonomy: communities had maintained control of their CTCs in developing initiatives in response to local problems</td>
</tr>
<tr>
<td align="left">b. private sector: responsible economic management was not enough to ensure sufficient income generation for CTCs</td>
</tr>
<tr>
<td align="left">c. government: the role of government was confused but there was an ongoing desire for limited engagement with government which did not undermine the autonomy of CTCs</td>
</tr>
</tbody>
</table>

### 4.6 Conclusion

This chapter provided an updated account to June 2008 of CTCs that were part of the NSW CTC Program from 2000 to 2005. Most of these CTCs became members of the Community Technology Centre Association (CTCA) and it was the membership of this
organisation that was studied. Using the methods of document analysis and case study investigation, responses were provided to research questions RQ1-RQ3.

In summary the analysis finds that the concerns raised in the investigation of the NSW CTC Program in Chapter 2 were still relevant to CTCs in June 2008. The failure of the private sector enterprise to provide adequate income support to CTCs suggests the need for ongoing investigation. Importantly, the autonomy of local communities in the management of CTCs is a highly desirable attribute of the NSW CTC Program that participants of the research wish to see remain.

Accordingly the thesis moves on to undertake the task of theory building to address the need to develop a theory-based rationale that seeks to maintain the success of CTCs as social enterprises in contexts of insufficient income generation. This clears the way for detailed case study analysis to establish the value of an innovation perspective generally recommended by Gurstein (see Section 2.3.1). This innovation perspective centres attention on the knowledge creating potential of CTCs and the significance of this in relation to successful social enterprises and income generation. Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory (see Section 2.4) are used to analyse three cases in depth in order to provide a context for the development of a theory-based rationale.
Chapter 5   A Tale of Three CTCs

5.1 Introduction

This chapter reports on the in-depth analysis of three case studies. As discussed in Section 3.3 the purpose of this in-depth analysis is to build theory in response to the research goal detailed in Section 1.3.

The manner in which the three chosen case studies are reported was discussed in detail in Section 3.4.2.1. The reporting of the three cases each follows a similar pattern (see Figure 5.1). The first part of the reporting of each in-depth case is directed at gaining familiarity with the case. This will be achieved by opening with a vignette about the researcher’s personal experience of the case then proceed to present what Creswell (1998, pp. 186-187) describes as “a body of relatively uncontested data” that develops an appreciation of the unique factors that characterise the case. Data is derived from interviews with CTC managers and volunteers and from surveys that were completed by customers and volunteers. Key issues that contribute to the complexity of the case will then be detailed. The overall purpose of this section is to provide a context for the focussed analysis of the challenges the CTCs experience in keeping their operation going. The analysis will then move on to the task of theory building by addressing research questions RQ4-RQ7 by studying two selected initiatives within each of the three cases.
In-depth Case 1 | In-depth Case 2 | In-depth Case 3

Setting the scene

Understanding the complexity of the case

Addressing research question RQ4
Two initiatives identified for analysis
Application of guide questions for the four Analytical Constructs to two selected initiatives within the CTC (see Table 5.1).
Application of guide questions for Enabling Conditions within the CTC (see Table 5.2)

Addressing research question RQ5
Connecting social enterprise with income generation

Addressing research question RQ6
ICT use and knowledge creation.
Reflecting on Community Informatics themes of Complexity, Effective Use and Sustainability

Summary and discussion of RQ4, RQ5 and RQ6
The analysis summarises the findings of the three in-depth cases

Addressing research question RQ7
The analysis describes the theory-based rationale that assists community, private sector and government to interact with CTCs in ways that promotes their success as social enterprises in contexts of limited income support

Figure 5.1 Reporting Structure of In-depth Cases

In addressing research question RQ4 a number of steps are taken to apply the Analytical Framework that was derived from Nonaka and Takeuchi’s Knowledge Creating Theory, as reflected in the guide questions in Table 5.1 and Table 5.2. The questions in Table 5.1 are used to systematically address each of the Analytical Constructs derived from Nonaka and Takeuchi Knowledge Creating Theory. Research question RQ4 also requires the issue of Enabling Conditions, also derived from Nonaka and Takeuchi’s Knowledge Creating Theory, to be considered (see Table 5.2). The purpose of this systematic application of guide questions and subsequent discussion is to assess the credibility of the framework (constructs and enabling conditions) for understanding the two selected initiatives in each of the three in-depth cases.
### Table 5.1 Analytical Constructs guide questions

<table>
<thead>
<tr>
<th>Construct</th>
<th>Guide Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Paradox.</td>
<td>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</td>
</tr>
<tr>
<td>2. Epistemology</td>
<td></td>
</tr>
<tr>
<td>2.1 Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td>2.2 Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td>2.3 Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td>2.4 Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td>3. Ontology</td>
<td>Which descriptors as described on the ontological scale (individual, group, CTC and community) are best identified with observed activities?</td>
</tr>
<tr>
<td>4. Knowledge Spiral</td>
<td>Do observed activities share relationships that indicate sequential transitions around the SECI framework? If so are these ordered transitions characterised by increasing degrees on the Ontology scale?</td>
</tr>
<tr>
<td>Discussion</td>
<td>Do the four Analytical Constructs provide a credible framework for understanding the selected examples?</td>
</tr>
</tbody>
</table>

### Table 5.2 Enabling Conditions guide questions

<table>
<thead>
<tr>
<th>Concept</th>
<th>Guide Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intentions</td>
<td>Are staff and volunteers willing to contribute to making a CTC a better place?</td>
</tr>
<tr>
<td>2. Autonomy</td>
<td>Do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?</td>
</tr>
<tr>
<td>3. Fluctuations and Creative Chaos</td>
<td>Do changing conditions within the CTC or external environment lead to knowledge creation?</td>
</tr>
<tr>
<td>4. Redundant Information</td>
<td>Are there a variety of information sources that go beyond the immediate operational requirements of the CTC?</td>
</tr>
<tr>
<td>5. Requisite Variety</td>
<td>Is there a diversity of expertise that mirrors the external environment?</td>
</tr>
<tr>
<td>Discussion</td>
<td>Do the five Enabling Conditions provide a credible framework for understanding activities in this CTC?</td>
</tr>
</tbody>
</table>
It is on this basis that the analysis then considers the thesis research goal by addressing research question RQ5. Research question RQ5 brings together the two separate observations of CTCs being successful social enterprises and the difficulties they experience in earning income. The analysis of this question reveals interesting detail about how these two apparently separate observations can be simultaneously considered using the Analytical Constructs derived from Nonaka and Takeuchi.

The analysis then moves on to address research question RQ6 to better understand ICT use by individuals and groups within the CTC. The thesis will consider whether links can be drawn between ICT use and knowledge creation. The analysis will also reflect on the three themes of complexity, effective use and sustainability, which were found to be important to Community Informatics theorists in Section 3.2.2.

After this pattern of analysis has been applied to each of the three in-depth cases, the study consolidates its findings by summarising the findings of research questions RQ4, RQ5 and RQ6. The significance of the preceding investigation is considered in relation to developing a theory-based rationale as detailed in research question RQ7. The formative response to research question RQ7 is made here to provide a foundation for subsequent consideration in Chapter 6 which is concerned with the question of generalisability of the findings from Chapter 5.

The selection of case studies for analysis was aimed to demonstrate the varying ways CTCs were able to garner resources (income, volunteer support, community good-will and so on) to sustain their on-going operation on the basis of knowledge creation. In order to increase the efficacy of case study method for theory building, the initiatives within each of the case studies have been purposely chosen to demonstrate contrasts (see Section 3.3). The nature of such contrasts primarily hinge on the Analytical Construct of Epistemology. The SECI model, which is fundamental to the construct of Epistemology, will be used to identify knowledge creating activities in relation to the creation of tacit and explicit knowledge. In fact, the three case studies have been chosen because initiatives that contribute to the generation of material and non-material resources of these CTCs can be understood by the emphasis each case study accounts display for one aspect of the SECI model, namely:
Externalisation (tacit to explicit knowledge);

Combination (explicit to explicit knowledge); and

Internalisation (explicit to tacit knowledge).

That is not to say that the SECI processes listed above occur to the exclusion of other knowledge creating processes described by the SECI model. Rather, the study will use this analysis of knowledge creating processes to explain the success of the studied CTC as a social enterprise and their ability to garner material and non-material resources. Hence, these insights are of direct relevance to the research goal which is to ‘develop a theory-based rationale for ongoing interaction of community, private sector and government with CTCs that promotes their success as social enterprises in contexts of limited income’.

To explain the structure of the analysis in this chapter, Table 5.3 provides a summary of the primary outcomes of the analysis of the case studies undertaken at Parkdale, Rangemoore and Viewbank CTCs.

<table>
<thead>
<tr>
<th></th>
<th>In-depth Case 1 - Parkdale</th>
<th>In-depth Case 2 - Rangemoore</th>
<th>In-depth Case 3 - Viewbank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setting the scene</strong></td>
<td>Dairying community undergoing economic change to macadamia nut growing. Has a large Aboriginal community.</td>
<td>Beef cattle farming area that is more affluent than the other two cases. CTC has been in operation several years prior to NSW CTC Program</td>
<td>Economy reliant on timber products. Suffers from high unemployment as a consequence of the destruction of a local factory</td>
</tr>
<tr>
<td><strong>Complexity of the case</strong></td>
<td>Small local market and depressed economic conditions.</td>
<td>Past negative experiences with volunteers and local government</td>
<td>Changing business context</td>
</tr>
</tbody>
</table>
| **Initiatives for analysis** | 1. Multimedia Training Course  
2. Community Engagement Program | 1. Community Newspaper  
2. Centrelink Form Collection Service | 1. Training courses for unemployment  
2. Proposed Web Development Service |
5.2 In-depth Study 1: Parkdale CTC

5.2.1 Gaining familiarity with Parkdale CTC

The visit to Parkdale CTC revealed a well-run operation that has become an important part of the local community. The CTC functioned as a Centrelink Access Point where income was derived from receiving and processing forms for Centrelink, the government agency responsible for government welfare support. This CTC had developed a number of creative initiatives such as the establishment of a broadband wireless service to businesses in the centre of town. The CTC also hosted a government-funded Community Engagement Program aimed at improving social outcomes for the local Aboriginal people.

The CTC was located in the centre of the town and shared its premises with the local credit union. The CTC was found at the rear part of the building which means that people entered the credit union first in order to gain access to the CTC. Once inside the credit union, people were able to transact CTC business, such as depositing forms for Centrelink, via a counter at the far-end of the credit union’s customer area. Next to the counter was the door that allowed entry into the CTC proper. The counter was usually attended by a volunteer but on the day of the researcher’s visit the manager was doing this as the rostered volunteer was late. This presented a good opportunity for him to explain the normal daily routine of the CTC. Part way through the conversation a teenage female came to use one of the public access computers. As she entered the CTC the manager greeted her by her first name.

Noting the proximity of the credit union to the CTC led the manager to tell me a story about the day a robbery took place some time ago. One of the three robbers entered the CTC part of the building and walked down the hall to the tea room at the rear of the building. Strangely, he was left behind as his two accomplices having obtained some cash from credit union staff decamped without their friend. There were a few stressful

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20 A credit union is a financial institution that is akin to a bank but is formed on the basis of a cooperative of members who each own shares in the organisation.
moments as the manager was left wondering whether he should inform the robber that his friends had left. Fortunately it did not take long for him to re-emerge from the tearoom and realise that he had been left behind. He quickly exited the building leaving Credit Union and CTC staff to take stock of the event that had just occurred.

Reflecting on the vulnerability of the CTC to unexpected events, the manager told me about the recent failure of the building’s air-conditioning system. Its repair had absorbed a sizeable portion of the financial reserves of the CTC leaving him feeling concerned, given the effort it had taken to establish this reserve.

The CTC had 20 computers networked to printers and broadband Internet for public access (see Table 5.4). Software for these computers was provided under Microsoft’s Unlimited Potential program meaning that a suite of software programs including word processing, spreadsheets, presentation, publishing, email and web browsing were available (see Section 4.3.2.3). The CTC also offered video conferencing facilities even though this equipment is located at the local high school. The CTC was open 40 hours per week. The fees derived from public access to these facilities were insufficient to meet the revenue needs of the CTC. The assessment of the manager of the future viability of the CTC was somewhere between vulnerable and comfortable as current sources of income are not fully assured.21

The CTC manager was employed on a full time basis of 30 hours per week. The manager had developed a significant amount of expertise over several years as an IT consultant to large scale projects in the public service and university sector. The manager was also assisted by 10 volunteers who provided an estimated 60 hours per week of additional service to the CTC. Volunteers represented an important element in the CTC’s ability to provide a range of services that included producing a weekly community newsletter and processing Centrelink forms.

21 As detailed in Section 4.4.2.2 CTC managers were asked to nominate three choices about the future viability of their CTC: precarious, vulnerable and comfortable. See Appendix B.2.3 for more detail.
Previously a major dairy farming community, Parkdale is a rustic town set in the eastern foothills of the Great Dividing Range at mid-north coast of NSW. The pastures which once used to graze dairy herds are now increasingly being planted with nut and fruit trees. A number of large colonial-style buildings grace the main street which runs at a moderate incline north to south. The museum (former council chambers), a cinema, mechanical repair shop and clock tower hark back to a time when the town was central to the region’s social and economic activity. Once the seat of local government now the town has fallen behind other towns in the region that have benefited from their location on the major highway some 20 kilometres away. As a consequence, residents of Parkdale and surrounds are now isolated from the centres in which government offices and medical facilities are located because public transport to these centres is infrequent (one bus in the morning, one in the afternoon). Parkdale as ranked in one of the forty most disadvantaged communities in NSW based on a basket of social indicators: social distress (for example, low family income, rental stress); health (low birth weight,
childhood injuries); community safety (confirmed child maltreatment, criminal convictions); economic (unskilled work, unemployment); education (attendance at preschool, incomplete education); and community engagement (membership of local groups, local volunteering) (Vinson, 2007).

The presence of a public housing settlement near the town centre accommodating Aboriginal people provides a distinctive context in which this CTC operates. This is revealed in key economic statistics of the town taken from the 2006 Australian Census that reveals a small population that suffers from an unemployment rate of 20%, which is four times the national average (see Table 5.5). Considering the level of disadvantage as revealed by Vinson (2007) it appears that the early mortality rate more generally found in Australian Aborigines and Torres Straight Islanders (ABS, 2008, p. 29) is reflected in the statistics of this town. The median age of Parkdale is two years lower than the national average which stands in contrast to the other two cases as well as nearly all cases studies listed in Table 3.7.

| Table 5.5 Key statistics from 2006 Census by Australian Bureau of Statistics: Parkdale |
|---------------------------------|---|---|
| **Regional Population**        | 975 | N/A | N/A |
| **Unemployed**                  | 60  | 20  | 5.2% |
| **Median Age**                  | 35  | N/A | 37  |
| **Individual Median Weekly Income** | $275 | N/A | $518 |

22 Figures pertaining to location have been rounded off to ensure confidentiality of responses. See Section 3.4.2.1.
An interesting feature of life in Parkdale is the number of people who had moved from major cities to this area in pursuit of a change in lifestyle. Stereotypically described as ‘tree-changers’, the influence of such people has been significant in the development of the CTC. The CTC provides a context for newcomers to meet local people and make themselves known to other people in the community. One recently arrived volunteer had retired from a middle management position in the state government and was given the task of producing a monthly newsletter. The CTC and the broader community benefit from such expertise developed in corporate, educational and government contexts in major capital cities. The CTC management committee chairperson had retired from a career in health research administration. Along with the manager’s background in IT project management, it can be seen that the CTC had benefited from a range of professional expertise.

The CTC was able to derive income from a number of sources. Significant on this list was the income derived from renting out part of the premises to the credit union. Ownership of the building can be explained by the foresight of an earlier management committee who guided the establishment of a Rural Transaction Centre (RTC) prior to the commencement of the CTC program. The RTC program was funded by the national government and was designed to overcome the difficulties experienced by rural people who were increasingly required to conduct business with government departments online. Even though funding support from this program had ceased, ownership of the building has provided a buffer against the vulnerability associated with funding fluctuations and removed the ongoing need to generate sufficient income to pay rent. The CTC also derived income from its status as a Centrelink Access Point which designated the CTC as an official point at which official forms could be submitted. This is an example of a brokered service that was identified in the Final project report as a necessary component for income generation for CTCs into the future (NSW DoC, 2004, p. 3 & 27).

The CTC hosted an initiative called the Community Engagement Program funded by the national government’s Office of Indigenous Policy Coordination. While this provided little in the way of direct revenue to the CTC, it delivered a number of related benefits. The Community Engagement Program addressed five priority areas: law and order;
health; education; job creation; and young people and families. The Chamber of Commerce, which played a role in the initial determination of priority areas, originally coordinated the Community Engagement Program. However, the program was moved to the CTC as the CTC was more able to host and support the project. The two program leaders had their offices located within the CTC. The weekly meeting of a young mothers group for Aboriginal women was held at the CTC.

The manager of the CTC played an important role in establishing positive links between the CTC and the Aboriginal community at a number of levels. Recognition of the contribution of senior members of the Aboriginal community was given in a CTC publication that detailed their life stories. A photographic exhibition in which the CTC participated provided the catalyst for this project. The manager also interacted with the young people who visited the CTC to use ICT facilities. He claimed that the CTC provided a context that dissuaded young people from engaging in anti-social activity.

The positive contributions that the manager had made were confirmed in other interviews. The two program leaders who administered the Community Engagement Program as well as the chairperson of the CTC management committee made specific mention of the manager’s work in building productive links with the Aboriginal community. Interestingly, the manager had been given the name of ‘Gubboriginal’. The term is a conjunction of the words ‘Gubba’, a term many Aboriginal people use to describe people of European descent, and the word ‘Aboriginal’. The significance of such a term is best understood in the broader process of reconciliation within Australia. Common use of this term among people indicates that he had gained acceptance by local Aboriginal people. It can be seen that the manager had also played an important role in mentoring the program leaders.

The two program leaders administering the Community Engagement Program also had strong links with the local Aboriginal community. They were once volunteers at the CTC but were able to obtain paid roles as program leaders. The two were responsible for engaging with people in the Aboriginal community as well as fulfilling formal

23 Reconciliation is a term that describes a nation-wide process of addressing a series of events that have seriously disadvantaged Aboriginal people since initial settlement of Australia by Britain in 1788 (see http://www.reconciliation.org.au).
reporting requirements to government. In interviews with these two people, their enthusiasm for their roles made it clear that this was a period of personal learning in which they developed new skills in working with people who were faced with the challenges arising from unemployment, poor educational attainment, alcohol abuse and substance abuse. They had also been able to develop new skills in the use of ICTs. In addition, they had benefited from developing administrative skills relevant to government requirements. They hoped that the experience that they had gained would stand them in good stead for similar roles in the future.

ICTs had played an important role within the Community Engagement Program. The CTC had hosted a computer workshop for Aboriginal youth, which taught young Aboriginal people to refurbish second-hand computers. One participant described the course to one program manager as a life-changing experience where he changed his career goal from construction to ICTs. In the meantime he had obtained a job working with computers. Another course was designed to teach young Aboriginal people DVD production skills. The multimedia workshop was aimed at the production of a DVD that depicted an aspect of the course participants’ life in their local community. The course took participants through the major steps of producing a DVD starting with the development of ideas, the scripting of such ideas, storyboarding, the recording of video and audio material, the editing of such material and the subsequent production of a DVD. Both of these workshops were co-sponsored by a not-for-profit training organisation called Work Ventures and Microsoft under their Unlimited Potential program.

While there was an obvious link to ICTs in these two examples, it was also interesting to find that ICTs were a useful complementary resource for the management and maintenance of groups. This was true for the young mothers group where the focus was naturally on mothercraft. ICTs played an important support function in providing access to the Internet to conduct research and to check emails. ICTs also assisted in the organisation of the group through the production of flyers, meeting notes and so on.

Another interesting feature in the study of Parkdale is that the CTC had become a place where the community could go to ask questions about problems they were experiencing
with computer equipment at home. The nature of such problems was often highly specific: an individual may not be able to get a document to print or to make a connection with an Internet service provider or may require advice about a particular feature in a computer program. These problems were ostensibly not amenable to solution through more formal means such as a reference manual, in-built help functions in software, frequently asked questions and the like. The manager was able to charge a fixed $30 per hour fee for home visits when he attended to people’s computer problems in their homes.

However, it was difficult to charge for the many requests for advice that were made over the counter. It became apparent that people dropped in to seek advice not only about ICT-related issues but also general knowledge questions. To illustrate this point, the manager related the story of the occasion when he was asked to investigate the timing of a dog’s reproductive cycle; more specifically when the enquirer’s “bitch was on heat”. A quick search on Google revealed the answer for which the enquirer expressed her thanks and left the premises without so much as a donation. The manager described this kind of interaction as “mediated access” where a CTC staff member would assist individuals in their use of the Internet or other programs.

It appears that the CTC had become a central point for information provision within the town. For example the decision to enter into an informal arrangement with the regional library to stock a limited range of novels so that people no longer had to travel to the regional centre was a natural one. Maintaining a library in the town was beyond the resources of the local council so the library had been closed some time earlier.

Another problem area for the town was the question of broadband access. When interviewing the manager, a long interruption ensued with the arrival of a local retiree who wished to discuss the prospects of broadband provision to the town. A number of minutes were taken up discussing the nature of microwave radio propagation in relation to the hilly terrain in which the town is located. Drawing on his previous technical career with the navy the retiree opined that the proposal by the national government for a microwave WiMAX solution was not suitable for the surrounding areas of the town. It was interesting to observe the manner in which the conversation between the manager
and the retiree was mutually educative. On the one hand, general principles of radio propagation were speculated upon in relation to the specific constraints of the local topography. On the other hand, the broader political dynamic in relation to the upcoming election was raised where the rival delivery methods posed by the two major political parties were discussed.

In discussing broadband provision, the manager described his initiative to provide wireless access to businesses in the town area. Using the CTC’s broadband connection, these businesses were able to receive broadband services via the wireless connection to the CTC. Bearing in mind the hilly topography of the town this required a period of experimentation in order to get the correct aerial locations but had developed into a stable service from which the CTC received some income. Reflecting upon the prospect that broadband would eventually become more freely available in regional areas of Australia, the manager wondered about the potential impact this would have on the CTC. The CTC was used by people to download large files that were impractical to download on a dial-up Internet connection. One such person made use of the CTC for its broadband connection as part of her work as an editor. The irony of facilitating a discussion of broadband implementation that could further undermine the CTCs viability led the manager to quip:

\[\text{We work to put ourselves out of business!}\]

According to the 2007-2008 CTCA Membership Returns 130 people used the CTC each week. From the manager’s observations of his customers the motivation for visiting the CTC was to deposit Centrelink forms, access email, use word processing software and to socialise with staff and other users. Primary age and teenage Aboriginal girls were keen users of social networking sites such as Bebo. In some cases, young people maintained contact with friends and siblings who attended boarding school in Sydney.

The manager also reported that some teenage boys exhibited a strong liking for games that contained violence and gore which were usually accessed online (rather than played from a local source such as CD ROM). This was of some concern to the manager who was able to monitor the screen contents of public-access computers from his office. When he felt that the level of violence was not appropriate he intervened. He preferred
not to ban complete access to such sites, reasoning that the benefits of having the boys involved in the CTC was preferable to sending them out on the street where they might create mischief. The enjoyment that the boys gained from competing with each other while playing online games can also be understood as a social activity pertaining to that group.

School children regularly made use of the CTC for their school projects. If care-givers were not able to assist, advice was often sought from CTC staff. The kind of activities that took place included using Google to identify relevant sources of information, using word processor or presentation software (for example, Microsoft Word and Power Point respectively) to initially document information and then format presentations which were printed using the CTC’s printers or emailed directly to the student’s teacher.

The use of the CTC by individuals, as recorded by the customer surveys, indicated a set of activities that related to the personal lives of customers. Survey responses from customers totalled 15 and the average age of respondents was 49 years. Nine females (average age 47 years) completed the survey compared to six males (average age 51 years).

The use of applications and technologies within the CTC is ranked in Table 5.6. It can be seen that the survey responses supported the manager’s assessment that email was the primary reason for people’s use of the computers in the CTC, estimated at 100 times every month (see Appendix B.4.5 for how this was calculated). After email, other applications and technologies such as word processing (67), photograph enhancement and printing (60), use of the scanner (61) and facsimile machine (58) enjoyed similar levels of use. Other applications reflecting more specialised audiences (for example web site developers, games and online chat) were used at about 30-40% of the email access rate.
Table 5.6 Use of software and devices at Parkdale CTC

<table>
<thead>
<tr>
<th>Software Application or Device (N=15)</th>
<th>Accessed per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>100</td>
</tr>
<tr>
<td>Word Processing</td>
<td>67</td>
</tr>
<tr>
<td>Scanner</td>
<td>61</td>
</tr>
<tr>
<td>Photograph Enhancement or Printing</td>
<td>60</td>
</tr>
<tr>
<td>Fax Machine</td>
<td>58</td>
</tr>
<tr>
<td>Webpage Design</td>
<td>40</td>
</tr>
<tr>
<td>Games</td>
<td>38</td>
</tr>
<tr>
<td>Online Chat</td>
<td>32</td>
</tr>
<tr>
<td>Video Audio Editing</td>
<td>30</td>
</tr>
</tbody>
</table>

Referring to Table 5.7 it is interesting to note the variety of purposes for which people used the CTC. Customers were asked to indicate the purpose of their visit to the CTC on the day they completed the survey. Qualitative responses from customers about their use of the CTC further supports the finding that email access was the primary reason for people’s use of the CTC. Even though email was found to be popular the variety of other responses in Table 5.7 indicates that the CTC responded to diverse needs of customers.

The ability of Parkdale CTC to respond to diverse needs is further supported by the responses that customers provided to the question about which three things they would miss most should the CTC close (see Table 5.8). It is interesting to note that many nominated social interaction as a factor that they would miss most. This is consistent with the analysis of other case studies reviewed in Section 4.4.1.1 where social interaction was ranked second in the factors that customers would miss most. Highest on the nominated list of factors that would be missed most was ICT training. Access to government services was another that would be missed which is consistent with the status of the CTC as a Centrelink Access Point.
Table 5.7 Typical motivation to use Parkdale CTC

<table>
<thead>
<tr>
<th>Reason for visit today...</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>5</td>
</tr>
<tr>
<td>Internet</td>
<td>2</td>
</tr>
<tr>
<td>Gov Service (Centrelink)</td>
<td>1</td>
</tr>
<tr>
<td>Fax</td>
<td>1</td>
</tr>
<tr>
<td>Job seeking</td>
<td>1</td>
</tr>
<tr>
<td>Facebook</td>
<td>1</td>
</tr>
<tr>
<td>Web page update</td>
<td>1</td>
</tr>
<tr>
<td>volunteer</td>
<td>1</td>
</tr>
<tr>
<td>Photo collage</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.8 Most valued services in Parkdale CTC

<table>
<thead>
<tr>
<th>Three most valued CTC services nominated by respondents (N= 15)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>8</td>
</tr>
<tr>
<td>Government Services</td>
<td>7</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>7</td>
</tr>
<tr>
<td>Internet/broadband Access</td>
<td>6</td>
</tr>
<tr>
<td>Computer Access</td>
<td>5</td>
</tr>
<tr>
<td>Email</td>
<td>3</td>
</tr>
<tr>
<td>Office Services (printing posters, printing photographs, photograph scanning)</td>
<td>3</td>
</tr>
<tr>
<td>IT Advice</td>
<td>1</td>
</tr>
<tr>
<td>Online Banking</td>
<td>1</td>
</tr>
<tr>
<td>Multimedia</td>
<td>1</td>
</tr>
<tr>
<td>MySpace and Facebook</td>
<td>1</td>
</tr>
<tr>
<td>Games</td>
<td>1</td>
</tr>
</tbody>
</table>
Eight customers chose to provide additional comments as recorded in Table 5.9. The tenor of comments alluded to ‘resources’ while others wrote in terms of ‘support’. Its convenient location was also a factor particularly for those who could not travel. Even though the opportunity existed to make negative comments none did so. It can be seen that support for the CTC was expressed in strong and impassioned terms by these customers.

Table 5.9 Open comments provided by respondents at the conclusion of the survey

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTC is indispensable to the community - many locals make use of it.</td>
</tr>
<tr>
<td>Don’t know what I would have done without this service. Its been a great</td>
</tr>
<tr>
<td>support to me, It will help people to survive and prosper.</td>
</tr>
<tr>
<td>This center is friendly and informative. They assist when I don’t understand.</td>
</tr>
<tr>
<td>The CTC is a very valuable community resources. The town would be</td>
</tr>
<tr>
<td>disadvantaged without it.</td>
</tr>
<tr>
<td>These centres are vital in small communities and should be supported through</td>
</tr>
<tr>
<td>gov funding because the population base is not great enough to keep them</td>
</tr>
<tr>
<td>running as a business but if the services are withdrawn it I detrimental to the whole community.</td>
</tr>
<tr>
<td>CTCs are a valuable resource in isolated disadvantaged communities.</td>
</tr>
<tr>
<td>Good to have credit union here as well. If CTC is closed credit union may leave also.</td>
</tr>
<tr>
<td>Fantastic facilities for public use. Great for those who can’t travel.</td>
</tr>
</tbody>
</table>

5.2.2 The complexity of Parkdale CTC

Despite the apparent success of the CTC in providing opportunities for personal and community development many parts of the interview with the manager were dominated by his concern over the economic viability of the CTC. This is consistent with the findings of the Final project report where it is noted that CTCs were successful as social enterprises but experienced difficulties in earning sufficient income. The two sources of income that the CTC relied on – rental income and payment as a Centrelink Access Point - were not assured. For example, it was not clear whether the credit union renting the shared premises would maintain their presence in the town. Similarly, no guarantees were made by Centrelink to maintain the form collection service. Accordingly, new ideas for revenue generation were considered on an ongoing basis.
The manager recounted that a number of possible business ideas had been canvassed since he became manager including the sale of whitegoods. Further investigations revealed that the whitegoods supplier in the regional centre was able to deliver this service more competitively, which limited the margins that the CTC would be able to achieve for income generation. Another example was the agency agreement that the CTC had with an Internet service provider which proved to be more trouble than it was worth. It was common for potential customers to seek information face-to-face from the CTC, then sign up for the service on the phone leading to a loss in commission payments.

The task of promoting a community newsletter had recently been given to a volunteer with the view of increasing advertising revenue from local business. The newsletter was revenue positive but was still some way from delivering a significant income stream. Interviews with this volunteer revealed that discussion had taken place about charging more for advertising from local business. As the volunteer did not have a background in newspaper production and was new to the area he freely admitted that he was learning on many fronts.

The provision of a webpage hosting service through the CTC was revenue neutral but had not been actively embraced by businesses or individuals. In fact, web-hosting capabilities languished because of the reluctance of business to take up the opportunity. Indicating a further lack of support from local business was poor use of video conferencing facilities. The manager had lent the video conferencing camera unit to the local high school which used the unit to deliver distance-learning subjects to its senior students. This enabled the CTC to replace the expensive ISDN line that the video conferencing system required with cheaper ADSL broadband access (the high school had access to a fibre optic broadband service). On the occasions that requests were made for the video conferencing unit, such as for Centrelink interviews or court related matters, arrangements were made with the school to enable this to occur.

It appears that many in the community associated the CTC with the free provision of information that would typical of a library and hence a book lending service. This seems to have worked against the CTC’s efforts to encourage payment for information. As a
consequence many of the shopfront interactions occurred without any exchange of money. In view of the need to generate income the difficulties in deriving a monetary return on the function of information provision was a difficult problem to address.

Reflecting on the limited opportunities that the CTC experienced to generate income the manager stated:

*CTCs are a concept that seems to have been set up to fail!*

The manager went on to explain his quandary by using the example of a recent haircut he had received from the local hairdresser to whom he had recently sold a refurbished computer.

*The business of [hairdressing] is a repeat one – in six weeks I’ll need another haircut. Meanwhile, the computer that I sold them won’t be replaced for years.*

On the surface, revenue constraints appear to be related to the limitations of the socio-economic context rather than poor management skills or lack of interest of CTC staff. The difficulty of this challenge is thrown into stark relief when one notes that this manager had a strong background in ICT management and had managed major ICT programs for the federal government and university sector. In seeking to better understand the challenges of CTCs that are successful social enterprises that nonetheless struggle to earn sufficient income the accounts of the CTC at Parkdale suggest that the limitations of the local socio-economic environment influence such an outcome. In addition to this, the business of providing information to the community is different to selling other services in the town where expectations that CTC services should be free or subsidised.

5.2.3 **In search of a credible framework for understanding diversity (RQ4)**

5.2.3.1 Application of the four Analytical Constructs to the case

The analysis moves on to the task of theory building by firstly using the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory to analyse selected initiatives from the case study. The selected initiatives from Parkdale CTC were considered in relation to the four Analytical Constructs of Paradox, Epistemology,
Ontology and Knowledge Spiral. The manner in which the four Analytical Constructs were applied to the research accounts was to use guide questions (see Table 5.1) to analyse activities within the CTC.

The procedure for the application of the guide questions was to begin with the construct of paradox. Using the definition of Paradox as being situations in which ‘inadequate and inconsistent knowledge’ exist, two examples from this case study were selected. The analysis then sought to organise associated activities using the four-part SECI model of Socialisation, Externalisation, Combination and Internalisation. The construct of Ontology was then addressed by noting the extent of involvement in these activities using the scale concepts of Individual, Group, CTC and Community. Finally the question of the Knowledge Spiral was considered by scrutinising the interactions between the first three Analytical Constructs.

The two initiatives selected to address research questions RQ4-6 were:

the Multimedia Training Course; and
the Community Engagement Program.

The first of these initiatives serves the purpose of introducing the application of Analytical Constructs to the case material. The second initiative demonstrates how knowledge-creating activities can be distinguished on the basis of knowledge transformation using the SECI model. After detailing the application of the Analytical Constructs to the two examples the thesis proceeds to address the other aspect of Nonaka and Takeuchi’s analysis called Enabling Conditions. In combination this section of the analysis concludes with consideration of the credibility of the Analytical Constructs and the Enabling Conditions in providing a framework for understanding these two initiatives.

The task of theory building begins when research question RQ5 is addressed. This research question seeks to link the two concepts of CTCs as ‘successful social enterprises’ with the difficulties of earning income to sustain the CTC. Finally, the
thesis will consider the role of ICTs in relation to the knowledge creating activities found in the research accounts as required by research question RQ6.

**Multimedia Training Course**

The Multimedia Training Course initiative is chosen because it allows the most straightforward application of the Analytical Constructs in order to develop familiarisation with the analytical framework used for theory building.

**Paradox** The paradox is defined by questioning whether inadequate or inconsistent knowledge has led to this initiative (see Table 5.1 question 1). As the training course was designed to address an area in which inadequate knowledge was perceived, that is the telling of personal stories through multimedia production, the first requirement of the analytical framework has been satisfied. Importantly this initiative led to opportunities for knowledge development not only in the potential audience of these DVDs but also for course participants. By developing the story line of their DVD participants had the opportunity to reflect on their life experiences and come to some understanding of these experiences in relation to the broader community. In addition to this learning, associated skills in multimedia production were also developed.

**Epistemology** The second step in the application of the Analytical Constructs to the case study data is to determine whether the example of Multimedia Training Course can be understood in relation to the Analytical Construct of Epistemology. The analysis of Epistemology relates to the four-part SECI model.

In the case of **Socialisation** the guide question is ‘Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?’ (Table 5.1 question 2.1). The response is that the initial steps of formulating ideas for the development of a story outline can be associated with Socialisation because course members were required to interact with each other and with the trainer throughout the training course to determine an overall theme for their personal story.

The guide question for **Externalisation** is ‘can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?’. This can also be answered in the affirmative
(Table 5.1 question 2.2) because at some point the story is summarised using a technique called storyboarding. Storyboarding is where text and diagrams are used to guide the recording of scenes (video and audio) for subsequent editing so Externalisation has occurred.

The guide question for **Combination** is ‘Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?’ (Table 5.1 question 2.3). The editing of pre-recorded segments of video and audio, which is by Nonaka and Takeuchi’s definition explicit knowledge, with the personal knowledge of the creator combine to create this story. The final production can be described as new explicit knowledge so Combination has occurred.

**Internalisation** is described by the guide question: ‘Do people use explicit knowledge when learning-by-doing or in formal learning?’ (Table 5.1 question 2.4). This aspect of the SECI model is apparent in the replaying of DVDs to family members and other people in the community where individuals are left to reflect on the DVD and to internalise the explicit knowledge contained in the DVD. Internalisation is also apparent in the experience and technical skills that participants gained through the Multimedia Training Course. So, Internalisation is seen to occur in these two ways.

In order to demonstrate the application of the Analytical Construct of Epistemology to the Multimedia Training Course the various activities are summarised in Table 5.10.
### Table 5.10 Summary of SECI processes associated with Multimedia Training Course

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the experience of young Aboriginal people growing up in the Parkdale community</td>
<td></td>
</tr>
<tr>
<td>Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td>Multimedia course allows students to interact face-to-face with teachers and other students about the story they wish to develop.</td>
<td></td>
</tr>
<tr>
<td>Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td>Crystallisation of ideas is seen in the way course participants decided how and what to video in support of their story line</td>
<td></td>
</tr>
<tr>
<td>Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td>The editing and assembling of recorded segments into the finished product is consistent with the process of combination</td>
<td></td>
</tr>
<tr>
<td>Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td>Audience reflects on DVD content thereby enlarging each individual’s knowledge Multimedia course provides training in the use of ICTs that is relevant to personal circumstances of young people.</td>
<td></td>
</tr>
</tbody>
</table>

**Ontology** Having detailed the epistemological transformations of this initiative, the thesis now addresses the Analytical Construct of Ontology. Put simply, the construct of Ontology characterises the numbers of people who share newly created knowledge at various stages of the SECI model (Table 5.1 question 3). The propensity of knowledge to be shared is facilitated by knowledge being made explicit. As the project progresses from the thoughts of individuals to storyboarding to the recording of segments to final editing, the involvement of more people is possible. Seeing that the DVD contains the explicit knowledge of the course participants, the showing of the DVD to people in the CTC and in the community enables a greater number of people to receive this knowledge. This corresponds to increasing levels of Ontology scale as indicated on the horizontal axis of the Ontology diagram (see Figure 5.2).
Knowledge Spiral The fourth major step is to analyse the Analytical Construct of the Knowledge Spiral which is done by noting whether there is interaction between the epistemological and ontological elements of the case study account of the Multimedia Training Course (see Table 5.1 question 4). The specific nature of this interaction described by Nonaka and Takeuchi is that the spiral links the main elements of the SECI model in a circular fashion but importantly not in a closed circle but in a spiral. The ever-widening trajectory of the spiral indicates increasing ontological scale or, put more plainly, increasing numbers of people.

The extent to which such coherency exists between Epistemology and Ontology can be seen in the previous discussion. The Multimedia Training Course provides an example where activities can be related in a way in which the passage of ideas from the personal tacit realm are externalised, made explicit and combined leading to the production of the DVD. In order to complete the loop one assumes that DVDs will be watched by people and internalised in a way that enlarges their individual knowledge. From an ontological perspective the process of articulation and codification of personal insights as recorded on the DVD enables this knowledge to be made accessible to increasing numbers of people. Therefore, the interaction between Epistemology and Ontology that the Knowledge Spiral describes can be perceived in the accounts of this initiative.

In summary, the production of the DVD provides tangible evidence that new knowledge was created. Less visible were the skills that course participants developed along the way as a consequence of the course or any specific social benefit. The focus of the analysis is on the application of the analytical constructs and what this demonstrates is that the function of the CTC, in staging this set of related activities, makes it an
important facilitator of this knowledge creation process even though the creation of such knowledge.

Community Engagement Program

The positive engagement that the CTC had with the Aboriginal community exemplified by the Community Engagement Program described in Section 5.2.1 is also open to interpretation using the four Analytical Constructs. The accounts of this initiative include a broad range of activities and actors that are funded as part of a program by the Office of Indigenous Affairs in the national government. Actors include the local Aboriginal community, the two program leaders employed to run the program, CTC manager and volunteers, the CTC management committee and the town’s Chamber of Commerce.

Paradox The first step in the analysis of this initiative is to determine if the antecedent of this initiative can be found in a paradox as described by the guide question ‘do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?’ (see Table 5.1 question 1). The nature of the paradox here, as defined by inadequate or inconsistent knowledge, is the need to address problems within the Aboriginal community defined by the five areas of social need: law and order; health; education; job creation; and young people and families. The intractable nature of social disadvantage within this community stands testimony to the need for more knowledge about encouraging individuals to change behaviours in ways that will result in positive improvements in the five key areas of social need. The CTC is ideally placed to facilitate such engagement.

Epistemology The second step in the analysis is to consider the Analytical Construct of Epistemology. Analysing the relevant guide questions that pertain to the four-part SECI model, evidence of Socialisation can be seen in the one-to-one interaction that has occurred between these individuals over a period of time (see Table 5.1 question 2.1). Most obvious in the accounts of interviews with CTC staff were the daily interactions between the manager, Aboriginal elders (one was also a councillor for local government) and the two program leaders within the CTC. Interaction between other actors, namely members of the CTC Management Committee and the local Chamber of
Commerce, were also reported in interviews with the CTC manager, so Socialisation has taken place.

Nonaka and Takeuchi claim that evidence of Externalisation can be found in a range of activities they associate with making tacit knowledge explicit: analogies, metaphors, models, dialogue, text or diagrams (see Table 5.1 question 2.2). Evidence of Externalisation was apparent in the use of ICTs by the program managers to produce information in the management of the program. While some of this information was destined for reports that were dispatched to government bureaucrats who administered the program from afar, it is apparent from the use of ICTs to maintain diaries, communicate emails and produce flyers that ICTs were also used by them to organise their interactions with specific groups (for example, teenage girls, teenage boys and mothers). All of these instances can be seen to be examples of Externalisation where the personal knowledge of program managers was made explicit. It is also interesting to note that the creation of the unique term Gubboriginal crystallised an important concept about the productive role the manager had played between the Aboriginal and non-Aboriginal people in that town. As the term represents a concept that many agree with it can be seen to play a similar role that Nonaka and Takeuchi ascribe to analogies to assist in the sharing of knowledge between individuals within groups. So, Externalisation has occurred.

A number of examples pertaining to Combination activities are apparent in this initiative too. Combination activities create new explicit knowledge from existing explicit knowledge for networking within the organisation and beyond (see Table 5.1 question 2.3). For example, the reporting mechanisms that were in place to ensure relevant information was sent to government authorities represent one means by which the outcomes were made explicit and documented. The weekly newsletter produced by the CTC contained important information about the program that was communicated to the broader community. This information was also available on the CTC website where a copy of the newsletter was published. Both of these examples indicate ways in which knowledge was made explicit and combined in a way that summarised activities of the Community Engagement Program. So Combination has occurred.
The fourth part of the SECI framework, **Internalisation**, relates to opportunities to internalise explicit concepts to develop personal knowledge and skills (see Table 5.1 question 2.4). Evidence of Internalisation within the groups of Aboriginal people reported by the CTC manager and program managers related to visible changes in the behaviour of young people. For example, some have been dissuaded from anti-social and criminal activity and some have made life changing decisions about career choices and have developed positive relationships with people within their respective groups.

As far as the Program Managers are personally concerned it was clear that they appreciated the opportunities for learning that were afforded to them. They expressed the hope that this experience would give them added standing in future when applying for similar positions. While some of the skills to deal with the challenges of their work were derived from explicit requirements of the program, they brought other skills to the job drawn from their personal knowledge of the community and its mores. To that extent, such learning can be understood as learning-by-doing which is one form of learning Nonaka and Takeuchi defined in the guide question pertaining to Internalisation.

**Internalisation** was also reasoned to have occurred in the publication of information in the community newsletter. In making an assumption that the newsletter was read by members of the community, evidence of Internalisation can be seen in the distribution of the newsletter in the community. Similarly, the sending of reports to government bureaucrats in head office can also be reasoned to be Internalisation if such reports are read and these bureaucrats make decisions based on this information. Even though not directly relevant to the task of engaging individuals within the local Aboriginal community, one can see that better informed individuals within the broader community and government creates a social context that is better able to respond to the Community Engagement Program. So, Internalisation can be seen to be occurring in a number of areas.

The preceding analysis of activities associated with the Community Engagement Program is listed in Table 5.11. Two columns have been used to separate activities that pertain to the target group from activities that can be considered as secondary (such as
### Table 5.11 Summary of SECI Processes relevant to the Community Engagement Program

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need to address problems within the Aboriginal community defined by the five areas of social need: law and order; health; education; job creation; and young people and families.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socialisation</th>
<th>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTC manager interacts with local Aboriginal elders to develop CTC-related responses to assist in the organisation of local Aboriginal families</td>
<td></td>
</tr>
<tr>
<td>Community Engagement Program leaders work from the CTC office. They are able to interact with each other as well as CTC manager and volunteers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Externalisation</th>
<th>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of program development found in text and diagrams contained on documents and on computers.</td>
<td></td>
</tr>
<tr>
<td>Manager is known as Gubboriginal indicating an important realisation about the CTC manager's ability to work in both Aboriginal and non-Aboriginal communities.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Combination</th>
<th>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little evidence of Combination activities.</td>
<td>Reporting instruments to government funding body.</td>
</tr>
<tr>
<td>Reporting instruments to government funding body.</td>
<td>Newsletter and website where activities of the Community Engagement Program are reported.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internalisation</th>
<th>Do people use explicit knowledge when learning-by-doing or in formal learning?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunities for learning by target groups (mothers group, teenage girls and teenage boys) through Community Engagement Program</td>
<td>Program leaders use their employment as leaders of the Community Engagement Program to learn new knowledge and skills</td>
</tr>
<tr>
<td>Changed behaviour of young people</td>
<td>Government bureaucrats are informed of Community Engagement Program through reporting instruments</td>
</tr>
<tr>
<td></td>
<td>Wider community is informed of Community Engagement Program through newsletter and website</td>
</tr>
</tbody>
</table>
the reporting mechanisms to government bureaucrats and the community newsletter). The first column listing mainstream activities with the target group is notable for the lack of evidence pertaining to Combination type of activities in the form of printed publications, posters or websites. The fact that engagement strategies are aimed at personal interaction within groups reduces the need for the codification of such information into the production of pamphlets, websites or other publications. The issue of literacy also presents itself as an issue given the low education attainment for many in this community.

**Ontology** The third step in the analysis of this initiative is to apply the Analytical Construct of Ontology. The analysis matches the various activities that make up this initiative with the descriptors of ‘individual’, ‘group’, ‘CTC’ and ‘community’ (see Table 5.1 see question 3). Referring to Figure 5.3, it can be seen that the one-to-one interactions between key actors such as the CTC manager, program managers, and Aboriginal elders within the CTC are the source of new ideas for the Community Engagement Program. Examples of group-level interactions are also apparent within identified groups within the Aboriginal community. One noticeable group is that of the teenage girls whose activities in the CTC focussed on the uses of the social networking site called Bebo. The popularity of gaming among teenage boys marks out another group relevant to Ontology. The young mothers group is another example of an identifiable group that is served through the CTC program. There is evidence of the

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**Figure 5.3 Application of the construct of Ontology to the Community Engagement Program**
involvement of more formal groups such as the chamber of commerce and the CTC management committee. The oversight that these committees provide to the program in terms of financial management and other governance issues provides a context in which the Community Engagement Program exists.

Continuing with the Analytical Construct of Ontology, it can be seen that the inclusion of Community as an identifiable group within the construct of Ontology makes sense. The newsletter and website enable community members to be kept informed of notable events in the Community Development Program. Keeping the community informed about activities and development of the program ideally creates goodwill in community members and leads to better promotion of the goals of the Community Engagement Program.

Evidence of some activities suggests that the descriptors found in the guide question for Ontology are not fully descriptive of interactions that occur with individuals and groups beyond the community. Examples of this are the bureaucrats who reside outside the community who manage the Community Engagement Program for government. They also represent important actors in the knowledge creation process as they learn of new and unique perspectives of the program in this locality. Evidence of relationship maintenance within groups includes accounts of contact with siblings and friends who are at boarding school in Sydney. The case study accounts reveal the maintenance of such relationships through email and social networking software such as Bebo. The prominence of these ‘beyond community’ relationships is consistent with the use of ICTs.

**Knowledge Spiral** The fourth Analytical Construct that is used in the analysis is the Knowledge Spiral. The potential of the Knowledge Spiral to provide a meaningful explanation of the activities associated with the Community Engagement Program is in the way it is able reveal the interaction between Paradox, Epistemology and Ontology (see Table 5.1 question 4). This is partly demonstrated in Table 5.11 where various activities from the Community Engagement Program initiative were arranged on the basis of the SECI model. The paradox in this initiative was described in terms of the need to address problems within the Aboriginal community defined by the five areas:
law and order; health; education; job creation; and young people and families. The ability to identify increasing numbers of people who learn and benefit from knowledge that is created through such activities, as described in Figure 5.3 using the construct of Ontology, provides support for the idea of the Knowledge Spiral.

However, it was difficult to observe in case study accounts the sequential transitions of the SECI model as reflected in the circular traverse of the spiral. This alludes to the difficult of capturing informal group interaction and, as a consequence, the explanatory value of the Knowledge Spiral appears to be limited in this case. Gaps are apparent in Table 5.11. For example, the interactions within the target groups of the mothers group, teenage girls and teenage boys suggest that Combination activities do not figure prominently. As reasoned previously this is consistent given the small size of such groups and the questions posed about literacy in the Aboriginal community.

Thus, it is apparent that even though knowledge creation may occur, and this can be seen to occur in increasingly larger groups within and outside the CTC, it may need not occur in the ordered manner suggested by the circularity of the spiral. That said, the constituent elements of the Knowledge Spiral – Paradox, Epistemology and Ontology – are found to be effective constructs by which to develop insight into the initiative of the Community Engagement Program.

**Discussion: do the four Analytical Constructs provide a credible framework for understanding the chosen initiatives in Parkdale CTC?**

Research question RQ4, in part, seeks to determine whether the analysis of case study account using the four Analytical Constructs develops credible insight about these initiatives. The chapter proceeds to consider each of the constructs in turn.

In addressing RQ4, the thesis reiterates one important aspect of the research design as it relates to case study method. As explained in Section 3.3, the intention is not to test for replication of case study research data with observations made by Nonaka and Takeuchi in their case study research. Nor is the intention to unearth a formula that can guide all CTCs managers to sustainable operations. Rather, the intention is to discover whether the use of Nonaka and Takeuchi’s theory, as reflected in the Analytical Constructs, is able to consistently deliver credible insights into the CTC case study data. Ideally these
constructs enable diverse situations to be explained using a common theoretical framework.

It is in the variability of these descriptions when using the Analytical Constructs that interesting contrasts emerge and enable a more penetrating understanding to be developed. The previous analysis of the two initiatives displayed contrasts when the four Analytical Constructs were applied. Most obvious in perceiving such contrasts were that the nature of the Paradox under scrutiny in each initiative was different. In the first initiative of the Media Training Course the primary purpose of the exercises was to inform the community about the experiences of teenage individuals in Parkdale. The paradox driving the second initiative of the Community Engagement Program was the need to develop more productive modes of interaction within the Aboriginal community as reflected in the five key areas of social need. Thus, these initiatives are centred on identifiable paradoxes from which knowledge creation was found to occur.

The variability between the analyses of initiatives was also apparent in relation to the Analytical Construct of Epistemology. The four-part SECI model guided the analysis to look to the nature of activities within each initiative. In both the Multimedia Training Course and the Community Engagement Program it was possible to associate activities with all four parts of the SECI model.

The application of the SECI model was effective in highlighting the role of Socialisation as an important element to idea generation. This was evident in the early stages of the Multimedia Training Course and was also apparent in the level of interaction between key actors in the Community Engagement Program. The construct of Epistemology was also effective in demonstrating the effects of knowledge being made explicit by way of the SECI concept of Externalisation. This was demonstrated through the use of diagrams and text in storyboarding in the Multimedia Training Course. The use of documents containing texts, tables and diagrams by the Program Managers in the Community Engagement Program are examples of Externalisation. A seemingly trivial example of the creation of the unique term Gubboriginal takes on significance when the construct of Epistemology is applied to this case study.
Moving on to the SECI concept of Combination, the publication of information through a DVD, government reports, community newspaper and website represents tangible evidence of knowledge creation. The ease with which such knowledge can be copied and transported to various places is consistent with Nonaka and Takeuchi’s observation that explicit knowledge is more amenable to networking. It is noteworthy that not all examples of explicit knowledge are ultimately embodied into publications, websites or DVDs. The difficulty in observing concrete examples of knowledge creation in the Community Engagement Program suggests that explicit knowledge may not be evident in codified artefacts but is observed more subtly in individual’s changed behaviours in the five areas of law and order; health; education; job creation; and young people and families.

The process by which people learn to use knowledge is described by the Internalisation component of the SECI model. Internalisation of knowledge was reasoned to occur when people viewed the DVDs produced in the Multimedia Training Course. The distribution of the Community Newsletter where community members were able to read about various activities within these two initiatives is also cited as an example of Internalisation. The reading of formalised reports from the Program Managers of the Community Engagement Program by government bureaucrats is another example of Internalisation. Internalisation is also reasoned to have occurred when people used knowledge in activities on the basis of Nonaka and Takeuchi’s identification of learning-by-doing. Hence, the experience of developing a DVD led course participants to learn technical skills in producing a DVD as well as to reflect on their personal experience of growing up in their town.

Activities within these two initiatives were also associated with different points on the Nonaka and Takeuchi’s modified Ontology construct, namely: individual, group, CTC and Community (see Figure 5.4). The identification of not only individual engagement with the CTC, but also group and community level engagement indicates that this construct is a useful one when associating knowledge creating activities with numbers of people. The decision to modify the labels of the horizontal axis of the ontological scale diagram to include ‘community’ (see Section 2.4.1.3) was found to be appropriate in this study to better distinguish the significance of knowledge creation beyond the
CTC in its immediate community. The notion that knowledge creation extends beyond the immediate community was included when reference was made to government bureaucrats who work in capital cities.

Figure 5.4 Modified Ontological dimension to include people beyond the community

The three concepts of Paradox, Epistemology and Ontology are brought together in the Analytical Construct of the Knowledge Spiral. By considering the relationships between Paradox, Epistemology and Ontology that Nonaka and Takeuchi claim give rise to the Knowledge Spiral, it is possible to perceive a coherency between the accounts developed when the Analytical Constructs were applied. With the Multimedia Training Course it was possible to observe a sequence of activities that followed the order of Socialisation, Externalisation, Combination and Externalisation of the SECI model. It was also possible to note that increasing numbers of people were able to participate in these knowledge creation processes as knowledge was increasingly made explicit.

Similarly it was possible to see increasing numbers of people engaged with the Community Engagement Program on the basis of knowledge being made increasingly explicit. However, an area of uncertainty about the Knowledge Spiral arose in relation to the ordered nature of transitions of the SECI model. It was not possible to unambiguously state that activities occurred in the time-sequence order that the SECI knowledge model suggests. In part, the difficulty in drawing a conclusion to this question is related to the limitations of the research design where the accounts of managers and CTC staff were used to identify such activities but not their sequence.

Analysis of the attributes of the Paradox reveals another important insight into the nature of activities within the CTC. To this point the paradoxes identified for analysis
are publicly acknowledged problems of the community that require resolution. However, there is also evidence from customer surveys that the CTC was used to address issues in people’s private lives. It was not possible to gather information about such paradoxes at the same level of detail and reliability as the publically acknowledged paradoxes that were identified by the manager at the outset of each case study investigation. If the CTC is viewed as important to individuals as they seek to solve problems within their private worlds, the CTC can also be seen as facilitating the knowledge creating activities in ways that are relevant to the personal circumstances of individuals.

In limiting the analysis to just the publically acknowledged paradoxes that are addressed by the Multimedia Training Course and the Community Engagement Program, the application of the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory provides penetrating insights into these examples. The analysis of these activities was able to reveal that CTC’s were indeed the source of new ideas that can be used for the benefit of the local community. It can be seen that the constructs of Paradox, Epistemology and Ontology enable useful comparisons to be made about knowledge creation within the CTC. It is possible to observe relationships between Paradox, Epistemology and Ontology leading one to observe interactions that are consistent with the Knowledge Spiral.

In summary, the credibility of the Analytical Constructs has been enhanced through their application to the two initiatives. It was possible to develop meaningful insights into the activities that made up these initiatives as knowledge creating processes that were shared by individuals within the CTC and in the broader community. The question of sequencing of SECI activities, as just discussed in relation to the application of the Knowledge Spiral construct to the Community Engagement Program, is noted as a possible area of inconsistency given the difficulty in observing such sequencing. Nonetheless, this establishes a foundation to proceed with the analysis of knowledge creation in relation to the second part of research questions RQ4.
5.2.3.2 Are conditions in Parkdale CTC conducive to knowledge creation?

Having argued that activities can be understood as leading to knowledge creation the chapter moves on to consider whether the five Enabling Conditions, as defined by Nonaka and Takeuchi (see Section 2.4.2), are implicated. While there is no expectation that explicit application of knowledge creation principles will have occurred in Parkdale CTC, it is possible that some or all of these Enabling Conditions are in evidence by virtue of circumstances or as a by-product of other management initiatives. Accordingly, the guide questions detailed in Table 5.2 are used to address the case study accounts of Parkdale CTC.

**Intentions: are staff and volunteers willing to contribute to making a CTC a better place?** The Enabling Condition of Intentions looks for an environment that encourages positive attitudes so that individuals will be encouraged to use their creativity for the benefit of the CTC. In this case, the enthusiasm of volunteers and manager alike was demonstrated in their strong support for the CTC. This was exemplified by the volunteers who made regular commitments to staff the centre and perform duties such as the production of the weekly newsletter. The willingness of volunteers to suggest new ideas to develop new ways to earn income for the CTC was another indication of these intentions. It was clear in the accounts of the manager’s and management committee’s work that improved conditions for community members was fundamental to their concern. So, the Enabling Condition of Intentions is evident in this case study.

**Autonomy: do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?** Nonaka and Takeuchi claim that the autonomy of individuals will also influence their ability to create new ideas. The case study accounts indicate that some freedom was extended to volunteers by allowing them to use CTC resources to pursue their own interests. For example, volunteers were allowed free access to broadband during their shifts. Volunteers were given the opportunity to try tasks they had never done before, such as produce the weekly newsletter. In summary, the case study accounts indicate that they were given the freedom to undertake such tasks without the need for close management oversight. So, the Enabling Condition of Autonomy is also evident in this case study.
Fluctuations and Creative Chaos: do changing conditions within the CTC or external environment lead to knowledge creation? The suggestion that fluctuations and chaos are management interventions that assist in knowledge creation is based on Nonaka and Takeuchi’s observation that stress can inspire higher levels of creativity. In the case of this CTC, the need to maintain sufficient revenue is an ongoing concern for this manager. This placed the management committee, the manager and the volunteers on a continued state of alert for new income-producing ideas. This was clearly evident in the variety of initiatives in the case study accounts - such as the sale of whitegoods, broadband delivery and web hosting - all of which have been the impetus for ongoing discussions to develop new lines of revenue generation. Accordingly, it can be seen that conditions akin to fluctuations and chaos exist in this CTC.

Redundant Information: are there a variety of information sources that go beyond the immediate operational requirements of the CTC? The significance of this Enabling Condition lies in the ability of an organisation to respond to unusual or unique circumstances because of the variety of expertise it possesses. Hence, redundant information is defined in terms of available information that goes beyond the normal day-to-day needs of the CTC. This can be seen in the case study accounts in the participation of the manager and the management committee chairperson who have both had long careers in a variety of public and private institutional roles. The ability of the CTC to manage the Community Engagement Program is evidence of this. Their project management expertise enabled this program to be taken on at relatively short notice after the chamber of commerce became aware it was unable to fully supervise this project. Hence, the Enabling Condition of Redundant Information is relevant to the accounts of the CTC.

Requisite Variety: is there a diversity of expertise that mirrors the external environment? The need for requisite variety reflects the need to respond effectively to the immediate environment in which the organisation exists. The presence of volunteers who have deep knowledge of local circumstances enhances the ability of the CTC to respond to local needs. The productive relationship that the manager shares with key
business and community leaders further supports the existence of this Enabling Condition. The ability of the CTC to respond to the challenges of its local environment is significantly enhanced through the dialogue that the manager is able to facilitate on a range of issues ranging from business development, broadband access and the local Aboriginal community. The knowledge of the local community that the two Program Managers bring to the CTC is another example of this. Hence, the Enabling Condition of Requisite Variety is evident

Discussion: do the five Enabling Conditions provide a credible framework for understanding initiatives in Parkdale CTC?

In summary, all five Enabling Conditions that Nonaka and Takeuchi claim are conducive to knowledge creation were found in this case study account. The positive disposition of the manager, volunteers and management committee to making improvements in the social conditions of their town has resulted in an environment that is conducive to knowledge creation.

The analysis of the Enabling Conditions concludes this section which has also examined the application of the Analytical Constructs as required by research question RQ4. Taken together, it can be concluded that the analysis has been able to identify and investigate in detail examples of knowledge creation in Parkdale CTC. The extent to which the analysis has been free of obvious inconsistencies contributes to perceptions of the analytical framework’s credibility. This in large measure has been the case except for the noted inconsistencies discussed previously in relation to the Knowledge Spiral.

5.2.4 Linking social enterprise with income in Parkdale CTC (RQ5)

In addressing research question RQ5, the thesis returns to the research goal which seeks to resolve the challenge of maintaining the success of CTCs as social enterprises in situations of insufficient income generation. The use of the Analytical Constructs of Paradox, Epistemology, Ontology and Knowledge Spiral to analyse two initiatives in Parkdale CTC shed light on the way the CTC was able to simultaneously serve the needs of the community and generate material and non-material resources.
The Analytical Construct of Ontology provided a means by which the success of CTCs as social enterprises can be linked to the analytical framework. When referring to increasing ontological scale Nonaka and Takeuchi (2004, p. 51) use the term ‘amplifies’ when referring to knowledge diffusion to increasingly larger groups. The previous case study accounts support the claim that the CTC is an effective context in which knowledge creation is enlarged because of the involvement of increasing numbers of people. Case study accounts indicated broad scale engagement that served the needs of people ranging from individuals to groups to community level involvement as shown in the following examples. Individuals were found to be users of the CTC to access the equipment that the CTC provides. It was also apparent in the informal groups of teenage girls and boys based on friendship and kinship who used the CTC. Community-wide involvement in knowledge creation can be seen in the distribution of the newsletter.

The case study accounts also indicate that this engagement is characterised in a positive light. This was demonstrated in the positive responses customers provided in surveys (see Table 5.8 and Table 5.9). The CTC is able to exert some influence over the behaviour of customers, particularly young people, through its supervision of online activities that are in turn informed by the code of conduct that the CTC subscribes to. The CTC is known to have had a positive influence on some young people as evidenced in the account of the life changing career choice and keeping potential trouble-makers off the streets and occupied with online games. Furthermore, the CTC management committee and its close working relationship with the town’s chamber of commerce provides another avenue by which the interests of the town can influence the work of the CTC. Accordingly, these depictions of the CTC are consistent with the description of a successful social enterprise.

The Analytical Construct of Epistemology, represented by the SECI framework, provides an approach to address the other aspect of the research goal; income generation. The case study accounts indicate that activities associated with the Community Engagement Program do not generate sufficient levels of income to support this initiative. Without the support from government to run the Community Engagement Program it is doubtful whether such a program could be staged by the CTC on a commercial basis. The socialised nature of group-based activities lends itself to informal
and interpersonal interaction between community members. Evidence from the case study indicates that it is difficult for these modes of interaction to generate revenue on a user-pays basis. The dominance of tacit knowledge exchange between individuals and the need to make such exchanges explicit, (as seen in the generation of principles by which people are encouraged to alter their behaviour), is consistent with the SECI process of Externalisation.

In bringing together the two concepts of social enterprise and income generation the analysis finds that the mainstream activity of the Community Engagement Program contributes to perceptions of the CTC’s success as a social enterprise but is commercially unviable. In seeking to characterise the pertinent attributes of this case for the purpose of theory building, the SECI process of Externalisation emerges as a key concept that simultaneously explains the social value of the Community Engagement Program and its associated income-generating potential. Externalisation most accurately describes the knowledge transformations which are critical to the resolution of a significant paradox that are unique to this local community - namely the need to improve social conditions of the Aboriginal community. Evidence of other SECI processes in the case study accounts clearly indicates that knowledge transformations described by other SECI processes are still present and relevant. However, the dominance of socially oriented and interpersonal nature of these exchanges works against commercial exploitation of this form of knowledge creation.

### 5.2.5 ICT use and knowledge creation in Parkdale CTC (RQ6).

This section of the analysis focuses on the ways ICTs are used and whether these can be related to knowledge creation. The section will also use the findings about ICT use in Parkdale CTC to reflect on Community Informatics research from the perspectives of complexity, effective use and sustainability.

ICT use in Parkdale CTC can be associated with knowledge creation processes. In the example of the Multimedia Training Course ICTs were used to create a video presentation depicting a story about their lives. The use of scripting, recording and editing applications, as well as playback provided students with comprehensive exposure to a range of ICTs. If one looks to Table 5.10 it is possible to associate
applications and devices with various parts of the SECI model. For example, video cameras can be seen to provide the means of Externalisation by which the ideas of the creator are made explicit in pictures and dialogue and sounds. When considering Combination, editing software on computers was required to edit and combine segments of video into the ‘final cut’. In order to facilitate Internalisation of this knowledge through the public viewing of the finished work, replay equipment (such as computers and DVD players which can be connected to data projectors or other display units) was used.

In contrast, the example of the Community Engagement Program reveals a different scenario where the use of ICTs was less visible. The focus of the mothers group that used the CTC was (unsurprisingly) on mother-craft where convenient access to computers allowed production of newsletters and flyers, information to be accessed from the Internet or emails to be read and sent. In this example the incentive to use ICTs related to the need to manage and coordinate activities within the group. In summary, the availability of computers at the CTC enhanced the management of the group and allowed people to maintain contact with other people using email. As people were exposed to ICTs one could expect that people’s ICT skills would also develop even though ICTs were not the primary focus of the group.

High use of email and social media software brings into focus the function that these applications perform to facilitate the one-to-one interaction of Socialisation but over distance. Nonaka and Takeuchi recognise such a possibility in their discussion of the philosophical concept of \( ba \) which can be virtual, that is mediated by ICTs, as well as a through interaction in physical space (see Section 2.4.1.1). Indeed, the sight of two girls interacting using online chat while sitting next to each other in the CTC only makes sense when one realises that a third person who was living in the city of Sydney was included in this interaction.

As reported in Table 5.7, the customer surveys indicate a diversity of factors that lead people to visit the CTC. Not all relate to the need to use ICTs as the social contact that respondents enjoyed was also a factor that was represented strongly in customer survey responses. The high nomination of email and photograph enhancement and printing,
coupled with the use of social media by teenage girls are suggestive of relationship maintenance between family and friends. Other uses such as word processing, scanning and fax suggest that people also use the CTC to conduct official and semi-official business such as sending information to government, completing school assignments or writing a letter to the editor of the regional newspaper. The need for training is another incentive for use of the CTC. However, it is not possible to determine whether this desire is a more generalised one or specific to a particular requirement such as a job. People’s more general identification of the Internet and broadband does not reveal much about the specific reasons that inspire such use.

It is instructive to briefly reflect on instances where people chose not to use ICTs that were available in the CTC. For example, case study accounts reveal that opportunities for businesses to develop an online presence were not taken-up. The case study account reveals that the CTC’s offer to host the website of local businesses on their server and to provide these businesses with email addresses was not accepted by many. On closer inspection the incentives to explore a new business model were not strong in that there was little prior experience to draw on. Current business models relied on a local presence that was facilitated through face-to-face contact. The poor take-up by business to establish an Internet presence is consistent with a conservative business plan that sought only to serve local customers in a face-to-face mode.

As discussed in Section 3.2.2, Kling (2000, p. 254) suggests that, from a research perspective, the most productive avenue to understanding ICT use is to look for the incentives that lead to the use of ICTs. In recommending this line of enquiry, Kling seeks to counter perceptions of what he describes as the ‘tool model’ of ICT use where the introduction of ICTs would invariably lead to predictable and beneficial change. The related area of Community Informatics (CI) research also seeks to define a clearer thesis on the use of ICTs but with a specific focus on communities (see Section 3.2.2). CI theorists have an interest in social-technical interaction that results in sustainable ‘effective use’ by physical communities. As de Moor (2009a) observes, research into the use of ICTs by communities is complicated by ‘messy’ practice. Nonetheless, Stillman (2010) contends that innovative and unanticipated outcomes are possible.
Hence, of prime interest here is whether the method used to analyse the two initiatives in Parkdale CTC has potential to reduce such complexity.

Addressing the work of Kling (2000) first, it can be seen that the ad hoc and mixed outcomes in relation to ICTs use counters perceptions that change can be predicated on the tool model’s assumption of predictable and beneficial change. While one can see that ICT use has led to some notable benefits there are also potential dangers such as the level of violence in some online games that the manager is required to supervise. Hence it is not possible to state that the use of ICTs in Parkdale has led to predictable and beneficial change. The reluctance of local business to adopt the Internet is another example of this. Patterns of adoption are better explained by the way groups within the CTC such as mothers, teenage girls and teenage boys have recruited ICTs for the purposes of maintaining relationships within these groups. Hence, Kling’s advice to look for incentives to deal with complexity of ICT adoption and use is consistent with ICT use by people who use the CTC.

Focussing more specifically on the interests of CI theorists the themes of effective use and sustainability are clearly relevant to the accounts of Parkdale CTC. The previous commentary on ICT use supports both Gurstein’s (2004) and Stillman’s (2010) characterisation of ICT use in communities where innovative activity factored on ICT use to address local problems was observed. Parkdale community is found to be an active recipient of the technological opportunities presented through the CTC which is found to be an agent that facilitates community problem-solving for the purpose of bringing about beneficial social change. To that extent, Parkdale CTC would satisfy the CI requirement of effective use. While taking advantage of community assets and skills in building social-technical capacity, the lingering problem of income generation, as detailed in the response to research question RQ6, remains. Hence, the relevance of the analysis of Parkdale CTC to the question of sustainability relates to response to research question RQ6 where the SECI concept of Externalisation is used to characterise the complexity of Parkdale CTC.

In summary, it appears that ICT use can be associated with knowledge creation. The Multimedia Training Course is an example where ICT use can be concretely linked to
knowledge creation. The Community Engagement Program reveals a more complicated affair where ICT use is intertwined with group level interaction. While not straightforward to observe, such group-level interaction was found to be useful in communicating knowledge about a range of socially relevant themes such as mothercraft, health and violence, as well as ICT-related skills. In other circumstances, such as the case of email and social media applications for the private purposes of individuals, one can note the strong social emphasis that was associated with such use in the maintenance of relationships with friends and family. Given the difficulty in the generation of revenue from such activities the issue of sustainability is complicated by the obvious benefits that the initiatives provide to the community. The analysis of this case suggests that the SECI concept of Externalisation provides a convenient characterisation of this situation.

5.2.6 Reflecting on Parkdale CTC

The initiatives drawn from this case have been purposely chosen as examples where a CTC can enjoy success as a social enterprise but still experience difficulties in earning sufficient income. The analysis of this case study suggests that developing a detailed understanding of knowledge creating processes assists in this understanding. The emphasis given to Externalisation demonstrates ways in which knowledge creating activities can serve the needs of the community but also represent an insufficient source of income generation. To be sure, other aspects of the SECI model were evident and were important in gaining a fuller understanding of activities in Parkdale CTC, however, the SECI process of Externalisation best explains the knowledge creating activity that was most germane to the needs of the community.

The next in-depth case study can be understood also in terms of knowledge creation but stands in contrast to Parkdale because commercial incentives exist for such knowledge creation to simultaneously serve the needs of the community and develop sufficient income streams.
5.3 In-depth Study 2: Rangemoore CTC

5.3.1 Gaining familiarity with Rangemoore CTC

The CTC at Rangemoore enjoyed attractive premises in the middle of the town where it had been located for four years. The CTC was known locally as the newspaper office as well as the place where forms were submitted for Centrelink. A major part of the CTC’s income was derived from these two initiatives. Such is the level of revenue support from these two initiatives that the CTC was able to work as an independent commercial operation employing three staff. It was also an example of a CTC that does not use volunteers.

When arriving at Rangemoore CTC to begin interviews, the weather threatened snow. On entering the CTC, the warmth of its interior stood in sharp contrast to the cold weather conditions outside. Computers were organised in islands throughout the room. Later I came to find that this promoted privacy of interactions with the screen, giving one a sense of ownership of the immediate space around the computer. Off to the side from where the public access computers were positioned was the work area for the three staff. This area comprised a couple of offices that were accessible via a counter area. The two staff on duty when I arrived provided a friendly welcome leaving the researcher with a first impression that this CTC was a comfortable and welcoming place. As well as the two staff, a local high school student on a school-to-work program sat at a computer playing a computer game.

As the interview began one staff member was called to the counter to answer a query from a customer. Even though the manner of the customer was ostensibly jovial the purpose of his visit was to register his dissatisfaction with a story that had appeared in the last edition of the newspaper. The story concerned a rival business; the complainant said the ‘story’ was really just a ‘free plug’ for the rival business’s upcoming cattle sale. The media release was really just a thinly disguised attempt at free advertising, which had worked as far as the customer was concerned. As this exchange was occurring the other staff member commented that the editorship of the newspaper was a challenge when people complained about content in the newspaper. The CTC managers’ backgrounds were in small country businesses management rather than in journalism.
Typical of many regional townships in NSW, the main street was long and wide where commercial premises extend for 1.5 km from one end of town to the other. The town is situated about 65 km from the nearest regional city. The vulnerability to cold weather is explained by the town’s elevation on the New England Tablelands region of NSW. The economic mainstay of the locality is beef cattle. In contrast to other forms of agriculture, the researcher was told that beef cattle farming was less vulnerable to drought because it is possible to manage herd sizes in response to prevailing climatic conditions. As a consequence, the town does not suffer to the same extent as towns that are dependent on income from crop farming.

The CTC had 11 public access computers that were equipped with a range of software provided under the Microsoft Unlimited Potential Program (see Table 5.12). Recently two computers had been replaced with new units complete with high-end graphic cards in response to increasing demands of games software. All computers had access to printing facilities and broadband Internet. The CTC was open for 39.5 hours every week. While a useful source of revenue, the money derived from public access computer facilities fell far short of providing sufficient funding for the CTC.

As well as the two staff who were on hand for interviews, the centre also employed another person on a half-time basis. In total, this equated to 76 hours of paid employment (see Table 5.12). In contrast to most members of the CTCA, this CTC did not use volunteers to support its operations (see Section 4.3.1.2). Having established an income stream that was sufficient to pay wages, rent, telecommunications and other utility costs, volunteers were not essential to enable continued operation of the CTC.

The regional population of this locality is 1620 (see Table 5.13). The unemployment rate of 6.0% is just above the national average of 5.2% but significantly less (about 60%) than the previous case study of Parkdale (see Table 5.5). The median age of 40 years is three years higher than the national average. Individual median income was listed at approximately $370 per week. While lower than the Australian average, this figure is 31% higher than for Parkdale. Based on these two measures the CTC operated in an environment of higher economic potential than the previous case.
Table 5.12 Summary of primary CTC attributes at Rangemoore

<table>
<thead>
<tr>
<th>Attribute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours of Operation per Week</td>
<td>39.5</td>
</tr>
<tr>
<td>Are fees from users sufficient?</td>
<td>No</td>
</tr>
<tr>
<td>Primary income sources</td>
<td>Advertising from Community Newspaper; Centrelink Access Point</td>
</tr>
<tr>
<td>Relies on Subsidy Source?</td>
<td>No</td>
</tr>
<tr>
<td>Future Outlook Assessment</td>
<td>Comfortable</td>
</tr>
<tr>
<td>Computers</td>
<td>11</td>
</tr>
<tr>
<td>Desktop Printers, Facsimile, Scanner</td>
<td>6</td>
</tr>
<tr>
<td>Stand-alone Printers and Photocopiers</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>Risograph</td>
</tr>
<tr>
<td>Paid Staff Hours</td>
<td>76</td>
</tr>
<tr>
<td>Volunteers Hours (estimated)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.13 Key statistics from 2006 Census by Australian Bureau of Statistics: Rangemoore

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>%</th>
<th>Australian Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Population</td>
<td>1625</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Unemployed</td>
<td>40</td>
<td>6</td>
<td>5.2%</td>
</tr>
<tr>
<td>Median Age</td>
<td>40</td>
<td>N/A</td>
<td>37</td>
</tr>
<tr>
<td>Individual Median Weekly Income</td>
<td>$360</td>
<td>N/A</td>
<td>$518</td>
</tr>
</tbody>
</table>

24 Figures pertaining to location have been rounded off to ensure confidentiality of responses. See Section 3.4.2.1.
The main sources of revenue for the CTC were the community newspaper and a Centrelink Access Point. Advertising from the 12 page newspaper contributed revenue that covers 1.5 staff positions while the Centrelink Access Point payment from the national government provided the remainder of the funds and roughly equating to one staffing position. In addition to wages, a significant cost to the CTC was rent. The premises were subleased from a local real estate agent for $600 per month. Even though this was below market rates this was nonetheless a significant cost for the CTC to meet. The assessment of the managers for future operations was judged to be comfortable.25

The centre had developed a niche printing capability that complimented the local printery. Ownership of a risograph suggested a serious capability in meeting the demands for the smaller print runs which the local printery was reluctant to take on for commercial reasons. Regular printing jobs included the weekly newspaper, the printing of flyers for upcoming cattle sales and the printing of business cards. Other notable projects that were undertaken on the risograph included the printing of a novel by a local teenager and the publication of a book recording the town’s history. The staff formatted both publications using publishing software for printing. The CTC normally charged desktop publishing services at $30 per hour. In some cases, staff donated some of their time and expertise for no charge, as was the case with the teenage novelist.

The CTC, as a designated Centrelink Access Point, was a place in which official forms were submitted. One important aspect of this service was that people who received government benefits for unemployment could submit information to ensure they continued receiving payments. Benefit recipients were required by the national government to provide a written account of their job seeking activity every fortnight. This information was submitted on a form that was then sent by facsimile transmission to a regional Centrelink office for processing.

The CTC provided a range of other services that responded to the needs of local business. This included secretarial help as well as photocopying, scanning and faxing services. The proximity of the CTC to cattle saleyards meant that the nature of such

25 Managers were asked to nominate three choices about the future viability of their CTC: precarious; vulnerable; and comfortable. See Appendix B.1.3 for more detail.
business activity was transitory requiring short notice access to secretarial expertise and ICTs, which the CTC was able to provide.

The staff reported that there was an ongoing expression of interest by customers for ICT training at the CTC. The recent demise of the local adult training business had resulted in increased requests for training. Interest in the CTC had been fuelled by the occasional offer of free training courses at the CTC provided on behalf of the CTCA. These training courses were funded by the NSW Department of Community Services and were designed to provide ICT exposure to two target groups – seniors and youth. The small business expertise of both managers was apparent as they deliberated about the financial feasibility of developing evening classes for ICT training. Potential class sizes and the need to heat premises on cold winter evenings were initially presented as important factors to be considered. Another indication of their disciplined approach to financial management was evident in a recent decision by the management committee to replace two of the older computers. The purchase of these two new computers, that were capable of displaying the latest games software, was financed by funds which had been set aside to replace ageing equipment. This was one of the few examples of the proper application of depreciation deductions found in the 17 cases.

Some examples of the engagement that the CTC had with the broader community were reflected in the inclusion of weekly school newsletter into the newspaper free of charge. The hosting of a high school student on the school-to-work program represents another example of the managers’ willingness to assist the local high school in its endeavours to provide meaningful learning opportunities for all of its students. Other indications of positive social engagement that the CTC had with the local community can be seen in the decision to provide photo opportunities with Santa Claus the previous Christmas. This idea was tried so that local parents and children were not required to travel to the local regional centre for Santa photos. This had the added benefit of improving the profile of the CTC in the community to those who were unaware of its existence. Another example of positive social engagement previously mentioned was the assistance provided to the teenage novelist and the local historian.
Other indications of the kind of engagement the CTC has had with the broader community can be seen in the numbers who used the CTC. Figures provided to the CTCA in the 2007-2008 CTCA Membership Returns indicated that an estimated 500 people used the CTC each week. The two staff members reported that mainly younger people used the CTC. Some came to the CTC to undertake homework tasks. The children of families who live outside of town often used the CTC to complete homework while their parents undertook weekly grocery shopping. Those who had left school and were not working were attracted to the place to interact with other young people when they come to check emails or to use e-Bay. There were those who came to submit forms for Centrelink as part of the requirements to continue receiving unemployment benefits.

Customer surveys indicate that the CTC met a range of ICT-related needs in the community. Fifteen people responded to the survey. All but one respondent were local to the town. The average age of respondents was 25 years. On the basis of gender, 11 females (average age 24 years) completed the survey compared to four males (average age 30 years).

The use of applications and technologies within the CTC is summarised in Table 5.14. It can be seen that the survey responses supported the manager’s assessment that email was the primary attraction for customers with an estimated 68 uses per month. Word Processing was the next most popular application accessed by customers estimated at approximately 39 times per month. Other popular applications were facsimile and Online Chat. It is noteworthy that the younger average age of respondents provides a possible explanation for the high number of people who nominated Online Chat. It is also apparent that frequent attendees to the CTC can boost the apparent popularity of applications. For example, case study accounts reveals that even though seven people indicated never having used Photograph Enhancement or Printing Software, those who did visited the CTC more often thereby increasing its usage rate to about 30 times per month.

The respondents indicated a variety of reasons for their visit to the CTC on the day they completed the survey (see
Table 5.15. Once again email access was represented strongly. Other reasons included eBay, research and school assignments, and to place an advertisement in the newspaper. It is apparent that people used the CTC’s facilities for a diverse range of purposes.

Table 5.14 Use of software and devices at Rangemoore CTC

<table>
<thead>
<tr>
<th>Software Application or Devices (N= 15)</th>
<th>Accessed per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>68</td>
</tr>
<tr>
<td>Word Processing</td>
<td>39</td>
</tr>
<tr>
<td>Fax Machine</td>
<td>34</td>
</tr>
<tr>
<td>Online Chat</td>
<td>30</td>
</tr>
<tr>
<td>Photograph Enhancement or Printing</td>
<td>30</td>
</tr>
<tr>
<td>Video Audio Editing</td>
<td>20</td>
</tr>
<tr>
<td>Scanner</td>
<td>18</td>
</tr>
<tr>
<td>Webpage Design</td>
<td>9</td>
</tr>
<tr>
<td>Games</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 5.15 Motivation to use Rangemoore CTC

<table>
<thead>
<tr>
<th>Reason for visit today…</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>5</td>
</tr>
<tr>
<td>Internet</td>
<td>2</td>
</tr>
<tr>
<td>eBay</td>
<td>2</td>
</tr>
<tr>
<td>Research</td>
<td>2</td>
</tr>
<tr>
<td>Do assignments</td>
<td>1</td>
</tr>
<tr>
<td>Place ad in newspaper</td>
<td>2</td>
</tr>
<tr>
<td>Work</td>
<td>1</td>
</tr>
</tbody>
</table>
Customers were also asked to nominate three things they would miss most should the CTC close down. In line with responses to this question at Parkdale, social contact was rated highly (the highest in this instance) indicating that ICT access was linked to social needs (Table 5.16). The results from the customer survey suggest that the absence of volunteers should not be construed as indicating poor social engagement of the CTC with the community. It can be seen that access to computers, the Internet and email were prominent in respondent’s minds. Notably, training and informal advice seeking about ICTs, a feature of Parkdale’s account, does not figure prominently in these responses. The manager’s identification of demand for training (as reported earlier in this section) is consistent with this finding.

<table>
<thead>
<tr>
<th>Three most valued CTC services nominated by respondents (n= 15)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Interaction</td>
<td>14</td>
</tr>
<tr>
<td>Office Services (printing, faxing, copying, secretarial services, etc)</td>
<td>9</td>
</tr>
<tr>
<td>Internet/broadband</td>
<td>8</td>
</tr>
<tr>
<td>Email</td>
<td>7</td>
</tr>
<tr>
<td>Multimedia (Newspaper)</td>
<td>3</td>
</tr>
<tr>
<td>Computer Access (e.g. word processing)</td>
<td>3</td>
</tr>
<tr>
<td>ebanking</td>
<td>1</td>
</tr>
</tbody>
</table>

The open-ended responses obtained from customers at the conclusion of the survey were positive (see Table 5.17). These customers saw the CTC as a valuable resource for the local community that was also enjoyable to visit. Notably the opportunity to make negative comments was not taken up by respondents.
This is a valued service to [the local community].
Staff are helpful and they offer friendly service.
A great place.
Good for locals and staff are friendly.
Love [this] CTC.
Staff are resourceful, helpful, friendly and willing to help.

5.3.2 The complexity of Rangemoore CTC

The early history of the CTC explains a number of features of this CTC, one of them being the absence of volunteers. The managers stated that the management of volunteers represented an overhead that was time consuming and stressful. In most part, this was the experience of CTC management during the data entry work they carried out for a company specialising in surveying denominations of the Christian church in Australia. Established originally as a telecentre in 1992, the history of this CTC precedes the NSW CTC Program by eight years. The commercial returns that the data entry work generated became a model of development that fledgling CTCs were encouraged to emulate.26

As this kind of activity was no longer pursued by the CTC it was interesting to gain an insight into this venture. One of the staff members who had participated in the data-entry venture negatively characterised this activity. The boring nature of data entry work created two significant challenges. The first related to on-going quality assurance in relation to the accuracy of data that was entered. This was in part related to the second challenge of managing volunteers who were not bound by the normal requirements of paid employment. While volunteers were motivated to participate for the greater good of the community it was found that there were limits to their generosity; particularly when the work was mundane. The CTC was formerly housed in a disused school building that was owned by the local government. Local government also paid for broadband and electricity expenses. Despite the close connection that the CTC had with local government the relationship with local government was now strictly

26As one example of this the researcher was told by the chairperson of the Parkdale CTC management committee that consideration had been given to emulating Rangemoore’s example by performing data entry work for a university research project.
commercial. Despite the apparent benefits of deriving subsidies from local government, both managers are happy to be fully independent. One reason relates to the freedom they have to rent premises in the centre of town (the former location was some way out of town). This independence also frees them from competitive neutrality provisions which would prevent them from competing with businesses in the private sector.

The ideal of full commercial independence envisaged in the NSW CTC Program (see Section 2.2.1) is evident in this case. It is probable that the better economic conditions, compared to Parkdale, contribute to its commercial viability. As one example the individual median income of Rangemoore of $360 (see Table 5.12) is higher than that of Parkdale, which was $275 (Table 5.5). Rangemoore CTC has been better able than Parkdale to commercialise the provision of information to the community through the popularity of its newspaper. The achievement of commercial independence has been possible while maintaining a friendly atmosphere that encourages people to visit and socialise but not to perform duties for the CTC. It is noteworthy that the group-based problem solving activities of the previous case study are largely absent in this case.

5.3.3 In search of a credible framework for understanding diversity (RQ4)

5.3.3.1 Application of the four Analytical Constructs to the case

The thesis proceeds to apply the same four Analytical Constructs that were used to investigate the previous case study of Parkdale. This will enable similarities and contrasts to be noted so that assessments can be made about the utility of Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. It also allows the thesis to show that this example is able to derive its revenue from knowledge-creating activities that are best described in terms of Combination.

On first impressions, Rangemoore CTC appears to be a relatively straightforward affair compared to the diversity of activities found in the case study accounts of Parkdale. The descriptions of Rangemoore CTC indicate a commercially-sound business operation that does not require or desire the support of volunteers. Closer scrutiny indicates that engagement with the broader community does exist but not in the same manner as at Parkdale. Rather than programs that engage groups within the CTC, this CTC’s engagement with the community is via its newspaper and Centrelink Access Point.
Accordingly, the two initiatives that are subject to the application of the Analytical Constructs are:

the Community Newspaper; and

the Centrelink Form Collection Service.

Community Newspaper

The application of Nonaka and Takeuchi’s Analytical Constructs to the example of the Community Newspaper reveals a number of interesting insights. The three CTC staff worked Monday to Tuesday to put together the paper. The staff relied on community members to provide stories and pictures to supplement their own information gathering and story writing for the paper. People brought media releases and advertising, comprised of text, pictures and graphics, for publication.

Paradox

In addressing the first Analytical Construct of Paradox one is challenged by specifying ‘insufficient and inconsistent knowledge’ that the guide question for paradox requests (see Table 5.1 question 1). Specifying the paradox that motivates the production of the newspaper was complicated by the diverse needs the paper sought to satisfy. This was reflected in the items that were found in the paper. For example, the edition of the paper on sale during the researcher’s visit contained stories of local interest, publication of the local public school’s newsletter, sports results and advertisements relating to local products and services. Each of these items could be considered a paradox in that each represents an area of insufficient or inconsistent knowledge. For the time being the thesis will group these diverse knowledge needs under the broad description of the ‘community’s need for local and timely information’.

Epistemology

Moving on to the Analytical Construct of Epistemology the first part of the SECI model relates to Socialisation. Consideration of Socialisation draws attention to the one-to-one interaction that occurs between individuals (see Table 5.1 question 2.1). The most obvious evidence of Socialisation can be seen when staff members interacted with each other during the production of the newspaper on Monday and Tuesday. One can also reason that Socialisation would also be relevant to the thinking that goes behind the creation of advertisements and media releases outside of the CTC
although it is also possible that individuals would be capable of developing an advertisement or media release without one-to-one interaction if the task was straightforward.

More obvious indications of knowledge activities as defined by the SECI model were those that pertained to **Externalisation**. The guide question for Externalisation asks whether any of the observed activities can be viewed in terms of tacit knowledge being made explicit (see Table 5.1 question 2.2). Externalisation is evident in the media items submitted for publication. These may have been produced within the CTC or brought to the CTC by members of the community. In both cases, personal tacit knowledge of writers is made explicit in the stories and media releases, advertising and other items that are presented to the CTC for publication. These items are delineated by information containing text, pictures and graphics.

The most obvious indication of knowledge creation related to **Combination** is where newspaper items were edited and combined into the weekly edition of the newspaper. The guide question for Combination asks whether any of the observed activities can be understood in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond (see Table 5.1 question 2.3). It is possible to associate Combination with the production of the newspaper which involves combining various media items into an appealing layout, editing stories to satisfy size constraints, and ensuring information is checked for accuracy. The subsequent publication of the newspaper is the means by which information is networked to the community.

The purchase of the paper by local community members is an indication that the explicit knowledge contained in the paper is internalised (see Table 5.1 question 2.4). To that end, the **Internalisation** aspect of the SECI model comes into play. While not directly apparent in the research accounts it is reasonable to assume that people read the paper to assist in making decisions about how to order their lives. The thesis cites the ongoing demand for the paper as evidence of Internalisation.

Table 5.18 provides a summary of activities associated with the community newspaper.
<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The community’s need for local and timely information</td>
</tr>
<tr>
<td>Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td></td>
<td>Staff interact on a one-one basis in the production of the newspaper</td>
</tr>
<tr>
<td></td>
<td>Individuals within the community are reasoned to interact with other when generating items for the newspaper</td>
</tr>
<tr>
<td>Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td></td>
<td>Production of advertisements, media releases, letters to the editors, news items of local significance</td>
</tr>
<tr>
<td>Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td></td>
<td>Newspaper production on Monday and Tuesday. Collating stories and using MS Publisher to edit and integrate stories. The newspaper represents tangible evidence of knowledge creation.</td>
</tr>
<tr>
<td>Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td></td>
<td>Ongoing demand for the newspaper as reflected in weekly sales indicates information needs of readership are being addressed.</td>
</tr>
<tr>
<td></td>
<td>Discussion by community members is reasoned to occur about issues of common interest raised in the paper.</td>
</tr>
</tbody>
</table>

**Ontology** It can be seen that the example of the Community Newspaper initiative introduces new perspectives to the understanding of Ontology (see Table 5.1 question 3). Rather than being confined to knowledge creation within the CTC it can be seen that the scale of knowledge creation is community wide (see Figure 5.5). One can see that the newspaper enables the involvement of individuals and groups outside of the organisational boundaries of the CTC to create and contribute knowledge to the newspaper. The diffusion of this knowledge to the community is enabled through the distribution of the newspaper. The CTC, as the publisher of the paper can be seen to play an important role as it mediates this process by executing its editorial responsibilities and arranging for the printing of papers. These qualifications have been noted in Figure 5.5 by indicating the involvement of individuals and groups outside of
the CTC in the creation of new knowledge. The assumption that all knowledge creation occurs within the CTC does not hold in this example.

Figure 5.5 Application of the construct of Ontology to the Community Newspaper

**Knowledge Spiral** The fourth Analytical Construct, the Knowledge Spiral, is now considered (see Table 5.1 question 4). In considering the interaction between Paradox, Epistemology and Ontology one can see that the newspaper is an effective means by which to diffuse knowledge throughout the community. Nonaka and Takeuchi describe this function in terms of ‘amplifying’ new knowledge. It is possible to see that codification of such knowledge as seen in the finished newspaper makes an increase in the Ontology dimension possible. Certainly one can see that the purchase of the newspaper by many people reflects an increase in the scale of Ontology. Thus, one can see that epistemological and ontological elements of the newspaper work in a coherent way.

The circularity of the Knowledge Spiral is apparent in the ordered activities that lead up to the publication of the newspaper and its subsequent distribution. The process of Externalisation (for example, writing articles) clearly leads to Combination (for example, editing the whole paper), which, in turn, leads to distribution and presumed Internalisation of such information by community members. It is also possible to see that the one-to-one interaction between CTC staff in the production of the newspaper constitutes Socialisation. However, it is less straightforward to define a role for Socialisation outside of the CTC. For example, the study assumed that individuals in the community interacted with others as they developed items for the paper. On the other hand, it may be within the capabilities of an individual to do this without the need for the one-to-one interaction that Socialisation describes.
It is also reasonable to assume that stories and advertisements that appear in the paper will inform community members about the timing of upcoming events in community. Alternatively, such stories may become the basis for conversation between individuals, which, in turn, may lead to new insights, and new knowledge. For example, news of anti-social behaviour by members of the community in the ‘Thumbs Up, Thumbs Down’ column could form the basis of ongoing discussion in the community. It can be seen that the paper performs an important role in facilitating discussion to resolve such problems. Messages from police and community leaders were communicated to the community at large while individuals were able to contribute to public discourse through letters to the editor. It is apparent that such interaction facilitated by the newspaper is akin to Socialisation thereby fuelling further knowledge creation within the broader community.

Thus, evidence of knowledge creation can be found in the publication of the community newspaper. In support of this observation the physical movement of people to the common point of the CTC to provide information for the paper, the subsequent activities that lead to the newspapers publication and its dissemination to the public indicate that such knowledge creation is important and relevant to many people in the local community.

**Centrelink Form Collection Service**

The second initiative investigated in this case is the form collection service that the CTC performed for the government agency, Centrelink. The significance of this initiative in terms of knowledge creation may not be immediately apparent. However, it is possible to apply the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory to better understand the significance of this initiative in the broader context of knowledge creation.

**Paradox** The paradox that can be determined in relation to this initiative is one where Centrelink required information about a person’s job seeking activity over the previous fortnight (see Table 5.1question 1). As explained previously (see Section 5.3.1), unemployed people who received benefits from government were required to list their personal details and report on their job search and training activities in the previous
fortnight. The payment of unemployment benefits was dependent on satisfactory reporting of these conditions. Hence this knowledge of people’s activities is consistent with the understanding of paradox being a situation in which ‘inadequate or insufficient knowledge exists’.

**Epistemology** The one-to-one interaction associated with the SECI concept of **Socialisation** was not observed nor reasoned to be a normal part of this initiative (see Table 5.1 question 2.1). This is consistent with the paradox that motivates this activity where information about the job seeking activities of individuals is relatively straightforward and does not require people to undertake the one-to-one kind of interaction characteristic of Socialisation.

The need for people to document their job seeking activities over the previous fortnight is relevant to the concept of **Externalisation** where the personal knowledge of the benefit recipient about their job-seeking activities or training activities is made explicit (see Table 5.1 question 2.2). The guide question for Externalisation describes knowledge creation in terms of a conversion from tacit to explicit knowledge through a number of methods (analogies, metaphors, models, dialogue, text or diagrams). In this case, the use of text to make such knowledge explicit is given effect through the completion of the Centrelink form.

The bringing together of this explicit knowledge with personal details and other information in the relevant Centrelink form is consistent with the descriptions associated with **Combination** (see Table 5.1 question 2.3). Combination is where explicit knowledge is combined to create new knowledge for the purposes of networking. Accordingly, the completed form represents new knowledge that is used to determine whether the benefit recipient is entitled to further payments.

It is apparent that this explicit knowledge needs to be processed by departmental officials in a way that enables benefit receivers to continue receiving their allowance. The submission of the form at the CTC and is subsequent transmission through facsimile machine to the central Centrelink office enables a process of **Internalisation** to occur (see Table 5.1 question 2.4). Since this process is absent in the case study accounts it is presumed that a bureaucrat within Centrelink in reviewing the information
must internalise this as tacit knowledge in order to make a decision about further payments.

The activities of this initiative have been summarised in Table 5.19. The absence of activities in the Socialisation category is consistent with the paradox which does not require or encourage knowledge creation through the one-to-one interaction characteristic of Socialisation.

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Government’s need to obtain information about benefit recipients’ job search activities</td>
</tr>
<tr>
<td>Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td></td>
<td>Not apparent in this example</td>
</tr>
<tr>
<td>Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td></td>
<td>Codify job search activities</td>
</tr>
<tr>
<td>Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td></td>
<td>Combine record of job search activities with dates and other personal details</td>
</tr>
<tr>
<td>Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td></td>
<td>Formatted information is recorded within government database and subsequently used by government bureaucrat to decide whether further benefit payments will be made</td>
</tr>
</tbody>
</table>

**Ontology** In relation to the Analytical Construct of Ontology it can be seen that the CTC is an intermediary to the transfer of knowledge between benefit recipients and Centrelink (see Figure 5.6). Staff members of the CTC play an important role in ensuring that this transfer of knowledge takes place but do not participate in the creation of additional information. The codification of job seeking activities in a government database enables distribution and potential Internalisation to any number of authorised government officers. Increased scale on the Ontology dimension can be understood to
occur. In much the same way that the Community Newspaper facilitates the creation of knowledge outside the CTC, the Form Collection Service similarly emphasises the role of the CTC as an intermediary in the distribution of knowledge to relevant government officials who are located outside the immediate community.

**Knowledge Spiral** Evidence of knowledge creation can be seen in the completed form that contains the list of activities that individuals have undertaken to improve their chances of gaining employment (see Table 5.1 question 4). The Externalisation of this personal knowledge through codification in a standard form is suitable for facsimile transmission and storage in a government database. This indicates the propensity of explicit knowledge to facilitate the networking of new knowledge.

Evidence indicates that the Knowledge Spiral is affected by the absence of Socialisation activities even though the other epistemological activities of Externalisation, Combination and Internalisation are apparent (see Figure 5.7). The absence of Socialisation can be related to the degree of difficulty associated with generating new knowledge. In this initiative the degree of difficulty in creating new knowledge is trivial even though such knowledge is important to the administration of benefit payments by government. Hence the absence of Socialisation appears consistent with the relative simplicity of the task.
The discussion moves on to address the question whether the application of the four Analytical Constructs deliver credible insights about the two initiatives just described, namely the Community Newspaper and Centrelink Form Collection Service. It begins with the Analytical Construct of Paradox where the two initiatives identified situations in which inadequate or insufficient knowledge exist. Even though the newspaper was found to respond to a variety of needs, these were identifiable as the community’s need for relevant and timely information. The Centrelink Form Collection Service initiative, on the other hand, can be related to the need for government to know the activities of job seekers to enable further payment of benefits.

The application of the second Analytical Construct of Epistemology to the two initiatives revealed that it was not always possible to associate activities with all parts of the SECI model. In relation to the Centrelink Form Collection Service evidence of the absence of Socialisation was found to be consistent with the nature of the paradox. The varying need for Socialisation in the example of the Community Newspaper suggested that the need for Socialisation activities varied from activity to activity within this initiative.

Closer scrutiny of the paradox in terms of the relative level of uncertainty yields an explanation as to why Socialisation may be a strong feature in some initiatives and less
noticeable or absent in others. It appears that in cases where the need for knowledge is less complex - such as the example with the Centrelink Form Collection Service - the need for Socialisation is lessened. It was also apparent in the Community Newspaper initiative that some items for publication were associated with Socialisation while others were not. Arriving at a decision about the sale of an impending cattle sale date was ostensibly less complex than news of an intractable social problem. As a consequence the nature of the specific paradox under scrutiny appears to make varying demands for Socialisation-related activities.

This contention is also given support by reflecting on the Community Engagement Program in Parkdale (see Section 5.2) where problems, in which higher levels of uncertainty existed, appeared to be in greatest need of the synthesis of new knowledge that comes through Socialisation. The goal of encouraging new modes of behaviour in order to address the five priority areas of the Community Engagement Program was a complex project. These new modes of behaviour were qualitatively new for many individuals and the group-based interaction that occurred in the CTC was seen to crystallise new ways of thinking in order to transcend current modes of behaviour. Hence, the need for socialised interaction which leads to new modes of thinking (that is Externalisation) is heightened by the uncertainty associated with the complex nature of problems that were addressed by the Community Engagement Program.

In distinguishing between varying levels of uncertainty the thesis is able to draw support from the literature. For example Management Information Systems (MIS) theorists Compaine and McLaughlin (1986, pp. 12-15) argue that a primary dilemma for managers in establishing reliable sources of information is that insufficient and contradictory information makes decision making difficult. They describe insufficient information on the basis of either ‘known unknowns’ or ‘unknown unknowns’. The former term refers to situations in which managers are able to predict areas of knowledge they require. The latter term is more uncertain because it is not possible to identify what knowledge is required in advance. Innovation management theorist Macdonald (1998, pp. 14-15) expresses a similar idea in terms of defining one’s ignorance. Those who are able to define their area of knowledge need are able to articulate a question – those who cannot, struggle to do so. The qualitative distinction
described by Compaine and McLaughlin, and Macdonald is useful for making a similar distinction in the paradoxes found in the initiatives to this point.

Figure 5.8 portrays varying levels of uncertainty. In placing the example of the Community Engagement Program at the right-hand end of the horizontal axis the diagram is able to illustrate the higher level of uncertainty associated with the paradox that this initiative addresses. The Centrelink Form Collection initiative at the left-hand end of the axis is intended to indicate greater certainty in that the required information for this paradox can be more readily described in advance. Given the broad range of knowledge needs that the Community Newspaper serves it does not make sense to indicate a single point of uncertainty. Rather, a range of uncertainty is indicated because the newspaper addresses a range of problem types from the trivial (that is, time and location of next cattle sale) to the complex (youth boredom). Thus, it appears that uncertainty represents one important factor that explains the need for Socialisation when considering initiatives within the CTC.

The two initiatives of this case study also provide interesting insights when the Analytical Construct of Ontology is applied. Firstly, the dissemination of the newspaper to the community provides an interesting example of the concept of increasing ontological scale. Rather than limiting the scale of analysis to activities within the CTC it can be seen that the CTC, as an organisation, is an actor in knowledge processes that are community-wide. Similar issues were found in relation to the Centrelink Form Collection Service where the CTC played an intermediary role in ensuring benefit

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27 To the extent that the Community Newspaper is able to respond to these different paradoxes indicates the flexibility of the medium. It is noteworthy that the newspaper competes well with rival multimedia on the Internet and mobile telephony.
recipients in the community were able to transfer information about their job seeking activities to Centrelink. In this case it is also necessary to remember that individual benefit recipients were outside the organisational confines of the CTC.

Secondly, these two initiatives were also useful in identifying individuals and groups beyond the immediate community who were found to play a part in the knowledge creation process. In line with findings of the Community Engagement Program at Parkdale, the example of the Centrelink Form Collection Service revealed that bureaucrats in Centrelink who lived outside the immediate community played a role in authorising further benefit payments. Figure 5.9 depicts this insight by including knowledge creation outside the CTC and knowledge creation beyond the community.

Consideration of the final Analytical Construct of the Knowledge Spiral is effected by the qualifications just made in relation to Epistemology and Ontology. Broadly speaking one can still perceive coherence between observations derived from the guide questions that relate to Epistemology and those for Ontology. It is clear that making knowledge explicit through codification enables more people to gain access and use this knowledge. Accordingly, the amplification that Nonaka and Takeuchi describe as occurring as part of the Knowledge Spiral is apparent in these two examples. Despite the qualifications noted in relation to Epistemology, where Socialisation was not always relevant to the knowledge creating needs of individuals, it is still possible to see increasing numbers of people gaining access to such knowledge. In the case of the Community Newspaper initiative, the spiral effect can be seen in the way people use information from the newspaper to order their lives and perhaps develop new

Figure 5.9 Use of the Ontology construct to highlight knowledge creation outside of CTC
knowledge in conjunction with others about complex social problems. In the example of the Centrelink Form Collection Service, the spiral appears to ‘finish’ once the bureaucrat from Centrelink makes a determination about eligibility of the individual for future benefit payments.

The application of the four Analytical Constructs enables a number of contrasts to be made. The complexity of the paradox in relation to Socialisation-related activities appears to be a credible qualification. The change of focus from CTC-centred knowledge creation processes to one that factors in community-wide knowledge creation processes also appears as a credible qualification as a result of the application of the Analytical Constructs.

The issue of sequencing of SECI activities, evident in the analysis of the Community Engagement Program in Parkdale, did not emerge as an issue in either of the initiatives studied in Rangemoore. In relation to the Community Newspaper, the activities listed in Table 5.18 appear to occur in the order listed in the SECI model and were determined by the weekly production cycle for the newspaper. The Centrelink Form Collection initiative also appears to occur in an ordered fortnightly cycle except that Socialisation was absent (Table 5.19). Hence the concerns developed about the lack of ordering of SECI activities in the analysis of the Community Engagement program in Parkdale are not strongly echoed in the analysis for Rangemoore.

In summary, the analysis is able to deliver credible insights based on the application of the four Analytical Constructs. The absence of Socialisation from the Centrelink Form Collection initiative is consistent with the relative simplicity of the knowledge creating task. Hence, this is a notable contrast to a normative understanding of Nonaka and Takeuchi’s Knowledge Creating Theory that identifies Socialisation as the starting point of the Knowledge Spiral. If the task is simple it follows that Socialisation is not a necessity for knowledge creation to occur. A similar line of thinking can also be applied to the creation of some items in the Community Newspaper where the decision to stage a cattle sale may be a routine decision for somebody just prior to submitting the advertisement in the paper. Once again, the need for knowledge creation that transcends current understanding to develop new concepts through Socialisation is not necessary.
The other notable difference that the analysis delivers is that knowledge creating processes need not be limited to within the CTC. This case provides examples where the CTC plays a key role in a community-wide knowledge process facilitated by the Community Newspaper. A similar argument can be mounted in relation to the Centrelink Form Collection Service.

In conclusion, the efficacy of the analysis using the four Analytical Constructs to explain differences between the case study accounts and a normative understanding of Nonaka and Takeuchi’s Knowledge Creating Theory is further indication that these Analytical Constructs can be used as a credible framework for understanding diversity within and between case studies.

5.3.3.2 Are conditions in Rangemoore CTC conducive to knowledge creation?

Having established that the two initiatives and their constituent activities can be understood using the four Analytical Constructs, the thesis moves on to consider the five Enabling Conditions, as described by the associated guide questions in Table 5.2.

**Intentions: are staff and volunteers willing to contribute to making a CTC a better place?**

It was not possible to consider the role of volunteers in this case because the CTC does not employ volunteers. The attitudes of the managers reflect a desire to serve the needs of the community, albeit with a keen eye on containing costs. The two initiatives chosen for analysis demonstrate examples where it is possible to serve the needs of the local community on a commercial basis. The not-for-profit status of the CTC reinforces this idea by establishing community service rather than profit as the primary rationale for commercial activity. There was also some indication that the managers wished to broaden the services they provided to include training. Consideration of future CTC-managed training courses in response to increased public interest following the demise of the local adult training provider suggests a willingness to make the CTC responsive to community needs. Customer surveys also reported very high levels of satisfaction with the friendly atmosphere of the CTC.

**Autonomy: do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?**

Evidence of
autonomy can be seen in the desire to maintain the CTC’s commercial independence. Steps were taken some time ago to separate the CTC from local government and there is no intention for these steps to be re-traced. Autonomy provides the managers and the management committee the freedom to consider alternative strategies such as the development of training courses. However, it is apparent that the freedom to pursue these strategies is limited by the oversight of the management committee who maintain close scrutiny over the CTC’s expenditure and activities. Besides the stated intention to develop training courses and the assistance provided to the teenage novelist and historian, there was no evidence of active experimentation with new ideas involving groups in the CTC.

**Fluctuations and Creative Chaos: do changing conditions within the CTC or external environment lead to knowledge creation?** The hurly-burly activity found in of Parkdale was markedly absent in this CTC. The absence of volunteers and their participation in the management of the CTC leaves minimal room for community engagement beyond the use of CTC facilities to conduct private affairs such as checking emails. The fact that the future outlook for the CTC is comfortable removes another significant incentive for problem solving in that the current business model is working well. There is little sense of crisis and, accordingly, little reason to change the status quo.

**Redundant Information: are there a variety of information sources that go beyond the immediate operational requirements of the CTC?** The absence of volunteers and the reliance on just the three staff to manage the CTC means that diversity of information sources is more limited than noted at Parkdale CTC. This is ameliorated to some extent by the diversity of expertise on the management committee which included professionals with backgrounds in business and tertiary education. However, as none of the management committee were involved in the CTC on a daily basis, their influence over daily activities, especially when developing new ideas, was limited to the kind of decisions that saw the approval for purchase of new high-end capability computers for games software.
Requisite Variety: Is there a diversity of expertise that mirrors the external environment? The small business backgrounds of the managers enable good representation of local knowledge. As mentioned above, the absence of volunteer involvement in the management of the CTC reduces opportunities for increasing the variety of information sources available to the CTC even though there is some diversity of expertise on the management committee.

Discussion: do the five Enabling Conditions provide a credible framework for understanding initiatives in Rangemoore CTC?

In summary, Enabling Conditions for knowledge creation appear less fertile to knowledge creation than in Parkdale CTC. This CTC is not required to auspice the kind of problem solving that Parkdale CTC does. This is consistent with the observation that group-based interaction within Rangemoore CTC is also absent from the accounts of this case study. The customer surveys indicate social interaction within the CTC where the friendly atmosphere is conducive to people’s positive comments about the CTC. However, there is little to suggest that these social activities lead to the kind of interaction that Nonaka and Takeuchi describe as Socialisation. While the CTC can be identified as a source from which new ideas spring by virtue of the role it plays as a newspaper publisher, knowledge creation is markedly less complex than Parkdale and this stems from the nature of problems that the CTC seeks to address.

5.3.4 Linking social enterprise with income in Rangemoore CTC (RQ5)

The discussion now addresses the research goal of the thesis which is to theorise about maintaining the success of CTCs in contexts of poor income generation. In the case of Rangemoore it can be seen that the success of the CTC as a social enterprise is partly based on its function as the publisher of the community newspaper. The application of the construct of Ontology reveals that the newspaper enjoys support from within the community by individuals and groups alike. This is fundamental to the ability of the CTC to derive income from the newspaper by way of advertising. Hence, the success of the CTC as a social enterprise is founded on its role in providing a socially valuable service, which, in this case, generates revenue for the CTC as a commercially viable business.
Delving into why the newspaper was able to generate sufficient levels of revenue in ways that were not possible for the Community Engagement Program at Parkdale CTC it can be seen that the nature of knowledge creation is qualitatively different. While the Community Engagement Program reveals activities best described by the SECI concept of Externalisation, the Community Newspaper initiative is characterised by Combination. Given that Combination describes the transformation of explicit knowledge ‘parts’ that are combined into explicit knowledge as a finished product the significance of the newspaper-as-explicit knowledge is two fold. The first is the ease by which the newspaper can be distributed to the community. Distribution mechanisms for the newspaper are well established and relatively simple to follow. Papers are available from a number of set locations around town and people are able to obtain a free copy. The second is that its status as explicit knowledge means that it is readily codified, packaged, copied, transferred and, ultimately, commoditised for revenue generation.

A similar line of reasoning can also be applied to the Centrelink Form Collection Service initiative. The process of Externalisation leads to explicit knowledge about the activities of benefit recipients, which is combined, with other identifying details. The completed form represents the product of Combination, which once again is amenable to networking within the Centrelink organisation. The ability to count each submitted form assists in tallying form transmittals thereby enabling an objective assessment of the value that this service provides to Centrelink. Using a similar line of reasoning to the Community Newspaper initiative, the completed form as explicit knowledge is readily packaged, copied, transferred and, ultimately, commoditised for revenue generation.

In summary, the analysis of these two initiatives suggests that activities that emphasise Combination appear more amenable to revenue generation. The propensity for explicit knowledge to be made separate and observable in an artefact such as a newspaper or an official form stands in contrast to the outcomes of knowledge creation of the Community Engagement Program where progress is observed through changed behaviours. In order to better define such knowledge creating activities the analysis points to the distinctions drawn between explicit and tacit knowledge. It appears that the potential for revenue generation increases when knowledge-creating activities are based on explicit knowledge, because the newspaper and the designated Centrelink form
(explicit knowledge) are more readily perceived by people as a distinct entity that can be commoditised.

That is not to say that other aspects of the SECI model are not important as it can be seen that Combination relies on other complementary processes as summarised in Table 5.18 and Table 5.19. The CTC at Rangemoore sits within a lucrative part of a value chain that generates and delivers explicit knowledge to the community. It can be seen that the CTC is not required to involve itself in the expensive and uncertain activities associated with generating tacit knowledge and making it explicit through Externalisation as seen in the Community Engagement Program in Parkdale. Rather the CTC at Rangemoore is able to simultaneously promote positive social outcomes for the community and generate revenue.

5.3.5 ICT use and knowledge creation in Rangemoore CTC (RQ6).

The thesis moves on to consider the different ways ICTs are used and their potential connection with knowledge creation. This information is used to reflect on Community Informatics (CI) research to address the themes of complexity, effective use and sustainability (see Section 3.2.2).

ICT use as reflected in the interviews with managers revealed that word processing and publishing applications were commonly used. This is consistent with the business model in which the CTC had developed a niche capability in newspaper production, publication of texts, and small-scale printing using the risograph. As there is an alignment between ICT use and the current business model it is possible to take the additional step of linking ICT use to the Analytical Construct of Epistemology. The use of publishing software is consistent with Combination where various pieces of explicit knowledge were combined to create a finished product (newspaper, book, newsletter, business cards and so on).

Curiously, the form collection service relied on more traditional forms of ICTs namely pen and paper prior to it being transmitted by the CTC to Centrelink by facsimile. (Benefit recipients also had the option of using a computer and printer to generate this form). The use of pen and paper to codify their personal knowledge of job-seeking
activities is consistent with Externalisation. Adding other identifying information such as name and address is consistent with Combination. The transmittal of the completed form to Centrelink by facsimile is also consistent with Combination where explicit knowledge is found to be amenable to networking.

In seeking to explain ICT use by customers, the customer surveys revealed a number of interesting similarities with Parkdale CTC. Once again, the maintenance of social relationships is represented strongly in the responses (see Table 5.16 and Table 5.17). As reported by the managers, the need for access to office services, also shown in Table 5.16, appears as another factor motivating the use of ICTs within the CTC. This was consistent with the demand for ad hoc business services to meet the needs of those staging cattle sales and associated activities. Like Parkdale, email was the most popular application nominated by customers followed by word processing (see Table 5.6). Other socially based applications such as online chat were represented strongly in customer responses. Online games can also be included as a socially based application as players often compete against each other.

Once again, it is possible to find support for the contention that ICT use can be linked to knowledge creation. In this case, the absence of organised group activity within the CTC means that ICTs are not overtly associated with the management and function of groups in the CTC. Instead, ICT use can be associated more explicitly with newspaper production, publication of texts, and small-scale printing using the risograph. In the case of the Centrelink Form Collection Service, the link with knowledge creation lies in the need for government bureaucrats to be aware of the activities of benefit holders in the previous fortnight. To that end, these initiatives provide clear linkages between ICT use and knowledge creation even if some ICT use may be considered rudimentary as demonstrated by the use of pens and paper.

Interestingly, ICTs have been used in Rangemoore to publish newspapers; a technology that has a long history in regional NSW (as well as the Western world). What is different in Rangemoore CTC (and other CTCs that have adopted this initiative) is that the means of newspaper production, once the provenance of trained typesetters and printers, has been made accessible to people who are competent in using ICTs. A
similar interpretation can also be applied to the Centrelink Form Collection Service where the local need for a government office to enable form submission and associated information provision has been outsourced by Centrelink to the CTC. Once again, the necessary skills for this task are largely dependent on the possession of ICT skills by CTC staff.

As a consequence the issue of complexity appears not to resonate as strongly with accounts of Rangemoore CTC as those from Parkdale CTC. While CI theorist de Moor (2009a) reflects that community processes are often ‘messy’, this does not emerge as a significant factor at Rangemoore CTC. Unlike Parkdale CTC, there is no evidence of group-based interaction within the CTC beyond the production of the newspaper. The elimination of volunteers and the management of the business on strictly commercial lines make for a well-ordered operation which is perhaps less fascinating from a human interest perspective.

Hence the effective use test of Community Informatics requires a different ontological perspective to that adopted for Parkdale where a community-wide assessment is required to reveal the benefits that the CTC’s Community Newspaper confers on the community. The Centrelink Form Collection Service is also of benefit to those who must submit forms but it appears that the greatest beneficiary here is the Australian taxpayer who benefits from the added efficiency that Centrelink achieves by outsourcing this function to the CTC.

On the question of sustainability, it appears that Rangemoore CTC is most confident in predicting its future viability. The analysis of research question RQ5 links the income flow to the CTC with the SECI process of Combination. While the commercial viability of the CTC appears to be strong there is a sense that the CTC is not well equipped to mobilise community resources should a significant local problem arise. Hence, the sustainability in relation to ongoing community support is questioned. This is hinted at in the deliberations about evening training courses. In the past, however, the CTC has been found to have responded to significant challenges and made significant changes to bring it to its current level of commercial sustainability. Hence, on the basis of past
experience it seems that the sustainability of Rangemoore CTC is consistent with the confidence its managers displayed about its future.

In summary, it is possible to link ICT use explicitly with knowledge creation within Rangemoore CTC. The response of the accounts to the CI themes of complexity, effective use and sustainability suggest that the relative order and commercial orientation of the CTC, while being of community benefit, lack some of the innovative endeavour that de Moor (2009a) and Stillman (2010) respectively associate with messy practice and unpredictable outcomes. Notably, customer surveys were overwhelmingly positive but reveal little about the learning opportunities or the contributions individuals are able to make to the community as a consequence of their involvement in the CTC. The characterisation of Rangemoore knowledge creation as being dominated by Combination provides a convenient means by which to understand the concept of sustainability as it applies to this case.

5.3.6 Reflecting on Rangemoore CTC

The initiatives analysed in this case have been purposely chosen to illustrate knowledge creation in a commercial context. The analysis in this case study broadly portrayed such knowledge creation in terms of the SECI process of Combination. The commercial impetus for newspaper production is reflected in the relative affluence of the town as suggested by the analysis of census information in Section 5.3.1. To that extent, the match between the ability of the community to pay and the provision of explicit knowledge in the form of a community newspaper culminates in a successful commercial operation. Similarly, the Form Collection Service is amenable to commercial exploitation by the CTC. It is noteworthy that this case study best approximates the outcome that the planners for NSW CTC Program envisaged for CTCs (as operating as independent businesses). The use of ICTs in this example is also found to be consistent with the theme of Combination. The next in-depth study of Viewbank CTC can also be understood in terms of commercialised knowledge creation but stands in contrast to Rangemoore CTC because the nature of knowledge creation is best associated with the SECI concept of Internalisation.
5.4 In-depth Study 3: Viewbank CTC

5.4.1 Gaining familiarity with Viewbank CTC

The CTC at Viewbank was at a crossroads in the kinds of services it provided to the local community. The CTC had developed a successful business partnership with a local adult training organisation by providing classrooms with ICT facilities for a variety of courses conducted by the training provider. The CTC also conducted its own training. The CTC is notable for its innovative approaches in the use of ICTs to address local problems. For example, it had secured a narrowcast radio licence that it used to broadcast music and announcements to local businesses. Changes in both the management committee and the broader commercial context by way of a significant rent increase had created uncertainty about the future. There was a desire by newer members on the management committee to change the nature of activities in the CTC to be more focussed on local business needs. This led to some angst being expressed as the management committee and manager struggled to deal with change.

The CTC is located on the main street of the town in a Victorian-era, double-brick, two-storey building. Inside the building the high ornate ceilings give a sense of space. At the time of the researcher’s visit to Viewbank it was the school holidays and a vacation-care group were booked to use the CTC. So the researcher’s interview with the manager had to wait until he had spoken to the leaders and the children. Every computer was in use as the primary-aged children played games and undertook other activities devised by the manager. The thirty computers were distributed around the perimeter of one large room and a smaller room off the main area. An administration assistant sat at a desk in the main room close to the front entrance to attend to customer enquires.

The manager was also dealing with a technical problem with the video conferencing unit. Even though the shift to ADSL broadband from ISDN broadband had been beneficial in terms of reducing costs, getting the video conferencing facility to full functionality had been complex.28 This problem had interfered with a Women in

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28 As previously detailed in Section 4.3.2.1, at the time of the research broadband could be delivered to premises in two ways. ISDN (Integrated Services Digital Network) broadband represents an older standard that never enjoyed significant support from consumers in Australia due to its expense. ADSL (Asymmetric Digital Subscriber Line) is a system of broadband delivery that can be provisioned in
Business training course that had recently been run. As another session of this course was scheduled for the following week, the intractable nature of the problem was creating frustration not only in this CTC but also in partner CTCs which were also conducting the course. The manager was in frequent telephone contact with other CTCs.

Viewbank is an historic town that owes its original settlement in the mid-1800s to timber getting. It is located on the main railway line between Sydney and Brisbane but the major road transport routes are located well away. Today, the main areas of economic activity are cattle, dairy farming and forestry. Viewbank’s proximity to a number of national parks means that it also benefits from passing tourists who stop on their way to and from these recreational areas. The town had recently suffered a significant economic setback when a local timber products factory burnt to the ground causing a sudden and significant rise in unemployment. With no plans to rebuild this factory, the problem of unemployment dominates the thinking of many within the local community and the CTC. The town is also the administrative centre for local government and where the local council offices are located.

The CTC had 40 public-access computers and was open for 40 hours every week (see Table 5.20). The large number of computers was required by the adult training organisation for its courses. In line with the experience of other CTCs, revenue from public access to its facilities had been insufficient to sustain the operations of the CTC. Even though the current arrangement with the training provider had been successful to date, changing business circumstances affecting the CTC led the manager to assess the future viability of the CTC as vulnerable.29

A full-time manager and a full-time office assistant staffed the CTC. The CTC manager had a technical background in the private sector and had been effective in managing the technological aspects of the CTC’s programs such as a computer refurbishment group, a project that the CTC receives income from as a work-for-the dole project. His commercial expertise was apparent in his strong focus on containing costs. The office response to varying budgets over existing telephone lines. Hence, consumers had more readily adopted ADSL as their broadband delivery method.

29 As explained in previous in-depth cases, CTC managers were asked to nominate three choices about the future viability of their CTC: precarious; vulnerable; and comfortable. See Appendix B.1.3 for more detail.
assistant was relatively new to the job being an apprentice who was supported through a government-sponsored apprenticeship scheme that was administered by a private employment service organisation. This person’s main job was to answer questions from customers throughout the day, either face-to-face, by telephone or by email.

Table 5.20 Summary of primary CTC attributes at Viewbank

<table>
<thead>
<tr>
<th>Attribute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours of Operation per Week</td>
<td>40</td>
</tr>
<tr>
<td>Are fees from users sufficient?</td>
<td>No</td>
</tr>
<tr>
<td>Primary income sources</td>
<td>Partnership with adult educational institution; Work-for-the-Dole Scheme</td>
</tr>
<tr>
<td>Relies on Subsidy Source?</td>
<td>No</td>
</tr>
<tr>
<td>Future Outlook Assessment</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Computers</td>
<td>30</td>
</tr>
<tr>
<td>Desktop Printers, Facsimile, Scanner</td>
<td>5</td>
</tr>
<tr>
<td>Stand-alone Printers and Photocopiers</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>Video Conferencing</td>
</tr>
<tr>
<td>Paid Staff Hours</td>
<td>70</td>
</tr>
<tr>
<td>Volunteers Hours (estimated)</td>
<td>36</td>
</tr>
</tbody>
</table>

The CTC also benefited from the support of six volunteers who jointly contributed an estimated 36 hours per week (see Table 5.20). The CTC had benefited from the diverse expertise that had come with the arrival of new people to the locality. The area in which the town is located is renowned for the promotion of alternative lifestyles, which, in turn, has attracted many people from all around Australia, particularly from Sydney and Brisbane.
Viewbank had a population of approximately 2730 people. The economic data presented in Table 5.21 confirms the view that unemployment was high with a figure of 11%, which is over twice the national average. Individual median income of $315 per week was 61% below the national average. In line with many other regional locations the median age of people is nine years higher than the national average.

Table 5.21 Key statistics from 2006 Census by Australian Bureau of Statistics: Viewbank

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>%</th>
<th>Australian Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Population</td>
<td>2,730</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Unemployed</td>
<td>100</td>
<td>11</td>
<td>5.2%</td>
</tr>
<tr>
<td>Median Age</td>
<td>45</td>
<td>N/A</td>
<td>37</td>
</tr>
<tr>
<td>Individual Median Weekly Income</td>
<td>$315</td>
<td>N/A</td>
<td>$518</td>
</tr>
</tbody>
</table>

The CTC was able to derive income from a diverse range of sources. The primary source of revenue came from the hiring out of facilities to the local adult training provider. The training provider was well established and provided a range of courses that were officially recognised by the Australia’s national vocational education and training standard. It was obvious that many of the training courses aimed to improve ICT-related skills. Courses on offer by the adult training organisation included introductory courses in the use of computers and the Internet as well as courses in the operation of various software packages suitable for small businesses such MYOB.

Some income was derived from work-for-the-dole projects that were funded by a local employment agency on behalf of the national government. As mentioned previously, one significant project was the computer refurbishment program that had an ongoing group of five to seven people who learned how to dismantle and assemble computers.

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30 Figures pertaining to location have been rounded off to ensure confidentiality of responses. See Section 3.4.2.1.
31 For further information, refer to the National Training Information Service (http://www.ntis.gov.au)
32 MYOB is the name of a popular accounting package. MYOB is an acronym for the statement “mind your own business”.

and install software. These computers were offered for sale or were given to local organisations. For example, the fire brigade had been a recent beneficiary of this program. Other work-for-the-dole projects included office training, which typically involved one to two people at a time learning administrative tasks at the CTC.

The CTC also conducted training courses that were funded by the federal and state governments as well as public not-for-profit foundations. For example, the Department of Community Services funded training courses for both seniors and young people on a yearly basis. The CTC had also conducted a Cyber safety course earlier in the year on behalf of the national government’s Attorney Generals Crime Prevention Unit and auDA Foundation. This course was designed to educate people about the pitfalls and dangers of commercial and social online interactions. The course was also conducted in 35 other CTCs. The Women in Business training course mentioned previously, is an example of a course that relied on funding from a private corporation that services rural communities.

It can be seen that many of the activities that occurred within the CTC were focused on training. This is consistent with one statement of the manager who exclaimed

[Viewbank] has the highest unemployment rate in the state!

While this may not have been factually correct the perception of high unemployment was real (twice the national average) and as such motivated the variety of training opportunities on offer at the CTC.

Viewbank CTC is notable for the variety of innovative initiatives it had undertaken. One example of this innovative thinking was a car-pooling scheme that the CTC managed. In response to the isolation of the town and its poor public transport, the CTC coordinated a carpooling scheme that enabled people to share transport to local regional centres for work. The purpose of this scheme was to reduce transport costs while opening opportunities for those who did not have transport to attend colleges or gain employment in regional centres. Another innovative response to the problem of

33 The auDA Foundation is a charitable trust established to promote and encourage educational and research activities that will enhance the utility of the Internet for the benefit of the Australian community (see http://audafoundation.org.au)
isolation was the CTCs learner driver scheme. As driver licences were required in some jobs, non-driving job seekers were particularly disadvantaged if they had no ready access to a car to gain practical experience to attain a drivers licence. Changes to the state government’s driver licence rules had exacerbated this problem because the numbers of hours required before learners were eligible to sit for the test increased significantly. As a consequence, the CTC took the unusual step of seeking sponsorship from local businesses to purchase a car to enable people to learn how to drive on an affordable fee-for-service basis. The manager revealed that the overhead of such a scheme was great as running costs of the vehicle were high and it was difficult to continually gain sponsorship from the business community.

Another creative initiative was the purchase of a narrowcast radio broadcast licence that allowed the CTC to broadcast music and information to the town centre. The narrowcast licence was seen as a way for the CTC to communicate with the broader community rather than to just those who entered its doors. This was revealed when the researcher visited businesses in the centre of town where the broadcasts could be heard in a number of shops. The narrowcast radio service also provided an opportunity for the hosting of a radio and Internet broadcasting course aimed at teenage girls sponsored by the NSW Government Office for Women. The purpose of the course was to encourage young women within the community to develop skills related to audio production, radio and Internet broadcasting. Echoing the DVD production course in Parkdale, the purpose of this course was for this group to develop and express a personal understanding about issues they face as a group and communicate this to a wider audience. The full potential of the radio had not been realised as the manager had not had the time or opportunity to train someone to undertake the task of seeking sponsorship. The limited geographical reach of the narrowcast radio broadcast was considered a limitation because there were parts of the town area that could not receive the broadcasts.

In the past the CTC had earned revenue from the production of a DVD for the local council. The CTC received $15,000 for this production which recounted the history of Viewbank. The DVD has made a worthwhile contribution to the community’s historical records in that accessibility to this history has increased due to ICTs. In line with the
experience of other CTCs that undertake multimedia production this project has not led to repeat business (see Section 4.3.2.1).

According to figures provided to the CTCA, Viewbank CTC attracts, on average, 90 people each week. The manager observed that customers use a range of facilities in the CTC, the most common being email, which, he estimated, was accessed several times a day by customers. Also used on a daily basis by customers was photograph editing software and computer games. Less popular applications that enjoyed usage a couple of times a week included word processing software, facsimile, scanner and videotape to DVD transfers. Online chat was used less frequently.

Beyond the use of facilities, the needs of customers were diverse. The manager related the story of a woman exhausted by the demands of caring for her family of adult sons who were unappreciative of her efforts. The CTC had become a refuge where she could engage in conversation and take advantage of informal computer training from volunteers and staff. A number of Outward Bound groups made use of the CTC during their courses in bushcraft and endurance. In line with the alternative lifestyles that many in the area were following, it was common for people starting micro-businesses to use CTC facilities to produce and print business cards.

These insights about customer use of facilities were important because the response rate for the customer survey was quite low. Seven customers with an average age of 43 years completed the survey. Six of these respondents were females with an average age of 42 years and one was a 52-year old male.

Despite the low response rate, some findings are consistent with the findings for customers at Parkdale and Rangemoore CTCs. Respondents indicated that the application they most often used was email followed by word processing (see Table 5.22). A high preference was given to Photograph Enhancement or Printing, Scanning and use of the facsimile machine. The use of Online Chat and Games was ranked lowest, perhaps reflecting the higher average age of respondents.

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34 Outward Bound is an organisation that seeks to provide challenging experiences that help people to discover, develop and achieve their potential. This is done through demanding physical and mental activities in wilderness areas. See http://www.outwardbound.org.au.
Table 5.22 Use of software and devices at Viewbank CTC

<table>
<thead>
<tr>
<th>Software Application or Device (N= 7)</th>
<th>Accessed per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>61</td>
</tr>
<tr>
<td>Word Processing</td>
<td>34</td>
</tr>
<tr>
<td>Photograph Enhancement or Printing</td>
<td>8</td>
</tr>
<tr>
<td>Scanner</td>
<td>3</td>
</tr>
<tr>
<td>Fax Machine</td>
<td>2</td>
</tr>
<tr>
<td>Webpage Design</td>
<td>1</td>
</tr>
<tr>
<td>Online Chat</td>
<td>1</td>
</tr>
<tr>
<td>Video Audio Editing</td>
<td>1</td>
</tr>
<tr>
<td>Games</td>
<td>1</td>
</tr>
</tbody>
</table>

The reasons nominated for the respondent’s visit when they completed the survey are contained in Table 5.23. It can be seen that email is once again most strongly represented and this is in line with the findings of the other two case studies.

Table 5.23 Typical motivation to use Viewbank CTC

<table>
<thead>
<tr>
<th>Reason for visit today…</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>2</td>
</tr>
<tr>
<td>Study</td>
<td>1</td>
</tr>
<tr>
<td>Teach</td>
<td>1</td>
</tr>
<tr>
<td>Photos</td>
<td>1</td>
</tr>
<tr>
<td>Computer use</td>
<td>1</td>
</tr>
<tr>
<td>Volunteer work</td>
<td>1</td>
</tr>
</tbody>
</table>
The three most significant factors that respondents would miss should the CTC close are listed in Table 5.24. In line with previous findings in Parkdale and Rangemoore it can be seen that the CTC provides a place in which people enjoy socialising as well as accessing the ICTs that are provided. Even though only seven people provided this information it can be seen that social interaction and ICT use were rated strongly.

<table>
<thead>
<tr>
<th>Three most valued CTC services nominated by respondents (n=7)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Interaction</td>
<td>6</td>
</tr>
<tr>
<td>Internet/broadband</td>
<td>6</td>
</tr>
<tr>
<td>Computer Access (e.g. word processing)</td>
<td>4</td>
</tr>
<tr>
<td>Email</td>
<td>2</td>
</tr>
<tr>
<td>Training</td>
<td>1</td>
</tr>
</tbody>
</table>

Three respondents took the opportunity to volunteer personal comments about the CTC all of which were positive (see Table 5.25). One person indicated that the CTC played an important part in their life while others expressed a less personal view on their desire to keep the CTC open.

<table>
<thead>
<tr>
<th>Table 5.25 Open comments provided by respondents at the conclusion of the survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be lost without my local CTC.</td>
</tr>
<tr>
<td>Without the CTC, I will not have access to a computer.</td>
</tr>
<tr>
<td>Keep the CTC!</td>
</tr>
</tbody>
</table>

5.4.2 The complexity of Viewbank CTC

The change in the business context of the CTC had created a challenge. The change in ownership of the building that housed the CTC was quickly followed by a rent increase. This had placed pressure on the CTC to look for an alternative location. The prospect of gaining space in the disused ambulance station represented an option because the CTC
would be able to negotiate lower rent from the owner, the local council. This represented an interesting change as the independence which full commercial operations brought would be reduced by accepting subsidised premises.

The manager found that his new role of manager required him to make difficult decisions about the ways he spent his time.

> What I love about the Community Technology Centre is the community side of it but unfortunately when you have to pay the bills I find myself talking to people and realising I am not getting paid for this [conversation], so I’m constantly checking other things while we speak. So there is an internal conflict that I am constantly dealing with. I would love nothing more [than] for the council to pay my wage so that I could philanthropically look at things we could do around town. It doesn’t work like that!

The question of the CTC’s future and its relationship with other organisations in the town became apparent. Despite the desire for a closer relationship with local council it was also apparent that the local council did not possess a significant vision for the CTC. As one previous CTC manager remarked

> [Our town] has a council who don’t believe in computers. ... We have a mayor who thinks that the best thing he can do for the town is to upgrade the highway.

The manager was also concerned that the management committee had proposed a shift in focus away from unemployment programs such as computer refurbishing, to serving the needs of the business community through web page development. The manager had run the proposal through the business model that was established when the CTC began operations and has drawn some frightening conclusions about the future viability of the CTC should this proposal be adopted. This issue had become a source of angst as ongoing discussion of the business model reinforced the possibility on the manager’s mind that the future of the CTC’s training programs were under threat as was its very viability.

This example is notable because it exemplifies the vulnerability of CTCs to changing economic circumstances despite apparent commercial success. The difficulty lies in
developing new ideas when the future is by no means clear. Despite a rich list of innovative responses that the CTC had made to local problems in the past, the vulnerability of the CTC to a change in the commercial context was palpable.

5.4.3 In search of a credible framework for understanding diversity (RQ4)

5.4.3.1 Application of the four Analytical Constructs to the case

Having provided an account of the CTC at Viewbank, the chapter moves on to apply the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. It follows an identical process to the analysis of the previous in-depth cases where initiatives are considered using guide questions for Paradox, Epistemology (the SECI framework), Ontology and the Knowledge Spiral (see Table 5.1). As with the other CTCs, implied within the analysis of these initiatives is the overarchling need to attract sufficient resources to the CTC to sustain it into the future. Ultimately, the discussion draws attention to the way resources are generated using the SECI concept of Internalisation.

Two initiatives from this case selected for the purpose of theory building are:

Training Courses; and

Web Development Service Proposal.

*Training Courses*

The prevalence of training in the CTC is a notable feature of Viewbank CTC. The importance of training as an activity that generates income represents an obvious choice for analysis when considering the application of Analytical Constructs.

*Paradox* In seeking to define a paradox that gives impetus to knowledge creation the analysis employs the relevant guide question in Table 5.1 to determine whether there is insufficient or inconsistent knowledge. In this case, the record of interview with the CTC manager contained a phrase that articulated one significant problem that provides the impetus for many of the activities in the CTC.

*We have the highest unemployment rate in the state!*
This exclamation represented a ‘call to arms’ to this manager. It was also a strong motivator of the former manager, who, in the early days of CTC development, saw the need for training courses to better prepare the many job seekers with ICT skills. As a consequence, a range of training opportunities were on offer at the CTC. Courses were available from the local adult training organisation that hires CTC facilities. There are also courses that the CTC conducted itself such as the Women in Business training course and work-for-the-dole training. So, this paradox is labelled as ‘the need for job skills’

**Epistemology** In seeking to place this initiative within the SECI analytical framework, the analysis begins by looking at the guide question for **Socialisation** which pertains to one-to-one interaction (see Table 5.1 question 2.1). The need for one-to-one interaction is apparent in the case study accounts of the deliberations that led to the staging of these courses. These included the development of course outlines, lesson plans, timetables and the like. Given that the bulk of resource materials presented in the courses represent well-established principles, the significance of Socialisation is less pronounced within the broader knowledge creation process.

In considering the guide question for **Externalisation** it was apparent that much of the work in transforming the tacit knowledge of training principles into explicit knowledge had occurred elsewhere over an extended period of time (see Table question 2.2). Textbooks and online resource materials are a case in point where the deliberations that led to the writing of these resources contain basic principles that had been developed and corroborated by experts and relevant professional institutions and societies in other places. Even so, some local externalisation of tacit knowledge was observed in the writing of timetables and course descriptions.

The bringing together of these resources external to the town with other learning resources as represented by the course outline and learning objectives can be viewed in terms of **Combination** (see Table 5.1 question 2.3). As course material was made up of a variety of examples of explicit knowledge one can see that the combining and editing of this knowledge satisfies the guide question for Combination. As a consequence of
Combination it can be seen that the detailed descriptions of the course enabled it to be marketed to potential customers on a fee-for-service basis.

The guide question from Table 5.1 that delivers the strongest affirmative response is the question associated with **Internalisation** (question 2.4). The question for Internalisation asks whether people embody explicit knowledge through the experience of learning-by-doing or formal learning. To the extent that textbooks and online resources are a common source of explicit knowledge for the Training Courses it can be seen that course participants were given opportunities to internalise this knowledge along with the knowledge that the course trainer is able to provide. Training Courses draw attention to processes by which people personalise the explicit knowledge presented in the course. By this process Nonaka and Takeuchi (1995, pp. 69-70) claim that explicit knowledge is transformed into personal tacit knowledge.

For training courses in which there is a skill component, such as the disassembling and assembling of computers, one can also observe that the personal tacit knowledge that the trainer possesses is also available for training as well as the explicit knowledge that the trainer provides. One example of this skill was the correct technique to remove and install circuit boards. While this element is suggestive of Socialisation it is best described as Internalisation as the primary purpose is the learning of existing knowledge and not the development of new knowledge. This is in line with Nonaka and Takeuchi’s (1995, p. 69) observation where Internalisation activities have a strong socialised element when skills are being developed.

Table 5.26 summarises the observations made of the initiative of Training Courses at Viewbank CTC.
Table 5.26 Summary of SECI processes associated with training courses to develop job skills

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The need for job skills</td>
</tr>
<tr>
<td>Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td></td>
<td>Some activities relevant to Socialisation reasoned to occur in relation to developing course curriculum</td>
</tr>
<tr>
<td>Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td></td>
<td>Development of explicit knowledge for text books and online resource material in another time and place</td>
</tr>
<tr>
<td></td>
<td>Local tacit knowledge creation made explicit through the scheduling of course and the development of course outlines</td>
</tr>
<tr>
<td>Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td></td>
<td>Sources of explicit knowledge such as textbook, computer manuals, training manuals combined with trainer’s knowledge to design course curricula</td>
</tr>
<tr>
<td></td>
<td>Course outline and objectives are used to market the course</td>
</tr>
<tr>
<td>Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td></td>
<td>Students internalise explicit concepts through assignments and exercises set by the course trainer.</td>
</tr>
<tr>
<td></td>
<td>One-to-one interaction with course trainer to facilitate skills development</td>
</tr>
</tbody>
</table>

**Ontology** The initiative of Training Courses can be associated with various scales of community involvement as indicated on the Ontological dimension (see Figure 5.10). Individuals can be seen as active in relation to individual teachers and students who plan and attend courses respectively. For the duration of courses, class members access CTC facilities for purposes other than their tuition. Classes for training represent an identifiable group who participate in this initiative. Moving to the right, the CTC can be seen as both mediating the delivery of training and conducting its own training courses. This reasoning is similar to that used to explain the increase of scale in Ontology in the study of the Community Newspaper in Rangemoore. In the community, groups are
apparent in the often-used description of the ‘unemployed’ and ‘job seekers’. On the far right of the ontological dimension are the individuals and groups beyond the community responsible for the production of training resources.

![Knowledge Spiral Diagram]

Figure 5.10 Application of the construct of Ontology to Training Courses

**Knowledge Spiral** Once again the associations described by the Knowledge Spiral lead the analysis to consider the interaction between the Analytical Constructs of Paradox, Epistemology and Ontology (see Table 5.1 question 4). Coherency between the constructs of Epistemology and Ontology can be found in an obvious increase in the scale associated with Ontology as the descriptions move through the SECI model (from tacit knowledge to explicit knowledge). The ‘centre’ or impetus of these activities is the paradox which pertains to the need for the development of ICT skills to improve the employability of job seekers. However, the circular traverse of ordered SECI activities comes under pressure because it is not possible to track the course of people’s lives as they apply this knowledge in a range of contexts, hopefully new jobs. From a theoretical perspective it can be argued that this new knowledge will be used in further ‘cycles’ of knowledge creation with new employers.

The other contrast relates to the need to qualify the source from which much of the explicit knowledge in the form of course material has come. If one accepts that the knowledge imparted in courses was well-established and was developed elsewhere, it can be seen that new knowledge was not developed locally. This represents another instance in which the Analytical Constructs are able to reveal contrasts in the way new knowledge is created in diverse circumstances.
In summary, evidence of knowledge creation can be seen in the numbers of people who successfully complete courses. Further to this, evidence can be found in the added capability that individuals possess to obtain employment. The fact that there is ongoing demand for such courses reflects an understanding that people judge the knowledge as potentially useful to their lives.

Web Development Service Proposal

The discussion and disagreement about how to best manage the CTC in changing commercial contexts can be seen in terms of early stage knowledge development. The case study accounts contain two alternatives for the future business direction of the CTC; maintain training programs for the unemployed or serve the needs of local business through a web development service.

Paradox The Analytical Construct of Paradox requires the analysis to define an area of knowledge that is insufficient or inconsistent (see Table 5.1 question 1). In this case the proposed initiative of the Web Development Service had its roots in the changed business context of the CTC. In seeking to respond to this situation uncertainty has arisen over the best course of action. Accordingly, the paradox that defines this early stage initiative is uncertainty over business strategy.

Epistemology The Analytical Construct of Epistemology is useful for heightening awareness of the value of one-to-one interaction in knowledge creation. Accordingly, face-to-face discussion between committee members and the manager can be understood to satisfy the guide question for Socialisation in Table 5.1 which seeks to discover one-to-one interaction. The suggestion by some in the management committee for the CTC to adopt a ‘small business focus’ expresses a metaphor that satisfies the guide question to Externalisation (see Table 5.1 question 2.2). The articulation of the metaphor makes explicit a concept that is important for understanding among a group of people. The work the manager has done to test the proposed scenario by using the business modelling software is suggestive of the combining of explicit knowledge that satisfies the guide question for Combination (see Table 5.1 question 2.3). The purpose of the exercise was to inform not only the manager but also the management committee.
This can be understood in relation to the process of learning that the guide question for **Internalisation** refers to (see Table 5.1 question 2.4).

These observations about SECI processes have been summarised in Table 5.27.

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Do any of the observations indicate that inadequate or inconsistent knowledge is the impetus for problem solving activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uncertainty over business strategy</td>
</tr>
<tr>
<td>Socialisation</td>
<td>Does the physical space of the CTC engender synchronous face-to-face interaction to address problems?</td>
</tr>
<tr>
<td></td>
<td>Discussion and disagreement about change of CTC focus in management committee</td>
</tr>
<tr>
<td>Externalisation</td>
<td>Can any of the observed activities be viewed in terms of tacit knowledge being made explicit (such as through analogies, metaphors, models, dialogue, text or diagrams)?</td>
</tr>
<tr>
<td></td>
<td>Future of CTC portrayed in terms of an increased 'business focus' increased responsiveness to business needs</td>
</tr>
<tr>
<td>Combination</td>
<td>Can any of the observed activities be viewed in terms of sorting, combining or editing explicit knowledge to create new explicit knowledge for networking in the organisation or beyond?</td>
</tr>
<tr>
<td></td>
<td>Business planning software used to test alternative scenario</td>
</tr>
<tr>
<td>Internalisation</td>
<td>Do people use explicit knowledge when learning-by-doing or in formal learning?</td>
</tr>
<tr>
<td></td>
<td>The implications of the business planning exercise are presented to management committee for further deliberation</td>
</tr>
</tbody>
</table>

**Ontology** The application of the Analytical Construct for Ontology indicates that the discussion of the Web Development Service Proposal has been confined mainly to the management committee and the CTC manager (see Figure 5.11). Local businesses were identified as the primary group in the community that would benefit from this initiative. Should the alternative business strategy be pursued it is possible that interested individuals will coalesce into groups as activities in the CTC move their focus away from adult education to web development services. However, since these discussions were at an early stage of development at the time of the research it is not possible to predict such future developments in relation to Ontology.
Knowledge Spiral Assessments about the fourth Analytical Construct of the Knowledge Spiral are also constrained by the early stage discussions at the time of the research (see Table 5.1 question 4). While it can be seen that all parts of the SECI model are represented in Table 5.27, the increase in scale of the Ontological dimension has been limited due to the early development stage of the ideas. Consequently, future changes in the nature of the Knowledge Spiral cannot be analysed. At the time of writing, these plans had not progressed significantly and the CTC had maintained its focus on training.

The proposed initiative of a Web Development Service is effective in highlighting the tensions that can occur when seeking to establish new ideas. The disagreement and dissonance of this example suggests that the process of knowledge creation can be difficult, which is not apparent when looking retrospectively at successful knowledge creation initiatives.

Discussion: do the four Analytical Constructs provide a credible framework for understanding the selected initiatives in Viewbank CTC?

Using the same reasoning as employed in the previous two case studies the credibility of the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory is now considered. The application of the Analytical Constructs of Paradox Epistemology, Ontology and the Knowledge Spiral reveals contrasts that are important to understanding the two initiatives. The two initiatives of Training Courses and the Web Development Service Proposal were associated in the analysis with two significant problems in which paradoxes, that is, incomplete or insufficient knowledge, existed.
The CTC’s response to the first of these problems was to respond to the paradox of insufficient job skills and become a key facilitator in the delivery of training to the town. In the second case, uncertainty over the viability of the Web Development Service Proposal for small business provided the impetus for discussion within the management committee to address the threat imposed by a changing commercial context. So, it is possible to link activities within the CTC to these two paradoxes.

The Analytical Construct of Epistemology – represented through the application of the SECI framework - was found to be effective in systematically ordering various activities associated with each initiative (see Table 5.26 and Table 5.27). The application of the SECI model was also able to meaningfully include the original production of textbooks and online resources within the local knowledge creation process even though this occurred in another time and place. This aspect of the analysis revealed the effort required to integrate external sources of knowledge into a local knowledge system such as a training course.

The application of the SECI model to the example of the Training Courses was also instructive in distinguishing Socialisation-like activities in Internalisation. The need for Socialisation is reasoned to be dependent on the need to create new knowledge. This stands at odds with training which is primarily designed to teach course participants established principles. Certainly, the learning of new ideas often relies on being able to engage in dialogue with teachers or others. In this exchange, one person (the teacher) possesses more reliable knowledge of a topic. This activity is more closely aligned to Internalisation; however, when this dialogue becomes a discussion in which both participants struggle to make sense of the problem, this resonates more strongly with Socialisation.

This distinction between Internalisation and Socialisation activities is consistent with the definition of innovation explained in Section 2.3.2. Innovation was defined there by the individual’s qualitative experience of novelty rather than by an objective measure as defined by its newness in time. The evidence from the case studies suggests that the attendant (here-now) knowledge is constrained by the knowledge resources on hand and the ability of individuals to use such resources. While the CTC is found to play an
effective role in reducing barriers to knowledge resources, this access is by no means unlimited and the need for people who are able to use such knowledge is still critically important.

In relation to the second initiative of exploring the Web Development Service Proposal the ordering activities using the SECI model was significant because an account of early stage of knowledge creation characterised by a significant degree of uncertainty is given. The difficulties in forging a new direction were reflected in the emotion and angst that the deliberations had created to that point. It was possible to identify activities in all parts of the SECI model. In analysing the Analytical Construct of Ontology it was noted that discussion had been kept within the confines of the management committee.

The application of the Analytical Construct for Ontology was also effective in judging the relevance of knowledge creation to people in the local community using the descriptors Individuals, Groups, CTC, Community and Beyond the Community. The application of the construct Ontology to the training-related examples emphasised a group, namely the unemployed, as an appropriate audience for these knowledge-creating activities. The idea that knowledge creation beyond the community in the form of textbooks and other resources used in training was useful for locating such activities outside the physical location of the Viewbank community.

The coming together of Paradox, Epistemology and Ontology in the Knowledge Spiral enabled the analysis to develop useful insights about both initiatives. The analysis supports Nonaka and Takeuchí’s contention that explicit knowledge has a propensity for networking. The relationship noted between accounts of SECI transformations and increases in the Ontological dimension is consistent with the construct of the Knowledge Spiral.

In relation to the initiative Training Courses there are understandable difficulties in tracking the diffusion of new knowledge once people have received their qualifications and hopefully gained employment. Without specific evidence, the thesis relies on extending the rationale of the Knowledge Spiral where newly developed personal knowledge will be used for further knowledge creation in the lives of these people, ideally within paid employment.
The utility of the Knowledge Spiral when considering the initiative of the Web Development Service Proposal is restricted because the development of this idea had not progressed beyond the management committee. Accordingly, there is little to conclude from the application of the Knowledge Spiral because even though all four parts of the SECI model were apparent, a shift in the Ontological dimension was not evident. It is possible that the idea will continue to be diffused in more people in the CTC or the idea may disappear because of lack of support.

It is also interesting to note the utility of the Analytical Constructs to reveal unique aspects of the knowledge creation process. In the analysis of the Training Courses, for example, it can be seen that the publication of textbooks prior to the planning of training courses challenges the idea that Socialisation must precede Externalisation. It is clear that the processes need not strictly conform to the sequential development of the SECI model where explicit knowledge, if available, can be pressed into service in the solution of problems even when knowledge creation is predominantly occurring in the Socialisation phase.

Previous discussion on the constructs of the Paradox in relation to Viewbank CTC (see final discussion in Section 5.3.3.1) argued that distinguishing between various levels of uncertainty is instructive when seeking to understand the relative complexity of knowledge creating activities. Referring to Figure 5.12 it can be seen that the first initiative of Training Courses occupies a middle area of the scale. The nature of the paradox that training seeks to serve is broad because there is a range of skills deemed necessary for job seekers. Even though it is not possible to specifically identify the skills course participants required in advance, it is possible to identify a range of skills (for example, basic IT operations or specific software applications). For this reason, Training Courses occupy the middle part of the axis.
The second initiative of the Web Development Service Proposal is placed at the extreme right on the axis of Figure 5.12. In contrast to Training Courses, the quest to develop a business model that ensures ongoing operation of the CTC is far more uncertain and complex from a knowledge creation point of view. For that reason, this paradox has been located at the extreme right.

In considering the range of paradoxes that are addressed and indicated in Figure 5.12 it is apparent that the specific circumstances of Viewbank CTC have led to a different set of knowledge creating activities than to those previously analysed. The application of the Analytical Constructs has delivered insights into the knowledge creating aspects from the perspectives of problem focus (Paradox), transformations between tacit knowledge and explicit knowledge (Epistemology) and diffusion between individuals and groups within the community (Ontology). The bringing together of these constructs into the fourth Analytical Construct of Knowledge Spiral enables one to see the relationships that exist. In the absence of any significant inconsistencies, it appears that the analysis of the chosen initiatives in this case provides further weight to the claim that the Analytical Constructs are able to provide credible interpretations of diverse initiatives.

Initiatives from this case have been purposely chosen to emphasise a specific mode of knowledge creation that leads to income but it is interesting to reflect on other potential examples from this case that could have been analysed using the Analytical Constructs. On the face of it, the radio production course for girls appears to share attributes with Parkdale’s Multimedia Training Course. The girls were required to develop a story that had to be recorded and edited prior to broadcast. All of these activities can be aligned

Figure 5.12 Using the concept of ‘uncertainty’ to illustrate the variability of Paradox
with the stages of production in the Multimedia Training Course at Parkdale. Similarly, the production of the DVD of Viewbank’s history echoes the accounts of Rangemoore CTC where the CTC was instrumental in the production of a history text. In the case of Viewbank CTC the final information artefact was a DVD rather than a book in Rangemoore. Perhaps the most unusual activity is the car-pooling example where the bringing together of explicit knowledge (people’s names, destinations and proposed times of travel) in a database can be aligned with the SECI concept of Combination.

5.4.3.2 Are conditions in Viewbank CTC conducive to knowledge creation?

Having analysed the two nominated examples from the CTC at Viewbank using the four Analytical Constructs the study moves on to consider whether the Enabling Conditions, as summarised in Table 5.2, influenced the knowledge creating attributes of these initiatives. To reiterate the qualification stated in the previous two cases, while there is no expectation that explicit application of knowledge management principles will have occurred, it is possible that the Enabling Conditions are in evidence by virtue of circumstances or as a by-product of other management action.

**Intentions: are staff and volunteers willing to contribute to making a CTC a better place?** Staff and volunteers indicate support for the CTC. This was indicated by the six volunteers who make regular commitments to staff the centre. For at least one volunteer her gratitude was summed up in the comment:

\[
\text{The CTC is my social life, my learning life [and] is my constant source of information.}
\]

Disagreement about future directions of the CTC, while unpleasant, is nonetheless indicative of a common desire to promote the success of the CTC. Indeed, Nonaka and Takeuchi identify the concept of ‘justifying concepts’ as being a necessary prerogative of managers to exercise when managing knowledge creation in an organisation (see Section 2.4.1.5). In summary, the need to exercise management control over knowledge creation is required to promote activities that will best serve the requirements of the organisation. This case reveals that good intentions are not sufficient in themselves to ensure a good outcome from knowledge creation. Deliberations about the future can be difficult; the outcomes of deliberations can never by fully guaranteed. The implications
of these decisions weighed heavily on the manager because he perceived that the future viability of the CTC was at stake.

**Autonomy: do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?** Volunteers appreciate the freedom to use broadband Internet access. However, ongoing cost pressures suggest that the manager is constrained from pursuing or, perhaps, recognising all possibilities for knowledge creation. This is summarised in the dilemma he expressed in relation to socialising with customers and staff and getting on with the job of making money for the CTC (see Section 5.4.2). It is noteworthy that the current suite of activities in the CTC was largely the brainchild of the former manager. The current manager’s difficulty seems to be partly related to his lack of autonomy to manage as he sees fit because the range of activities that the CTC undertakes stresses him.

**Fluctuations and Creative Chaos: can changing conditions within the CTC or external environment be associated with activities that lead to knowledge creation?** The changing commercial context and pressure to change the current business model are clearly linked to knowledge creation in the analysis. The crisis associated with the increase in rent had not only led to problem solving about the services the CTC offers but had also given impetus to the thought of moving to new premises.

**Redundant Information: are there a variety of information sources that go beyond the immediate operational requirements of the CTC?** The importance of information that goes beyond the immediate operational needs of the CTC can be seen in the range of expertise that the current manager and past manager have brought to the CTC by virtue of their previous career roles. This is reflected in the variety of innovative initiatives that have been tried such as the learner-driver scheme, the radio production course for teenage girls and the acquisition of a narrow cast radio broadcast licence.

**Requisite Variety: is there a diversity of expertise that mirrors the external environment?** The inclusion of both locals and people who have moved to the area seeking lifestyle changes provides new expertise to the broader community. However, a significant gap can be seen in perceptions held by local government officials about the
value of ICTs to the local community. The lack of vision attributed to the local mayor (see Section 5.4.2) suggests that some influential members of the local community are, at best, neutral to the work of the CTC. This is consistent with the actions of some newly arrived members of the management committee who similarly displayed scepticism about the CTC’s focus on providing training to the unemployed. This suggests that ongoing attention is required to resolve differences of opinion.

Discussion: do the five Enabling Conditions provide a credible framework for understanding initiatives in Viewbank CTC?

Thus, a mixed picture emerges after the application of the guide questions pertaining to the Enabling Conditions. On the one hand, staff and volunteers display a positive disposition to the CTC and its work and a high degree of commitment to the success of the CTC in addressing the needs of local people, particularly the young and the unemployed. On the other hand, the analysis reveals that some conditions, particularly the limited foresight of local councillors, undermine efforts to fully exploit the potential of ICTs. The cause of these conditions appears to be ignorance of other possibilities, suggesting that the limiting factor is the broader knowledge context in which the CTC operates. While the CTC has displayed some leadership in the community through its innovative programs, it appears that it has generated resentment in some people who want the CTC to re-focus its attention on addressing the needs of established businesses. This reflects the classic situation of the paradox where the CTC and the local community attempt to address the situation in which insufficient or inconsistent knowledge exists. The case study account suggests that the process of creating knowledge to resolve these problems is difficult.

5.4.4 Linking social enterprise with income in Viewbank CTC (RQ5)

In linking the two themes of social enterprise and income generation, it is apparent that the services offered by the adult training organisation using CTC facilities, and the training that the CTC offers by way of computer refurbishment, have addressed the key problem of unemployment within the local community. Training activities have also been a key source of revenue.
Hence, reasons why this CTC should be described as a successful social enterprise can be found in the response the CTC has facilitated to unemployment. The construct of Ontology enables the number of groups that benefit from the CTC’s presence in the town to be recognised. The unemployed, those who do not have transport, and young people all benefit from the activities of the CTC. Given the significance of unemployment in the town, it appears reasonable to judge the CTC as a successful social enterprise in its efforts to facilitate the efforts of the unemployed to obtain a job.

From an epistemological perspective, the predominance of income-earning activities that are best aligned with Internalisation identifies this SECI concept as key to understanding the garnering of resources to support the CTC. Such activities rely on the provision of explicit knowledge in an appropriate context so that course participants are able to personalise such knowledge as tacit knowledge. The significance of these learning opportunities is reflected in the money that people within the community pay to attend such courses. As detailed previously, these Internalisation activities are supported by complementary activities that are described by the other components of the SECI model; namely Socialisation, Externalisation and Combination. However, Internalisation lies at the heart of the value proposition that leads to income generation.

Using similar reasoning to that employed in the analysis of Rangemoore it is possible to see that explicit knowledge is more amenable to revenue generation. Training courses and training programs, as well as the reputation of the course trainer, can be ‘packaged’ on the basis of the explicit knowledge that is presented, leading to fee-for-service transactions. In contrast to the uncertainty associated with Externalisation activities apparent in Parkdale’s Community Engagement Program, the ability to define and market CTC services on the basis of specific knowledge outcomes enables such services to be sold. The link between social enterprise and revenue raising can therefore be understood in terms of the role that explicit knowledge plays in responding to the needs of the community as expressed in the paradox ‘the need for job skills’ to address the problem of unemployment.

However, the conditions that give rise to the CTC’s ability to earn income and simultaneously be considered a successful social enterprise can be tenuous. An
unexpected increase in rent for Viewbank CTC has led to the need to consider alternative accommodation. Questioning of the suitability of training regimes by the management committee has added to this vulnerability. This elevates the significance of management sanction as an important condition for knowledge creation. As discussed in the previous section, Nonaka and Takeuchi give voice to this condition when they refer to the concept of ‘justifying concepts’. When considering this idea the case of Viewbank CTC throws into stark relief the influence that decisions about knowledge generating activities have in relation to the contexts in which they occur. This requirement was not as apparent in the previous case studies where a cogent framework for CTC activities existed and disagreement over the CTC’s activities were not noticeable.

In summary, an analysis of training activities at Viewbank CTC indicates that the link between social enterprise and revenue generation lies in the emphasis that the application of the Analytical Constructs gives to Internalisation. The application of the Ontology construct indicates that the success of the CTC as a social enterprise lies in the activity of training which is a logical response to the local problem of unemployment. The CTC’s ability to earn revenue lies in the nature of explicit knowledge where courses can be packaged, marketed and sold to people who require training in their efforts to find work. The fact that there is ongoing demand for such courses suggests that the future of the CTC is assured. However, the vulnerability of the CTC from a changing commercial context has precipitated discussion about the need to change this apparently successful strategy.

5.4.5 ICT use and knowledge creation in Viewbank CTC (RQ6).

The chapter now moves on to analyse the two initiatives from the perspective of ICT use. Following this, the discussion addresses the themes of complexity, effective use and sustainability derived from Community Informatics (CI) research (see Section 3.2.2).

A clear connection between ICT use and training can be established. The adult training organisation courses focussed on teaching people how to use ICTs and relevant business applications. On first appearance, people seemed to be learning about ICTs just for the
sake of learning about ICTs. As common wisdom dictated the need for ICT skills for job seekers, the incentives for ICT training can also be linked with improved prospects in obtaining a job. Whether this kind of training will be sufficient to deliver a positive outcome or not is open to conjecture given the complex nature of regional economies but ICT training appears to be a necessary component. To that end, a clear link between ICT use and knowledge creation is identified.

The second initiative of the Web Development Service Proposal has a clear connection with ICT use where there is need for expertise to assist business to develop a Web presence. In contrast, the case study accounts reveal that the deliberations over future business models emphasises the face-face interaction between manager and management committee. The revelation that the business planning software was used to test the alternative business model indicates the important role that ICTs played in making explicit the concerns that the manager held about proposed changes. One could assume that telephones and email were used to assist in these discussions though no evidence of this was cited in the case study accounts. Thus, ICTs can be associated with this initiative even though knowledge creation was at an early stage of development.

The use of ICTs by individuals as reflected in the customer survey is consistent with the other two case studies. Even though the response rate of seven was low, a number of findings were consistent with the survey findings of Parkdale and Rangemoore. For example, email was the most popular application in terms of usage. Photograph enhancement and printing was also prominent, as in Parkdale and Rangemoore. The accounts from managers are consistent with these findings. In addition to this the manager noted that the CTC served the local cottage industry as he recounted people’s use of the CTC for the production of business cards, price lists and advertising pamphlets.

The insights of Social Informatics theorist Kling (2000) is instructive in understanding the popularity of ICT training in Viewbank CTC (see Section 3.2.2). One could form a view that such popularity is based on an assumption that ICTs skills will in themselves deliver benefits to both individuals and the community without consideration of the social context. This example is closest to what Kling (2000, p. 249) describes as the
‘tool model’ where future benefit can be predicted on the basis of use or non-use of ICTs. Kling argues that such a view is naive as it fails to take into account the specific social context in which this occurs. For example, one could ask whether local businesses need ICT skills or whether there are any jobs at all. Even so, one cannot ignore the strong community influence on the unemployed to obtain work as a strong incentive that leads people to undertake ICT training at the CTC.

Ostensibly, a strong case for the Community Informatics (CI) concept of effective use exists because there is consensus that increased ICT skill development will eventually lead to better employment outcomes. Whether this scenario will ultimately be the case remains to be seen. In the meantime, the income flow that the training initiatives provided to Viewbank CTC is a significant factor in achieving sustainability. The longevity of this initiative will depend on community perceptions of its value to job seekers in their quest for employment.

The turmoil described in relation to the proposed Web Development Service reveals the complexity of deliberations in seeking to make effective use of ICTs in a community setting. The level of passion displayed by the manager on this issue indicated that the struggle to assert his view against opposing opinions was a complex and emotional one. Interestingly, the business planning software was important in reducing future uncertainty by predicting a negative outcome should the venture proceed. Given the desire of CI researchers to reduce the uncertainty associated with the deployment of ICTs within the community, the use of the Analytical Constructs to analyse the proposed Web Development Service identifies this as an example of early-stage knowledge development. The application of the SECI concept of Socialisation to the Web Development Service initiative brings some order to the complexity in terms of understanding the difficulties of dealing with uncertainty.

Accordingly, the effective use test of the proposed Web Development Service in meeting community needs still needs to be determined. Indeed, the presence of such uncertainty emphasises the centrality of knowledge creation to developing appropriate ICT systems that can be put to effective use within the community.
In summary, the use of ICTs in Viewbank CTC can be linked to knowledge creation. While there is little information about the use of ICTs by individuals within the CTC, the innovativeness of a range of initiatives in Viewbank can be seen to involve ICTs to better equip people to obtain employment. Much of the complexity of Viewbank CTC relates to the changing business circumstances which, in turn, have led to re-appraisal of initiatives. While the current strength of training initiatives satisfies the test of effective use, attempting to predict future efficacy for the community in relation to the Web Development Service is complex. The analysis of RQ6 links training to the SECI concept of Internalisation and provides a rationale for current sustainability of the CTC. With significant changes to the business context of the CTC there is scope for further application of the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory to better understand future sustainability on the basis of knowledge creation. This represents an area for future research.

5.4.6 Reflecting on Viewbank CTC

The initiatives drawn from this in-depth study have been purposely chosen to illustrate another demonstration of knowledge creation in a commercial context but this time focussing on Internalisation. The preceding analysis broadly portrayed training as knowledge creation that was appropriate to the needs of the community and was recognised as such in the status given to the CTC as a successful social enterprise. The ability to package courses provides another example of the way that explicit knowledge is amenable to commercial exploitation. This provides the analysis with the means to draw links between explicit knowledge and income generation with a focus on activities that are best aligned with Internalisation.

This case study was also notable for highlighting the complexities of knowledge creation in communities. The concept of ‘justifying concepts’ is found to be useful in emphasising the role that managers play in sanctioning knowledge creation within their CTCs and the risk inherent in dealing with new ideas in an uncertain context. While it is relatively easy to look back upon change and note the developments that have occurred, it is much more difficult to look forward and predict the likely outcomes of ICT-based initiatives. The application of the four Analytical Constructs and the five Enabling
Conditions from Nonaka and Takeuchi enable some of this complexity to be understood as a normal aspect of knowledge creation.

### 5.5 Discussion and Findings

The analysis of the three in depth case studies was undertaken to assess the value of Nonaka and Takeuchi’s Knowledge Creating theory in better understanding the need for a range of knowledge creating responses in differing circumstances (see Table 5.28). The analysis indicates three dominant modes of knowledge creation which can be aligned to three processes detailed in Nonaka and Takeuchi’s SECI model. The insights that were generated in the analysis will not be used to formally address research questions RQ4–7.

**Table 5.28 Summary of findings from the three in-depth cases**

<table>
<thead>
<tr>
<th>Initiatives for analysis</th>
<th>In-depth Case 1 - Parkdale</th>
<th>In-depth Case 2 - Rangemoore</th>
<th>In-depth Case 3 - Viewbank</th>
</tr>
</thead>
</table>
| **Connecting social enterprise with income generation** | 1. Multimedia Training Course  
2. Community Engagement Program | 1. Community Newspaper  
2. Centrelink Form Collection Service | 1. Training courses for unemployment  
2. Proposed Web Development Service |
| While both initiatives were considered worthwhile from a community perspective it as difficult to offer these services on a commercial basis. | Both initiatives were considered worthwhile from a community perspective and were offered on a commercial basis. | Training was considered worthwhile by the community and was on a commercial basis. The proposed Web Development Service provided insights into the challenges of developing a new initiative. |
| **Aspect of SECI Model given emphasis** | Mode of knowledge creation most readily associated with resource generation: **Externalisation** | Mode of knowledge creation most readily associated with resource generation: **Combination** | Mode of knowledge creation most readily associated with resource generation: **Internalisation** |
5.5.1 The credibility of the Analytical Framework for understanding diversity (RQ4)

In developing a formal response to research question RQ4, the following section will summarise the application of the four Analytical Constructs and the five Enabling Conditions to all three in-depth cases. The analysis will then go on to address the question of credibility of the Analytical Constructs and the Enabling Conditions in understanding the three case studies.

The first Analytical Construct of Paradox, defined as incomplete or inconsistent knowledge, was found to be effective in finding a focus for a range of knowledge-creating activities. A number of local-specific problems were found in the case study accounts that could be related to initiatives of the CTC. In addition to this, it was possible to draw associations between the nature of knowledge-creating activities within each of the initiatives and the level of uncertainty that characterised the associated paradox. In effect, a higher level of relative uncertainty led to greater complexity in problem solving. This contention is best explored by firstly addressing the second construct of Epistemology.

The thesis was able to characterise activities as being related to knowledge creation on the basis of the construct of Epistemology. The ability to answer in the affirmative many of the guide questions in Table 5.1 that were relevant to Epistemology enabled activities within each initiative to be organised on the basis of the SECI model. Consequently, the thesis is able to argue that knowledge creation had occurred in all of the initiatives analysed.

Furthermore, it was possible to describe various activities in relation to the use of tacit knowledge and explicit knowledge. The SECI model was able to provide a descriptive framework that enabled tacit knowledge and explicit knowledge to be identified. In relation to explicit knowledge it was possible to observe direct evidence of explicit knowledge creation through the observation of information-based artefacts such as a newspaper, website, DVDs, course outlines and so on. It was more difficult to observe the creation of tacit knowledge. Socialised interaction between individuals or within
groups coupled to the emergence of analogies and summative statements were all considered to be the outcomes of tacit knowledge creation.

It was not always possible to answer all guide questions in the affirmative. While this may be a limitation of the research design, a strong argument exists that the absence of Socialisation activities is related to the relative complexity of the paradox that was the focus of various initiatives (see Figure 5.13).

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**Knowledge Spiral**

- **Dialogue**
- **Socialization** (tacit-tacit)
- **Externalization** (tacit-explicit)
- **Internalization** (explicit-tacit)
- **Combination** (explicit-explicit)

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**Learning by doing**

- **Linking explicit knowledge**
- **Field building**

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**a. Nonaka and Takeuchi’s SECI Model with the Knowledge Spiral**

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**b. Modified SECI Model to indicate absence of Socialisation activities**

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*Figure 5.13 Analytical construct of Epistemology was found to be of value in understating the use of tacit knowledge and explicit knowledge to address problems*
Complex problem solving was associated with initiatives in which Socialisation-related activities were prominent. Examples of such initiatives were the Multimedia Training Course (Parkdale), Community Engagement Program (Parkdale) and the Web Development Service Proposal (Viewbank). These initiatives have been placed at the extreme right of the axis in Figure 5.14 which depicts varying degrees of perceived uncertainty. The initiatives that were deemed as having greater certainty (and less complexity) have been placed further to the left on this axis. The Centrelink Form Collection Service, notable for the relative simplicity of the knowledge creation task, has been placed on the far left of the scale in Figure 5.14. There were also initiatives that were notable for occupying a middle position between these extremes. The Community Newspaper and the Training Courses occupied this position as they were found to respond to range of paradoxes that were characterised by the varying levels of uncertainty between the extremes. Thus, the relative uncertainty of paradoxes is consistent with observations that were made about the varying need for Socialisation in different initiatives.

![Figure 5.14 Uncertainty and the varying need for Socialisation](image)

The application of the guide question associated with the Analytical Construct of Ontology revealed varying scales of knowledge-creating activities within each of the initiatives. It was possible to assess activities on the basis of the descriptors of Individual, Groups, CTC, Community and Beyond the Community. This was useful in assessing the take-up and acceptance of CTC services within the community (see Figure 5.15). Such take-up could be seen in the use of CTC facilities by individuals. The use of the CTC by groups enabled the analysis to identify the CTC as a sponsor of knowledge-
creating activities as seen in the Community Engagement Program in Parkdale. The CTC was also found to be an agent in facilitating knowledge creation on a community-wide scale as seen in the Community Newspaper that Rangemoore CTC publishes. The significance of knowledge creation outside of the immediate community was clearly apparent in the Training Courses that were investigated in Viewbank. From these examples, it can be seen that the construct of Ontology is able to explain the scale of knowledge development in communities by individuals and groups within the community and beyond the community.

The Analytical Construct of the Knowledge Spiral incorporates the three constructs of Paradox, Epistemology and Ontology. Fundamental to understanding the interaction between these three constructs that ultimately gives effect to the Knowledge Spiral is the increasing propensity of knowledge to be networked as it becomes more explicit. This was most evident in the Multimedia Training Course in Parkdale and the Community Newspaper initiative in Rangemoore. Further support for the notion of the Knowledge Spiral was seen in the ordered nature of SECI activities leading to the production of the DVD and newspaper and its dissemination in the broader community. It was also possible to see the increase in ontological scale that codification of knowledge in the form of a DVD or newspaper made possible. For these examples, the Knowledge Spiral provides a credible explanation of how Paradox, Epistemology and Ontology interact.
Some variation to the idealised interactions that Nonaka and Takeuchi describe is also observed. One such variation was the initiatives noted for the lack of Socialisation activities. Of importance here is whether such variation can be explained by identifiable factors or whether they reveal fundamental inconsistencies of the theory itself. In this case, the absence of Socialisation has been explained as being an expected outcome due to the relative simplicity of the problem that the respective initiatives addressed. For example, the analysis of the Centrelink Form Collection Service still supported the fundamental contention about the propensity of explicit knowledge to be networked to increasingly larger groups of individuals. Hence, the variation in the observations of such initiatives and the idealised version provided by Nonaka and Takeuchi is consistent with the explanation of uncertainty provided above.

The other significant variation when using the construct of the Knowledge Spiral was found in initiatives in which it was not possible to observe sequential transitions in the order of Socialisation, Externalisation, Combination and Internalisation. The research design prevented this issue from being explored to a sufficient level of detail because it was difficult for managers to recount the order in which activities occurred. Foreshadowing discussion in Chapter 6 about limitations of the research, it is relevant to note that some commentators, as discussed in Section 2.4.4, have questioned Nonaka and Takeuchi on the ordered transitions between the SECI elements of their knowledge model. The study lends some support to these criticisms.

In summary, the analysis using the four Analytical Constructs enabled investigation and discussion of diverse examples as demonstrated by the six initiatives from the three in-depth case studies. To the extent that the accounts provide logical associations and do not present significant inconsistencies suggests that this exercise in the application of the four Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory provided credible insights into the chosen initiatives within each of the case studies. The question of sequential transitions between SECI elements of the knowledge model does not undermine the significance of tacit knowledge and explicit knowledge especially in their application in research question RQ5.
Having summarised the application of the Analytical Constructs to all three in-depth case studies, the thesis moves on to consider whether the analysis of the five Enabling Conditions provides added credibility to the use of Nonaka and Takeuchi’s Knowledge Creating Theory for this research. Nonaka and Takeuchi have identified these Enabling Conditions to provide guidance for managers when creating conditions conducive to innovation. In all cases, the Enabling Conditions as defined in the guide questions detailed in Table 5.2 were found. The discovery of the Enabling Conditions allowed assessments to be made about management interventions in relation to knowledge creation as defined by the Analytical Constructs.

**Intentions: are staff and volunteers willing to contribute to making a CTC a better place?** Managers in all three case studies demonstrated positive intentions towards the CTC. In the two cases where volunteers were present their positive intentions were exhibited through their assistance with various aspects of CTC management, interaction with visitors, undertaking training and carrying out special projects. Even the CTC that did not employ volunteers was favourably regarded by its customers as shown by customer surveys which indicated positive support for the managers of the CTC.

**Autonomy: do staff and volunteers enjoy some freedom to pursue and develop their own interests or expertise within the requirements of the CTC?** The issue of autonomy was partly reported in relation to providing incentives to volunteers to create knowledge. In the two cases in which volunteers were present (Parkdale and Viewbank) they were allowed to pursue their own interests. For example, the availability of free broadband was of personal benefit to some volunteers. The implications for knowledge creation, however, were more apparent in Parkdale where evidence of volunteer participation in the community newsletter and suggestions for income-earning activities was apparent. While autonomy may have led to knowledge creation by individuals in Viewbank, it was not apparent in case study accounts.

The relationship between autonomy and knowledge creation was most clearly perceived in the autonomy of CTC management to determine the initiatives that CTCs undertook in response to local problems. The autonomy that managers and management
committees had in determining priorities is argued in Section 4.4.1 to be key to the success of CTC as social enterprises. The analysis in this chapter has been able to link this autonomy to knowledge creation. Thus, the Enabling Condition of Autonomy is found to exist in all three in-depth case studies and can be linked to knowledge creation.

**Fluctuations and Creative Chaos: do changing conditions within the CTC or external environment lead to knowledge creation?** This condition featured in the two cases which were under the greatest financial pressure. Interestingly, they were also notable for their creativity. The Community Engagement Program from Parkdale CTC and the learner driver scheme from Viewbank CTC are two examples of such creativity, where the need to address local problems was the inspiration for these ideas.

In contrast, the case of Rangemoore CTC did not reveal the same degree of creative endeavour. This was partly related to the absence of group-based activity within the CTC but also in the relative complacency of the management team to address the obvious demand for training expressed by the local community. Notably, Rangemoore CTC was characterised by a relatively stable and lucrative business model where there was little risk of impending closure.

In the case of Parkdale and Viewbank CTCs, it can be seen that the uneasiness associated with maintaining commercial viability had been the impetus for experimentation in a number of areas. However, it can be reasoned that if such unease escalates this may overwhelm CTC management. Nonaka and Takeuchi (Takeuchi & Nonaka, 2004b, p. 75) comment on this danger when participants are not able to duly reflect upon their actions either because they do not have sufficient time or knowledge and consequently make decisions that are sub-optimal. Hence, the potential of ‘fluctuations and creative chaos’ as an enabling condition that leads to knowledge creation needs to be assessed in relation to the expertise of CTC staff and whether they are capable of managing such uncertainty.

**Redundant Information: are there a variety of information sources that go beyond the immediate operational requirements of the CTC?** In Parkdale CTC and Viewbank CTC it was apparent that the managers and some of their volunteers had moved into the area for lifestyle reasons after careers in both commercial and public
sectors in major urban areas. Hence the Enabling Condition of redundant information, which extends beyond the immediate operational needs of the CTC, can be found in these two CTCs. This was also apparent in Rangemoore CTC where the managers’ strong backgrounds in small business management had been used to good effect in the CTC. In each of the cases, the respective management committees were also a source of redundant information.

The significance of this Enabling Condition can be seen in the strategies that had been applied to various initiatives. For example, the management of the Community Engagement Program was in part due to the expertise of the manager and the management committee chairperson who both previously held senior positions in private and public enterprise. The strong focus on cost containments has paid dividends in Rangemoore CTC which is evident in the viable business that has been developed over time in newspaper publishing. The creative responses of Viewbank CTC to the problems of unemployment and isolation can be seen in the learner driver scheme and the car-pooling database. All of these examples are indicative of expertise that was brought to the CTC rather than developed purely as a consequence of these people’s involvement in the CTC.

**Requisite Variety: is there a diversity of expertise that mirrors the external environment?** Nonaka and Takeuchi considered this condition important to ensure that the organisation had sufficient knowledge to match the variety and complexity of the local environment. Requisite Variety emphasises local knowledge in combination with recently arrived expertise in guiding the knowledge-creating activities of the CTC. This condition was most strongly represented in Parkdale and Viewbank because of volunteer involvement in their respective CTCs. Volunteers drawn from the local community were able to provide local knowledge to complement the development of initiatives within CTCs. The Enabling Condition of Requisite Variety was also apparent in Rangemoore CTC where the managers were long-term residents of the town who had a good understanding of the town’s organisations and issues. In fact, the relative conservatism of Rangemoore’s business plan is consistent with its Community Newspaper initiative rather than, for example, with the introduction of novel multimedia services.
The analysis of the Enabling Conditions brings to the fore the influence that managers, management committees and volunteers have on activities undertaken in each of the case study CTCs. To the extent that such activities can be represented as knowledge creating, it can be concluded that managers, management committees and volunteers shape the nature of knowledge creation in each of the CTCs. This was particularly apparent when discussion about justifying concepts occurred in relation to the difficulties associated with the planning for future business models in Viewbank CTC. This underlined the significance of management expertise, where the personal knowledge of managers was found to be important in developing programs that were consistent with the needs of the community. Hence the identification of managers as playing a key role in the success of CTCs in their response to the problems they face emerges as an important finding from the analysis.

In drawing the discussion on research question RQ4 to a close it can be seen that the analysis of the Analytical Constructs and the Enabling Conditions have delivered a number of plausible insights and are generally free of inconsistencies. On this basis, it is possible to conclude that the Analytical Constructs and the Enabling Conditions in combination provide a credible framework by which to analyse the initiatives in the three in-depth cases. As these cases contained a range of examples it is also possible to conclude that this framework is able to addresses diverse circumstances.

5.5.2 Linking social enterprise with income generation (RQ5)

Research question RQ5 goes to the heart of the research goal of the thesis which is to link the success of CTCs as social enterprises to their sources of income generation. The application of the Analytical Constructs and the Enabling Conditions to the three cases enabled this question to be addressed from a knowledge-creating perspective.

The research has been able to use the Analytical Constructs of Paradox and Ontology to provide a knowledge-based understanding of the success of CTCs as social enterprises.

Firstly, the construct of Paradox enabled local impetus for knowledge creation to be identified. Perhaps axiomatically, one criterion for being judged a successful social enterprise was a CTC’s commitment to address problems that were relevant to the local
community. All three case studies had links between initiatives and problems that were able to generate support from the community either through the involvement of volunteers or on a commercial basis. This was evident in Parkdale’s Community Engagement Program designed to address the social needs of its Aboriginal community. It is no coincidence that the nature of knowledge-creating activities in Parkdale CTC was highly interpersonal and group-based because they best responded to the knowledge needs of that community. Similar reasoning can be applied to Rangemoore CTC, where the reasoning for a Community Newspaper was linked to the need for a locally-based communication mechanism that was able to respond to a broad range of knowledge needs in the community. The relative affluence of Rangemoore community, as reflected in the higher level of individual median income (see Section 5.3.1), could also be used to understand the motivation of businesses to advertise in the Community Newspaper. The final in-depth study of Viewbank was notable because the problem of unemployment was associated with the CTC’s role in providing training to job seekers. As the paradoxes that gave rise to initiatives were linked to the individual conditions of each town it can be concluded that contingent circumstances are an important factor in understanding why individual CTCs have adopted different initiatives.

Secondly, the scale of the engagement that the CTC had with their respective communities, revealed through the Analytical Construct of Ontology, was also important to understanding the success of CTCs as social enterprises. The construct was useful in identifying the significance of knowledge-creating activities in terms of their relevance to numbers of people. The construct aided in understanding the varying scale in which knowledge-related activities occurred, ranging from individuals to groups to CTC to the community and beyond. Hence, in Parkdale it was possible to gain an understanding of the important role that group-based interactions within the CTC played in addressing the needs of the local community in the Community Engagement Program. In Rangemoore, the ability to perceive knowledge creation on a community-wide scale was important in understanding the value of this initiative to the community. Finally in Viewbank, it was possible to see that the CTC facilitated the transfer of knowledge beyond the immediate community in the form of textbooks and the like to enable the training of local people to take place.
In summary, the constructs of Paradox and Ontology are found to be important analytical concepts in understanding the success of CTCs as social enterprises. The key to the application of these constructs relates to the knowledge-creating activities that occur in CTCs and whether they respond to problems that are considered important by the local community.

The propensity for activities in the CTC to generate revenue addresses the second aspect of the research goal of income generation. This can be understood as being related to the Analytical Construct of Epistemology. Indeed the initiatives (each highlighting a different aspect of the SECI model) from the three in-depth studies were chosen to illustrate this contention. As a consequence, it was possible to develop an understanding of the significance of tacit and explicit knowledge in relation to revenue generation. Highlighting the significance of explicit knowledge, there were initiatives in which knowledge was ‘packaged’ in a form where it could be sold as a commodity or a service. For example, in the Community Newspaper initiative at Rangemoore, revenue could be generated from advertising. Similarly the Centrelink Form Collection Service was found to be an activity from which revenue was generated essentially because it enabled forms to be counted and quantified. The ability to package courses in Viewbank similarly indicated the potential of explicit knowledge to generate revenue through the offering of training courses on a fee-for-service basis. As a consequence, the study finds that activities in which explicit knowledge predominates are more amenable to revenue generation than activities reliant on the generation of tacit knowledge.

In contrast, the more personal and group-based interactions seen in the case study accounts of Parkdale were reasoned to be mainly concerned with tacit knowledge creation and not as amenable to revenue generation. While the purpose of the program was to impart explicit knowledge to community members to address several areas of social need, the publication of such knowledge for eventual sale did not occur. On the basis of the small groups involved, poverty and poor levels of literacy in the Aboriginal community, one could also argue that the production and sale of printed material would also be inappropriate. This is perhaps exemplified by the need for government support for this program, as it was difficult to provide this program on a commercial basis.
It is possible to gain a sense of revenue raising potential of knowledge-creating activities by first considering the two part nature of the Epistemology construct being a continuum between tacit knowledge and explicit knowledge (see Figure 5.16). It appears that the potential for revenue creation increases when knowledge is made explicit and packaged into a discrete form. The case study analysis finds that newspapers, DVDs and published descriptions for training courses are examples where explicit knowledge can be ‘packaged’ in a way that is amenable for revenue generation. In contrast, knowledge creation that relied on conversation and one-to-one interaction was not readily amenable to revenue generation. As well as the Community Engagement Program, the manager at Parkdale CTC expressed some frustration that the over-the-counter advice often dispensed at the CTC was done without any payment. Social custom seems to work against the use of money to facilitate informal interaction through conversation. Knowledge creation in this context appeared to be dependent on the personal knowledge of individuals. While some of this knowledge may be explicit in that accepted principles may be imparted in such conversation, it appears to also possess a strong tacit element made up of personal experiences much of which is difficult if not impossible to articulate.

![Figure 5.16 The commercial potential of knowledge-creating responses is a factor of the tacit-explicit knowledge continuum](image)

A specific transition point in the continuum between tacit and explicit knowledge where revenue raising potential becomes feasible appears to be at a point at which explicit
knowledge is codified. Around the point of codification a number of interesting possibilities can be seen. As detailed in the case studies, codification of explicit knowledge into some form of artefact (such as newspaper, DVD and websites) enables it to be reproduced at relatively little cost and sold. Alternatively, partial codification of explicit knowledge may serve the CTC’s interest better. For example, the production of an outline for a training course provides a broad descriptions of what potential course participants may experience without giving away all of the course material for free should all explicit knowledge be codified. Finally, it may not be feasible or preferable to codify explicit knowledge. This is relevant to groups who may wish to retain explicit knowledge in people’s memory such as instances where some knowledge must remain confidential. This appears to be most relevant to the Community Engagement Program where the level of group interaction enables knowledge to be shared verbally.

It can be argued that the point of codification may be of more analytical import than the point at which tacit knowledge is transformed into explicit knowledge. On the one hand, the point of codification can be specified in terms of a place and time while on the other hand, the transition point between tacit knowledge and explicit knowledge is much less certain. This is reflected in the difficulty in providing a definition of tacit knowledge and explicit knowledge that enjoys widespread acceptance, as discussed in Section 2.4.4. Hence, from an analytical perspective, the point of codification emerges as a useful concept that can be defined in terms of time and place and is more concretely linked to the task of income generation. In order to distinguish this point the thesis will refer to it as ‘codified explicit knowledge’ (see Figure 5.17).

![Figure 5.17 Codification of explicit knowledge](image-url)
Interestingly, when knowledge creation is concentrated in the non-codified realm of knowledge creation, volunteers appear to compensate for the constrained opportunities for revenue generation. Given the need for socialised interaction between individuals and within groups when dealing with tacit knowledge, as defined by the SECI concepts of Socialisation and Externalisation, the presence of volunteers is consistent with the enjoyment they receive from social contact as reflected in volunteer surveys. Volunteer participation seems to partly ameliorate the constrained nature of revenue creation when dealing with knowledge creation through one-to-one interaction. This reasoning can also be applied to Internalisation where training was also found to rely on social interaction between trainer and student. While training can be a source of revenue for CTCs, the accounts in Chapter 4 indicate that training can also be offered cost free if volunteers are willing to undertake this role (see Section 4.3.2.1).

Given the propensity of certain kinds of knowledge-creating activities to generate revenue, it appears that the nature of the local paradox will strongly influence the kinds of knowledge-creating responses possible. Accordingly, responses that are reliant on tacit knowledge are less amenable to revenue generation than responses that are reliant on explicit knowledge, particularly codified explicit knowledge. In cases where such responses favour the use of Socialisation-like activities, the potential for commercial revenue generation is reduced. Even though community support by way of volunteer participation has a compensatory effect, the case study accounts suggest that this is not sufficient to compensate for the absence of revenue. Hence the linkage between successful social enterprises and income-earning potential is strongly influenced by the nature of problems that dominate the local scene and the application of the most appropriate responses.

In summary it can be seen that the application of Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory is able to bring together the apparent disparate observations about CTCs as social enterprises and the difficulties they face in earning revenue. The three case studies just described represent in different ways the significance of knowledge creation (and the factors leading to knowledge creation) on the generation of revenue and the development of sustainability. Some places will be better positioned to develop revenue creation initiatives because of their
contingent circumstances. As suggested by the analysis, a dominance of codified explicit knowledge will lend more to revenue creation than the socialised interactions that are required when dealing with tacit knowledge (and explicit knowledge that has not been codified). As these circumstances are local and unique it is not possible to mandate in advance that the most appropriate response will be amenable to revenue generation.

In formally responding to research question RQ5 one can see that the research goals derived from the Final project report that described CTCs as being successful social enterprises that experienced difficulties in earning income can be addressed using the four Analytical Constructs. The interactions between Paradox, Epistemology and Ontology enable the diversity of CTC experiences to be described. When considering these factors simultaneously as required by the fourth Analytical Construct of the Knowledge Spiral, it becomes clear that local circumstances demand a certain combination of knowledge-creating responses that may or may not be amenable to income generation. The intersection of these Analytical Constructs forms an important juncture at which cases that are performing important knowledge-creating activities for the benefit of the local community, but cannot generate sufficient income from these activities, struggle to achieve sustainability. Alternatively, other communities are more fortunate because their problems can be addressed by knowledge-creating activities that are amenable to income generation. The key to this conundrum between CTCs as social enterprises and their income-earning capacity is whether CTCs can exploit codified explicit knowledge creation or whether they are required to deal with uncommercial processes of tacit knowledge creation.

5.5.3 ICT use and knowledge creation (RQ6)

As detailed in Section 3.2.2, the complexity of socio-technical relationships represents one of the key challenges that theorists from CI define when seeking to understand the use of ICTs by individuals and groups. Rather than assuming that benefits will predictably flow from the use of ICTs regardless of people’s choices, these theorists maintain that ICT use can be best understood by recognising the complexity of the social environment and attendant socio-technical processes. The tool model that Kling criticises for purporting to reliably predict benefits by the use or non-use of ICTs is not
strongly supported in the analysis of the three in-depth cases because patterns of ICT adoption and use were so diverse.

Customer surveys were used to gain an appreciation of the nature of ICT use within CTCs. The results from these surveys indicated across-the-board support for email followed by word processing. When moving to the popularity of other applications different patterns of usage based on age were suggested. Younger people showed a greater propensity to use chat and social media applications than older people who displayed a stronger preference for photograph enhancement and the use of equipment such as facsimile machines and scanners. Some customers reported specific incentives for their use of ICTs in the CTC. One poignant example was from a teenage girl who relied on the CTC to enable her to communicate daily with her mother who lived a long distance away (see Box 4.7). However, the reasons most people provided for their use of the CTC could not be used to unambiguously identify specific linkages with their use of equipment in the CTC. In citing why they had visited the CTC, responses usually related to a vague need to check emails, obtain training, use the Internet or ‘say hello’.

Despite the potential benefits of ICT use, there is evidence that some people remain ambivalent about ICTs. Established patterns of behaviour can be difficult to change. This was apparent in poor participation of some businesses in opportunities to use web-hosting facilities for e-commerce or the use of video conferencing facilities. Accordingly, there may be circumstances in which ICT use does not address the needs of individuals even if such a need is obscured by ignorance.

There are also dangers in ICT use. When one considers the negative consequence that can result from ICT use, particularly use of the Internet, the optimistic assumptions of the tool model that benefits will naturally flow from ICT use are contradicted. The CTCs of this study have been required to take steps to reduce potential harm by limiting access to pornography, gambling and other similar sites. This represents another example of the way that social context has influenced the use of ICTs.

In seeking to reduce the complexities of these interactions, knowledge-creating activities can be linked to a paradox that has its origin in a local problem. Incentives to solve problems appear as a precursor to ICT use. The analysis was able to characterise
ICT use in relation to knowledge creation in the three in-depth cases by using the SECI model. For example, email, as an interpersonal medium for communication, seems appropriate as a tool to facilitate the one-to-one interaction described by Socialisation. The use of email, word processing software or video-audio recording applications appears appropriate for Externalisation where tacit knowledge is made explicit. The use of publishing software for newspaper production and editing software for multimedia production were easily aligned to the SECI process of Combination. Interestingly, the Centrelink Form Collection initiative was also found to facilitate Combination as a knowledge creating process. Networking of information through the publication of newspapers, books, websites and DVDs assists with the process of Internalisation. Display equipment such as data projects and high definition TV displays, similarly assist with Internalisation, as it is able to provide information to several people simultaneously.

When one considers the role of ICTs in making knowledge explicit through codification, the potential for networking of knowledge is enhanced. Hence, the Analytical Construct of Ontology is useful in systematically analysing the role of ICTs in knowledge creation. Indeed, the networking of knowledge becomes increasingly reliant on ICTs as the scale of interaction increases beyond face-to-face communication within groups.

Therefore, it can be seen that when social processes are viewed through the lens of knowledge creation, it is possible to develop a coherent account of ICT use in a diverse range of circumstances which can be linked to the incentive of solving problems in the local community. To that extent, the application of the Analytical Constructs is able to bring some order to the complexity of research accounts.

The extent to which this study can also be built around the notion of community is of particular relevance to CI theorists. Given the nature of the NSW CTC Program, which mandated a high degree of community autonomy in the management of CTCs, the research has been able to study patterns of ICT adoption by communities. One lesson is that communities are required to deal with problems of differing complexity. The relative certainty of producing a newspaper with a reliable revenue stream in one
community stands in stark contrast to the need to change destructive behaviours within groups in another community. The prominence of training in Viewbank revealed usage which most closely resembles the tool model that Kling criticises in that people appeared to have a fundamental conviction that ICT-related skills were necessary to obtain a job. Even so, ICT adoption is more completely explained by the social problem of unemployment and the desperation of job seekers. Responding to an unexpected loss of a factory that has been a town’s economic mainstay provides a more meaningful context for understanding ICT use than a reliance on the inherent benefits of ICTs.

The finding that CTCs have been able to respond to diverse challenges stands testament to the flexibility of ICTs coupled to an autonomous CTC management structure led by competent expertise. The ‘effective use’ test of ICT deployment in communities was satisfied in the analysis of the three case studies. Indeed, there is good reason to link the concept of effective use with the success that CTCs enjoyed as social enterprises.

The knowledge-based framework that the study has used to analyse the case studies enabled the question of sustainability of CTCs to be addressed. Sustainability of community-based technology projects represents a key problem area in CI research. This was, in part, the impetus for Gurstein’s call for greater recognition for community-based technology centres as agents to better integrate communities into regional and national systems of innovation (see Section 2.3). The response of the thesis to the question of sustainability is essentially provided in the response to research question RQ6. Contingent circumstances of communities will demand knowledge-creating responses that may or may not be amenable to commercial exploitation. Knowledge creation that is reliant on socialised interaction between people will be unattractive from a commercial perspective. Even though socialised interaction is likely to attract the goodwill of the community these contributions will not be sufficient to address costs such as utilities and rent, and the need for ongoing replacement of capital equipment such as computers and printers. In contrast, the case study that was most successful from a commercial perspective was also the CTC that was less reliant on socialised interaction within the CTC but struggled to develop a response to the pressing need for training from the local community.
In summary, ICT use within the three in-depth cases analysed in this chapter reveals interesting and innovative applications of ICTs in a range of situations. The analysis has established that incentives to use ICTs can be rooted in specific knowledge-creating activities of individuals and groups within each of these communities. Therefore, ICT use and sustainability can be assessed in relation to knowledge creation in the specific circumstances in which each CTC exists. Such an outcome responds well to Gurstein’s vision of better defining a role for community technology as a contributor to local innovative capabilities that can be integrated into broader regional and national initiatives. The following discussion about the theory-based rationale used in this thesis is therefore directly relevant to the interests of CI researchers who are fundamentally interested in assisting communities to developing sustainable ICT-based responses to the community’s problems.

5.5.4 The theory-based rationale (RQ7)

Using the analysis of research questions RQ4-6 the thesis is able to respond to research question RQ7 which requires that a theory-based rationale be developed that assists the community, private sector and government to interact with CTCs in ways that promote their success as social enterprises in contexts of limited income.

The theory-based rationale of the present study rests on the distinction that Nonaka and Takeuchi draw between tacit knowledge and explicit knowledge. The relative complexity of the paradox will make varying demands on those responsible to create knowledge. When existing knowledge and skills are inadequate to address the situation at hand, one-to-one interaction comes to the fore as the means by which new knowledge is developed. Such knowledge is invariably tacit knowledge. Hence, another distinction between tacit knowledge and explicit knowledge that can be made relates to origins of new knowledge where tacit knowledge creation appears as an antecedent to explicit knowledge creation.

Placed in the varying contexts of the case study CTCs, the theory-based rationale plays out in a variety of ways. In responding to local problems, CTCs are led to pursue a range of knowledge-creating activities. Fundamental to developing appropriate responses is the degree of uncertainty that characterises problems and the consequent
complexity of knowledge creation. Such knowledge-creating responses may or may not be amenable to commercial exploitation. In making a distinction between tacit knowledge creation and explicit knowledge creation, the analysis has established the significance of the Analytical Construct of Epistemology for making assessments about the commercial potential of a range of knowledge-creating activities.

As a consequence, it is possible to observe knowledge-creating activities that are not amenable to commercial exploitation and thereby to indentify these as possible targets of assistance by benefactors. As such activities, by definition, do not compete for private sector investment, such assistance can be given without undermining the goals of efficient economic practices. Community contributions by way of volunteer labour and payment-in-kind are also facilitated by the inherently non-commercial nature of such activities. Hence, the concept of social capital, used by various commentators to emphasise the value of non-material factors such as co-operative personal relationships characterised by trust (see Section 2.2.4), can be aligned with knowledge creation that is dependent on socialised interaction as described by the SECI concept of Socialisation.

The application of the Ontology construct enabled knowledge-creating activities to be assessed in relation to the participation of identifiable groups within the community. This is of particular use when seeking, once again, to address the knowledge-creating activities that are found to be beneficial but do not attract private sector investment. Justification to a benefactor for the support of such activities may rely on demonstration of such benefits to groups of people. Even though responses were found to lead to variable income-earning outcomes, the perceived value of these responses by the community was more reliably reflected in the endorsement communities gave to their CTC for addressing problems of local relevance. Once again, it can be seen that the theory-based rationale is able to assist in the support of CTCs by establishing the means by which benefit to the community can be analytically assessed.

The nature of the paradox fundamental to local problems is found to have significant implications in relation to the relative level of complexity involved in knowledge creation. The comparisons that were made between initiatives on the basis of uncertainty found that greater levels of uncertainty required responses that were heavily
dependant on Socialisation-like activities. Less complex paradoxes were addressed with knowledge creation that was not so dependent on Socialisation-like activities and more readily codified into knowledge that could be embodied in various information artefacts such as printed publications, DVDs and the like. Accordingly, the concept of uncertainty emerges as influential in determining the nature of knowledge-creating activity. As communities are not able to choose the problems that dominate their existence, the range of knowledge-creating responses, and by extension, commercial opportunities, is influenced by the requirements of the paradox.

The analysis in this chapter suggests that some qualification to the theory-based rationale is necessary. Firstly, the epistemological nature of activities, characterised by differing uses of tacit and explicit knowledge, were associated with the different potentials for income generation. However, while making knowledge explicit was found to be important, codification of explicit knowledge was found (in Section 5.5.2) to be an important distinction to make. Codification of knowledge is necessary when embodying such knowledge in printed publications, websites and DVDs. The ability to make knowledge explicit and codify such knowledge into a disembodied information product was found to be a significant in enabling income generation from knowledge creation. Given the difficulty in specifying the point of transition between tacit and explicit knowledge the point of codification of knowledge is analytically significant, because it can be independently observed.

Secondly, the Analytical Construct of the Knowledge Spiral draws attention to the interaction between the epistemological nature of knowledge creation and Ontology as defined by Nonaka and Takeuchi. The propensity of explicit knowledge to be networked is of explanatory value when considering the diffusion of knowledge to numbers of people (as indicated by the Analytical Construct of Ontology). However, of less explanatory value is the ordered nature of transformations between tacit knowledge and explicit knowledge as described by the sequential transformations of knowledge and defined by the SECI model. This difficulty emerged in the active research stage when it became apparent that the research design was not able to capture this level of detail. Even though this issue posed a quandary in terms of drawing a definitive conclusion concerning the veracity of the Knowledge Spiral, it had little practical effect
in terms of understanding the varying significance of tacit knowledge and explicit knowledge in relation to income generation and the propensity of explicit knowledge to be diffused among groups of people.

The final qualification is perhaps axiomatic; the commitment of CTC management to their local communities was fundamental to the success of the in-depth cases. Echoing the observation of the Parkdale CTC Management Committee Chairperson, the position of CTC manager requires a person who has the interests of the community uppermost in their concerns. The need for such personal commitment is probably reflective of the difficulty of the role and the poor remuneration given to managers. Drawing on the experience of Parkdale’s CTC Chairperson, the absence of such a commitment is likely to lead to community dissatisfaction. From the perspective of a CTC’s sustainability poor commercial outcomes are a challenge but withdrawal of community support is very serious.

Reflecting on the neo-liberal economic rationale of the NSW CTC Program discussed in Section 2.2.4, it can be seen that commercial activity in the work of CTCs in community development was privileged. While this is appropriate in some communities, the neo-liberal economic rationale does not address situations in which CTCs are forced to respond to local problems in ways that are not amenable to commercial exploitation. The analysis has demonstrated how the theory-based rationale derived from Nonaka and Takeuchi’s Knowledge Creating Theory is able to address both commercial and uncommercial scenarios using the one analytical framework.

The significance of the theory-based rationale for communities is that it clarifies distinctions between valuable social initiatives that are commercially attractive from those that are not commercially attractive. Given the inability of the neo-classical philosophy to give sufficient recognition to non-commercial initiatives that were of social benefit, the theory-based rationale is able to elevate the status of such initiatives. Even though unattractive as a commercial proposition, such initiatives are an appropriate response to local problems.

The significance of the theory-based rationale for the private sector is that the constrained economies of regional NSW are not in themselves solely responsible for
insufficient private sector support of CTC initiatives. While limited vision and time were found to be responsible for poor participation of business in CTC activities, the reluctance of the private sector to support some initiatives is explained by the difficulties in deriving a commercial benefit from tacit knowledge creation.

The significance of the theory-based rationale for policy oversight of CTCs is the distinctions that can be drawn between commercial and non-commercial knowledge creating initiatives. Accordingly, government support of non-commercial knowledge creation can be justified on the basis that supported activities are not attractive to the private sector, hence, such support does not undermine the normal function of the economic market. The imposition of competitive neutrality provisions can be less onerous because it is easier to discriminate between commercial and uncommercial knowledge-creating activities. Indeed, the Community Engagement Program in Parkdale was an example of such an arrangement where support by government of the program did not prevent the CTC from engaging in other commercial ventures.

In conclusion, the manner in which this theory-based rationale is able to assist community, private sector and government to interact with CTCs in ways that promote their success as social enterprises is to firstly acknowledge that insufficient income support may be a natural outcome of a CTC’s response to the problems in their local community. If the complexity of local problems demands high levels of socialised problem solving activity to create tacit knowledge, the commercial potential of such activity is undermined. Conversely, if it is possible to respond to local needs through knowledge creation that involves explicit knowledge that can be codified, the potential for commercialisation is heightened. Importantly, local circumstances strongly influence the nature of the knowledge-creating responses. Secondly, the theory-based rationale provides guidance in targeting support from benefactors such as government for worthwhile initiatives that do not compete for private sector investment. This will enable CTCs to compete in the private sector in the delivery of commercial service without sacrificing the needs of the local community for knowledge creation that cannot be supported on a commercial basis.
5.6 Conclusion

This chapter has investigated selected initiatives from three case studies to demonstrate the utility of Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory. The Analytical Constructs were found to be effective in analysing the diverse circumstances reflected in the case studies by logically highlighting similarities and contrasts between knowledge-creating activities. Out of these contrasts it was possible to characterise each CTC as responding to local needs, which in turn supported the notion that CTCs were successful social enterprises. Also apparent in these contrasts were the alternative modes of knowledge-creating activities that had varying potential for income generation. These modes of knowledge creation facilitated by the respective CTCs were based on the specific needs of the community, as reflected in the paradox. To that end, the thesis is able conclude that knowledge creation is an important activity in which CTCs participate, potentially with benefit to the local community. The extent to which such activity is amenable to commercial exploitation has significant implications for the CTC’s ability to generate sufficient income to sustain itself.
Chapter 6  Conclusions and Further Research

6.1 Introduction

This chapter draws on the findings of the previous chapter to assess the significance of the theory-based rationale for the other case studies, theory development and for practical advice to assist community, the private sector and government in their interaction with CTCs. It does this by firstly analysing the other 14 cases which were studied. By identifying examples that are similar to the initiatives studied in the three in-depth cases in Chapter 5, it is possible to argue that the application of the analytical framework derived from Nonaka and Takeuchi’s Knowledge Creating Theory has relevance to the other 14 cases. The chapter then moves on to qualify the research by addressing limitations of the methods used. This leads to a discussion about the insights and theories that informed the development of the research questions, namely Nonaka and Takeuchi’s Knowledge Creating Theory. Prime among the issues to be considered is the need to provide a formal response to Gurstein’s suggestion for the use of innovation as a concept to better understand the significance of community-based technology centres. This response will also be considered in relation to Community Informatics research in which Gurstein is a leading proponent (de Moor, 2009a, 2009b; Gurstein, 2001, 2003, 2004, 2007; Stillman, 2010). Given the influence of Hall and Midgley’s Social Development Theory (Hall & Midgley, 2004; Midgley, 2003) in structuring aspects of the analysis, this chapter will reflect on their call for a more holistic development policy using insights from Arrow (1962). It is out of these reflections that the thesis is able to define future research that has potential to better assist the community, private sector and government to promote CTCs as successful social enterprises in contexts of limited income support.

6.2 Implications of the In-Depth Analysis for the Remaining Cases

The theory-based rationale derived from the analysis of the three in-depth case studies claims that knowledge creating activities within CTCs are significant for two reasons: firstly, the appropriateness of these knowledge creating activities as a response to local
problems; and secondly, the propensity these knowledge-creating activities have for income generation. The significant finding from the in-depth cases is that the ability to derive income from CTC activities is heavily influenced by contingent circumstances. As CTCs were considered to be most successful when they responded to problems in their immediate communities, the analysis in Chapter 5 reasoned that the propensity for income generation was inversely related to the relative complexity of knowledge creation that was, in turn, determined by the level of uncertainty that characterised each problem. As knowledge creation in the tacit domain was found to be less amenable to income generation than knowledge creation in the explicit domain, the opportunity for revenue generation was linked by the analysis to contingent circumstances. The significance of this theory-based rationale is now considered in relation to the remaining 14 cases.

One indication of the theory-based rationale’s relevance to other members of the CTCA can be seen in the similarity of activities when compared with examples recorded in Table 4.5. In Section 5.3.3.1, the Community Newspaper in Rangemoore was identified as an important source of income. Table 4.5 indicates that two other CTCs listed community newspapers as a major or moderate source of income. The other initiative studied in Section 5.3.3.1 was the Centrelink Form Receipt Service that was offered by Rangemoore CTC. In Table 4.5 it can be seen that three other CTCs listed the Centrelink Form Receipt Service as a major source of income. When one considers the value of training to Viewbank CTC (see Section 5.4.3.1) it is unsurprising to find that training is listed 19 times in Table 4.5 as a major or moderate source of income. Consistent with difficulties in earning income from the Community Engagement Program (see Section 5.2.3.1), Table 4.5 reveals that 14 separate group-based activities (Hosting of Groups) are recorded in the column titled minor source of income – just one is judged as a moderate source of income. The number listed stands testament to their perceived value even though the potential for income generation is minor. In summary, the activities listed in Table 4.5 appear to be consistent with the findings of the three in-depth case studies.

Looking at other evidence from the remaining 14 cases, it is also possible to apply Analytical Constructs in order to understand the income-earning potential of CTCs. One
example is the case of Tidal River CTC which was hosted by the local museum (see Figure 4.2). The work of the museum complements the CTC in that the availability of computers for public use can also be used to display information that is relevant to the museum which displays information about the town’s aviation history and its unique local flora and fauna. The ability to earn income from combining and distributing explicit knowledge is reminiscent of the analysis that was applied to Rangemoore where an emphasis on Combination was argued. Similarly, the example of Tourist Offices in Lemont and Siestaway (see Figure 4.2) is indicative of Combination because a range of explicit knowledge sources was combined and made available to provide a convenient service for tourists. The respective CTCs judged these as major sources of income.

Other CTCs displayed initiatives that were more typical of Internalisation. For example, Ferngrove CTC was notable for its role in facilitating the development of micro-businesses (see Figure 4.2). A young man with some expertise in repairing computers had been allowed to offer ICT services to locals as a precursor to his finding premises to rent in which to run his own business. The same CTC was also responsible for examples that can be associated with Externalisation seen in the unleashing of the creative potential in community members. One elderly resident visited the CTC daily to write her life history. Another person underwent a dramatic transformation from town vagrant to a mainstay of the CTC’s volunteers.

The limited income-earning potential of these last examples is consistent with the view that activities that involve tacit knowledge development, despite their obvious benefits, are not amenable to income generation. In the case of small business development and the writing of the autobiography, one can argue that such initiatives are at a pre-commercial stage. In other examples, such as the transformation from town vagrant to prominent CTC volunteer, the value appears best measured in terms of positive human relationships which are impossible to quantify in money terms.

The Analytical Construct of Paradox can be readily applied to the data from the remaining 14 cases. The links between local problems and initiatives within CTCs detailed in Figure 4.2 illustrates the high number of activities that have knowledge
creation at their core. Training figures prominently in this diagram. Multimedia production is also evident as a response to local problems. Less obvious are the group activities that rely on interpersonal contact which, on the basis of the SECI concept of Socialisation, the analysis signals for the opportunities for personalised tacit knowledge creation. These examples suggest that the CTC has developed a suitable context for knowledge creation which is appropriate to local circumstances.

Accordingly, the theory-based rationale proposed in Chapter 5 is relevant to the remaining 14 cases for the following reasons: firstly, there is a discernable relationship between local problems and CTC activities; secondly, activities based on their income-earning history can be distinguished using the SECI knowledge model. Given these two reasons, the uncertainty of contingent circumstances can similarly be reasoned as a key factor that influences the knowledge-creating activities of the CTCs. Accordingly contingent circumstances determine the income-generating potential of CTCs.

So it is possible to extend the implications of the theory-based rationale for community, private sector and government to the remaining cases. As far as the community is concerned, the theory-based rationale justifies initiatives on the basis of their need to address local problems. Being able to distinguish activities on the basis of opportunities for commercialisation enables support for non-commercial activities to be pursued without undermining the aims of economic efficiency. The missing element in this arrangement is the existence of a benefactor to support worthwhile but non-commercial initiatives. Given the reluctance of some levels of government to involve themselves in the work of CTCs the theory-based rationale enables non-commercial activities to be targeted for support from government while leaving commercial activities to be offered by the CTC without having to subsidise non-profitable but worthwhile activities.

6.3 Limitations

The insights that this research has generated about the CTCs that owe their genesis to the NSW CTC Program are of interest to a range of groups. Prime among these are those who research and work in community-based technology projects that rely on ICTs. The extent to which the findings of this study can be generalised to the particular circumstances of other CTCs in the CTCA, in Australia or elsewhere in the world
requires some comment. As each potential research site moves further away from the cases an increasing number of differences are involved. Another source of contrast relates to time because circumstances, even for the CTCs that were studied in detail, change with time.

The strength of case study research is its ability to incorporate detailed data about unique and diverse circumstances in order to inform theory. Given this strength, the application of such insights needs to be done with the understanding that the unique and diverse circumstances of other cases will not follow the same processes nor necessarily generate the same outcomes. As a consequence, the application of the research findings needs to be done with caution and with an informed understanding of the variety of local factors that may influence outcomes. This requirement is germane to the research philosophy of Nonaka and Takeuchi who recognised the critically important role that managers play in not only establishing enabling conditions for knowledge creation but also in dealing with the contingencies of their local environment.

One issue requiring further attention in relation to this discussion of limitations is the apparent anomaly regarding the ordered transitions between SECI elements of the knowledge model used to describe the Analytical Construct of Epistemology. As detailed in Section 2.4.4, Cook and Brown (1999), in seeking to bring greater clarity to the work of Nonaka and Takeuchi, contend that the ordered process of the Knowledge Spiral based on a natural sequencing of activities described by the SECI model cannot be applied in all case studies that they have observed. The significance of their claim relates to factors that motivate knowledge development in the tacit and explicit domain. Nonaka and Takeuchi’s SECI model indicates a natural progression from tacit to explicit to tacit knowledge as one is transformed from one form of knowledge to another. In contrast, Cook and Brown’s framework holds that tacit knowledge and explicit knowledge are distinct processes that have no natural connection leading to conversion from one to the other.

Contingent Circumstances

The significance of Cook and Brown’s (1999) clarification centres on the concept of contingent circumstances (see Figure 6.1). Rather than seeking to establish a natural
order of transformations between tacit and explicit knowledge they contend that people, in the act of problem solving, will draw on either or both tacit and explicit knowledge depending on their own experience and what makes most sense at the time. To be sure, explicit knowledge can be a useful tool in the generation of tacit knowledge but Cook and Brown (1999, p. 397) argue that it is not a general characteristic of explicit knowledge that tacit knowledge should be produced as a consequence. Similarly there is no special characteristic of tacit knowledge that leads to its conversion into explicit knowledge. Rather the generation of explicit knowledge or tacit knowledge is primarily dependent on the “specific needs and resources that an organization has at hand in a given situation” (Cook & Brown, 1999, p. 397). For that reason they go on to conclude that the production of new knowledge does not lie in the “continuous interaction
between tacit and explicit knowledge” but rather in “interaction with the world” (Cook & Brown, 1999, p. 397).

A number of implications for this research flow from the contentions Cook and Brown (1999) pose. Firstly, the difficulty discovered in observing ordered transitions between elements of the SECI model in some initiatives in this study is not inconsistent with the Cook and Brown’s arguments. Secondly, Cook and Brown’s contention indirectly provides support for the decision to characterise the in-depth cases study on the basis of Externalisation, Combination and Internalisation from the SECI knowledge model. Freed from the theoretical need to be related to a sequence of knowledge creating transformations greater weight can be given to the thesis claim that contingent circumstances will favour particular knowledge-creating responses on the basis of uncertainty and associated complexity. This represents a potential area for research.

6.4 Significance of the Research

6.4.1 Reflecting on Nonaka and Takeuchi’s Knowledge Creating Theory

The application of the Analytical Constructs derived from Nonaka and Takeuchi’s Knowledge Creating Theory has presented an opportunity to experience first hand the strengths and weaknesses of the theory in relation to the concerns expressed in Section 2.4.4. On the basis of the limitations discovered in the application of their theory in this study it appears that the criticisms of Nonaka and Takeuchi in relation to their understanding of tacit knowledge and its relationship to explicit knowledge has some foundation. The mobilisation of tacit knowledge that Nonaka and Takeuchi identify as fundamental to the task of the management of knowledge in organisations is not just a matter of managing a transformation of tacit knowledge to explicit knowledge but requires each knowledge form to be treated as separate processes needing alternative management strategies.

In response to these criticisms, Nonaka with von Krogh has sought to clarify his position on the questions of the knowledge continuum and knowledge transformations (Nonaka & von Krogh, 2009). They re-iterate that some aspects of tacit knowledge are embodied within people’s thoughts, viewpoints, skills and practices and are not
amenable to being made explicit. He argues that this is consistent with Polanyi’s view and has been a source for some misunderstanding (Nonaka & von Krogh, 2009, p. 640). They go on to reason that some aspects of a scientist’s tacit knowledge must be the basis for scientific knowledge. They cite examples that would lead to explicit knowledge such as “experiences of discovery processes, the results of...successful improvisation with instruments...errors to avoid when replicating experiments” (Nonaka & von Krogh, 2009, p. 641). Accordingly Nonaka and von Krogh reason that explicit knowledge does not represent a distinct entity from tacit knowledge but seeks to convey important insights about beliefs held by a person or a group of people that are justified and purportedly true. This is why they maintain their support for the knowledge continuum.

The knowledge continuum is further justified as a useful construct that continues to generate important and relevant questions for managers to consider. The benefits that flow from such questions are that managers are better able to distinguish between knowledge assets that are more visible and amenable to exploitation by the organisation (for example, technology and procedures) from other assets that required “several layers of ‘thick’ interpretation to be understood (e.g. expertise or organizational culture)” (Nonaka & von Krogh, 2009, p. 641). Interestingly, this argument resonates with Gourlay (2006, p. 1424) who suggests that the distinction between tacit knowledge and explicit knowledge from a management perspective is possibly best understood as the management of two sets of behaviours where the latter (explicit knowledge) is more straightforward than the former (tacit knowledge).

The relationship between tacit knowledge and social interaction is an area they concede requires further work by organisational knowledge creation theorists. However, Nonaka and von Krogh (2009, p. 644) argue that dialogue has been confused by differing research agendas. One of these research agendas seeks to define tacit knowledge development within a relatively well-defined community of practice (as exemplified by Cook & Brown, 1999) where the prime purpose is to produce specialists and deal with the complexity of problems within normal operations of the organisation. The other research agenda, and the one that Nonaka aligns himself with, is one that studies organisations that actively and regularly create new products such as motorcar manufacturers. The generation of new ideas (innovation) is not only necessary but
requires management as a whole-of-organisation pursuit. As a consequence, the application of insights from the former area does not take fully into account the challenge of managing organisation-wide innovation across professions in an uncertain context. In outlining future research in better defining the relationship between tacit knowledge creation and social practice he suggests that the knowledge conversion thesis offers a pathway to broaden the scope of community-of-practice research.

Regrettably Nonaka and von Krogh (2009) do not address the construct of the Knowledge Spiral which arguably embodies the most controversial aspects of Nonaka and Takeuchi’s theory of knowledge conversion. In contrast to the ordered process of conversions defined by the Knowledge Spiral, it appears that Nonaka and von Krogh are comfortable with the ad hoc nature of idea development or problem solving. For example, they describe a scenario where a marketer of clothing draws upon the insights generated through interaction with groups of young people and combines this with personal knowledge as well as explicit knowledge (memos, charts, video shots) to develop not only her own knowledge but others as well (Nonaka & von Krogh, 2009, p. 638). Strictly speaking this example is not consistent with the Knowledge Spiral because it does not follow the ordered sequence of the SECI model. If one adopts Nonaka and von Krogh’s broader frame of the innovating organisation one could surmise that the Knowledge Spiral refers to organisation-wide processes of successfully innovating organisations rather than the micro-level problem solving of the fashion designer.

So, on reflection, the noted inconsistencies of the SECI model discovered in this research and, its apparent consistency with Cook and Brown’s insights, may ultimately relate to the appropriateness of Nonaka and Takeuchi’s Knowledge Creating Theory for small-scale problem solving or perhaps even for organisations where innovation is not the prime focus. Certainly, the application of the Analytical Constructs to the Community Engagement Program in Parkdale CTC, which addressed complex problems of social disadvantage in the locality, yielded accounts that were most consistent with Nonaka and Takeuchi’s Knowledge Creating Theory. In contrast, the more stable and commercially secure initiatives of the community newspaper (Rangemoore) and IT training (Viewbank) were found to present instances in which
Socialisation was less important. The lesson appears to be one where further application of Knowledge Management theory to community-based applications of ICTs would benefit from this ongoing debate about the relationship between social practice and knowledge creation.

6.4.2 Reflecting on Community Informatics

The significance of the study for CI research is that the concept of innovation, identified by Gurstein as a rationale for the support of community-based technology centres (see Section 2.3.1), is found to be with merit. The analysis carried out in each of the in-depth cases in relation to ICT use addressed three themes important to CI theorists: complexity; effective use and sustainability (see Section 3.2.2).

The first theme of complexity alludes to the difficulty in analysing socio-technical relations that exist with ICTs. In addressing this challenge, de Moor (2009a, 2009b) and Stillman (2010) identify the need for methods that are able to systematically analyse complex socio-technical processes. The application of the Analytical Constructs to the three in-depth cases was designed to achieve such a requirement. In doing so, the analysis of the in-depth cases using the Analytical Constructs enabled a credible account to be given of diverse cases on the basis of Nonaka and Takeuchi’s Knowledge Creating Theory. Despite the limitations of the theory it can be concluded that this method is of value to CI theorists and worthy of further theoretical development.

The second theme of effective use focuses on the benefits that communities achieve through their use of ICTs. The relevance of this concept to the research can be assessed in relation to the general assessment that CTCs were judged as successful social enterprises. Effective use of ICTs was further supported by over 200 examples of innovative ICT-based initiatives that were reported by members of the CTCA (see Table 4.3). Furthermore, the application of the Analytical Constructs enabled a more detailed appreciation of some of these initiatives in terms of their relevance to local problems (Paradox), their need for tacit knowledge and explicit knowledge creation (Epistemology) and the significance of these activities to numbers of people in the community (Ontology). Finally, it was possible to characterise how these various
aspects combined (Knowledge Spiral). In summary, the research was able to provide a comprehensive and systematic response to the CI theme of effective use.

The third theme of sustainability is directly relevant to the research goal of the thesis, which set out to develop a theory-based rationale to place in context the success of CTCs as social enterprises in situations of limited income support. The thesis was able to systematically address the theme of sustainability through the application of the Analytical Construct of Epistemology, more specifically the SECI model, to demonstrate varying propensities of CTC initiatives to generate income. The Analytical Construct of Ontology was also able to address another aspect of sustainability that related to the numbers of people who involved themselves in using ICTs. The analysis was able to reveal that support for many initiatives existed even though some were not viable from a commercial perspective. The application of these constructs revealed the relevance of community-based knowledge creating processes to sustainability as they responded to the uncertainties of their local environment through the use of ICTs. The community’s desire to support initiatives that were of benefit despite their low commercial viability was found to be germane to the notions of sustainability. Accordingly, the theory-based rationale enables both commercial and non-commercial initiatives to be considered when meanings of sustainability are being negotiated within communities.

6.4.3 Reflecting on Social Development Theory

Given the influence of Hall and Midgley’s work in structuring the analysis along the lines of community, the private sector and government, it is appropriate to reflect on their vision for ‘holistic development policy’. As detailed in Section 2.2.3 this vision sought to draw on the relative strengths of each of the three approaches that Hall and Midgley described; Populist, Enterprise and Statist respectively. The potency of Populist approaches is that they are well suited to mobilising community resources and participation in social development in ways that address needs that are articulated by the community. The strengths of Enterprise approaches are the promotion of efficiency via the use of economic incentives and recognition of income-generation as an important element in social development. Finally, Hall and Midgley wish to see the strengths of
government be put to more effective use in ways that better ensure people’s basic needs and freedoms and the private sector is adequately regulated.

They go on to state that the incorporation of these strengths is complicated by the sometimes-contradictory nature of these goals as well as by the limitations of people’s ideologies that purport to understand how the world works. In response, Hall and Midgley claim that the key to holistic development policy is the need for tailoring to suit specific circumstances. As situations have multiple dimensions, accordingly policies must be versatile actors in order to effectively address local conditions (Hall & Midgley, 2004, p. 37).

Of prime relevance to Hall and Midgley’s (2004) desire for more effective Social Development Theory were instances in this research where reliance on the private sector to create commercially viable CTCs was severely tested because of poor income generation. Given the socially valuable function that CTCs were performing, some managers claimed that a clear case for government intervention existed. Such reasoning resonates with the arguments of commentators who argued for government assistance on the basis of market failure prior to June 2005 (see Section 2.2.4). These conditions represent a worthy case in which to explore Hall and Midgley’s call for a more holistic development policy.

The theory-based rationale that was employed in this study enables non-commercial initiatives of value to the community to be identified and separated from commercial initiatives on the basis of knowledge-creating activities. As non-commercial initiatives do not compete for private sector investment it is appropriate that these initiatives be separated from activities that are suitable for commercial exploitation. On this basis, activities that will contribute to social development through the application of efficient economic practices can be fully exercised. It then remains to determine how best to manage non-commercial activities that are judged valuable by the community.

Ensuring responsible supervision of projects emerges as a problematic aspect when considering the possibility of supporting non-commercial actions by way of private or public subsidy. Given the requirement that control over local activities remains within the community, questions about what control should be afforded to a possible
benefactor surface. As discussed in Section 2.3.2, Arrow identifies potential conflicts when dealing with the support of innovation at the technological frontier. While government is considered a suitable source of funding on the basis of its risk-bearing capacity, the goals of government do not readily align with the practice of innovation. Arrow (1962, p. 624) alludes to the possibility of poor government management of projects because of the motivation underlying government decision making, which may negatively influence knowledge creation either through risk-averse bureaucrats or excessive centralisation.

Of greater significance is Arrow’s contention that the reduction of risk that comes with benefactor support will in turn lessen the incentive to succeed. So if measures to mitigate risk are too strong, the incentive to succeed that comes with the risk of failure is reduced or removed. The mitigation of risk, while maintaining the incentive to succeed, represents a difficult ‘balancing act’.

It is interesting to reflect on aspects of the case study accounts that resonate with this dilemma. Some managers expressed anguish over the difficulties they experienced in servicing community needs through non-commercial initiatives encapsulated in the exasperated statement from Parkdale’s manager:

CTCs are a concept set up to fail!

A similar sentiment was expressed by Ferndale’s manager when he quipped:

A solution to market failure [CTCs] are meant to be a market success!

On the other hand, the case of Siestaway reveals a case where the financial security guaranteed in their contract with local government to run the local visitor bureau was so unpopular with volunteers that they were hostile in their comments about the CTC and its manager (see Box 4.1).

Set within the broader economic rationalist policy setting agenda described by Pusey (1991), it can be seen that significant incompatibilities arose between espoused economic theory and practical outcomes in regional Australia. In order to provide an avenue to enable a more effective social development outcome in regional areas without
completely abandoning market based policies it is beneficial to consider the work of Arrow.

In seeking to ensure that innovation occurs in spite of its non-commercial nature, Arrow suggests that a contract between benefactor and innovating organisation be established to enable the balancing act between risk and incentives to be more effectively managed. He acknowledges that in seeking to define the conditions of such a contract it is not possible to state in advance a specific outcome. Rather he advises that conditions be developed that require the organisation to show diligence in responding to the uncertainty that it must address. In recognising the inherent uncertainty of the situation the purpose of the contract is to codify behavioural requirements of innovators rather than attempting to specify outcomes.

Arrow’s (1962, pp. 623-625) suggestion for a contract represents a potential area to extend from this research because it draws on the relative strengths of the three primary approaches of Populist, Enterprise and Statist that Hall and Midgley identify as being necessary for holistic development policy. This is reflected in the autonomy of local communities to decide on relevant initiatives that reflect local needs. Entrepreneurship and the promotion of efficient economic practices are encouraged through the separation of commercial activities from non-commercial innovative activities. The strength of government is in its relative size; it is able to fund measured and strategic support of social development projects. The contract enables local autonomy over projects to remain but ensures that incentives to succeed are in place to encourage responsible use of subsidies. Given the private sector’s lack of desire to support non-commercial innovative activity, the limited support of government does not theoretically contravene competitive neutrality provisions. Hence, other initiatives that are offered on a competitive basis on the open market should not be affected by government’s strategic support of specified knowledge-creating activities. Given the potential of these ideas, the work of Arrow and its applicability to Social Development Theory are a suitable area for future research.
6.5 Future Research

Given the limitations of the research, a number of research projects can be outlined. Beginning with the achievement in using Knowledge Management Theory to better understand community-based technology centres a number of areas are suggested. As an initial step, the qualifications that Cook and Brown seek to provide to Nonaka and Takeuchi’s Knowledge Creating Theory represents one area that the thesis has outlined for future research. As well as challenging the circularity of knowledge-creating processes as described by the Knowledge Spiral, they also wish to delineate a difference between knowledge when used by individuals from knowledge that is used by groups (Cook & Brown, 1999, pp. 385-386). Other critiques of Nonaka and Takeuchi revolve around their understanding of the philosophical underpinnings that give rise to the concept of tacit knowledge (Gueldenberg & Helting, 2007; Ray, 2008). These contentions have potential to provide further insight into knowledge creation within community-based technology centres. For example, one could emulate the example of Ray (2008) who immerses himself in the life of Polanyi to re-discover the fundamental truths of Polanyi’s understanding of tacit knowledge. Given the potential benefit to better understand knowledge development within communities, greater attention to the issue of tacit knowledge creation within communities appears as a potentially productive line of research.

The extent to which such work brings greater clarity to complex social processes that involve ICTs at the community level will be of interest to CI theorists. Even though Gurstein (2008) is pleased to note that CI research appears to be growing in stature and popularity, limitations to further growth are apparent. Given de Moor’s (2009) recent assessment of CI, the need for further theory development and coordination between researchers is ongoing. Greater utility of CI research appears partly dependant on what de Moor (2009b) describes as greater systemisation of research efforts to enable outcomes of research to be better generalised. According to Stillman (2010), fundamental to this project is being able to better incorporate unanticipated outcomes and risk in CI projects. Demand for such research can be seen in the Web Services Development initiative in Viewbank CTC where attention was drawn to early stage knowledge development. Given the theory used in this study, one can see the need for
ongoing research into early stage tacit knowledge development where one-to-one interaction of Socialisation represents a key process in dealing with the uncertainty of CI projects.

The presence of risk within CI projects leads to Arrow’s (1962, pp. 623-625) suggestion of a contract to balance risk and incentives. A contract potentially provides an effective means that is able to guide community, the private sector and government in their interaction with CTCs. Some basic features of a contract that are worthy of attention in future research relate to the need to support knowledge creation in ways that do not eliminate risk as an incentive to succeed. To that end, the contract is required to cover the costs of engaging an innovator (individual or organisation) but does not (or cannot) specify an outcome. In order to mitigate the negative consequences of poor management Arrow suggests that such contracts be awarded on the basis of past performance. While the contract does relieve some of the burden of risk by underwriting costs, the incentive to succeed remains with contractual obligation and the added personal standing that will come to successful completion of the project that leads to community benefit.

In relation to the potential application of this idea to CTCs, the critical role that managers were found to play in setting the priorities of the CTC suggests that this individual would satisfy the requirements suggested by Arrow. In the accounts of the in-depth cases, managers were found to be influential in directing activities that had a direct bearing on knowledge creation. They were able, often in consultation with the management committee, to sanction knowledge-creating activities. Nonaka and Takeuchi’s identification of the management process of justifying concepts has utility within this context. The four Analytical Constructs offer a number of points of reference to better describe intended innovative activities. For example it is possible to determine through the application of the Analytical Construct of Epistemology whether activities will be predominantly concerned with tacit knowledge or explicit knowledge. The application of the Analytical Construct of Ontology enables assessments to be made of the scale of knowledge creating activities. It is therefore possible to gain greater clarity in the terms of any contract based on the application of the Analytical Constructs to initiatives. To this end, the advice that Arrow delivers on contracts in conjunction with
the Analytical Constructs employed in this thesis has potential for application within CTCs and for future research in other community-based technology projects.

In summary, non-prescriptive and non-positivist advice that the thesis delivers to CI practitioners, academics and policy makers is that the task of CTC management is akin to the venture capitalist or university researcher where the outcomes of innovation are uncertain and risky. The difficulty in establishing a stable commercial service is similarly fraught with challenges. Policy makers have a key role in encouraging entrepreneurial activity in ways that do not inordinately punish practitioners for failure but, on the other hand, encourage responsible use of funds. The key response to this circumstance appears as one of a bi-lateral arrangement between government and communities on a project-by-project basis occurs in ways that ensures community autonomy is maintained and expenditures are monitored to ensure waste of public funds does not occur.

6.6 Conclusion

The research goal of the thesis was to develop a theoretical rationale for ongoing interaction of community, private sector and government with CTCs that promotes their success as social enterprises in contexts of limited income. The need for a theoretical rationale is born out of the philosophical underpinnings of the NSW CTC Program that privileged initiatives on the basis of commercial benefit. It was clear from this case that such a philosophy leads to insufficient recognition of the value of knowledge creation to local communities. This has profound significance for similar projects around the world which are similarly challenged to become commercially sustainable.

The theoretical response of the thesis, therefore, is to highlight the need for knowledge creation as fundamental to the work of CTCs as they responded to the problems of their local communities. This approach enables an understanding to be developed of the work of CTCs which in serving their communities, struggled to develop initiatives that were of commercial value. Key to this understanding is the level of uncertainty that characterised the problems of CTCs where the need for complex knowledge-creating activities in response to greater uncertainty worked against their commercialisation.
The thesis finds that the limitations of the NSW CTC Program lay in the reliance on commercial viability of initiatives to create sustainable CTCs when the question of uncertainty had not been adequately addressed. While the program was successful in unleashing a wave of creative endeavour in communities that were responsive to their problems, the difficulties of commercialising such initiatives were not given sufficient consideration. The neglect of the planners to adequately address activities that were of clear benefit to the community but inherently non-commercial remains a curious omission in the light of insights generated by this research. On the basis that CTCs were sponsors of innovation, the economic arguments pointing to the failed aspects of the CTC program can be found in Arrow’s work from 1962.

In order to redress the failed aspects of the NSW CTC Program, the theory-based rationale enables a diverse range of initiatives undertaken by CTCs to be considered in relation to their relevance to local problems. In being able to discriminate between initiatives on the basis of their knowledge-creating attributes it is possible to better target initiatives for support for their innovation-related attributes without undermining the goal of economic efficiency.

To this end, the interests of community, the private sector and government are addressed. The autonomy of communities to manage their CTCs in ways that address local problems is maintained. The interests of the private sector are recognised because the efficiencies delivered through competition are promoted through the identification of initiatives that are amenable to commercial exploitation. Government, as the body responsible for creating conditions for the progress of society, can justify its support of selected initiatives on the basis of their innovative potential without undermining competition in local economies. As pointed out by Gurstein, this mode of support is common in the financing of research at the technological frontier and the investigation of this study supports the application of this argument to the innovative work of CTCs.

The fundamental challenge here is defined by the need to support knowledge creation in ways that do not eliminate risk as an incentive to succeed. Arrow’s suggestion of a contract-like arrangement between underwriter and innovating organisation can be used to model a strategic relationship between government and individual CTCs. Such an
approach recognises the diversity of circumstances that CTCs address and provides ways for CTCs to respond to the needs of their communities in ways that simultaneously promote the attainment of social progress and economic efficiency.
References


Appendix A  CTCA Documents Analysis

A.1 CTCA Membership Data

Two documents from the CTCA provided important data about the operations of CTCs after June 2005. These two documents were an unpublished report of the CTCA titled ‘CTC Statistics for 2005/06 Financial Year’ and internal membership data obtained from the CTCA referred to as ‘2007-2008 CTCA Membership Returns’. Both of these documents can be found on the CD-ROM included in the rear cover of the thesis.

As discussed in Section 4.2, the documents were considered primary sources of information that contained a number of anomalies. These mainly occurred in the ‘2007-2008 Membership Returns’ where late payment of membership dues and neglect to submit requested information meant that some financial members were not fully detailed. Hence the 46 centres detailed here is less than the eventual membership of 54 for the CTCA in July 2008.

A.2 Analysis of CTCA Membership Data

Analysis of the two CTCA documents was carried out to address research questions RQ1 and RQ2. As detailed in Section 4.2, membership data was used to ascertain the numbers of CTCs that were still operational in June 2008 as required by research question RQ 1.

In response to research RQ 2 detailed in Section 4.3, a two-step process was undertaken to categorise initiatives. The first step was aimed at tagging each initiative with meaningful descriptions (see Figure A.1)

Some of these descriptions were derived from the designations used by CTCA. Examples of such were: government (national, state and local); youth; seniors; business; indigenous; and community. Other descriptions were also used for tags to better designate the nature of such initiatives such as training, hosting of groups, and production of multimedia. To that end five categories were used to organise activities:

- government services (national, state and local);
• training services;
• hosting of community groups;
• multimedia production; and
• business support services.

The second step to the process was to count the number of times each tag was associated with various reported initiatives (see Figure A.2). This enabled Table A.1 to be developed that is used in the thesis to indicate the relative popularity of initiatives (see Section 4.3.1.1).

Figure A.1 Example of how initiatives were initially tagged

Figure A.2 Example of how tagged initiatives were grouped
## Table A.1 Initiatives arranged on the basis of categories derived from CTCA data

<table>
<thead>
<tr>
<th>Category</th>
<th>Initiatives</th>
<th>Number of CTCs that nominated this initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>National</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Australian Taxation Office</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Centrelink</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Medicare</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Community engagement program (indigenous)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Others (environmental, crime prevention,</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>rehabilitation service)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>State</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Access NSW</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Department of Fair Trading</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Health centres</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Other (housing, car pooling scheme, Countrylink</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>agency)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tourism office</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Library</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Collect rates</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Community meetings</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (seniors)</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (youth)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (cyber safety)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (small business)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (work-for-the-dole)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Computer repair (work-for-the-dole)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Office admin (work-for-the-dole)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Hiring of facilities to employment services for</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>training (work-for-the-dole)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of ICTS, (software such as Adobe Photoshop)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Use of ICTS (all ages/not specified)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Hiring of facilities to private adult education</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>providers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learner Driver Scheme</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Information Service (business, grants, local</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>etc)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hosting of Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seniors</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Youth (Games LAN party)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Youth (homework)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Indigenous</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Women, mothers, playgroups</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>All ages (not specified)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Other e.g. chess, music, car poolers, genealogy,</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>remedial massage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multimedia Production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Community Newsletters/Newspapers</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Printed publications</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CD-ROM</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Website hosting and ecommerce</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Art/photo exhibition</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Narrowcast radio</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hosting of Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Secretarial services</td>
<td></td>
</tr>
</tbody>
</table>

Important information about volunteers from the second CTCA document was used to respond to research question RQ2. Two columns of the ‘2007-2008 CTCA Membership
Returns’ indicated the number of volunteers and the estimated hours of contributions they made (see Table A.2).

Table A.2 Calculation of the estimated average hours contributed to each CTC by volunteers

<table>
<thead>
<tr>
<th>n</th>
<th>No. of volunteers</th>
<th>Total hours worked/week</th>
<th>n</th>
<th>No. of volunteers</th>
<th>Total hours worked/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>45</td>
<td>24</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>36</td>
<td>25</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>106</td>
<td>26</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>15</td>
<td>27</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>28</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>48</td>
<td>29</td>
<td>2</td>
<td>10</td>
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<tr>
<td>8</td>
<td>6</td>
<td>30</td>
<td>30</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>12</td>
<td>110</td>
<td>31</td>
<td>19</td>
<td>237</td>
</tr>
<tr>
<td>10</td>
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<td>0</td>
<td>32</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>40</td>
<td>33</td>
<td>14</td>
<td>20</td>
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<tr>
<td>12</td>
<td>3</td>
<td>6</td>
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<td>39</td>
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<td>13</td>
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<td>35</td>
<td>5</td>
<td>10</td>
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<tr>
<td>14</td>
<td></td>
<td></td>
<td>36</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>42</td>
<td>37</td>
<td>120</td>
<td>1200</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>3</td>
<td>38</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>24</td>
<td>39</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>18</td>
<td>10</td>
<td>32</td>
<td>40</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>19</td>
<td>12</td>
<td>50</td>
<td>41</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>0</td>
<td>42</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>21</td>
<td>0</td>
<td>0</td>
<td>43</td>
<td>40</td>
<td>250</td>
</tr>
<tr>
<td>22</td>
<td>0</td>
<td>0</td>
<td>44</td>
<td>8</td>
<td>120</td>
</tr>
<tr>
<td>23</td>
<td>4</td>
<td>40</td>
<td>45</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>46</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>389</td>
<td>1728</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total CTCs with Volunteers</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Estimated average of hours/CTC/week</td>
<td>45.5</td>
<td></td>
</tr>
</tbody>
</table>

1 The stated figure of ‘30-40’ was averaged to ‘35’
2 The data associated with this CTC stands out as being inordinately high. Assuming an error has occurred the total number of hours stated for this CTC has not been counted in the total number of hours even though the CTC has been counted as one with volunteers. The impact of this correction is to underestimate the average number of hours contributed to each CTC by volunteers.
Appendix B  Design of Interview and Survey Instruments

B.1  Introduction

This appendix describes the development of research instruments that were used in the research. Three instruments were required to gather information from CTC staff through semi-structured interviews, volunteers using surveys and customers using surveys. Each of these is described in the following sections respectively.

B.2  Design of Interview Instrument

The interview instrument was divided into five sections. The five sections were designed to gather information about CTCs for the following purposes: administering the research, discovering the primary attributes of the CTC in terms of opening times and equipment; sources of material and non-material support; volunteer support; future outlook; common activities, significant events and achievements in the recent past; and areas of capability development.

B.2.1 Interview Instrument: Section 1

The questions found in Section 1 of the interview instrument gathered data that uniquely identified each of the cases (see Box B.1). Included in this part of the interview instrument was the Centre name (Question 1) and whether the manager was willing to be contacted again after the conclusion of this research visit (Question 2).

Question 3 provided an indication of the equipment that the CTC possessed. The purpose of this information was to gain an appreciation of the nature of equipment that was available in various locations. The following question, Question 4, recorded the opening times of the CTC. Knowledge of opening hours provided an indication of the level of accessibility to IT-related services that the CTC was able to provide to the community. This question was followed by one that sought to discover whether seasonal factors influenced the opening times of the CTC (Question 5).
### Box B.1 Section 1 Questions about important attributes of the CTC

1. Centre Name: ______________________

2. Do you agree to being contacted in the future for a follow-up study (should it be required)?
   - [ ] Yes
   - [ ] No

3. Facilities offered by the CTC.
   - a) How many computers?
   - b) How many Printers? _____
   - c) How many Scanners?
   - d) Fax machine? _____
   - e) Photocopier? ______
   - f) Are any other technologies offered by the CTC?

4. Since 1 February 2007 what have been the opening hours of your CTC?
   - Monday ___________ Tuesday ___________ Wednesday ___________
   - Thursday ________ Friday ___________ Saturday ___________
   - Sunday ___________

5. Do seasonal or other factors mean that the hours of operation as listed in Question 4 change? If yes, please explain (briefly)

6. What issues or problems are most relevant to your local community? Some examples may be youth unemployment, closure of local banking services, drought in rural areas.
   - 1.
   - 2.
   - 3.

7. What is the population of the local area? __________________________
Information was then gathered about the locality in which the CTC was situated. Managers were asked to nominate two or three significant problems that were central to the thinking of community members. The identification of problem foci in the community was related directly to the first analytical construct derived from Nonaka and Takeuchi’s knowledge creating theory.

The local population number was then requested in Question 7. This was for informational purposes for the benefit of the researcher during interviews. The figures recorded in the thesis are derived from the Australian Bureau of Statistic 2006 Census Data (ABS, 2006). By way of explanation, two relevant figure are provided by the ABS: a State Suburb figure refers to a census-specific area that approximates a gazetted suburb and locality; and Urban Centre or Locality figure, which refers to recognised population clusters (more than 1000 people and 200-999 people respectively) that may extend geographically beyond the town limits of gazetted suburb. As it is conceivable that those who lived out of town may make use of CTC facilitates the Urban Centre or Locality figure were used.

B.2.2 Interview Instrument: Section 2

The means by which the CTC gained material and non-material support for its initiatives was investigated in Section 2 of the interview instrument (see Box B.2). In this case, information was obtained by probing managers about possible sources of income. The following were used to prompt thinking: fees from users; service provision (training courses, office services); commercial sponsorship; and sale of IT products (CDs DVDs, newspapers). Other means of material support were also investigated such as subsidies from a private or public source or from a related business. These specific factors were derived from interviews with the managers of two CTCs visited in December 2005 and November 2006 as well as information derived and presentations at the 2006 ‘Inspire’ Community Technology Centres Conference hosted by the CTCA at Dunmore Lang College, North Ryde, NSW, Australia, 18-19 September 2006.
Box B.2 Guide questions about income producing initiatives

8. What sources of revenue are used to fund the initiatives in your CTC? Select the most appropriate option for each line. In this context
   a. ‘Major source of revenue’ can be assessed as being sufficient to threaten the centre’s viability should this source disappear.
   b. ‘Moderate source of revenue’ would place the CTC under financial pressure but could continue to function.
   c. ‘Minor source of revenue’ – the disappearance of this revenue will not create significant change to financial position.

<table>
<thead>
<tr>
<th>Major source of revenue</th>
<th>Significant source of revenue</th>
<th>Minor source of revenue</th>
<th>Not relevant to our CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees from users</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Subsidies from public sources</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Subsidies from private sources</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Service Provision</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Commercial sponsorship</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sale of CTC information products</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Subsidy from a related activity</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (Please explain)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

If ‘Other’ was selected, please explain.

________________________________________________________________________

In distinguishing between these levels of support respondents were asked to consider the impact should a nominated source of revenue disappear. In order to gain consistency between managers the level of impact was rated using the following descriptors: the removal of a ‘major’ source of income was considered sufficient to threaten the centre’s viability; the removal of a ‘moderate’ source of income would place the CTC under financial pressure but could continue to function; and the removal of a ‘minor’ source of income would not create significant change to the financial position of the CTC. Asking managers to provide a round dollar figure was considered less meaningful because CTCs
were of different sizes. For comparative purposes it was considered more useful to ask managers to assess the impact should this source of income disappear.

Clarification was also required in the distinctions made between subsidies from private sources and commercial sponsorship. While grant givers may welcome recognition for their contributions commercial sponsorship arrangements are defined by the explicit requirement for recognition by way of advertisements in a newsletter or on a website.

B.2.3 Interview Instrument: Section 3

In Section 3 of the interview instrument (see Box B.3), Question 9 asked about the number of hours that staff were paid. Question 10 went on to record the contributions that volunteers made to the CTC. In order to simplify the assessment of such contributions managers were asked to indicate the numbers of volunteers who contributed more or less than four hours per week to the CTC respectively.

Managers were then asked to provide a qualitative assessment of the viability of the CTC in the coming year (Question 11). Rather than requesting detailed financial data that was not amenable to comparison because of the wide range of factors involved, the collective knowledge of managers about future operations was drawn upon to gain a measure of confidence about the future for the purposes of comparison.

Box B.3 Guide questions about volunteers and future outlook

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>How many hours of paid staff need to be covered? ____________________________</td>
</tr>
<tr>
<td>10.</td>
<td>Do you have volunteer staff? □ Yes □ No</td>
</tr>
<tr>
<td></td>
<td>a. How many of your volunteers contribute more than 4 hours of work per week? ____________</td>
</tr>
<tr>
<td></td>
<td>b. How many volunteers contribute less than 4 hours per week? ____________</td>
</tr>
<tr>
<td>11.</td>
<td>How would you assess the financial position of your CTC?</td>
</tr>
<tr>
<td></td>
<td>□ Precarious - we are facing closure in the next financial year</td>
</tr>
<tr>
<td></td>
<td>□ Vulnerable – we are just surviving</td>
</tr>
<tr>
<td></td>
<td>□ Comfortable – the outlook for future operations is positive</td>
</tr>
</tbody>
</table>
B.2.4 Interview Instrument: Section 4

In Section 4 of the interview instrument managers were asked to recount regular activities, achievements and special events at the CTC (see Box B.4). As well as recapping on possible sources of income already identified in Section 2, this question also captured activities not recognised as income producing activity but still considered worthwhile. The two questions used to gain this information were:

*Describe group based activities that your CTC undertakes on a regular or ad hoc basis.*

*What achievement(s) or notable event(s) have marked the CTC’s history to date?*

Managers were then asked what ICTs were used in these activities.

*If IT (information technology) was used in this activity describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).*

As indicated in the following questions, information was then requested in relation to learning by people within the CTC and the broader community.

*In your assessment what did CTC participants, as individuals or as a group, learn from this activity?*

*In your assessment did the broader community learn anything from this activity? If so what?*

This question was subsequently modified after Trip 1 (see Table C.1) because interviewees seem to be confused by the concept of learning. In order to better orientate respondents they were firstly asked to reflect upon benefits. They were then probed about specific examples of learning. The following modified questions were used in the gathering of research data from Trip 2 and subsequent trips (see Table C.1).

*In your opinion, what were the benefits of this activity to the CTC? (Prompt for learning outcomes if not forthcoming).*

*In your opinion did the broader community benefit from this activity? If yes, in what way? (Prompt for learning outcomes if not forthcoming).*
Finally managers were asked to comment on whether such activities and events were related to local problems. This is in line with the theoretical proposition that these activities, if rooted in problem solving, could be associated with innovative activity and was considered in relation to Question 6 in Section 1 (see Appendix B.2.1).

Did this activity address a problem that is of concern to your CTC or community? If so, please specify.

The identification of activities and achievements or events proved to be useful touchstones in interviewing other staff members at the CTC.

Box B.4 Summary of interview questions pertaining to regular activities

<table>
<thead>
<tr>
<th>CTC Activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe group based activities that your CTC undertakes on a regular or ad hoc basis.</td>
</tr>
</tbody>
</table>

If IT (information technology) was used in this activity describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).

In your assessment what did CTC participants, as individuals and as a group, learn from this activity? Version 1

In your opinion, what were the benefits of this activity to the CTC (Prompt for learning outcomes if not forthcoming)? Version 2

In your assessment did the broader community learn anything from this activity? If so what? Version 1

In your opinion did the broader community benefit from this activity? If yes, in what way? (Prompt for learning outcomes if not forthcoming) Version 2

Did this activity address a problem that is of concern to your CTC or community? If so, please specify.
Box B.5 Summary of interview questions pertaining to notable one-off achievements and events

<table>
<thead>
<tr>
<th>Achievement and Events.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What achievement(s) or notable event(s) have marked the CTC’s history to date?</td>
</tr>
<tr>
<td>Achievement/Event 1. ______________________________________________________</td>
</tr>
<tr>
<td>If IT (information technology) was used in this achievement/event describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).</td>
</tr>
<tr>
<td>__________________________________________________________________________</td>
</tr>
<tr>
<td>In your assessment what did CTC participants, as individuals and as a group, learn from this achievement/event?</td>
</tr>
<tr>
<td>Version 1</td>
</tr>
<tr>
<td>In your opinion, what were the benefits of this achievement/event to the CTC? (Prompt for learning outcomes if not forthcoming) Version 2</td>
</tr>
<tr>
<td>__________________________________________________________________________</td>
</tr>
<tr>
<td>In your assessment did the broader community learn anything from this achievement/event? If so what? Version 1</td>
</tr>
<tr>
<td>In your opinion did the broader community benefit from this achievement/event? If yes in what way? (Prompt for learning outcomes if not forthcoming)Version 2</td>
</tr>
<tr>
<td>__________________________________________________________________________</td>
</tr>
<tr>
<td>Did this achievement/event address a problem that is of concern to your CTC or community? If so, please specify.</td>
</tr>
</tbody>
</table>

B.2.5 Interview Instrument: Section 5

Section 5 of the interview instruments was designed to gain an indication of what knowledge managers believed community members had developed as a consequence of their involvement with the CTC (see Box B.6). The questions used to gauge the nature of knowledge development were derived from interviews with the managers of two CTCs visited in December 2005 and November 2006 as well as information derived from presentations and interviews at the 2006 ‘Inspire’ Community Technology Centres Conference hosted by the CTCA at Dunmore Lang College, North Ryde, NSW, Australia, 18-19 September 2006. The question types distinguish between three levels of ICT knowledge development; novices, experienced or highly experienced users (see Questions 1-3). In order to clarify what these differing levels of knowledge were being referred to, examples of relevant software and activities were given.
Box B.6 Summary of interview questions pertaining to knowledge development

**Capabilities**

The following list of statements indicates knowledge and skills people who have visited a CTC may have learnt. To the best of your knowledge, indicate your level of agreement with the following statements.

The CTC has been a place in which people have learnt…

1. … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

2. … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

3. … high level IT skills such as web page design or multimedia software (e.g. Adobe Photoshop, audio and video editing).
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

4. … how to participate in a community group.
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

5. … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

6. … how to manage a community group (take a leadership or training role).
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

7. … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list etc.)
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

8. … how to use IT to participate in online community groups such as “Bebo”, “My Space”, YouTube, game communities and so on.
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

9. … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).
   - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

10. … how to use IT to better manage a business.
    - [ ] Strongly agree  [ ] Mildly Agree  [ ] Not sure  [ ] Mildly Disagree  [ ] Strongly disagree

11. Did the previous statements miss out on an area of learning that you have experienced in your CTC? If so, please describe this below?
Another area of activity considered important by managers at the CTCA conference was the social interaction within CTCs, particularly participation in community groups (Question 4). Following on from this theme the use of ICTs to better manage community groups and businesses were indentified as another important area of skill development for CTCs (Questions 6, 7 and 10). Two other ICT themes were scrutinised that related to online groups using social media programs (Question 8)) and e-commerce (Question 5). Once again examples were provided to provide some direction as to the meaning of these categories. As a final option, an opportunity to provide an open-ended response was given for areas that were not covered by the previous questions (Question 11).

The questions in Section 5 were used again in Volunteer Surveys and Customer Surveys in order to provide a common point on which to triangulate responses and to discover obvious inconsistencies that could be subsequently followed up.

B.3 Design of Volunteer Surveys

The motivation for volunteer participation was probed through surveys. The survey also enabled volunteers who could not be interviewed during the course of a case study visit to contribute information to the research.

B.3.1 Volunteer Survey: Section 1

Section 1 of the Volunteer Survey was designed to gain an indication of what knowledge volunteers had contributed to their CTC (see Box B.7). The questions used to gauge the nature of knowledge development were derived from interviews the managers of two CTCs visited in December 2005 and November 2006 as well as information derived from presentations and interviews at the 2006 ‘Inspire’ Community Technology Centres Conference hosted by the CTCA at Dunmore Lang College, North Ryde, NSW, Australia, 18-19 September 2006. The question types distinguish between different aspects of ICT-related skill development as discussed in Appendix B.2.5.
Box B.7 Volunteer Survey questions probing for knowledge that volunteers provided to their CTC

<table>
<thead>
<tr>
<th>1. In your role as a Volunteer in this CTC what skills and knowledge have you brought to this CTC?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>This CTC has been a place in which I have shared...</strong></td>
</tr>
<tr>
<td>1. … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>2. … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>3. … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>4. … how to participate in a community group.</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>5. … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>6. … how to manage a community group (take a leadership or training role).</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>7. … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list etc.)</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>8. … how to use IT to participate in online community groups such as “Bebo”, “My Space”, YouTube, game communities and so on.</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>9. … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>10. … how to use IT to better manage a business.</td>
</tr>
<tr>
<td><img src="Checkmark" alt="Strongly agree" /></td>
</tr>
<tr>
<td>11. Did the previous statements miss out on an area of learning that you have experienced in your CTC? If so, please describe this below. ________________________________________________________________</td>
</tr>
</tbody>
</table>
B.3.2 Volunteer Survey: Section 2

Section 2 of the Volunteer Survey gauged the kinds of knowledge that volunteers had developed through their involvement in their local CTC. Hence, the purpose of the question was to see if volunteers also benefited from learning opportunities that were afforded to them. Referring to Box B.8 it can be seen that the same questions categories were used as in Section 1. Once again, if the available choices were not sufficient, respondents were given the opportunity to specify other areas of learning that they were able to benefit from through an open-ended response question.

Box B.8 Volunteer Survey questions probing for knowledge volunteers developed through their participation in the CTC

2. In your role as a Volunteer in this CTC what skills and knowledge have you developed?

This CTC has been a place in which I have learnt...

12. … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

13. … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

14. … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

15. … how to participate in a community group.
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

16. … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

17. … how to manage a community group (take a leadership or training role).
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

18. … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list etc.)
   □ Strongly agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly disagree

19. … how to use IT to participate in online community groups such as “Bebo”, “My Space”, YouTube, game communities and so on...
20. … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).

21. … how to use IT to better manage a business.

22. Did the previous statements miss out on an area of learning that you have experienced in your CTC? If so, please describe this below.

---

### B.3.3 Volunteer Survey: Section 3, Section 4 and Section 5

Section 3 of the Volunteer Survey captured information about the benefits that other organisations in the town may have experienced as a consequence of the volunteers involvement in the CTC (see Box B.9).

In Section 4 volunteers were then asked to provide their reason for their initial participation in the CTC as well as reasons for their continued involvement in the CTC (see Box B.10). The two-part nature of these questions was designed to capture whether their motivation had changed over time. They were also asked to provide an indication of the number of hours they normally gave to the CTC in order to provide an indication of the relative and collective contribution volunteers made to the ongoing operation of their CTC.

Finally volunteers were asked to provide information about themselves to assist with describing the demographics of respondents (gender, age and usual number of hours contributed per week). Volunteers were also given the opportunity to provide an open-ended response to any issues about the research that they felt was important.
Box B.9 Volunteer Survey questions probing for benefits of volunteer involvement to the broader community

3. **Do other people benefit from the things you have learnt at this CTC?**

Are you able to use the skills you have developed in the CTC in other places such as at home, a business or other non-profit organisation?

[ ] Yes [ ] No

If so, what place(s) are you able to use these skills? ______________________________

Box B.10 Volunteer Survey questions probing for factors that motivate involvement, personal details pertaining to age and gender and open-ended response question

4. **What factors motivate you to be part of the CTC?**

What attracted you to join the CTC as a volunteer in the first place?

________________________________________________________________________

________________________________________________________________________

What reason(s) can you give for your continued involvement in the CTC?

________________________________________________________________________

________________________________________________________________________

5. **Background Information**

1. Are you?

[ ] Female [ ] Male

2. What is your age? ______________________________

3. How many hours per week do you normally contribute to the CTC? _____

4. What is the name of the CTC you are at now? ____________________________

5. What is today’s date? ____________________________________________

**Thank you for completing the survey.**

Do you have any other comments to make? ________________________________
B.4 Design of Customer Surveys

The Customer Survey provided information about the use of the CTC by community members. It was possible to gain an indication of the number of visits customers made, whether they had learnt new knowledge and skills at the CTC, what they valued most about the CTC as well as demographic information about gender, age and where they lived. Customer Surveys for the final five case studies contained an additional section, which probed customers about the software, and equipment they regularly used at the CTC.

B.4.1 Customer Survey: Section 1

In order to gain a convenient indication of frequency of use from customers they were requested to nominate the number of times they visited the CTC over the past month (see Box B.11).

Box B.11 Customer Survey question probing for frequency of visits to the CTC on a monthly basis

1. IT (Information Technology) knowledge and skills

Over the past month, how many times have you visited this CTC?

<table>
<thead>
<tr>
<th>A few days a week</th>
<th>Once a Week</th>
<th>Three times this month</th>
<th>Twice this month</th>
<th>Once this month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many days a week?

7  6  5  4  3  2

B.4.2 Customer Survey: Section 2

Customers were asked if the CTC had assisted them to develop knowledge (see Box B.12). This question was chosen to provide a broad response to the central question of knowledge creation that the study addresses. If it was found that the CTC had not been a place of learning, customers were directed to Section 3. For those who had developed new knowledge through their involvement in the CTC they were asked to nominate
their agreement to a series of statements that mirrored those used in the Interview Instrument (Section 5) and Volunteer Survey (Section 1 and 2).

**Box B.12 Customer Survey questions probing for knowledge development in the CTC**

2. Has your knowledge of IT (information technology) improved because of your visit(s) to this CTC?

- [ ] Yes
- [ ] No,

If you answered ‘No’, jump to Section 3.

The following statements describe knowledge and skills that people may learn in a CTC. Select the box that best describes your experience with this CTC.

This CTC has been a place in which I have learnt…

1. … basic IT skills such as using email, browsing the Internet, saving files, using the printer etc..

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

2. … medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

3. … high level IT skills such as web page design or multimedia software (eg Adobe Photoshop, audio and video editing).

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

4. … how to participate in a community group.

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

5. … how to take part in electronic commerce such as e-bay, downloading ringtones or music and so on.

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

6. … how to manage a community group (take a leadership role such as leader or trainer).

   - [ ] Strongly agree
   - [ ] Mildly Agree
   - [ ] Not sure
   - [ ] Mildly Disagree
   - [ ] Strongly disagree

7. … how to use IT to better manage a community group (e.g. maintain membership lists in excel, record minutes, develop rosters, maintain email distribution list etc.)
8. … how to use IT to participate in online community groups such as “Bebo”, “My Space”, YouTube, game communities and so on.

9. … how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).

10. … how to use IT to better manage a business.

11. Did the previous statements miss out on an area of learning that you have experienced in your CTC? If so, please describe this below.

**B.4.3 Customer Survey: Section 3**

In order to gauge the importance of the CTC to the community, respondents were asked what they would miss most should the CTC close down (see Box B.13).

**Box B.13 Customer Survey question asking respondents to nominate three things they valued most about their CTC**

Write down **three** things that you would miss most if the CTC was to close.

1. 
2. 
3. 

The following list may help you decide your three most important things you would miss.

<table>
<thead>
<tr>
<th>Access to broadband</th>
<th>Access to Government Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using email to communicate with friends and family who do not live in the area.</td>
<td>Community group meetings and activities</td>
</tr>
<tr>
<td>Using email to communicate with friends and family who live in the area.</td>
<td>Access to online groups such as Bebo, My Space,</td>
</tr>
<tr>
<td>Friendships with other CTC members</td>
<td>Computer Games</td>
</tr>
<tr>
<td>Having equipment to write and print letters for job applications, school assignments</td>
<td>Online banking</td>
</tr>
<tr>
<td>Learning how to use computers and computer software</td>
<td>eBay</td>
</tr>
<tr>
<td></td>
<td>Producing multimedia – such as webpages, CDs,</td>
</tr>
<tr>
<td></td>
<td>Photograph editing</td>
</tr>
</tbody>
</table>
B.4.4 Customer Survey: Section 4

Respondents were also asked what the purpose of their visit was on the day they had completed the survey. This question was designed to generate a snapshot of typical use. Information was requested that enabled assessments to be made about the respondents’ age and gender and whether they where visitors or local to the area (see Box A2.13). Respondents were also given the opportunity to provide an open-ended response about their CTC or the research.

Box B.14 Customer Survey questions requesting personal information

4. Background Information.

1. The purpose of your visit today was to ____________________________


☐ Female ☐ Male

4. What is the name of CTC you are at now? ____________________________

5. Are you a local or visitor to the area?

☐ Local ☐ Visitor

6. What is today’s date? ____________________________

Thank you for completing the survey.

Do you have any other comments to make? ____________________________

B.4.5 Customer Survey: Section 5

The Customer Surveys that were delivered to case studies 12-17 contained an additional section (see Box B.15). The purpose of this additional section was to gain a quantitative indication of applications and devices that were used by respondents in response to research question RQ6. The list of applications and devices that were nominated were gleaned from interviews undertaken in case studies 1-11. Respondents were also given an opportunity to nominate applications or devices that were not listed. With the addition of Section 5 the sequence of questions described in Section 4 was also modified slightly. The open-ended response question was placed after the end of
Section 5 enabling respondents to provide their voluntary response once they had completed this section.

**Box B.15 Customer Survey questions used in Case Studies 12-17 requesting information about personal use of applications and devices**

| 5. How often do you use the following technologies or applications in this CTC? |
|-------------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|
| 1. Accessing email            | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 2. Word processing, spreadsheet and power point software. | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 3. Online chat and instant messaging software | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 4. Webpage design software    | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 5. Photograph enhancement or printing | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 6. Video or audio editing     | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 7. Fax machine.               | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
| 8. Scanner.                   | Every visit       | Most visits     | Some visits     | Rarely          | Never           |
9. Games.

Is there any other software and technology that you use that is not mentioned above? Please describe:

Thank you for completing the survey.

Do you have any other comments to make?

In calculating a quantitative value for the level of usage the customers nominated frequency of visits per month was multiplied by a fraction that was nominally associated with the descriptors of ‘Every Visit’ (1), ‘Most Visits’ (0.6), ‘Some Visits’ (0.4), ‘Rarely’ (0.1) and ‘Never’ (0). Table B.1 details the formula that was used to calculate these relative frequencies.

**Table B.1 Formula used to quantify the relative frequency of use for applications and services in the CTC**

<table>
<thead>
<tr>
<th>Frequency of use/month = Number of visits per month (Customer Survey Section 1)</th>
<th>1.0 – Every Visit</th>
<th>0.6 – Most visits</th>
<th>0.4 – Some visits</th>
<th>0.1 – Rarely</th>
<th>0 – Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every visit</td>
<td>Most visits</td>
<td>Some visits</td>
<td>Rarely</td>
<td>Never</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C  Schedule of Interviews

The interviews that were undertaken during the 17 case studies are recorded in Table C.1. The names listed are pseudonyms in order to protect the identity of individuals who were interviewed in line with the method approved by the University of Wollongong Human Research Ethics Committee’s (HREC) approval for this research.

<table>
<thead>
<tr>
<th>Trip 1</th>
<th>Location</th>
<th>Interviewee</th>
<th>Position</th>
<th>Interview Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aldinga Waters</td>
<td>Gwen</td>
<td>Manager</td>
<td>2 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lindie</td>
<td>Volunteer</td>
<td>2 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chrissie</td>
<td>Management Committee Chair</td>
<td>3 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jake</td>
<td>Volunteer</td>
<td>3 May 2007</td>
</tr>
<tr>
<td>2</td>
<td>Baden Bay</td>
<td>Stephen</td>
<td>Manager</td>
<td>4 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eunice</td>
<td>Volunteer</td>
<td>4 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Winifred</td>
<td>Volunteer</td>
<td>4 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brent</td>
<td>Assist. Manager</td>
<td>4 May 2007</td>
</tr>
<tr>
<td>Trip 2</td>
<td>Calamba River</td>
<td>Kate</td>
<td>Manager</td>
<td>15-16 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sharma</td>
<td>Assist. Manager</td>
<td>15 May 2007</td>
</tr>
<tr>
<td>4</td>
<td>Deavenport</td>
<td>Roz</td>
<td>Manager</td>
<td>17 May 2007</td>
</tr>
<tr>
<td>Trip 3</td>
<td>Erindale</td>
<td>Dan</td>
<td>Manager</td>
<td>28-30 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sonya</td>
<td>Volunteer</td>
<td>29 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ione</td>
<td>Volunteer</td>
<td>30 May 2007</td>
</tr>
<tr>
<td>6</td>
<td>Ferngrove</td>
<td>Tony</td>
<td>Tony</td>
<td>31 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carlie</td>
<td>Volunteer</td>
<td>31 May 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Myra</td>
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<td>Rhiannon</td>
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<td>Ditty</td>
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<td>Connie</td>
<td>Manager</td>
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<td>Parkdale</td>
<td>Kevin</td>
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<td>Ashleigh</td>
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<td>Juanita</td>
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<td>Steve</td>
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<td>Peter</td>
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<td>15 Tidal River</td>
<td>William</td>
<td>Manager 1</td>
<td>10 July 2007</td>
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<td>Monique</td>
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<td>16 Viewbank</td>
<td>Ray</td>
<td>Manager</td>
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<td></td>
<td>Megan</td>
<td>Former manager</td>
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<td>Rachel</td>
<td>Admin Assistant</td>
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<td>17 Wageman</td>
<td>Lynne</td>
<td>Manager</td>
<td>12 July 2007</td>
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Appendix D  Forms Used In This Research

The forms used in this research are found in this appendix. These are grouped in the following three sections: instruments used to obtain research data; forms used to inform research participants about the study; and reviews from managers of the three in-depth cases. All of the forms used in this research were approved by the University of Wollongong Human Research Ethics Committee (HREC).

D.1 Interview and Survey Instruments

The following forms were used to obtain research data through semi-structured interviews and surveys:

- Semi structured interviews (see Box D.1)
- Volunteer Survey Form (see Box D.2)
- Customer Survey Form (see Box D.3)
- Customer Survey Form additional section for Case Studies 12-17 (see Box D.4)
1. Centre Name: ______________________

2. Do you agree to being contacted in the future for a follow-up study (should it be required)?
   - Yes  - No

3. Facilities offered by the CTC:
   a) How many computers?
   b) How many printers?
   c) How many scanners?
   d) Fax machine?
   e) Photocopy?
   f) Are any other technologies offered by the CTC?

4. Since 1 February 2007 what have been the opening hours of your CTC?
   Monday _______  Tuesday _______  Wednesday _______
   Thursday _______  Friday _______  Saturday _______
   Sunday _______

5. Do seasonal or other factors mean that the hours of operation as listed in Question 4 change? If yes, please explain briefly.

6. What issues or problems are most relevant to your local community? Some examples may be youth unemployment, closure of local banking services, drought in rural areas

7. What is the population of the local area?

8. What sources of revenue are used to fund the activities of your CTC? Select the most appropriate option for each line. In this context:
   a) “Major source of revenue” can be assessed as being sufficient to threaten the centre’s viability should this source disappear.
   b) “Moderate source of revenue” would place the CTC under financial pressure but could continue to function.
   c) “Minor source of revenue” — the disappearance of this revenue will not create significant change to financial position.

<table>
<thead>
<tr>
<th>Fees from users</th>
<th>Significant source of revenue</th>
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<tbody>
<tr>
<td>Subsidies from public sources</td>
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<td>Subsidies from private sources</td>
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<td>Service Provision</td>
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<td>Commercial sponsorship</td>
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<td>Sale of CTC information products</td>
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<td>Subsidy from a related activity</td>
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<td>Other (Please explain)</td>
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</table>

9. How many hours of paid staff need to be covered?

10. Do you have volunteer staff?  - Yes  - No

   a) How many of your volunteers contribute more than 4 hours of work per week?

   b) How many volunteers contribute less than 4 hours per week?

11. How would you assess the financial position of your CTC?
   - Precarious – we are facing closure in the next financial year
   - Vulnerable – we are just surviving
   - Comfortable – the outlook for future operations is positive
Achievements and Events.

1. What achievement(s) or notable event(s) have marked the CTC's history to date?

   Achievement/Event 1.

   [Blank lines for input]

   If IT (Information Technology) was used in this achievement/event, describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).

   In your opinion, what were the benefits of this activity to the CTC? (Prompt for learning outcomes if not forthcoming).

   In your opinion did the broader community benefit from this activity? If yes, in what way? (Prompt for learning outcomes if not forthcoming).

   Did this achievement/event address a problem that is of concern to your CTC or community? If so, please specify.

   Achievement/Event 2.

   [Blank lines for input]

   If IT (Information Technology) was used in this achievement/event, describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).

   In your opinion, what were the benefits of this achievement/event to the CTC? (Prompt for learning outcomes if not forthcoming).

   In your opinion did the broader community benefit from this activity? If yes, in what way? (Prompt for learning outcomes if not forthcoming).

   Did this achievement/event address a problem that is of concern to your CTC or community? If so, please specify.

   If more space is required there are additional copies of this form at the end of this survey for you to photocopy and fill in as you see fit.
### CTC Activities.

2. Describe group based activities that your CTC undertakes on a regular or ad hoc basis.

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If IT (information technology) was used in this activity describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).

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In your opinion, what were the benefits of this achievement/went to the CTC? (Prompt for learning outcomes if not forthcoming).

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In your opinion did the broader community benefit from this achievement/went? If yes, in what way? (Prompt for learning outcomes if not forthcoming).

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Did this activity address a problem that is of concern to your CTC or community? If so, please specify.

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### Activity 2.

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If IT (information technology) was used in this activity describe what was used and how? (Feel free to provide details about equipment and software that were used if this is known).

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In your opinion, what were the benefits of this achievement/went to the CTC? (Prompt for learning outcomes if not forthcoming).

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In your opinion did the broader community benefit from this achievement/went? If yes, in what way? (Prompt for learning outcomes if not forthcoming).

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Did this activity address a problem that is of concern to your CTC or community? If so, please specify.

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Box D.1 (cont’d) Interview Instrument pp 7-8

5. Capabilities

The following list of statements indicates knowledge and skills people who have visited a CTC may have learned. To the best of your knowledge, indicate your level of agreement with the following statements.

The CTC has been a place in which people have learned...

1. ...basic IT skills such as using email, browsing the Internet, saving files, using the printer etc.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

2. ...medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

3. ...high level IT skills such as web page design or multimedia software (e.g. Adobe Photoshop, audio and video editing).
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

4. ...how to participate in a community group.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

5. ...how to participate in electronic commerce.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

6. ...how to manage a community group.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

7. ...how to use IT to better manage a community group.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

8. ...how to use IT to participate in online community groups.
   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

9. ...how to use IT to communicate information to the broader community (such as graphic art, web pages, CDs, DVDs, community newsletters).

10. ...how to use IT to better manage a business.
    [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]

11. Did the previous statements miss out on an area of learning that occurs in your CTC? If so, please describe these here.

   [□ Strongly Agree □ Mildly Agree □ Not sure □ Mildly Disagree □ Strongly Disagree]
Volunteer Survey of selected NSW Community Technology Centres.

Your participation is voluntary and you are free to withdraw from the study. The ways that privacy will be protected are as follows:
- Your identity will not be revealed.
- The location of your CTC will not be revealed. This will be achieved through the use of pseudonyms (make up name) for centres names.
- The questions are about IT services to community. Please be as accurate as you can but remember that an approximate answer is still useful for the study.
- If you don't receive a question for any reason, you are not required to do so.

If you have any questions or concerns about this research you may contact the Chief Researcher, W. Tidball (Ph: 0414 327 676 or whalter.t@uow.edu.au).

You can also contact the Human Research Ethics Committee at the University of Wollongong (Ph: 02 4221 4625).

More information on this research can be found at:
http://www.uow.edu.au/cit/centreindex/CTCindex/Research/PrivacyDeclaration.html

Comment

I give my consent to use the information I supply to this study on the understanding that:
- I will be used for research and evaluation purposes only
- The information will only be used for the purposes outlined in the study outer enrolment
- Community Technology Centres (the path to sustainability: information for participants)
- Reports and publications from the study will be based on de-identified information and will not identify CTCs and individual participants.
- My participation is voluntary. I am free to withdraw from the study at any time.

My decision on whether or not to participate in this study will not affect my involvement with the University of Wollongong.

I have been provided with information about this study including how it will gather, store and use the information.

[ ] - Accept. Please turn the page to begin the questionnaire.

1. IT (Information Technology) knowledge and skills

In your role as a Volunteer what skills and knowledge have you brought to this CTC?

This CTC has a place in which I have shared...

1. ... basic IT skills such as using email, browsing the Internet, saving files, using the printer...

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

2. ... medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point).

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

3. ... high level IT skills such as web page design or multimedia software (eg. Adobe Photoshop, audio and video editing).

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

4. ... how to participate in a community group.

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

5. ... how to take part in electronic commerce such as e-bay, downloading programs or music and so on...

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

6. ... how to manage a community group (eg take a leadership or training role).

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

7. ... how to use IT to better manage a community group (eg. member meetings via e-mail, word processing, booking spaces, sending emails and distribution list etc.).

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

8. ... how to use IT to participate in online community groups such as “blogs”, “My Space”, YouTube, game communities and so on.

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

9. ... how to use IT to communicate information to the outside world (such as graphic art, web pages, CDs, DVDs, community newsletters).

[ ] Strongly Agree [ ] Mostly Agree [ ] Not Sure [ ] Mostly Disagree [ ] Strongly Disagree

1. [ ] Accept. Please turn the page to begin the questionnaire.
2. In your role as a Volunteer in this CTC what skills and knowledge have you developed?

This CTC has been a place in which I have learnt...

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<tr>
<th>Number</th>
<th>Description</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>N/A</th>
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<tbody>
<tr>
<td>12</td>
<td>Basic IT skills such as using email, browsing the Internet, saving files, using the printer etc.</td>
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<td>13</td>
<td>Medium level IT skills such as word processor software, spreadsheet software or presentation software (such as power point)</td>
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<td>High level IT skills such as web page design or multimedia software (e.g. Adobe Photoshop), audio and video editing</td>
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<td>How to participate in a community group.</td>
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<td>16</td>
<td>How to take part in electronic commerce such as e-bay, downloading ring tones or music and so on...</td>
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17. ...how to manage a community group... (e.g. take a leadership or training role)

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<th>Number</th>
<th>Description</th>
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<th>Strongly Agree</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>N/A</th>
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<td>How to use IT to better manage a community group by maintaining membership lists in MS Excel, word processor, develop spread sheet, maintain email distribution lists etc.</td>
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<td>How to use IT to participate in online community groups such as Facebook, MySpace, YouTube, game communities and so on...</td>
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20. ...how to use IT to communicate information to the outside world such as flyers, community newsletters, brochures, CD's, DVD's...

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<th>Number</th>
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<th>Agree</th>
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<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>How to use IT to better manage a business.</td>
<td></td>
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</table>

22. Did the previous statements miss out on an area that you have learned in your CTC? If so, please describe below:

There is space at the end of the survey form to write more.

3. Do other people benefit from the things you have learnt at this CTC?

Are you able to use the skills you have developed in the CTC in other places such as at home, a business or other non-profit organisation?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
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</table>

If so, what places are you able to use these skills?

There is space at the end of the survey form to write more.

4. What factors motivate you to be part of the CTC?

What attracted you to join the CTC as a volunteer in the first place?

There is space at the end of the survey form to write more.
5. Background Information

1. Are you: □ Female □ Male
2. What is your age? ______________
3. How many hours per week do you normally contribute to the CTC? ______________
4. What is the name of the CTC you are at now? ______________
5. What is today's date? ______________

Thank you for completing the survey.

Do you have any other comments to make? ______________

________________________

Please put the survey in the box marked “UoW Surveys.”

You can use the space below to provide more information if you ran out of room answering previous questions.
Customer Survey of selected NSW Community Technology Centres.

This study responds to a need to create sustainable Community Technology Centres (CTCs). This part of the study deals with the knowledge and experience of CTC-users in NSW. Your participation is voluntary and you are free to withdraw from the study. The data collected will not be linked to you personally. The identity of your CTC will not be revealed. This will be achieved through the use of pseudonyms and the removal of personal identifiers.

The questionnaire asks about IT skills to complete. Please be as precise as you can but remember that an approximate answer will be valuable for the study. If you don’t want to answer a question for any reason, you are not required to do so.

Finally, if you have any questions or comments about this study you may contact the Chief Researcher, Dr. [Name] (Ph: [Phone number], email: [Email address]).

You can also contact the Human Research Ethics Committee at the University of Wollongong, Ph: [Phone number] 4221 4585.

More information on this research can be found at:

Consent:
I give my consent to use the information I supply to this study on the understanding that:
- I will be asked to complete a questionnaire that will take about 15 minutes to complete.
- The information will only be used for the purposes outlined in the study information sheet.
- Reports and publications from the study will be based on de-identified information and will not identify CTCs and individuals taking part.
- My participation is entirely voluntary. I can withdraw from the study at any time.
- My decision on whether or not to take part in this study will not disadvantage me or affect my involvement with the University of Wollongong.
- I have been provided with information about the study including how it will gather, store and disclose information about me. I have been given an opportunity to ask questions that have been fully answered.

☐ Accept Please turn the page to begin the questionnaire.

☐ If you are under 18 years of age you will need to ask for your parents/guardian to sign below to show that they give permission to fill out this survey.

☐ Give permission for my child/daughter to complete this survey.

Signature: __________________________________________ Date: ____________

1. IT (Information Technology) knowledge and skills

Over the past month, how many times have you visited this CTC?
☐ Never ☐ 1 time ☐ 2 times ☐ 3 times ☐ 4 times ☐ 5 times

2. Has your knowledge of IT (information technology) improved because of your visit(s) to this CTC?
☐ Yes ☐ No

If you answered yes, go to question 3.

The following statements describe knowledge and skills that people may learn in a CTC. Select the box that best describes your experience with this CTC.

This CTC has been a place in which I have learned...

1. Basic IT skills such as using email, browsing the internet, saving files, using the mouse etc.
   - Strongly Agree ☐ May Agree ☐ Neutral ☐ May Disagree ☐ Strongly Disagree

2. medium level IT skills such as word processor software, spreadsheet software or presentation software such as power point.
   - Strongly Agree ☐ May Agree ☐ Neutral ☐ May Disagree ☐ Strongly Disagree

3. High level IT skills such as web page design or multimedia software eg. Adobe Photoshop, audio and video editing.
   - Strongly Agree ☐ May Agree ☐ Neutral ☐ May Disagree ☐ Strongly Disagree

4. How to participate in a community group.
   - Strongly Agree ☐ May Agree ☐ Neutral ☐ May Disagree ☐ Strongly Disagree

5. How to take part in electronic commerce such as e-bay, downloading ring tones or music and etc.
   - Strongly Agree ☐ May Agree ☐ Neutral ☐ May Disagree ☐ Strongly Disagree
3. What do you value about this CTC?
Write down three things that you would miss most if the CTC were to close.

1. 
2. 
3. 

The following list may help you decide your three most important things you would miss.

- Access to broadband
- Online banking and bill paying
- Learning how to use computers and software
- Developing multimedia, such as websites, CDs, and graphic editing
- Access to Government Services
- Community group meetings and activities
- Access to online groups such as blogs, Your sites

4. Background Information.

1. The purpose of your visit today was to:

2. Are you?
   - Female  
   - Male

3. What is your age?

4. What is the name of the CTC you are at now?

5. Are you a local or visitor to the area?
   - Local
   - Visitor

6. What is today's date?

Thank you for completing the survey.

Do you have any other comments to make?
5. How often do you use the following technologies or applications in this CTC?

<p>| | | | | |</p>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Accessing email</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>2. Word processing, spreadsheet and power point software.</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>3. Online chat and instant messaging software</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>4. Webpage design software</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>5. Photograph enhancement/or printing</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>6. Video or audio editing</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>7. Fax machine</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
<tr>
<td>8. Scanner</td>
<td>Daily</td>
<td>Less</td>
<td>Some</td>
<td>Never</td>
</tr>
</tbody>
</table>

Is there any other software and technology that you use that is not mentioned above? Please describe:

___________________________________________________________________________

Finally, thank you for completing the survey.

Do you have any other comments to make?

___________________________________________________________________________

___________________________________________________________________________
D.2 Participant Information and Consent Forms

The following forms were used to obtain research data through semi-structured interviews and surveys:

- Information Sheet for CTC managers (see Box D.5)
- Information Sheet for CTC customers (see Box D.6)
- Information sheet for young people; Information Sheet for parents; and Permission Form (see Box D.7)
- Interview Consent Form for CTC managers and Form from CTC managers indicating their consent to distribute Customer Survey (see Box D.8).
Box D.5 Information Sheet for CTC Managers

Community Technology Centres: what path to sustainability?

Information for participants – recorded interviews with selected CTC managers.

Chief Investigator: Will Tibben

What is this study of CTC sustainability about?

This study responds to the current need to develop better ways to create sustainable Community Technology Centres (CTCs). This means that we need to learn more about how to help CTCs receive more money as well make computers work to the benefit of local communities. This part of the study draws on the knowledge and experiences of CTC managers in NSW.

Who is conducting the study?

The study into CTC sustainability is being conducted by William Tibben as part of his postgraduate studies (PhD) at the University of Wollongong. The conduct of this research is overseen by a postgraduate supervisor Associate Professor Peter Hyland.

The study is supported by the CTCF (Community Technology Centre Association).

Why have you been selected for study?

As part of a CTC management team your experience and knowledge of running a CTC will provide valuable information in making assessments about the usefulness of this approach to understanding sustainability in CTCs.

What do you need to do?

We ask that you take part in a recorded interview at your CTC. The interview will take about 60 minutes to complete. The interview will be subsequently transcribed and analysed. You will be asked to provide detailed information about the way that individuals and groups use the CTC’s facilities. We ask that you sign the consent form to indicate your willingness to take part in the interview.

It is entirely your choice whether you take part in this study. If you do choose to take part, you are free to withdraw at any time up until the completion of the “active research” stage, 31 December 2007.

What sort of information is required?

Your responses to questions will be analysed in relation to the activities that occur within your CTC and in particular, acts of the software and IT that used. It will also be noted whether these activities are carried out individually or by groups within the CTC. Please be as accurate as you can but remember that an approximate answer is still valuable for the study. If you don’t want to answer a question for any reason, you are not required to do so.

What will be done with your information?

All information collected will be treated confidentially and used for this research only. The location of your CTC and the identity of individuals associated with the CTC will not be revealed. This will be achieved through the use of pseudonym identifiers and both centre name and individual names. Research data including this recorded interview will be stored by the University of Wollongong for five years after which it will be destroyed. Additionally, the study is accountable to the University of Wollongong Human Research Ethics Committee.

The research findings from this study will be published in a thesis and journal articles.

How will information from the Study be used to help CTCs?

The information will give a better understanding of the way that CTCs facilitate learning and communications among the community, in particular, the ways in which people use the CTC to learn about IT and how this is reflected in the activities they undertake will provide baseline data for the CTCF. The research findings will be provided to the CTCF, for distribution to members after the publication of the research.

How can you find out more about this study?

If you have any questions, comments, or complaints about this study you can contact the following:

Chief Investigator:
Will Tibben
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 3768
Fax: (02) 4221 4170
Email: wlt@unsw.edu.au

Post Graduate Research Supervisor:
Associate Professor Peter Hyland
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 3759
Fax: (02) 4221 4170

For any complaints you may also contact:
Secretary
Human Research Ethics Committee
Research Services Office
Research and Innovation Division
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 4457
Email: enquiries@unsw.edu.au.
Box D.6 Information Sheet for CTC Customers

Community Technology Centres: what path to sustainability?

CTC Customer Survey - information for participants.

What is this study of CTC sustainability about?

This study responds to the concern need to develop better ways to create sustainable Community Technology Centre (CTCs). This means that we need to know more about how to help CTCs receive more money as well make computers used to the benefit of local communities. This part of the study asks people who use CTCs to fill out a questionnaire.

Who is conducting the study?

The study into CTC sustainability is being conducted by William Tibben as part of his post graduate studies (PhD) at the University of Wollongong. The conduct of this research is overseen by a post graduate supervisor Associate Professor Peter Hyland. The study has the support of the CTCA (Community Technology Centre Association).

Why have you been selected for study?

As a user of the CTC your experience will provide valuable information in making assessment about the sustainability of Community Technology Centre (CTC) in general.

What do you need to do?

To take part all you need to do is to complete a questionnaire that should take less than 3 minutes to complete. Please make sure that you indicate your consent at the front of the questionnaire by ticking the appropriate option before depositing it in the box marked “UW questionnaires.” It is entirely your choice whether you take part in this study. If you do choose to take part, you are free to withdraw at any time up until you deposit the questionnaire.

What sort of information is required?

Your responses to questions will be analyzed in relation to the activities that occur within your CTC using particular notes of the software and IT that you have used and the purpose for which it is used. Please be as accurate as you can but remember that an approximate answer is still valuable for the study. If you don’t want to answer a question for any reason, you are not required to do so.

What will be done with your information?

These questionnaires will be stored by the University of Wollongong for five years after which they will be destroyed.

The location of your CTC will not be revealed. This will be achieved through the use of pseudonyms (made-up names) for centre names. Additionally, the study is accountable to the University of Wollongong Human Research Ethics Committee.

The research findings from this study will be published in a thesis and journal articles.

How will information from this study be used to help CTCs?

The information will give a better understanding of the way that CTCs help learning and communication among the community. In particular, the ways in which people use the CTC to learn about IT and how this is reflected in the things they do will provide useful data for the CTCA as they seek further funding from Government.

How can you find more about this study?

If you have any questions comments or complaints about this study you can contact the following:

Chief investigator:
William Tibben
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 2788
Fax: (02) 4221 4170
Email: wjt@uow.edu.au

Post Graduate Research Supervisor:
Associate Professor Peter Hyland
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 3759
Fax: (02) 4221 4170

For any complaints you may also contact:
Secretary
Human Research Ethics Committee
Research Services Office,
Research and Innovation Division
University of Wollongong
Wollongong NSW 2522
Ph: 02 4221 4457
Email: wrce@uow.edu.au
Community Technology Centres: what path to sustainability?

Information sheet for young people.

What is this study about?

Have you ever thought what life would be like without this CTC? Even though lots of people make use of CTCs around NSW it is difficult to keep them open and running. This study wants to know how your local CTC survives and the things that people like about it.

Who is doing the study?

This study is being carried out by Will Tibebe as part of his studies at the University of Wollongong. Peter Hunt, his boss, is helping him with the study too. The study has the support of the CTTA (Community Technology Centre Association). Your CTC belongs to the CTTA so if you want to know more about the CTTA ask the manager.

Why have you been asked to do a survey?

Your experience with the technology in the CTC will provide valuable information about the many ways CTCs work in your town.

What do you need to do?

To take part all you need to do is complete a questionnaire that should take less than 5 minutes to do. Please make sure that you first get your Mum or Dad or the person who looks after you to sign the permission slip on the front of the survey. It is entirely your choice whether you do the survey. If you do choose to do the survey, you are free to withdraw at any time (up until the time you put the survey in the drop box).

What sort of information are we asking you to provide?

We are interested in knowing what software you use and the reasons you use this software. We also want to know what you have learnt by coming to this CTC. Be careful with your answers to make sure they are the best answers you can provide. If you are not sure about something a rough answer is still OK.

If you don’t want to answer a question for any reason, you DO NOT have to.

What will be done with your information?

As soon as the survey is returned your personal details will be separated into the research. The other information you provide is put into a database. The surveys will be stored by the University of Wollongong for five years after which they will be destroyed.

You don’t have to worry about people getting to know who you are or where your CTC is. Your town or your name will NOT be used in anything that is written about this study.

The findings from this study will be published in a thesis and journal articles written by Will Tibebe.

The University has a special committee who make sure that the research is carried out correctly. They will keep an eye on this research.

How will information from the Study be used to help CTCs?

The information from everyone’s surveys will give a better understanding of the way that CTCs help people in your town to learn about computers. This information will also help to the CTTA to help them to learn more about the ways CTCs work across NSW.
Community Technology Centres: what path to sustainability?

Information for parents – CTC Customer Questionnaire

Anonymous questionnaires will be made available to all customers of the CTC (Community Technology Centre). This questionnaire is part of a University of Wollongong research project into CTCs (see below for further information). Parents of children who use the CTC are asked to fill out the attached permission slip and return it to the CTC.

What is this study of CTC sustainability about?

This study regards to the current need to develop better ways to create sustainable Community Technology Centres (CTCs). This means that we need to know more about how to help CTCs receive more money as well making computers work for the benefit of local communities. This part of the study adds people who use CTCs to a group to anonymously record what they do in the CTC as well as what they have learned from their use of the CTC.

Who is conducting the study?

The study into CTC sustainability is being conducted by William Tibben as part of his postgraduate studies (PhD) at the University of Wollongong. The conduct of this research is overseen by a postgraduate supervisor, Associate Professor Peter Hyland. The study has the support of the CTCAs (Community Technology Centre Association).

Why have you been selected for study?

As a user of the CTC, the experience of your child will provide valuable information in making assessment about the sustainability of Community Technology Centres (CTCs) in general.

What do you need to do?

To take part all CTC customers need to do is to complete a questionnaire that should take less than 2 minutes to complete. It is entirely your choice whether your child...
Box D.7 (cont'd) Information Sheet for Parent p 3 & Parent Permission Form

If you do choose to take part, you are free to withdraw permission at any time.

What sort of information is required?

Your child's responses to questions will be analyzed in relation to the activities that occur within your CTC taking particular note of the software and IT that they have used and the purpose for which it is used. If your child does not want to answer a question for any reason, they are not required to do so.

What will be done with your information?

These anonymous questionnaires will be stored by the University of Wollongong for five years after which they will be destroyed.

The location of your CTC will not be revealed. This will be achieved through the use of pseudonyms (made-up names) for centre names. Additionally, the study is accountable to the University of Wollongong Human Research Ethics Committee.

The research findings from this study will be published in a thesis and journal articles.

How will information from the Study be used to help CTCs?

The information will give a better understanding of the way that CTCs help learning and communication among the community. In particular, the ways in which people use the CTC to learn about IT and how this is reflected in the things they do will provide useful data for the CTCs as they seek further funding from Government.

How can you find out more about this study?

If you have any questions, comments or complaints about this study you can contact the following:

<table>
<thead>
<tr>
<th>Chief Investigator:</th>
<th>For any complaint you may also contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will Taben</td>
<td>Secretary</td>
</tr>
<tr>
<td>University of Wollongong</td>
<td>Human Research Ethics Committee</td>
</tr>
<tr>
<td>Wollongong NSW 2522</td>
<td>Research Services Office,</td>
</tr>
<tr>
<td>Ph: 02 4221 3765</td>
<td>Research and Innovation Division</td>
</tr>
<tr>
<td>Fax: (02) 4221 4170</td>
<td>University of Wollongong</td>
</tr>
<tr>
<td>Email: <a href="mailto:wtab@uow.edu.au">wtab@uow.edu.au</a></td>
<td>NSW 2522</td>
</tr>
<tr>
<td></td>
<td>Ph: 02 4221 4457</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:orea@uow.edu.au">orea@uow.edu.au</a></td>
</tr>
</tbody>
</table>

For CTC students, two copies of the questionnaire are returned.

Permission Slip.

I do not (cross out which ever is not applicable) give permission for my
son/daughter ___________________ to fill in the questionnaire titled
CTC Anonymous Questionnaire* from the University of Wollongong.

Signed

Date:

Please return to CTC staff

---------------------------------------------------------------------

*As the questionnaire is anonymous, once the questionnaire is dropped into the “CTC Questionnaires” box it may not be possible to retrieve this information.
Community Technology Centres: what path to sustainability?

Recorded interviews with selected CTC managers and volunteers.

Consent

I give my consent to use the information I supply to this study on the understanding that:

- I will participate in a recorded (audio only) interview for a period of 1 hour
- The information will only be used for the purposes outlined in the study leaflet entitled:

  Community Technology Centres: the path to sustainability

  Information for participants – recorded interview with selected CTC managers.

- Reports and publication from the study will be based on de-identified information and will not identify CTCs and individuals taking part.
- My participation is entirely voluntary. I am free to withdraw from the Study at any time until the completion of the “Active Research” stage, 31 December 2007.
- My decision on whether or not to take part in this study will not disadvantage me or affect my involvement with the University of Wollongong.

I have been provided with information about this study including how it will gather, store and disclose information about me. I have been given an opportunity to ask questions and have been fully informed.

Name (Print): ____________________________
Signature: ______________________________
Date: _________________________________

CTC Manager Permission Note for Distribution of Customer Survey.

Consent

As manager of the CTC listed below I have agreed to make available a survey developed by Will Hiben from the University of Wollongong to customers on the understanding that:

- Reports and publication from the study will be based on de-identified information and will not identify CTCs and individuals taking part.
- The participation of customers is entirely voluntary.
- My decision on whether or not to take part in this study will not disadvantage them or affect their involvement with the University of Wollongong.

Location of CTC: ______________________________
Name (Print): ______________________________
Signature: _________________________________
Date: _________________________________
Appendix E  Review of In-depth Cases by CTC Managers

The managers of CTCs selected for in-depth analysis were asked to review the case study descriptions which appear in the thesis (Parkdale, Rangemoore and Viewbank). Their comments and permission to publish the accounts can be found in Boxes E.1 to E.3.
Hi Will

Surprise, surprise – I took a paper copy home and did an edit over a cuppa on the weekend. Mainly typos and a couple of factual corrections.

Where can I mail it to. I think that would be easiest for me.

Regards

From: William Tibben [mailto:wjt@uow.edu.au]
Sent: Thursday, 29 October 2009 6:53 PM
To: [redacted]
Subject: RE: [redacted] Doc for your comment

Sorry about the length of the document but its because there were so many interesting things to report on at [redacted]. I cant guarantee all the typos have been removed but its been cleaned up a bit. I’m hoping to get this done by thei Dec/OK Feb
Box E.2 Review of Case Study Account by Rangemoore’s CTC Managers

William Tibben

From: Telecottage [mailto:William.Tibben@telecottage.com]
Sent: Friday, 5 December 2008 12:16 PM
To: William Tibben
Subject: Re: description check
Attachments: Feedback to Check sheet.doc

Will
Attached document with answers.
Thankyou

--- Original Message ---
From: Will Tibben
To: [Redacted]
Sent: Friday, December 05, 2008 11:45 AM
Subject: description check

HI [Redacted].

As discussed attached is the description of the telecottage. Identifying information has been left out - this is why I call it Location 13 rather than [Redacted] and I don't use your names.

It also represents the situation as it was when I visited so I'm hoping you can cast your mind back.

There are a couple of questions in the footnotes that I ask that you or [Redacted] may be able to answer.

Apologies in advance if there are in any spelling errors or grammatical errors. If you can please ignore these. I'm not expecting you to proof read the doc!

Regards and Thanks!

Will

Internal Virus Database is out of date.
Checked by AVG.
Version: 8.0.100 / Virus Database: 270.3.0/1500 - Release Date: 12/06/2008 4:58 PM
Box E.3 Review of Case Study Accounts by Viewbank CTC Past-manager

Re: feedback

William Tibben

From: [email]@ctca.net.au
Sent: Thursday, 17 December 2009 2:10 PM
To: William Tibben
Subject: RE: feedback
Attachments: Location 16.doc

Hi Will, your doc returned with some proof-reading comments highlighted. I think it is a pretty fair description.

The epilogue to it is:
[Redacted] found the move from Tech Support to manager too stressful. He was unable to do the kind of aggressive grant and funding seeking that had kept CTC alive, and found the responsibility for the very precarious financial viability of the centre too much. He resigned. A new manager took over who was in some ways overqualified, and not a resident. The job does not pay well enough or have enough career prospects to be satisfying to someone in that situation. The CTC managers who stay in the job are there for love rather than money! So she lasted just six months, before [Redacted] took over as manager. [Redacted] was a long-time committee member, and had moved to [Redacted] to retire. The "love" motive was there, along with a huge amount of competence. Despite the damage that four managers within a year had done to the budget, she was able to pull it through. CTC and ACE formally amalgamated their services, sharing staff and management as well as accommodation and computers. Earlier this year, the centre finally moved into the old Ambulance station. Whether the rent is subsidized there is debatable. I would argue that the CTC pays commercial rent when both cash and in-kind services to Council are counted. It is certainly true that if CTC were to fold, it would cost Council a great deal more to provide those services, particularly the kind of community development project management services that CTC provides. Council would be under a great deal of pressure to provide them as they are strongly identified in its Social Plan as being Council responsibility. This is an example of something that is common throughout the CTC network: cash strapped local governments offload community services to volunteer organisations. So instead of them supporting CTCs, it is the other way round! CTC is still extremely vulnerable, hanging on by the skin of its teeth and the generous support of volunteers and staff working volunteer hours.

Hope that helps,

[Redacted]

email: [Redacted]
Skype: [Redacted]
Web: www.ctca.net.au
(02) 80060811

From: William Tibben [mailto:wt@uow.edu.au]
Sent: Thursday, 17 December 2009 1:35 PM
To: [Redacted]
Subject: RE: feedback

Hi [Redacted],

The case study description if [Redacted] has been attached. I refer to [Redacted] as "location 16". I still have not decided on a friendlier-sounding pseudonym.

8/11/2010