

An information technology adoption
model for the rural socio-cultural context
in developing countries

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This exploratory research focuses on impacts of the rural socio-cultural context on Information and Communication Technology (ICT) adoption for business information needs using the Maldives as the study context, and attempts to develop a model to capture the influences of the rural context on ICT adoption decisions. While ICTs have the potential to provide an effective and efficient channel for information exchange, literature shows that ICT adoption has been low in rural communities and rural businesses. Literature on information seeking behaviour, human communication and community ICTs highlight the importance of the context and culture in determining information seeking behaviour. The proposed research combines these two views – considering the socio-cultural context of rural communities as the prime focus of the research to explore how the context impacts on information seeking behaviour of rural businesses and in turn on ICT adoption for such needs.

The numerous ways in which rural context differs from urban context, such as small markets combined with familiarity among community members and reliance on interpersonal relationships, suggest potential impacts on the nature and management practices of rural businesses and provide an approach to explore ICT use in rural settings. However, no scientific studies were found that undertook a comprehensive analysis of the rural socio-cultural context that might affect ICT adoption.

Using findings from literature on characteristics and practices of rural communities and rural businesses, a theoretical framework was developed to outline how the socio-cultural context of a rural community of a developing country might affect ICT adoption by rural businesses. The research model predicts relationships between context factors and perceived benefits and barriers of ICTs, and between these perceptions and intentions to adopt/use ICTs. The key context factors explored in the research model are management practice, contribution from personal networks, information sources, communication and interaction, and skill levels.

Using the Maldives as the study context, the initial phase of the research focused on a few selected rural and urban businesses to undertake a preliminary testing of the research model. Using interviews and observations of business owners, the first phase enabled identification of important context factors and ways to refine the research model. The revised research model was then tested using a quantitative survey of 314 rural and urban businesses, and data was analyzed using exploratory factor analysis and logistic regression.

The findings supported predicted differences between rural and urban contexts for all five factors included in the model. The results also show that context factors explain 35.5% of variance on perceived benefits of ICTs and 49.3% variance on perceived barriers of ICTs. Findings suggest that informal management practices of rural businesses may have the largest impact on ICT adoption by negatively affecting perceptions of ICTs. Skill level has the second largest impact on ICT adoption, followed by contributions from personal networks. The findings also raised questions about the disjoint between opinions of ICTs and actual use, the limited value derived from ICTs, and potential drivers of actual implementation of ICTs. The research also highlighted that promoting ICT adoption in rural businesses was a highly complex issue that has important linkages to public policy support.

Overall, this research provides important insights into the complex dynamics that exist in rural settings that have implications for ICT use, clarifies how the rural context could affect ICT adoption, and provides empirical evidence to illustrate differences between urban and rural contexts, as well as the level of influence from different context factors on ICT adoption. A major contribution of this research is the development of a technology adoption model that is suitable for rural contexts in developing countries. This research has relevance for organizations working towards the development of rural communities.

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Dedication

This dissertation is dedicated to my parents for their inspiration, and to my husband and son for their unwavering support in the pursuit of my goals.

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Chapter 1

Introduction

In the past decades, rapid developments in Information and Communication Technologies (ICTs) have led to increasing interest in utilizing ICTs for the development of rural communities (Arunachalam, 2004; Hollified & Donnermeyer, 2003). ICTs are defined as technologies such as radio, television, telephones, computers and Internet, which facilitate communication and the processing and transmission of information by electronic means (DFID, 2002). ICTs are recognized as essential tools of development that can help empower poor people, develop their skills, increase productivity, and improve governance (World Bank, 2005). They are also believed to help developing countries overcome “traditional problems of development like poverty, illiteracy, disease, unemployment, hunger, corruption, social inequalities” (Arunachalam, 2004, p.960). More importantly, ICTs have the potential to offset “the economic disadvantages of rurality by reducing the barriers of time and distance from major markets” (Hollified & Donnermeyer, 2003, p.136).

Thus the motivation for the research stems from an interest in exploring the rich potential of ICTs for rural businesses in developing countries, specifically focused on the small island nation of Maldives, which is characterized by geographically dispersed rural communities with small population sizes. The research is aimed at identifying ways in which rural businesses can utilize ICTs to satisfy their information needs, which could potentially lead to improvements in efficiency, market access, competitiveness, productivity, technological change and innovation, and business growth (Rao, 2004; OECD, 2001).

Although importance of the context in understanding information needs of communities and in designing ICTs for communities has been recognized in literature, no comprehensive studies were found that focused on analyzing the impacts related to the socio-cultural aspects of the rural context on ICT adoption. Hence, this research attempts to address this gap by developing a theoretical framework to capture potential impacts on ICT adoption resulting from the socio-cultural context of an average rural community of a developing country, with specific focus on the adoption of ICTs by rural businesses. It is important to understand why, how and to what extent different aspects of the socio-cultural context affect ICT adoption and the mediating influences related to information needs and information seeking behaviour so that these influences can be addressed in designing and developing ICTs for rural businesses to result in effective and efficient ICT applications that facilitate business growth.

Using findings from literature on ICT adoption in rural contexts, theories on information behaviour, human communication and technology adoption models, and specifically focusing on differences between rural and urban contexts, as well as rural and urban businesses, this research develops and tests a model to capture the impacts from the socio-cultural context of rural communities in developing countries on ICT adoption by rural businesses. This new model extends the traditional Technology Adoption Model (TAM) developed by Davis (1989), which forms the underlying foundation for this research; theory and methodology. The objectives of the research are to investigate if and how the rural context impacts on ICT adoption by rural business, identify the factors of the context that promote ICT adoption and those that pose barriers to adoption, identify which of the factors have greater impacts than others, and assess how alignment of ICT modality with the socio-cultural context could impact on ICT adoption.

Informed by literature, this research identifies key factors of the socio-cultural context that could influence ICT adoption and tests relationships between these factors and business owners' perceptions of ICTs for business needs. The key factors are management practice, contribution from personal networks, information sources, communication and interaction, and skill levels. Furthermore, relationships between ICT perceptions and intentions to adopt/use ICTs are also tested, to assess how perceived benefits of ICTs and perceived barriers of ICTs affect intentions towards ICTs.

This research is exploratory in nature and is aimed at getting a better understanding of the influences of the socio-cultural context of rural communities on business practices and in turn on ICT adoption. Thus, the research was conducted in both rural and urban communities of the Maldives in order to enable comparisons. The initial phase of the research focused on a few selected rural and urban businesses to undertake a preliminary testing of the research model and to justify further research. Using interviews and observations of business owners, the first phase enabled identification of important context factors and ways to refine the research model. The revised research model was then tested using a quantitative survey of rural and urban businesses.

The research provides important insights into the complex dynamics that exist in rural settings of developing countries that have implications for ICT use. Drawing from multiple disciplines to clarify how rural context could affect ICT adoption, this research focused specifically on understanding the differences between socio-cultural contexts of rural and urban communities using the Maldives as the research context. It presents a technology acceptance model suited to the developing country context,

which is aimed at capturing influences from the rural socio-cultural context on ICT adoption decisions. It also provides initial empirical evidence to illustrate level of influence from different context factors on ICT adoption by rural businesses. This research has relevance for organizations working towards the development of rural communities such as government and non-governmental organizations and institutions.

1.1 Defining rural

Literature presents numerous definitions of 'rural' and there is much debate about the concept, as well the distinction between 'rural' and 'urban'. Most of the definitions of 'rural' are related to small population size and geographic isolation, but it is argued that such definitions may not be applied across countries (UNESCO, 1964). Dewey (1960) suggests looking at two dimensions when differentiating rural and urban areas. The first is the population dimension, taking into account size and diversity of population, and the second is the cultural dimension. Alternatively, it is suggested that the 'rural' definition may be viewed as a geographic concept or a social representation (Du Plessis, Beshiri, Bollman & Clemenson, 2004). In defining general characteristics of rural and remote communities, Slack, Bourne and Gertler (2003) also note the factors of small population and geographic distance, but further add some economic characteristics including small markets and labour supply, lack of economic diversification, and higher production and servicing costs compared to urban areas.

Earlier definitions of rurality were based on descriptive socio-spatial characteristics such as the Index of rurality developed by Cloke (1977), and included variables such as employment, population, migration, housing conditions, land use and remoteness. Other definitions focused on socio-cultural characteristics and were based on the assumption that the environment and population density affected behaviour and attitudes (Halfacree, 1993). A third and more accepted definition viewed 'rural' and 'urban' as a continuum rather than a simple dichotomy and placed areas or communities on a scale ranging from very remote rural areas to larger cities (Halfacree, 1993, Cloke, 1985).

In trying to define 'rural', it is important to note the continuous changes taking place in rural areas all over the world, and the arguments for diminishing difference between rural and urban areas (Wiggins & Proctor, 2001; Cloke, 1985; Mitchell & Clark, 1999). The main change taking place in rural areas is that related to the rural economy, shifting away from agriculture or other primary industries as the dominant industry and diversifying into manufacturing and other small businesses.

Rural areas are attracting new product specializations and many large national and international companies are relocating their branches in rural areas. Other changes include shifts in population movements with higher in-migration and increasing flow of goods and dependency between rural and urban areas, as well as social and technological developments. However, the rate of change is different for different rural areas, thus creating different impacts according to the level and nature of changes taking place (Mitchell & Clark, 1999).

Thus, researchers suggest that several factors affect the degree of rurality (Douglas, 2003; Cloke, 1985; Wiggins & Proctor, 2001; Deavers, 1992). These include:

- physical factors such as the physical geography, abundance of natural resources, and proximity to urban centres,
- social factors such as income and poverty, education, health, housing, and overall quality of life,
- economic factors such as size and structure of economy, specializations, vulnerabilities, and labour force,
- Political/institutional factors such as commitment to development, investments, and infrastructure, and
- Cultural factors such as traditional values and beliefs.

Halfacree (1993, p. 34) suggests that “any single, all-embracing definition of the rural is neither desirable nor feasible”. Thus, the recommendation is to use a definition that is appropriate for the issue that is being addressed (Halfacree, 1993, du Plessis et al., 2004). For the purposes of this research, a definition that encompasses the rural context in developing countries will be used, particularly focused on rural areas that are geographically distant from larger urban centres. Therefore, characteristics relating to small population size, geographic distance, small markets and lack of economic opportunities, lower quality of life, weak institutions, as well as the resulting socio-cultural aspects will be taken as the characteristics that differentiate rural communities from urban communities.

1.2 Rural communities and ICTs

Before reviewing adoption of ICTs by rural businesses, it may be worthwhile to understand the situation of rural communities in relation to ICTs first, in order to place ICT adoption by rural

businesses in the context of rural communities. Due to economic and social benefits possible for rural development through ICTs, many countries have continued to invest in providing ICT access and infrastructure support to rural communities, and implement ICT projects that can provide evidence of such benefits (Grimes, 2000). Literature gives evidence of numerous successful ICT projects implemented in rural communities (O'Neil, 2002; Cecchini & Scott, 2003; Ramirez, 2001; OECD, 2001). However, despite these successes and ongoing efforts to promote ICT access to rural communities, rural ICT adoption remains low (Hollifield & Donnermeyer, 2003; Cecchini & Scott, 2003; Mitchell & Clark, 1999; Lai, 1994). Barriers that prevent rural and remote communities from benefiting from the use of ICTs are lack of awareness about benefits, lack of access, literacy and language issues, lack of motivation to use new technologies, and infrastructure and policy constraints (Rao, 2004). Due to literacy and language issues, most users in rural communities are said to require a human intermediary (Cecchini & Scott, 2003). Apart from these barriers, the failure of some ICT initiatives is attributed to poor design (Grimes, 2000), and the tendency to emphasize technology (Wessels, 2000; Stoecker, 2005) and requirements of the provider, rather than the needs of the community have also been noted (Grimes, 2000).

Researchers argue that provision of infrastructure alone is not enough to promote adoption (Hollifield & Donnermeyer, 2003; Grimes, 2000), and access is not synonymous with adoption, or more importantly with effective use of ICT (Hollifield & Donnermeyer, 2003). It is suggested that creating demand for ICTs and developing necessary ICT skills in rural communities are just as important as the supply side of ICTs (Grimes, 2000). Based on lessons from ICT projects in rural India, Cecchini & Scott (2003) note the role of local intermediaries in promoting ICTs, importance of assessing local needs before developing applications, raising awareness and providing ICT skills training, and ensuring financial sustainability of ICT initiatives to ensure success and continued use.

Although not specifically focused on rural communities, importance given to understanding social and human factors in the development of ICT applications targeted for community needs, may also be relevant for rural ICTs. Information and communication appear to be important aspects in the development of community ICT applications. Gurstein (2000) highlights the importance of understanding the organization and governance within communities, as well as the way information is handled. Wessels (2000) suggests taking into account cultural and social differences within a community, as it pertains to communication. Importance of understanding the pre-existing role of information in a community (Heeks, 2002), analyzing how information is used in the community

(Stoecker, 2005), and importance of assessing the information needs of a community with a specific focus on demographic profiles of users, roles of different channels available, and the quality of information (Slack & Rowley, 2004) are some of the specific aspects identified by researchers.

Although the above issues are raised in relation to community level adoption of ICTs, these issues may be relevant to rural businesses, which are an important subset of rural communities. Particularly, the barriers to adoption, including access to infrastructure, lack of awareness, and literacy and language issues, may be equally applicable to rural business owners. Furthermore, as ICTs deal with information, the norms and practices of rural business owners in seeking and managing business information and their communication patterns would be important to understand their adoption decisions.

1.3 Rural business adoption of ICTs

Some of the ways in which ICTs could contribute to the economic development of rural communities include improving access to market information, expanding access to government services, lowering transaction costs, increasing efficiency, competitiveness and market access for local businesses, enabling participation in global economy, and diversifying rural economies (Rao, 2004; Grimes, 2000; OECD, 2001). Despite these potential benefits, literature suggests that adoption of ICTs by rural businesses is low and lag behind urban businesses (Galloway & Mochrie, 2005). A study by Anderson, Tyler and McCallion (2005) show statistically significant results that indicated lower use of ICTs among remote rural businesses compared to urban businesses and rural businesses close to urban centres. Other studies of rural businesses (Lai, 1994; Mitchell & Clark, 1999; Clark, Ilbery & Berkeley, 1995) show that 63% to 68% of rural businesses included in the study samples used computers but they were mainly used for management purposes and operational efficiency and only about 10% used computers for electronic transfer of data or funds. Research on small and medium enterprises also show that only 33% of businesses had a website but most did not have an e-business case (Ramsey, Ibbotson, Bell, & Gray, 2003). An interesting finding from the survey of Mitchell and Clark (1999) was that businesses with linkages and dependencies outside the local community had a higher level of adoption. The reason for the high adoption was found to be outside pressure to conform to requirements of key customers and suppliers. Similar findings on use of ICTs for more advanced functions being related to extensive business linkages are highlighted by Clark, et al. (1995).

Many reasons are presented in the literature for the low adoption of ICTs by rural businesses (Wolcott, Kamal & Qureshi, 2008). One of the reasons is claimed to be the lack of ICT skills of business owners, and high proportions of elderly people in rural communities are noted as an influence (Galloway, Mochrie & Deakins, 2004). The survey findings of Mitchell and Clark (1999) note that owners/managers who are young, educated and have some experience with technology are more open to ICT use. Lack of familiarity with ICTs and lack of awareness of the potential of ICTs for the business are also highlighted (Richardson & Gillespie, 1996; Galloway et al., 2004). Other reasons include the lack of time of owners to learn and use ICTs (Galloway et al., 2004,) perception of business owners that ICT costs are high in relation to benefits (Clark et al., 1995; Richardson & Gillespie, 1996), reluctance to invest in technology that may become obsolete within a short duration, lack of adequate after-sales support and problems in hiring and training ICT skilled workers (Clark et al., 1995). Furthermore, despite the importance of costs and technical aspects, adoption of ICT by small businesses in rural areas is suggested to be a more cultural and mindset problem, as the goals, customers, and operating modes of rural businesses have changed little over time (OECD, 2001).

Nevertheless, ICTs have been used by rural businesses in creative ways to reap benefits. Galloway et al. (2004) describe how collectivism existing in rural communities and among rural business owners was used to harness the potential of ICTs for business actions. The researchers outline five case studies of Internet forums used collectively by rural business owners in rural Scotland. The forums were defined as a portal that provided local businesses with a unique selling point or brand, based on the local setting or traditional industry. Some of the ways in which the forums enabled business expansion as identified from the case studies include the option to effectively repackage the business, provide a new channel to access customers and provide a means to penetrate new markets. This example demonstrates how adoption of ICTs can capitalize on some of the special features or behaviour within rural contexts to result in benefits for many rural businesses.

1.4 The research context – the Maldives

This research is undertaken using the Maldives as the research context. The Maldives is an island nation consisting of 1,192 islands, located across the equator in the Indian Ocean. The coral islands, formed in twenty six natural atolls, are low lying and very small, with just three islands having a land area larger than three square kilometres. The population of Maldives is 298,968, distributed across 194 inhabited islands. The capital, Male', has a third of the total population of the country and is considered as the urban centre. It is the centre of government and economic activities, leading to high

in-migration from the other islands. Of the remaining inhabited islands, 37% have a population less than 500, 45% have a population between 500 and 1,500, and only three islands have populations between 5,000 and 10,000. Maldives is a homogenous country in terms of religion, language and culture, having a 100% Muslim population, and a common local language called *Dhivehi* (MPND, 2004a; 2007).

Tourism is the main driving force behind the Maldivian economy, contributing to a quarter of the Gross Domestic Product (GDP) of the country. Individual islands are developed as tourist resorts, and currently ninety four resorts are in operation. The growth in tourism has led to an increase in opportunities in other sectors such as transport, construction, trade and handicrafts. Jobs in resorts are an increasing source of income for people from the rural islands. The GDP contribution of the fishing and agriculture sectors remain low at five percent and two percent respectively. However, fishing has been the traditional source of livelihoods, and is highly integrated with the rural economy, engaging over fifteen percent of the total workforce of the atolls. The geographic nature of the islands limits commercial agriculture, although subsistence agriculture and a smaller number of commercial initiatives continue to evolve. Manufacturing accounts for seven percent of the GDP, but the sector is characterized by very small scale activities such as traditional crafts, boat building, carpentry, food and beverages, clothing, and a few larger operations in the urban centre. A sizable part of the rural economy is said to be non-monetized, with many activities falling into the informal economy (MPND, 2004a; MPND, 2009).

Developments in the tourism sector led to positive growth rates and increase in the per capita income of Maldives from US\$ 879 in 1985 to US\$ 2,800 in 2009 (MPND, 2009). Combined with a high per capita and improvements in socio-economic indicators, Maldives was set to graduate from the list of Least Developed Countries (LDC) in 2008. However, following the devastation caused by the tsunami of 2004, a period of transition from LDC status to developing country status was set from 2007-2010 (MFA, 2010). Despite these developments, several challenges are faced by the Maldives in continuing the development trend. These include the vulnerability of the islands to climate change and other environmental impacts, vulnerability to external shocks resulting from the narrow economic base and high reliance on imports, as well as wide disparities between the urban capital and the rural islands in terms of income and employment, access to social services and infrastructure (MPND, 2004b).

1.5 Structure of the dissertation

This dissertation is divided into 10 chapters. Chapter 1 gives an overview of the research including the research objectives and methodology, and touches briefly on a definition for 'rural', some background on the level of ICT adoption in rural communities and rural businesses, as well as a brief description of the research context. Chapter 2 reviews literature on information behaviour, human communication, and technology adoption models, and summarizes the relevant aspects for this research. Chapter 3 continues the literature review focused on identifying social and cultural aspects of the rural context that differentiates it from the urban context, and the differences between rural and urban businesses. Following the literature review, Chapter 4 outlines the theoretical framework developed to explain potential implications for ICT adoption resulting from the rural context, and presents the research model and hypotheses. The research methodology is then presented in Chapter 5. Chapter 6 presents the findings from the field studies conducted as the first phase of the research, followed by an outline of the revised research model in Chapter 7. Next, chapter 8 presents the findings from the quantitative survey conducted as phase two of the research, followed by a discussion of the research findings in Chapter 9. Finally, Chapter 10 covers the contributions and limitations of the research, as well as future directions to continue the research agenda.

Chapter 2

Literature review part one - Information seeking, human communication, and technology adoption

Since the focus of the research is on investigating the potential of ICTs to cater to information needs of rural businesses, it is necessary to get a general background of information needs including how such needs are created and how people behave to satisfy the needs. The main theories of information seeking behaviour are first summarized, followed by a review of relevant theories and elements from human communication literature. Then, the underlying emphasis in both streams of literature, on the significance of context and culture in understanding and analyzing human behaviour is explored. Finally, in order to understand ICT adoption decisions and factors that affect such decisions, theories and models of technology adoption are reviewed. The chapter ends with a summary of the main findings relevant to this research.

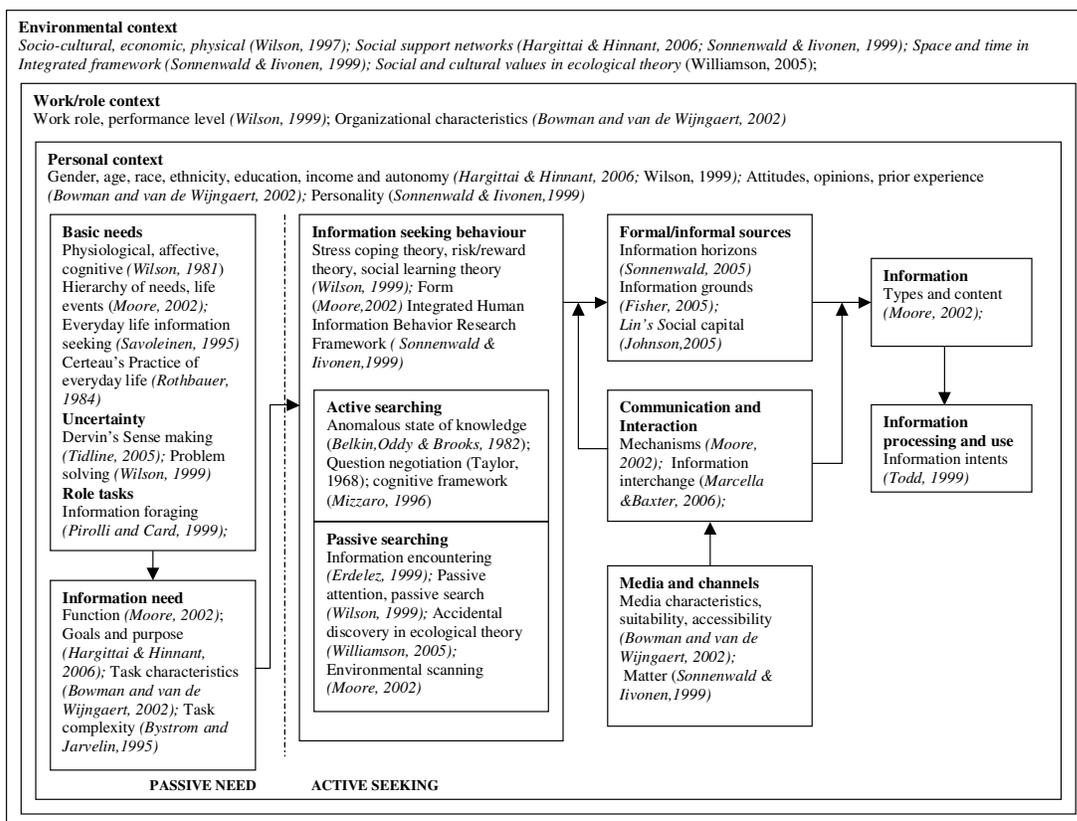
2.1 Information needs and information seeking behaviour

Information needs and information seeking behaviour are topics of significant attention in the literature, particularly related to library and information science. Although numerous definitions and delineations between data, information and knowledge exist (Zins, 2007), for the purposes of this research, information can be defined as data that creates a change in the state of knowledge of a recipient of the data (Mizzaro, 1996). Information behaviour is defined as all human behaviour and activities that include “how people need, seek, manage, give and use information in different contexts” (Fisher, Erdelez & McKechnie, 2005, p xix). One of the seminal works in the field of information behaviour is that of T.D. Wilson (1981). Wilson’s first attempt at providing a theoretical framework proposed a model for information behaviour in which he suggests that a need for information is secondary and arises from more basic primary needs categorized as physiological, affective and cognitive needs. Physiological needs are needs such as for food, water, and shelter, affective needs are psychological and emotional needs, and cognitive needs are needs such as for learning and planning. These categories of needs can be related to the hierarchy of needs theory developed by Maslow (Hagerty, 1999), in which he defines five levels of needs that humans strive to fulfill in a fixed sequence. These 5 levels of needs are: physiological, safety, belongingness and love, esteem, and self-actualization. According to Maslow, individuals strive to achieve the most basic level of needs first before moving to the next level of needs. Wilson (1981) suggests that these needs

are influenced by the context of an individual, which can also act as barriers to the information seeking activities of the individual. Wilson later developed a new model based on this original framework, where the context (defined as intervening variables) may not only hinder but also support the information seeking behaviour (Wilson, 1997; Wilson, 1999).

A review of literature provided an overview of numerous theories, frameworks, and models that attempted to explain or capture information related behaviour. The ideas proposed in the theories and frameworks can be summarized in a graphical presentation, as shown in Figure 1. This figure shows the different stages of information behaviour, starting from how information needs are created, how people approach information seeking, the information sources and media channels used, communication and interaction, and the acquisition, transfer and usage of the information. These stages are embedded within the contexts of the information seeker.

Figure 1: Summary of theories and frameworks in information behaviour (developed by author)



As can be seen in Figure 1, the contexts in which information needs and information seeking behaviour occur are highlighted in many theories and frameworks. These include the individual's personal context, the work or role related context and the broader environmental context. Information needs are suggested to result from basic needs or role-related tasks, or to reduce uncertainty. Some frameworks suggest looking at this basic need or function for which information is required, in order to understand information seeking behaviour.

The notion of information seeking being initiated to reduce uncertainty created from different problems is also proposed by Wilson (1999). The goal of the person is to reduce this uncertainty and resolve the problem and hence the resulting information seeking behaviour can be depicted as goal seeking behaviour, which can include different stages of problem identification, problem definition, and problem resolution. Sense-Making (Dervin, 1983) is another theoretical perspective and methodological approach to study information seeking behaviour from the user perspective, focused on reducing uncertainty caused by problems. Sense-Making is comprised of four elements: a situation in time and space that represents the context in which information needs arise; an outcome that is the desired goal for the sense-making process; a gap, which focuses on the disparity between the existing situation and the goal; and a bridge, which provides some means for closing the gap to achieve the outcome.

Information needs arising out of work roles and tasks and the related information behaviour are also given prominence in the literature. One of the theories that focus on the task related information seeking is the Information Foraging theory (Pirolli & Card, 1999). This theory emphasizes the importance of analyzing the embedded tasks and the resulting requirement for information seeking to achieve outcomes related to the task. The granularity of the task, whether taken as a whole or as subtasks, and the complexity of the information required to achieve the task outcomes are important factors that affect the seeking behaviour. Related to information needs resulting from work roles is the conceptual framework proposed by Bystrom and Jarvelin (1995) to explain how the task complexity affects the types of information sought and the channels and media used. The framework proposes that information needs required to perform the task is interpreted by the individual depending on the needs, and situational and organizational factors. The actions taken to address the information needs in turn depend on personal factors such as prior experience, personal style of information seeking and perceived accessibility to information channels and sources.

Other researchers argue that information needs arise not only from work or role related tasks, but also from general every day life. One of the more popular theories in this regard is the everyday life information seeking (ELIS) theory proposed by Savolainen (1995). This theory is motivated by the need to explain the role of socio-cultural factors that affect information seeking behaviour and source preferences. A similar view, that information behaviour is existent in daily life, is proposed through the conceptualization of the practice of everyday life by Certeau (1984). He proposes that information seeking behaviour relates to all situations of daily life, including non-work related contexts, and using different information sources too satisfy needs to assist in the tactics used to cope with everyday life. Looking at the broader social context, Hargittai and Hinnant (2006), propose a Social Framework for information seeking to address the limited attention to the social processes in information seeking behaviour. They suggest looking at social and demographic attributes of the individual such as gender, age, race, ethnicity, education and income to understand how such attributes lead to differences in information behaviour. They focus on the context of the individual and suggest that the autonomy of the individual in information seeking, the social support networks which act as important information sources, and the goals and purpose of the information need would impact of the information seeking behaviour.

The physical task of information seeking is categorized into passive and active searching. The importance of passive search has been recognized by researchers such as Wilson (1999) who updated his earlier model to include passive forms of information gathering. Passive search has been given prominence due to the focus on information behaviour related to everyday life information seeking. The ecological theory of human information behaviour developed by Williamson (2005) suggests that information is more often acquired by accident rather than actively sought. The theory proposes that we continuously monitor our environment for relevant information, and recognize some needs that are unconscious, only when the relevant information is discovered. Moore (2002) also points to a similar form of information acquisition and refers to it as environmental scanning. Another theory on passive information acquisition is information encountering proposed by Erdelez (1999), which suggests that while an individual is actively searching for some information, some other information may be accidentally discovered.

Theories on active search focus mainly on information retrieval. According to Belkin, Oddy and Brooks (1982) and Taylor (1968), a person seeking information has difficulty expressing precisely what information is needed as he himself does not know what that information is, but rather has a

conscious need for information arising out of an inadequate state of knowledge. However, he can explain why the information is needed. Mizzaro (1996) suggests that a need for information can be satisfied in different ways by taking different paths to reach a knowledge state that satisfies the need. An inquiry for information should not be viewed as a single event, but as an unrestricted and dynamic negotiation about an area of uncertainty (Taylor, 1968), where iteration and interaction can help find the appropriate information (Belkin, Oddy & Brooks, 1982). Different perspectives on the search process can be highlighted using the models developed by Kuhlthau (1991) and Ellis (1989). Kuhlthau (1991) presents a stage model of the information search process, depicting it as a linear process with five stages: initiation, selection/exploration, formulation, collection, and presentation. The stages are presented as a gradual refinement of the problem area. Although Ellis (1989) also presents a model of similar stages in the search process (starting, chaining, browsing, monitoring, differentiating, extracting, verifying, and ending), he argues that the interrelations and sequencing patterns between the different stages would vary depending on the circumstances of the information seeking activities of the person at that point in time.

Theories related to information sources suggest that the sources used depend on both formal and informal sources that a seeker has access to within the broader environmental context, including social networks (Sonnenwald, 2005; Fisher, 2005). Interactions that take place between the provider and seeker of information depend on the relationship between the two, and it is suggested that the roles and objectives of both could be different with regard to the same information (Marcella & Baxter, 2005). The media and channels used to exchange information depend on the match between the task, the user and the channel or technology (Bowman & van de Wijngaert, 2002), and channel characteristics such as relative advantage, compatibility, accessibility, complexity, reliability, interactivity, user-friendliness, and costs affect the choice made.

This section covers a brief overview of the main theories and models related to information needs and information seeking behaviour. These theories focus on how information needs are created, the passive or active nature of the search process, and the sources and channels used for information transfer. The importance accorded to the context of the information seeker in many of the theories is highly relevant for this research. These theories suggest that the personal and work context, as well as the broader environmental context affect all stages of the search process, including the sources and channels used and the interactions that take place in the transfer of information.

2.2 Human Communication

Although, literature on information needs and searcher's behaviour provide useful insights into information seeking behaviour, it is still not clear how the required information is transferred and understood by an individual and how interactions occur in the exchange or transfer of information. To understand such phenomena, the literature on human communication was studied.

Communication has numerous definitions in literature, but a simple definition describes it as a process by which people create meaning through interaction (Heath & Bryant, 1992). Some key and recurring concepts in the definitions of communication in literature include symbols, verbal and speech patterns, as well as interactions or relationships and social processes that lead to understanding of content transferred (Littlejohn, 1983). Viewing communication as a process, Heath and Bryant (1992) identified some of its key concepts: source/receiver, intent/purpose, feedback, message, channels, interaction, context, and cognitive processes.

One of the most cited theories in communication is the mathematical theory of communication proposed by Shannon and Weaver (1949). Their theory proposed that communication is a process, with an information source, a transmitter that encodes a message, a communication channel, and a receiver that decodes the message and forwards it to a destination. Shannon and Weaver (1949) also define three levels of communication: technical level concerned with accurate transmission of a message, semantic level concerned with how meaning is conveyed, and effectiveness level which looks at how meaning produces the desired result. It is the semantic level that is of interest to this research.

The relationship between symbols and meaning is significant in human communication. Meaning is taken to be the impact on communication partners (Heath & Bryant, 1992). All communication is based on signs and symbols, which can be anything that conveys information, including sounds, objects, colour, scents and even silence (Howard, 1993). Models depicted as triangles of meaning that outline how meaning is associated between objects, symbols and referents exist in literature (Ellis & McClintock, 1990; Littlejohn, 1983; Heath & Bryant, 1992) The model of symbolic interaction proposed by Mead (1934), suggest that people associate meaning with words or symbols through interaction, and shared experiences and meaning then become conventionalized over time (Heath & Bryant, 1992).

The way an individual understands a message depends on both verbal and non-verbal communication. When interpreting non-verbal communication, the following aspects influence the meaning: paralinguistics - which include: pitch, emphasis and intonation; facial expression and eye contact; gesture; physical distance or proximity between people; and touch. All aspects of verbal and non-verbal communication are influenced by culture (Ellis & McClintock, 1990). Hall (1976) defines communication as an element that can identify cultural differences by describing it as being a continuum, going from low context to high context. Low context communication is where information communicated is included in an explicit code, such as the verbal message. However, in high context communication, information is derived not just from the explicit message but also from the physical context, internalized meanings, patterns of an individual's past communication, and other verbal and non-verbal signals. Therefore, the context is an important determinant of how meaning is communicated and how people behave when communicating.

Patterns of communication and interaction are often included in theories and models. Littlejohn (1983) and Heath and Bryant (1992) describe several theories and models of communication, of which Shimanoff's (1980) rules theory, Bandura's (1977) social learning theory and Schramm's (1954) limited effects model are of specific relevance. These theories outline how human behaviour is structured and influenced by culture and situation, and how people of different cultures inherently understand the rules and patterns for interaction in order for them to communicate. Patterns occur at all levels of communication: societal, group and individual. At societal level, patterns occur in terms of functions, categories of talk, attitudes and conceptions about language and speakers. Patterns also occur due to roles and groups within society including factors such as sex, age, social class/category and status, and occupation (Saville-Troike, 2003). In a community, rules of interaction define and constrain the type of interactions that can take place within and between different social categories (Saville-Troike, 2003). Control, trust and intimacy are proposed as three variables that affect the quality of a relationship and thus communication patterns within the relationship (Heath & Bryant, 1992). Levels of trust and intimacy in relationships can be linked to the important concept of social capital, defined as interlocking networks of social relationships between individuals and groups (Onyx & Bullen, 2000).

This section focused on how meaning is conveyed in the communication of information between individuals. Literature suggests that people associate meaning to words and symbols through interactions and experiences that are conventionalized over time. The level of understanding could

also depend on the conventions of using verbal and non-verbal signals in the communication process. People follow certain patterns and rules of interaction that may differ based on the roles and status of people or social groups and categories within a given community. Relationships between the people communicating could also affect the interaction patterns. What is relevant for this research is how culture and conventionalized norms within a community determine the interaction rules and patterns in communication, and how such norms could potentially affect the use of ICTs for communication of information.

2.3 Context and culture as key determinants of behaviour

Culture and context appear to be key elements that define human behaviour in both information behaviour and human communication literature. The contexts identified in the theories and models of information needs and behaviour are summarized in Table 1.

Table 1: Contexts identified in information behaviour theories and models

Context	Theory/Model	Reference
Personal context, role /work related context, environmental context (political, economic, technological, etc.)	Model for information behaviour - 1981	Wilson (1981)
Personal context (emotional, educational, demographic), economic context (cost, time), social and interpersonal context, environmental context (time, geography, culture)	Model for information behaviour - 1996	Wilson (1997)
Time and space	Dervin's Sense making	Tidline (2005)
Individual and organizational characteristics, attitudes and opinions, experience	Media choice	Bowman & van de Wijngaert (2002)
Social and demographic attributes (gender, age, race, ethnicity, education and income),	Social framework for information seeking	Hargittai & Hinnant (2006)
Personality (individual & social support networks), space (work / task context and organizational, sociopolitical and socioeconomic context), time	Integrated Human Information Behaviour Research Framework	Sonnenwald and Iivonen (1999)
Relationship between information type/source/system and user	Ecological theory	Williamson (2005)
Personal context, characteristics of information environment, role and socio-cultural context	Information encountering	Erdelez (1999)
Social networks and the broad environmental context	Information horizons	Sonnenwald (2005)
Resources embedded in social structure	Lin's Social capital	Johnson (2005)

Steinwachs (1999) criticizes the lack of adequate theories and models in literature to explain cultural influences on information behaviour. She describes how national culture can influence information seeking by applying the cultural model of Hofstede (1980) to different elements of the

information seeking process including the sender and receiver of information, the content or information transferred, and the channels used. Hofstede's (1980) cultural model is seminal in cross-cultural studies and includes the following dimensions:

- high or low power distance - perceptions of equality and inequality between levels in hierarchy.
- individualism versus collectivism - where goals/outcomes are centered around the individual or groups.
- high or low uncertainty avoidance - which affects tolerance for limited information and anxiousness in situations of limited information.
- orientation towards masculine or feminine roles - masculine cultures stress achievement, control and power, while feminine cultures focus on collaboration, quality of life and family.

Another cultural model used in cross-cultural studies is that of Hall (1976). Hall's elements or dimensions of culture include the following:

- time (monochronic versus polychronic) – monochronic time is when one thing is the focus of attention as a time, which is said to emphasize schedules, promptness and segmentation, where as polychronic time or doing several things at a time stress the involvement of people and completion of tasks rather than schedules.
- context (low versus high) – focuses on communication and handling of information. High context is when a lot of information is interpreted from the context, rather than being explicitly included in the message. Low context is when information is explicitly conveyed through the message passed.
- space (low versus high territoriality) – how space is handled and the level of importance given to space and territoriality.
- action chains – set of sequence of events people participate in. High context cultures are said to have greater commitment to completing action chains compared to low context cultures.

Emphasis on culture in determining behaviour is more pronounced in the communication literature. For interpretation of meaning from symbols, and how similar meanings can be associated with a symbol by both sender and receiver of a message, the context in which the symbol is used and the cultural backgrounds of the individuals are noted to be important (Ellis & McClintock, 1990). Saville-Troike (2003) suggests that even though all aspects of culture are relevant to communication, the aspects that influence it most are the social and institutional structure, values and attitudes about language and speaking, conceptual categories from past experiences, and ways in which shared cultural knowledge are transmitted from generation to generation.

Culture is defined as the customary manner in which human beings learn to organize behaviour and thought in relation to their environment (Howard, 1993). Culture is something that is learnt and acquired through time – known as enculturation (Rosman & Rubel, 1992). The cultural rules learnt define acceptable behaviour for people of that culture, but these rules can change over time depending on the interpretation of majority of people in that culture.

In this regard, development and modernization is said to have brought about not just economical change but wider social and cultural and political change to many parts of the world. Development was perceived as “social engineering of emerging national societies” (McMichael, 2008, p.25), and progress viewed as “ordered social change and reform” (Hoogvelt, 1997, p.36). Colonization by European countries imposed European culture on native cultures, which were perceived as backward, and broke apart their social organization and traditions based on natural ecologies. Based on inequality, colonization exploited natural resources and labour, leading to formation of new inequities and tensions that remained beyond de-colonization (McMichael, 2008).

Following the demise of colonialism, new interest was generated towards development led by capitalism, with the objective of reducing the disparity between the richer First World countries of the West and the poor Third World countries (McMichael, 2008). Food aid, technology transfer and credit to support export oriented production led to the rapid growth of a few countries in Asia and South America, but at the same time it also led to the fall of many countries in Africa stemming from the debt crisis of the 1980s (McMichael, 2008). Globalization resulted in many changes in the social and political systems of the countries involved. Involvement of emerging economies in the world production systems led to a new social organization of human interactions across borders, new divisions of labour, and re-organization of local policies to fit the new global economy (Hoogvelt, 1997).

According to Hoogvelt (1997), the experiences of colonialism and its interaction with globalization have produced different experiences for different countries. While irrevocable changes have been brought about in countries active in the global economy, a large part of the world is said to be excluded from this wave of globalization, with about 50% of the Third World countries being in this excluded group (Hoogvelt, 1997). Exclusion and failure of modernization, together with imposed structural and political changes contributed to weak governments causing anarchy and civil war in many sub-Saharan African countries. Rise of Islamic fundamentalism in some countries like Palestine, Sudan, and Egypt, are suggested to be the result of resistance against globalization (McMichael, 2008), and the need to recapture a local identity that got weakened during social change (Hoogvelt, 1997). As such, it would be important to understand the diversity between cultural identities of those countries changed by modernization and those excluded from or resisting modernization. The impact of culture on behaviour related to information seeking and communication is likely to be very different for countries that are highly affected by modernization and those that have remained excluded from it.

There is significant interest in the literature to study the relationship between culture and ICT adoption and use (Ein-Dor, Segev & Orgad, 1993). Hofstede's (1980) and Hall's (1976) cultural dimensions appear to be used in many studies exploring the relationship between culture and ICTs. Some of these studies are summarized in Table 2.

Table 2: Studies exploring relationship between culture and ICTs

Study	Cultural dimensions	Findings/Suggestions
Citation analysis of IS Journals (Ford, Connelly & Meister, 2003).	Hofstede's	57 articles from 22 journals used cultural dimensions. Significant interest in culture in technology adoption literature (13 out of 25 articles categorized under the IS management subcategory)
Empirical analysis of the relationship between culture and adoption of ICTs using secondary data sources for 31 countries (Bagchi, Hart & Peterson, 2004).	Hofstede's	ICT adoption being higher in cultures with high individualism, low power distance, and feminine value orientations, were all supported. ICT adoption being lesser in cultures with high uncertainty avoidance was weakly supported.
Relationship between culture and ICT adoption and usage in the work place, using a comparative study of urban businesses in the USA and Saudi Arabia (Buragga, 2001).	Hofstede's & Hall's	Hofstede's dimensions (power distance, uncertainty avoidance, and individualism/collectivism) - no relationship found. Hall's dimensions (context and monochronic/polychronic time) - no relationship found. No explanations given as to why the results failed to show linkages.

Study	Cultural dimensions	Findings/Suggestions
Relationship between culture and ICT adoption using ICT usage data, financial data and Ethno-linguistic Fractionalization index for 31 countries (Geissler, 2006).	Hofstede's	Low power distance and high individuality were found to be significant for likelihood of adoption. Adoption being lower for countries with high uncertainty avoidance was found to be marginally significant. No relationship found for masculinity/femininity.
Relationship between culture and ICT by incorporating cultural variables into an extension of the Technology acceptance model and using foreign students of a US university (Srite, 2000).	Hofstede's	Power distance (PD) was found to be significant for adoption of technology (low PD - higher adoption) willingness to innovate (high PD - less willing) and trust in technology (high PD - less trusting). Collectivism was found to be significant for subjective norms. No relationship found for uncertainty avoidance and masculinity/femininity.
Outlining potential impacts on the information-seeking process using ICT (Komlodi & Carlin (2004).	Hofstede's & Hall's	Hofstede's dimensions - Power distance impacts sources and first steps of seeking; Individualism/collectivism impacts on collaborative ICT solutions and information sharing; Uncertainty avoidance impacts on expression of information needs and frequency of search execution. Hall's dimensions - High/low context in communication impact on extent of reliance on context and in query formulation and interpretation of results; Polychronic/monochronic time concepts impact on multiple versus focused search executions and accidental information encountering.

A second stream of culture and ICT literature focuses on influences of culture on business management practices and in turn on ICT adoption for business use. The findings from these studies (summarized in Table 3) highlight the importance of understanding the management practices in the development of ICTs for business needs.

Table 3: Influences of culture on management practices and ICT adoption

Studies	Management practice	Influence on ICT
Chinese business practices and relation to ICT (Martinsons & Westwood, 1997)	Reliance on personal and informal sources of information	Reduces need to generate formal information
	Centralized decision-making	Reduces need to transfer and exchange information within the business
	Information used as power	Reduces need to share or make information accessible
	High context communication	Loss of meaning may result if encoded
	Decision-making based on experience and intuition	Reduces need for data collection and analysis
Cultural differences in ICT design using Chinese business practices (Tricker, 1988)	Business is enmeshed in family links and obligations	Business goals and purpose on its own right has no meaning
	Lack of formal organizational structures	Create differences in ICT use as compared to Western countries
	Informal interpersonal networks	Create differences in ICT use as compared to Western countries

Studies	Management practice	Influence on ICT
Relation-based governance systems by Li (2005)	Transactions and information based on personal sources and implicit arrangements	Lack of formal procedures limits ICT use.
	Information derived from personal contacts	Lack of need to scientific analysis limits ICT use.
	Decision-making is closed, informal and centralized	Lack of formal procedures limits ICT use.
Transferability of ICT across cultures - Japanese and Hong Kong businesses (Fukuda, 1984)	Management practices related to data processing stemming from decision-making styles and leadership patterns	Impact on the perceived effectiveness of management information systems for business functions

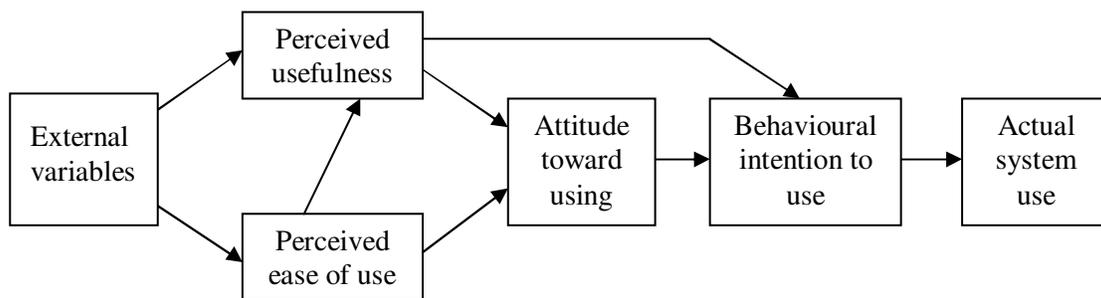
This section focused on the significance of context and culture in information seeking literature and human communication literature. It provides a more detailed look at the different contexts that are defined in the relevant theories and models, and attempts to get a better understanding of culture and how it is compared in cross-cultural studies. The role of modernization on changing national cultures is also briefly looked at. Furthermore, the relationship between culture and ICT adoption and use also provides useful insights. What is most relevant to this research is how context and culture can potentially affect information seeking behaviour and the communication of information between the provider and seeker. Findings from studies that applied the cultural models of Hofstede (1980) and Hall (1976) to ICT adoption, and findings from studies that explore the relationship between ICT use and business management practices that are influenced by culture, may be usefully applied to this research.

2.4 Information technology adoption

Since the above mentioned relationship between culture and ICT adoption is relevant for this research, and since the research attempts to explore the impact of the rural context on ICT adoption, a review of the literature on ICT adoption is essential. High costs of information systems implementation combined with low success rates (Legris, Ingham, & Collerette, 2003) fuelled a significant interest in understanding user acceptance of ICTs and to develop high quality measurement scales (Davis, 1989). The technology acceptance model (TAM) was specifically developed by Davis (1989) to understand user's acceptance or rejection of ICTs. Since then, it has become one of the most prominent user acceptance models to be applied to predict ICT adoption decisions (Legris et al., 2003). The original model was focused on trying to predict how system characteristics affected acceptance. Davis (1989) adapted concepts from a well-known theory from

social psychology, the theory of reasoned action (TRA), developed by Fishbein and Ajzen (1975), which proposed that a person's performance of a specified behaviour is determined by his behavioural intention to perform the behaviour, and intention was determined by the person's attitude towards the behaviour and subjective norm concerning the behaviour (Davis, Bagozi & Warshaw, 1989). This link between an individual's attitude and actual use was directly adopted into TAM. In TAM, Davis (1993) further proposed that attitude was influenced by the perceived usefulness and perceived ease of use of the system. System characteristics in turn affected perceived usefulness and perceived ease of use (Davis, 1993). The original TAM is presented in Figure 2. Davis et al. (1989) tested both TRA and TAM and found that perceived usefulness was the major determinant and perceived ease of use a secondary determinant of intentions to use a system, and that intention to use was a good predictor of actual use. However, they found that attitudes mediated between perceptions and intentions less than expected.

Figure 2: The original technology acceptance model developed by Davis

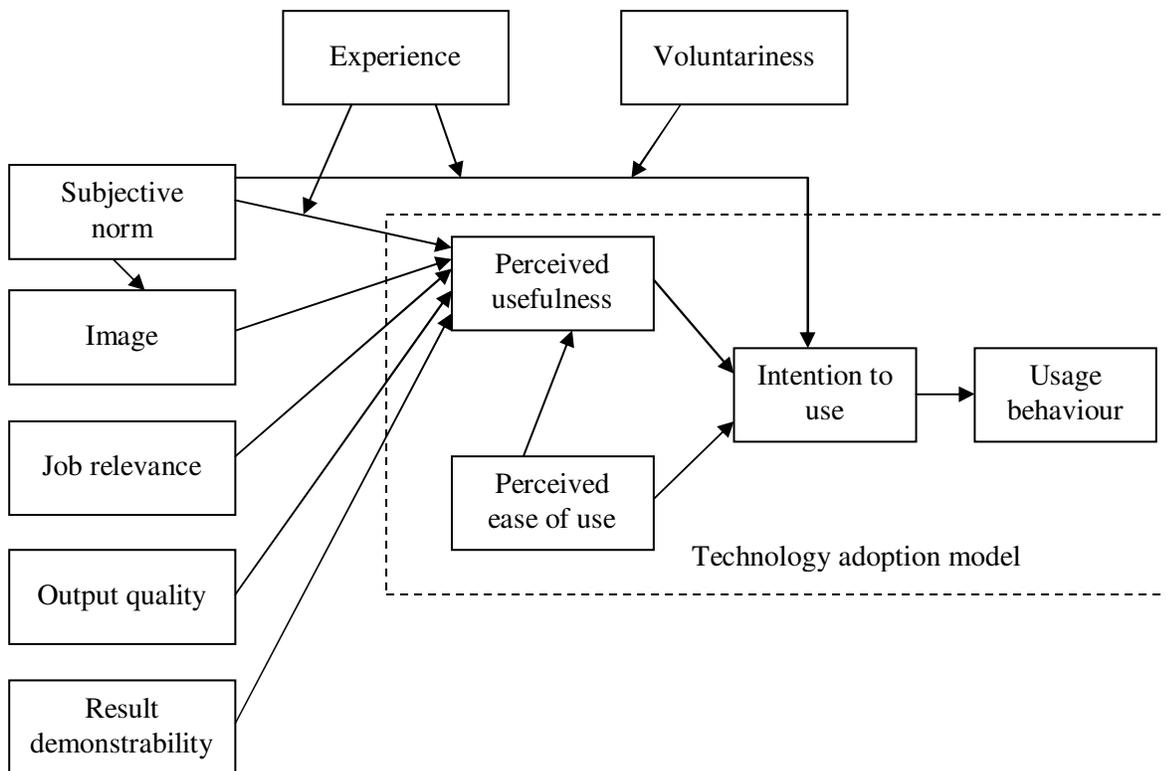


Legris et al. (2003) presents a good review of studies that have used TAM to test user acceptance of different information technologies including microcomputer use, software tools and business systems, as well as office automation software, such as word processing, spreadsheets, voice and electronic mail. The authors state that TAM has been proven as a useful theoretical model that has been tested in many empirical studies giving statistically reliable results. Overall, TAM is claimed to have empirically predicted about 40% of a system's use (Legris et al, 2003; Venkatesh & Davis, 2000).

TAM has also been extended by many researchers to include external variables that influence the main constructs of perceived usefulness and ease of use. The review of TAM by Legris et al. (2003) revealed use of numerous external variables including gender, experience, education, computer support, management support, output quality, and self-efficacy. The studies revealed that external

variables provide a better understanding of what influences user perceptions. Venkatesh and Morris (2000) studied gender influences using TAM and found that men considered perceived usefulness more than women in usage decisions, but perceived ease of use was more significant for women. Other researchers have extended TAM through combination with other related models, such as the task-technology fit model (Dishaw & Strong, 1999). The combined model predicted influence of task-technology fit – the match between capabilities of the technology and the demands of the task – on perceived usefulness and ease of use, and tests showed that the combined model was a better predictor of usage than either model alone (Dishaw & Strong, 1999). The influence of time on usage decisions has also been addressed by researchers by testing TAM at different points in time during the adoption process. Karahanna, Straub, and Chervany (1999) tested TAM during adoption and use stages and found that normative components dominated adoption intentions, but attitudinal components dominated intentions for continued use. Aspects such as ease of use ceased to be important for users and technical support became more important to users compared to management support and informal networks for the adopters. Decreasing importance of ease of use, as people get more experienced with a system, was also found by Szajna (1996).

Figure 3: TAM2 – an extended technology acceptance model



To address the determinants of perceived usefulness and how influences changed over time with experience, Davis introduced an extended version of TAM, named TAM2 (Venkatesh & Davis, 2000). TAM 2 (see Figure 3) incorporated several external variables as determinants of perceived usefulness. They included social influence processes such as subjective norm, and image, as well as cognitive instrumental processes such as job relevance, output quality, and result demonstrability. Voluntariness and experience are added as moderating variables. The empirical tests of the extended model showed that the external variables significantly influenced user acceptance (Venkatesh & Davis, 2000).

Besides TAM, there are many other theories and models that attempt to predict user acceptance. Venkatesh, Morris, Davis and Davis (2003) review eight of the most prominent models including TAM. The eight models and the main constructs predicting behavioural intentions are given in Table 4. Observation of the key predictors in these models show common themes such as subjective norm, ease of use and behavioural control, but also a range of variables that are identified in only one model. Combining key themes in all models, Venkatesh et al. (2003) propose a unified model of user acceptance and identifies four main predictors for behavioural intention to use a system. These four predictors are: performance expectancy, which takes into account aspects such as perceived usefulness, relative advantage and job-fit; effort expectancy, which takes into account ease of use and complexity of systems; social influence, which include subjective norm, image and support from organization; and facilitating conditions, which cover control over use, level of technical assistance and compatibility.

Table 4: Prominent models of user acceptance

Theory/Model	Main constructs
Theory of reasoned action (TRA)	Attitude toward behaviour, subjective norm
Technology acceptance model (TAM)	Perceived usefulness, perceived ease of use
Motivational model	Extrinsic motivation, intrinsic motivation
Theory of planned behaviour (TPB)	Attitude toward behaviour, subjective norm, perceived behavioural control
Combined TAM and TPB	Attitude toward behaviour, subjective norm, perceived behavioural control, perceived usefulness
Model of PC utilization	Job fit, complexity, long term consequences, social factors, facilitating conditions
Innovation diffusion theory	Relative advantage, ease of use, image, visibility, compatibility, results demonstrability, voluntariness of use
Social cognitive theory	Outcome expectations – performance, outcome expectations – personal, self efficacy, affect, anxiety

Despite the popularity of TAM, researchers have identified some limitations of the studies that test the model. These limitations include the common use of students as research participants rather than real users in organizations, focus on simple individual-oriented hardware and software instead of business process applications or applications that are of organizational concern, use of self reported usage, and conducting tests after initial adoption stages when users are more experienced with the systems under study (Legris et al, 2003; Venkatesh et al, 2003).

Of greater importance is a theoretical limitation of TAM, in failing to consider broader organizational dynamics in adoption and user decisions (Legris et al., 2003). Due to the interdependencies between technology and organisational contexts and related impacts on effective outcomes, Legris et al. (2003) state that the predictive capacity of TAM cannot be increased unless it is integrated into a broader model that includes organizational and social factors.

This theoretical limitation of TAM has clear implications for using TAM as a model to predict user acceptance of ICTs in the rural setting. Being originally developed to understand the influence of system characteristics on user acceptance (Davis, 1993) the model fails to take into consideration the broader contextual aspects that could possibly influence the adoption and use decision. TAM and the other seven prominent user acceptance models do not include explicit factors or relationships such as the preference or availability of sources and channels for information within the context, role of social networks, communication patterns and norms, inter-personal relationships and other cultural norms, and management practices. Different extensions of TAM or additions of predictor variables have focused more on: task or outcome characteristics such as usefulness, output quality and relative advantage; individual user characteristics such as experience, gender or age; and on normative beliefs such as subjective norm, image and visibility. Only a few predictors such as compatibility or facilitating conditions take into account other related organizational or contextual factors. Given the differences between urban and rural communities in terms socio-cultural dynamics resulting from small population sizes and distance from urban centres, TAM provides little value in understanding impacts of the socio-cultural context of rural communities on ICT adoption decisions.

2.5 Summary

This first part of the literature review examined the theories and concepts from information behaviour and human communication literature, as well as the issues related to technology adoption models. Theories and models of information behaviour highlight the importance of context in influencing

information needs and information seeking behaviour. Furthermore, theories of human communication emphasize context and culture as the crucial aspects which can help us understand how people associate meaning to words, how interaction patterns occur in communication, and how social strata and relationships affect such interactions. These theories and models might have potential when trying to understand the rural adoption of ICT, as the literature focusing on the relationship between culture and ICT use suggests that culture has potential implications for ICT adoption and use. However, an explicit exploration of differences in culture between rural and urban settings and potential impacts of any cultural differences on ICT adoption is not included in these studies.

This chapter also investigated the research that explicitly studies ICT adoption. In this literature, the focus has been on analyzing the influence on user intentions to use a technology resulting from task related characteristics such as usefulness, individual user characteristics such as age and gender, and normative beliefs such as image. Similar to the general ICT literature, rural and urban contextual factors are not emphasized and are not explicitly included in the models.

The following chapter reviews the literature on rural and urban communities, and discusses potential rural and urban factors that might be influential in ICT adoption and that might be candidates for including in an extended TAM framework, or for taking into consideration while doing field work when studying ICT adoption in these settings.

Chapter 3

Literature review part two – Context and culture of rural communities

Since the research is focused on rural communities and rural businesses, literature that describes the characteristics and behaviour of rural communities and rural businesses are reviewed with the intention of identifying specific aspects that differentiate between rural and urban communities and rural and urban businesses.

3.1 Socio-cultural systems and context of rural communities

Average characteristics of rural communities and behaviour resulting from these characteristics as identified in literature are summarized in Table 5. Wiggins and Proctor (2001) summarizes the difference between urban and rural communities as a difference in access to physical, human, social and financial capital.

Table 5: Characteristics and behaviour of rural communities

Characteristic / Behaviour	Reference
<i>Geographic distance or remoteness from urban centres</i>	Slack et al., (2003); du Plessis et al. (2004)
<i>Population dimension</i>	
Small size and low density	Dewey (1960), Slack et al. (2003)
Greater proportion of elderly people	de Haan (1999); Dandy & Bollman, 2008
<i>Social and cultural dimension</i>	
Familiarity among members (backgrounds known)	Atkin (2003), Gross (1948)
Strong community feeling and intimate interaction	Atkin (2003), Gross (1948)
Conservatism and traditional values	Francis & Henderson (1992), Atkin (2003), Chitsike (2000)
Self-sufficiency and self-help	Francis & Henderson (1992), Atkin (2003)
Minorities, attitudes and power	Francis & Henderson (1992)
Slower less pressurized way of life	Atkin (2003)
Low levels of education, skills and health care	Shields (2005)
<i>Economic dimension</i>	
Small markets and labour supply	Slack et al. (2003)
Traditional engagement in primary industry	Slack et al. (2003)
Economic diversification increasing	Page & Beshiri (2003); Reimer (2009)
Limited range of public and private services	Slack et al. (2003)
High production and servicing costs	Slack et al. (2003)
Lower income levels, taxes and cost of living	Galloway et al. (2004), Ravallion & van de Walle, (1991); Biggs, Bollman, & McNames, (1993)
Informal economy, self employment, and bartering/ credit arrangements	Schneider (2002), du Plessis (2004), Douglas (2003)
Poor infrastructure	Korten, 1987

Communities are social systems composed of sub-systems. Social systems are made up of social interactions and cultural factors that influence and structure these interactions (Loomis & Beegle, 1950). Loomis and Beegle (1950) identified the elements that make up a social system as: roles that individuals take; status given to the individuals based on roles or individual qualities; authority of the individuals; their rights; goals and objectives of individuals and groups; norms that govern behaviour; and the space or territory that governs the social system. Citing Bates, Peacock (1991) describes society as a network of social systems that are at times cooperating but also competing and conflicting with each other.

Based on an analysis of American rural communities, Loomis and Beegle (1950) suggested that rural communities are familial systems that place more emphasis on norms, as compared to contractual nature of urban communities, where goals and objectives are the most important elements. In rural communities (as familial systems), action is non-rational, where behaviour is traditional and emotional, and interpersonal ties and relations are crucial, functions and extent of rights of community members are diffuse, hardships and loss are borne by all members, and roles are integrated in and out of the system. For urban communities, actions are rational, functions are specific, there is limited responsibility, and roles outside the system are irrelevant (Loomis & Beegle, 1950).

This conceptualization of rural communities as *Gemeinschaft* and urban communities as *Gessellschaft* as coined by Toennies, is criticized by Chekki (1979) as lacking conceptual rigour and inadequate for community development purposes. He proposes that a better conceptualization is to view communities as “a social system composed of people living in some spatial relationship to one another, share common facilities and services, develop a common psychological identification with the locality symbol, and together frame a common communication network” (Chekki, 1979, p.5). Besides the territorial nature, the common bond between community members, sharing of common interests, values and identity, and the rights and responsibilities of all members are identified as important elements of a community. However, Roberts (1979) differs on the aspect of geographic locality, suggesting that it is not the most important factor when considering communities, although locality may be of importance to small rural locations where problems stem from isolation or geographic features. He suggests that communities form only when perceptions of common interests

and problems evolve into a common and shared community identity together with mutual objectives of community members to improve community life (Roberts, 1979).

The sense of strong community feeling and close-knit nature of residents in rural communities in developing countries is highlighted by examples provided by Campfens (1997) and Korten (1987). Campfens (1997) describes the communal system of self help and mutual aid in rural Ghana, and how social harmony and sense of community is maintained in a rural village in Bangladesh, through residents taking part in communal and recreational activities, and addressing social well-being issues such as social injustice, fair wages, and women's rights. Korten's (1987) examples include village norms in rural Thailand of sharing seed among farmers or communal contribution to provision of public goods such as schools and roads, and the operation and maintenance of communal irrigation systems in rural Philippines, which are undertaken through either informal or formal arrangements based on system size. Korten (1987) suggests that some of the reasons why a community can mobilize resources for public goods include the intimate knowledge of community members and other resources in the community, the need for recognition of contributions, and sense of involvement and option for sharing benefits.

Groups and social networks are important elements within a community. Francis and Henderson (1992) note that for analysis of rural communities, it is important to understand the membership in groups, their goals and norms of operation, as well as the relationship with other groups and organizations in the community, and the power and influence of the group within the community. Campfens (1997) provides a good example of group solidarity among female income generation groups in rural Ghana and describes how common identity was used to solve problems and settle disputes with mutual understanding, respect and trust, and the sense of commitment to group welfare through personal and communal contributions and reciprocated assistance. Another example comes from rural India, where community associations provided members with a voice in water use decisions and enforcement based on mutually agreed norms (Korten, 1987). The changing stability and loyalty among kinship groups and use of factional politics to derive political influence and access to resources in rural Bangladesh (Korten, 1987) is another example that highlights the influence of community groups in rural life.

According to Wild (1974), it is the social stratification systems that determine social relationships, rather than the rural/urban nature of a community. Implications of social stratification systems and local power structures for residents in rural villages are revealed through examples from Bangladesh.

Residents in rural villages are divided into 3 groups: landless peasants; land owners; and the rural elite who control most of the power and have close links to local government officials (Campfens, 1997). Hence, the strategies residents adopted were based on the assets they controlled and the economic structure in the village. Patron-client relationships between the elite and poor were common, with the poor depending on the elite for labour and credit patronage in times of need and distress (Campfens, 1997). Widespread exploitation of the rural poor and corruption among people in positions of power were found by a study by the Bangladesh Rural advancement Committee (BRAC). The study found that a small number of powerful rural elite victimized the poor and landless by controlling access to resources meant for the poor, and used their economic power, threats, force and illegal activities to exploit the poor (Korten, 1987). Similar corrupt practices targeted at the poor and less educated in rural communities in Ghana are mentioned by Campfens (1997).

The high prevalence of poverty, particularly in rural communities of developing countries (Chambers, 1983), is thus a crucial aspect that affects the livelihood strategies of residents in such communities. Chambers (1983) identifies five clusters of disadvantage that the rural households face: 1) households being poor due to lack of assets; 2) households being physically weak due to lack of food, as well as the ratio of dependents to able-bodied people; 3) households being isolated from centres of village life; 4) households being vulnerable against contingencies such as disasters, social conventions or physical incapacity; and 5) households being weak against exploitation. These five clusters of disadvantage are said to interlink and create a vicious cycle of poverty from which most households are unable to rise above. Studies found rural poor to be tough, hard working, ingenious and resilient, who continued to struggle for daily subsistence as well as to increase their assets in the longer term (Chambers, 1987). Interventions from governments and donors to alleviate poverty are claimed to be experiments with different approaches targeting the survival of rural residents (Campfens, 1997).

Communication is suggested to be an important element in considering communities, since common objectives can be agreed between community members through some form of communication (Roberts, 1979). Interaction is said to be largely face-to-face in small-scale societies, which exhibit high internal cohesion, familiarity, and overlap in social units (Howard, 1993). Face-to-face interaction may also be the common form in rural communities of developing countries lacking proper transport and communication facilities, although advances in technology continues to change the communication options available (Roberts, 1979). Based on a case study of interpersonal patterns

of communication within a farming community in northeast Missouri, Lionberger (1959) noted that information flow was downhill, with farmers depending on others with higher prestige within the community as sources of information. After studying information behaviour in the Phokoane village in South Africa, Meyer (2005) suggested that the medium or channel used to transfer the information could have implications for rural people used to oral communication, by impacting the way information is received and how it is understood. The case study is also said to have highlighted the importance of trust and honesty in the acceptance of outside information (Meyer, 2005). Therefore, the extent of reliance on oral communication and trusted sources of information for rural communities are likely to be important elements that should be explored for ICT adoption.

This section attempted to summarize some general characteristics of rural communities. Rural communities are viewed as social systems that are composed of people in some spatial relationship and sharing a common bond and identity, as well as common objectives. A review of literature highlights strong community feeling and close-knit relationships between people, as well as the importance of community groups and networks in working towards common goals. It also highlighted how social stratification systems affected relationships, access to resources, and dependencies within a rural community. The high prevalence of poverty in rural communities of developing countries is an important issue that is crucial to understand the survival strategies of the rural people. Furthermore, the norms of communication and interaction within a community, and how people accept information from different sources are of utmost relevance for this research.

3.2 Characteristics and practices of rural businesses

The rural setting is claimed to have important influences on businesses that operate in such settings. Based on a review of literature, Shields (2005) identifies such influences as related to geo-demographic characteristics and socio-cultural aspects of rural communities. In terms of geo-demographic characteristics, small population size, limited labour supply and skills, low household incomes, low infrastructure and technology diffusion, geographic isolation, and limited access to finance, are said to create challenges for rural businesses, limiting their growth. Geo-demographic aspects also affect the extent of the market available for rural businesses. Dalglish and Bradley (2006) suggest that the small size of markets in rural villages and the isolated nature of some of them pose disadvantages to rural businesses, particularly in developing countries where lack of adequate transport and distribution channels limit the options for market expansion. Options for business growth are suggested to be through starting a new unrelated business, or expanding to neighbouring

communities (Gladwin, Long, Babb, Beaulieu, Moseley, Mulkey, & Zimet, 1989). Surveys of rural businesses (Mitchell & Clark, 1999; Clark et al., 1995; Anderson et al., 2005) found the majority of rural businesses to be small with a few number of employees, owned privately or by families, single-site operations and dependent on links outside the community. However, these studies indicated different results regarding sectoral distribution of rural businesses. Many researchers also highlight difficulties faced by rural businesses in recruiting labour, particularly professional and skilled labour (Clark et al. 1995; Galloway et al., 2004; Anderson et al., 2005).

In terms of socio-cultural aspects of rural communities, traditional gender roles, cooperative strategies, importance of social networks, word of mouth communication, and reliance on informal social relations are suggested to influence rural businesses (Shields, 2005). Gender stereotypes are suggested to pose barriers to the types of businesses that rural women can participate in. Based on practices in Africa, Chitsike (2000) notes that women run small-scale businesses, mainly dealing with products that can be made in the home or using skills related to their care-giving role, and their involvement in business is constrained by their skills, time availability after undertaking primary roles, as well as cultural norms. Although cooperative strategies among rural businesses (Shields, 2005) and rural businesses having fewer competitors (Anderson et al., 2005) are noted in the literature, Moazzem and Fujita (2004) also found fierce competition among traders in rural Bangladesh, and Rutten (2001) points to existence of conflicts between business factions along family and geographic lines in villages in Indonesia. Since socio-cultural norms differ among different countries, the prevalence of such norms is likely to impact on the practices of rural businesses.

Despite competition and conflicts, what is highlighted as most important for the survival of rural businesses are their social networks. As proposed by Granovetter (1985) in his seminal work on embeddedness, most behaviour, including economic behaviour, is closely embedded in networks of interpersonal relations. Uzzi (1996) proposed a similar view and suggested that the social relations among businesses create new business opportunities as well as access to such opportunities. Based on ethnographic study of clothing firms in the US, Uzzi (1996) notes that close relations made information credible and interpretable. Rutten's (2001) case study research on rural Malay entrepreneurs, found that businessmen relied on contacts within their own community for business operations and new links were established with the help of friends and relatives.

These networks of social support can be understood through the concept of social capital. Reimer, Lyons, Ferguson and Polance (2008) define social capital as social networks and their associated

norms that facilitate various types of collective action. In addition to networks of relationships, reciprocity and trust in the relationships are identified as two important themes that are linked to social capital (Onyx & Bullen, 2000). Reviewing different definitions and measurement of social capital in literature, Wall, Ferrazzi and Schryer (1998) suggest that social capital can be taken to include networks, relations and obligations that exist in social situations as well as the product of interactions within the networks.

Two distinct types of social capital can be identified in literature: bonding and bridging social capital. Bonding social capital or strong ties are based on a common identity such as family and kinship, gender, ethnicity, or religion, while bridging social capital or weak ties exist between people who are heterogeneous but have shared interests or backgrounds (Knorring & van Staveren, 2007). Tiepoh and Reimer (2004) differentiate between social capital availability and social capital use, defining social capital use as social capacity - the ability of rural people to organize and use their social capital through various processes to achieve valued economic objectives. The authors argue that economic performance can be influenced by social capital as social networks enable and facilitate the flow of information and inputs that are crucial for economic outcomes, and their research showed an important relationship between household social capital use and household income.

Literature provides some evidence of differences in social capital between rural and urban communities. Using data from 1,211 residents from rural and urban areas of New South Wales, Onyx and Bullen (2000) show that social capital is higher overall in rural communities. Comparing eight different elements developed to capture social capital, the authors found higher levels of feelings of trust and safety, higher participation in the local community and higher neighbourhood connections for the two rural communities studied. Based on the results, the authors suggested that rural communities generated stronger bonding social capital, whereas the urban communities were characterized by bridging social capital. Another study supports the existence of stronger bonding social capital in rural communities. Using data of 7,114 families from a national sample of U.S. households, Hofferth and Iceland (1998) show that rural families are dependent more on kinship-based social exchanges compared to urban families. 58.2 percent of the rural families were involved in giving or receiving money or time help with kin only, compared to 45.8 percent of the urban families. Zuwarimwe's (2007) research of rural small-scale entrepreneurs in Zimbabwe also showed greater reliance on relatives and friends for enterprise activities although differences were observed between male, female and family run enterprises.

Despite the importance given to trust in discussions of social capital, Reimer et al. (2008) argue that it is the norms that maintain and organize connections between individuals in social networks that are most crucial to understanding social capital. Based on this, the authors identify four different modes that guide behaviour in social relations:

1. Market relations are those involved with the trade of goods or services, and sharing of information about markets and prices.
2. Bureaucratic relations are impersonal and formal, and linked to organizational structures developed to identify and enforce rights and entitlements, such as government and corporate organizations.
3. Associative relations are based on shared interests such as clubs and hobby groups, and emerge when interests coincide and members contribute to common goals.
4. Communal relations are based on a strong sense of shared identity, such as birth, ethnicity, or location. Relationships are maintained through the exchange of favours and identity reinforcement.

Using site data from a national, multi-disciplinary research project named New Rural Economy (NRE) focused on 32 rural communities in Canada, Reimer (2002) shows that on average market-based capital is highest followed by associative-based capital, and communal-based capital was the lowest for the rural communities studied. The study also showed how different modes of social relations were linked to different characteristics of the community and household. For example, market social capital was found to be related to labour force characteristics, bureaucratic social capital to visible minority and employment conditions, associative social capital to education and visible minority status, and communal social capital to income and family labour.

In addition to local conditions, Reimer (2006) argues that contextual conditions can also hinder or facilitate social capacity processes. These include the level of integration of local economies into the global economy, the stability of the local economy, the proximity to major urban centres, and the level of institutional capacity in the local region. Using the NRE project data, Reimer (2006) analyzed the relationship between different modes of social capital use and community outcomes such as labour force participation, unemployment, and income, and studied how contextual conditions affected the relationships between social capital use and outcomes. The findings provide important evidence that contextual conditions affect the nature and intensity of the relationship between social

capital use and outcomes. For example, globally integrated economies appeared to be most responsive to the use of various forms of social capital, in fluctuating economies the use of communal-based social capital became more important than market-based social capital, non-adjacent sites used bureaucratic and communal social capital whereas adjacent sites used market-based social capital, and low-capacity sites used bureaucratic and communal-based social capital to achieve outcomes.

The small size of rural businesses and influences of the rural setting result in distinctive management practices which are common to small rural businesses. Due to the small size, business functions are not clearly separated (Mitchell & Clark, 1999), and tasks may be performed by untrained or non-specialist workers (Clark et al., 1995). Poor management practices exist and many businesses do not keep internal records or records of transactions (Duncombe & Heeks, 2002). Many owners are also said to leave earnings within the business and not take a salary (Gladwin et al., 1989), and informal credit arrangements and bartering exchanges are suggested to exist (Douglas, 2003; Duncombe & Heeks, 2002). Dyer (1988) found paternalistic culture (where family members retain power and relationships are hierarchical) in 80% of firms researched within the US. Since most rural businesses are owner-operated or family-run (Mitchell & Clark, 1999; Clark et al., 1995), the influences from social relations and obligations are also high. Mutual obligations and expectations of assistance and support are claimed to exist within businesses and social relations (Rutten, 2001). Relationships of businesses with their customers are found to be more personal and caring (Gladwin et al., 1989) and reputation is identified as important for the survival of the business (Moazzem & Fukuda, 2004).

Such management practices of rural businesses can also be linked to the role of the informal economy, particularly in developing contexts. While, the informal economy is both supportive (Reimer, 2000) and complementary (Ratner, 2000) to the formal economy, Becker (2004) suggests that the informal economy is increasing in most developing countries, including rural areas. Some of the reasons for the growth of the informal economy are surplus labour, barriers of entry into formal economy, demand for low cost goods and services, and weak institutions and governments (Becker, 2004). The informal economy is important because it provides an alternate source of goods and services (Reimer, 2000), an alternate distribution network and safety net for people who do not have access to the formal economy (Ratner, 2000).

While the formal economy is taken to be economic activity recorded by government agencies, the informal economy covers the “production, distribution, and consumption of goods and services that

have economic value, but are neither protected by a formal code of law nor recorded for use by government-backed regulatory agencies” (Reimer, 2000, p. 2). It can include activities like household production and consumption, barter, unpaid labour and labour exchanges, unreported business transactions, sharing, and volunteer activity (Ratner, 2000). Activities in the informal economy are characterized by low entry requirements, a small scale of operations, skills gained outside formal education, and labour-intensive methods (Becker, 2006).

Informal enterprises are said to have limited capital, affecting their ability to enter into contracts and transactions, which results in lack of accounting systems (Becker, 2006). Becker (2006) differentiates between three different segments of informal enterprises and outlines how their choices are affected by their situation: 1) Entrepreneurial enterprises that have growth potential and ability to link with formal markets, but operate to take advantage of the potential for autonomy and profits provided through lack of regulation; 2) Households and individuals that take up informal activities for survival, because they can rely on local resources and household labour, and entry into the informal economy is easy requiring minimum capital; 3) Individuals who take up informal work part-time while working elsewhere, such as civil servants in Asia and Africa who supplement their low salaries through part-time work. Dalglish and Bradley (2006) also suggest that the poverty level of a household could impact the survival and growth of any enterprise run by members of that household, as in the case of survival activities where most of the profits earned are likely to be directed into household expenses rather than into the business.

Literature provides some examples of the sizes of the informal economy in different countries. Based on figures for 1999/2000, Schneider (2002) suggests that the informal economy is the largest in Africa with an average size of 42%, with countries like Zimbabwe, Tanzania and Nigeria having close to 60%. The informal economy is equally large in Latin America with an average size of 41%, while Asia has an average size of 26%. However, some countries in Asia, like Thailand has an informal economy of 52.6%, while in other countries like Sri Lanka and India it is 44.6% and 23.1% respectively. In contrast, the Western Europe OECD countries have an average informal economy of 18%, while in Canada it is 16.3% and in the USA it is 8.8% (Schneider, 2002). A similar picture is seen when comparing figures for self-employment as a percent of informal employment: 70% in Sub-Saharan Africa, 62% in North Africa, 60% in Latin America and 59% in Asia (Becker, 2004). These figures give an indication of the importance of the informal economy for the developing context.

Reimer (2000) suggests that the informal economy is different in rural areas due to differences in access to exchangeable resources, level of knowledge and skills required, support from social networks, norms supporting reciprocity, and the demand or need for informal activity. Reimer's (2000) analysis of the informal economy in Canada shows that compared to metropolitan residents, residents in non-metropolitan areas were more likely to participate in informal economy activities, spent more time on such activities, and participation in the informal economy increased as involvement in the formal economy decreased. Shaw (2004) also found differences in the informal economy between semi-urban and rural areas in Sri Lanka, with a third of semi-urban respondents involved in entrepreneurial or higher return enterprises compared to only 5% for rural areas. People in the rural areas engaged in more survival or secondary income earning activities and supplemented their income through a number of informal activities. Shaw (2004) suggests that the differences can be attributed to three factors: 1) the rural location with its poor infrastructure and limited physical and market environment provides few alternatives for enterprise development, 2) rural people cannot generally afford the higher capital investments required for high earning enterprises; and 3) rural people do not have good understanding of market conditions and business opportunities and socio-cultural conditions may pose restrictions, such as access to shared resources or price competitions.

The nature of small scale businesses in rural communities of developing countries can be linked to rural livelihoods and the strategies rural people adopt to overcome poverty and ensure adequate livelihood support. Ellis (1999) defines livelihood as the activities, assets, and access that determine the living earned by an individual or household. Rural households are claimed to rely on multiple and diversified income earning activities, with 30-50% reliance on non-farm income sources in Sub-Saharan Africa and 60% in South Asia (Ellis, 1999). Diversification in rural livelihoods stems from the need to spread risks, deal with market or other shocks and take into account changes in labour and consumption due to seasonality (Ellis, 1999).

The situation of rural enterprises and how they draw upon multiple assets available to the household can be understood using the robust conceptual framework known as the Sustainable Livelihoods Framework. This framework is a cross-thematic approach that builds upon aspects such as income generation, environmental management, women's empowerment, health and education, technology, finance, and governance, and puts people as the central focus in helping them to build assets and skills to access new opportunities for income generation (Helmore & Singh, 2001; DFID,

2008). Key approaches promoted by the framework (Brocklesby & Fisher, 2003; Helmore & Singh, 2001) are to:

- recognize the vulnerable context that rural people live in,
- identify the many assets and entitlements available to rural people in terms of natural, financial, physical, human and social capital,
- identify adaptive strategies that can make use of the assets to result in positive outcomes,
- and ensure that policies, institutions and processes are in place to provide access to assets

Furthermore, the importance of ensuring sustainability of livelihood activities through economic efficiency, social equity, ecological integrity and resilience of communities to risks and shocks, are highlighted (Helmore & Singh, 2001).

With the focus of development aid on poverty reduction in the past two decades, rural communities in developing countries have had many interventions focused on sustainable livelihoods. Literature provides numerous examples of successes achieved through programmes and projects funded by development agencies and national governments (DFID, 2008; Helmore & Singh, 2001). The Department for International Development (DFID) of the United Kingdom is said to have spearheaded the use of the framework (Brocklesby & Fisher, 2003). DFID's interventions in rural India, for example, have transformed rural livelihoods through the development of skills, provision of technical and business advice, facilitating access to supplies and markets, and building of local institutions and supporting to diversify within and outside agriculture (DFID, 2008). Helmore and Singh (2001) provide many examples of successful interventions in rural Africa and India, through empowerment of rural people, provision of appropriate technologies, and innovative options for savings and credit.

Therefore, the rural context and level of interventions based on the sustainable livelihoods approach are likely to impact on the nature and operations of small enterprises in rural communities in developing countries. In terms of the context, aspects such as climate and land, socio-economic conditions, trade and politics (Scoones, 1998), as well as the asset base available to a household could result in differences in the types of income earning activities undertaken. In terms of available assets such as the natural resource base, savings and credit, infrastructure and equipment, skills and labour, and social networks and relations can all have implications for the strategies adopted for livelihoods (Brocklesby & Fisher, 2003; Helmore & Singh, 2001; Scoones, 1998).

Despite the successes of the sustainable livelihoods approach, it has also been the target of some criticisms. Brocklesby and Fisher (2003) criticize the lack of community development thinking and practice in applying the framework, and Scoones (2009) identify four failings of the approach: lack of consideration of aspects related to economic globalization; lack of attention to power, politics and governance issues; lack of consideration of longer term environmental impacts such as climate change; and failure to take into account shifts in rural economies.

Public policy has played an important role in the development of rural enterprises over the past decades and continues to do so today. Donors, including international agencies, bilateral development partners and NGOs, together with national governments, have targeted rural enterprise development as a means of reducing poverty, improve rural conditions and boost economic growth (IFAD, 2004). Support for rural finance, including microcredit or microfinance has taken priority in many donor programs. Donors are the main source of funds for microfinance institutions and it is estimated that donors spend about US\$500 million a year on microfinance (World Bank, 2004).

Support for rural economic activities through rural finance is said to help generate income and employment, build local businesses, develop human capital, foster market competition, and promote broad economic participation of rural communities (World Bank, 2004). Since rural people in general have very few assets that could be acceptable as loan collateral, combined with weak legal systems in many developing countries (Nagarajan & Meyer, 2005), microcredit came to be considered as a magic bullet for poverty alleviation (Karim, 2008). Microcredit and its concept of giving small loans to the poor without collateral provided a much needed avenue for rural enterprises to seek credit for their business development. The success of the Grameen Bank and its work on microcredit in Bangladesh is well documented in literature (Muhammad, 2009). The Grameen Bank model, with its 98 percent rate of recovery, supports individual entrepreneurs to become self-employed, build and own assets and sell labour on the market (Karim, 2008). Ssendi and Anderson (2009) also outline how a government intervention through microcredit resulted in improvements in business performance for more than two thirds of the loan recipients in Tanzania. Many other examples of donor programs and successes of rural finance are given in a review by Nagarajan and Meyer (2005).

However, microcredit programs are not without criticisms as well. Based on a study of a microcredit program in rural Afghanistan, Kantor and Andersen (2007) found that microcredit did not appear to improve economic conditions and livelihood security of clients, and that client dropouts

were increasing. The authors concluded the importance of understanding the rural context and the potential for microcredit in that context. Muhammad (2009) refers to several studies of microcredit that showed improvements in economic conditions only for a small percentage of clients, ranging from 5-19%. Karim (2008) criticizes the Grameen Bank and other microcredit NGOs in Bangladesh for exploiting the pre-existing beliefs of honour and shame among women in order to achieve their capitalistic goals. Furthermore, a review of UNDP microfinance programs also found a dismal picture with 42% of 66 projects being judged as “unacceptable” (Rosenberg, 2006).

Consequently, public policy has not simply focused on financial services but other non-financial services as well. Based on experiences of rural enterprise projects, IFAD (2004) highlights the multifaceted nature of rural enterprise development including the support for non-financial services like entrepreneurship training, business planning, business management, accounting and bookkeeping services, market services, training and facilitation, and access to cost-effective technologies. Nagarajan and Meyer (2005) also suggest that the new rural finance paradigm recognizes that financial services need to be supplemented by complementary investments in infrastructure, facilitation of groups and social capital, skills training, and providing business development services. The Income Generation for Vulnerable Groups Development program of BRAC, Bangladesh is a success story in rural enterprise support, where two-thirds of women, who received food grain assistance, credit and savings support, and business related training, improved on their poverty status (Nagarajan & Meyer, 2005). Another example is the success with Self Help Groups (SHGs) in rural India, which went beyond simple credit schemes to support networking of SHGs into associations, providing livelihood opportunities and access to technical resources, strengthening asset base, developing risk management options, and ensuring local access to trained resource persons (Nagayya & Rao, 2009). These examples highlight the significant impact of public policy on the development of rural enterprises.

This section summarized a number of important concepts that help to understand the nature of rural businesses. First, literature suggests that due to small population sizes and small markets, rural businesses are generally small in size with a few employees. Second, traditional gender roles as well as existing cooperative strategies or rivalries potentially affect how business is conducted. An important concept that helps to understand the cooperative strategies is social capital and research suggests that rural communities have more bonding or kinship based social capital. Third, the small size of rural businesses and linkages with social relationships are suggested to have implications for

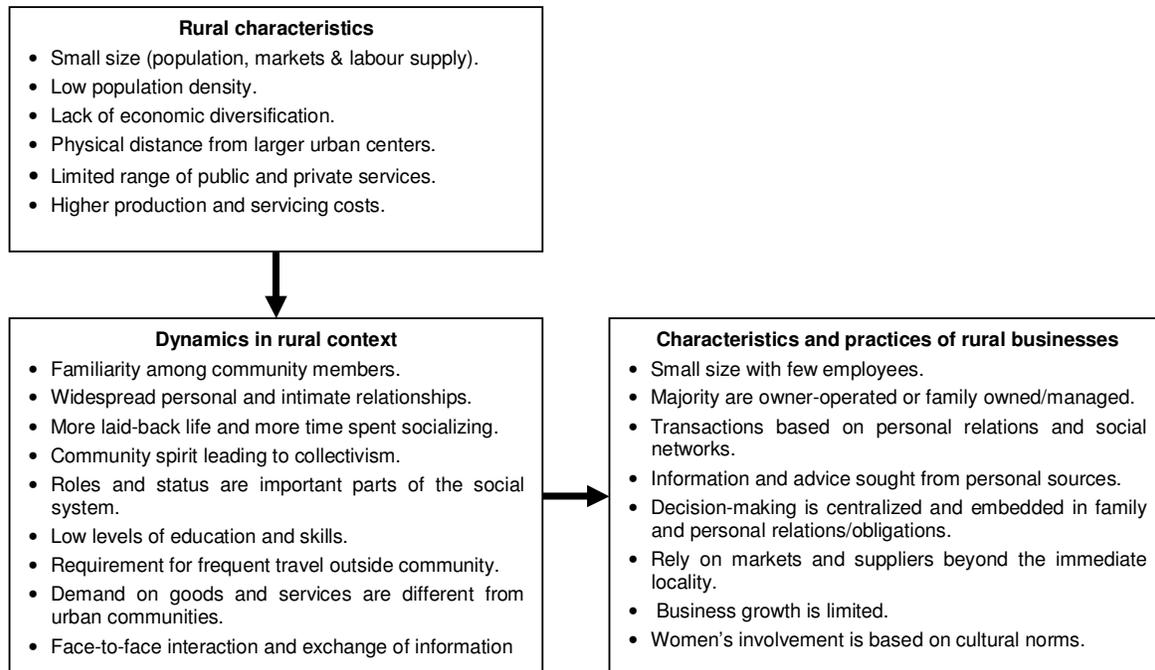
how the businesses are managed. Informal management practices and transactions based on social relations and obligations are found to exist. These informal practices may be explained by reviewing the literature on the prevalence of the informal economy in rural communities, particularly in developing countries, which suggests that rural households engage in multiple informal activities to ensure a livelihood. Another relevant body of research is that related to sustainable livelihoods and how livelihood strategies are not just related to income generation but is a broader cross-sectoral issue. Interventions by donors related to sustainable livelihoods, as well as other public policy interventions by governments and development agencies, such as micro-credit and business support services, have important implications for the advancement and growth of rural businesses.

3.3 Summary and research gap

Studies on rural communities describe conservatism and close-knit friendly social relations and collectivism, as well as social stratification among community members. Literature also shows that majority of rural businesses are small with a few employees, and are owned and run privately or by families. Some of the common characteristics and management practices of rural businesses noted in literature can be identified as direct influences from their context (see Figure 4). These observations clarify potential differences between urban and rural communities and urban and rural businesses and suggest ways to explore ICT use in rural settings.

Chapter 2 included a review of technology adoption models and identified the limitation of TAM in considering broader contextual factors in predicting ICT adoption decisions. The literature review included in this chapter helps to identify potential rural context factors that might be considered to extend the TAM model to make it more suitable to understanding ICT adoption by rural businesses. These include the small size and informal nature of a large number of rural income earning activities, collectivistic practices and linkages of business with social networks and obligations, intimate and face-to-face interaction and communication of information, impact of traditional gender roles on women-owned businesses, as well as lower education and skill levels of rural residents. These aspects have the potential to influence the decision to adopt ICTs to satisfy business information needs.

Figure 4: Influence of rural characteristics on rural businesses (developed by author)



The literature review in chapter 2 and chapter 3 reveals several research gaps. First, the importance of understanding context and culture to determine behaviour related to information seeking is noted, but little guidance was found in the literature on how to analyze or capture impacts of the context on information seeking. Second, numerous ways in which the socio-cultural context of rural communities differed from urban communities are identified, but no literature was found that specifically related these differences of the rural context to potential influences on ICT adoption. Third, differences in management practices of rural businesses are acknowledged, but the literature does not appear to explore the relationship between rural business management practices and ICT use. Fourth, cultural influence on ICT adoption and use has been established, but no relevant studies could be found that explicitly looked at cultural differences between urban and rural communities. Therefore, this research attempts to address some of these research gaps.

Chapter 4

Theoretical framework and preliminary research model

This chapter describes the theoretical framework developed and tested in this research. First, the potential of ICTs to satisfy information needs of rural businesses is presented. This is followed by a discussion of how to match ICTs with the behaviour and norms that exist within a given context. The preliminary research model is then presented, followed by definitions of the constructs and explanations of predicted relationships between context factors and ICT adoption. The final research model is presented in Chapter 7.

4.1 ICTs and rural business information needs

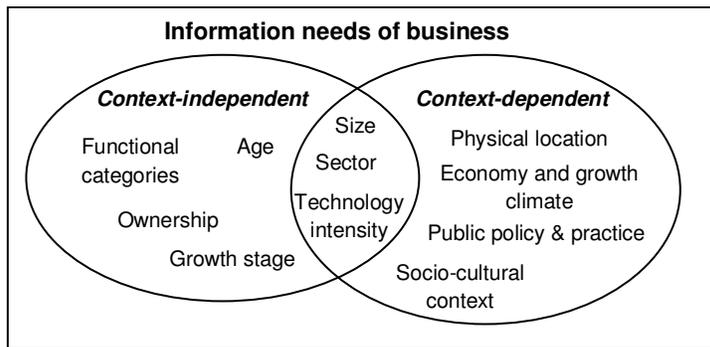
This research focuses on the potential of ICTs to cater to information needs of rural businesses. Compared to existing methods and channels of information exchange such as face-to-face, radio, TV, newspapers, telephone, fax and other written forms, ICTs provide a channel and capability that is different due to its unique characteristics: high speeds and data volumes, variety of forms and types, as well as interactivity and time/place independence. According to an Overseas Development Institute (2002) report, ICTs have the potential to support rural development by improving existing information management processes, providing new information sharing opportunities, improving access to information, supporting education and training, and providing new linkages and partnerships for information sharing. Despite the characteristics of ICTs that seemingly enable it to become an ideal channel for information transfer and exchange, rural businesses were found to have low levels of ICT adoption (Lai, 1994; Mitchell & Clark, 1999). Researchers working on community ICTs (Gurstein, 2000; Heeks, 2002; Stoecker, 2005; Slack & Rowley, 2004) suggest looking at pre-existing roles of information and communication patterns.

A brief review of studies that focused on rural business information needs suggests that information needs, sources and channels varied with business characteristics and location. However, a common theme was the reliance on informal sources, such as family and friends, and personal contacts for information and verbal exchange of information by rural businesses (Njoku, 2004; Ikoja-Odongo & Ocholla, 2003; Duncombe & Heeks, 2002; Marcella, McConnell, Moore & Seton, 1996).

Business characteristics such as sector, size, age and ownership as well as the nature of business functions are likely to create different information needs and search processes. Anthony (1965)

differentiates between three categories of management functions (operational control, management control and strategic planning), and specifies types of information required for the different functions. Hence, while some information needs may be context-independent, other needs are likely to result from the context in which the business operates from, as summarized in Figure 5. The information behaviour literature highlighted the importance of understanding influences of the context on information needs of rural businesses.

Figure 5: Elements that affect information needs of businesses (developed by author)



4.2 Alignment of ICTs with socio-cultural context

The literature suggests that overcoming common barriers of awareness, motivation and infrastructure alone may not be enough to realize rural businesses adoption of ICTs (Hollifield & Donnermeyer, 2003; Grimes, 2000). This research proposes that in order to promote ICT adoption by rural businesses, it is important to design or apply ICTs in ways that align or match with the behaviour and dynamics that exist within the community. A similar view of harmonizing ICT adoption with local community values in the rural context is proposed by Rhodes (2009) suggesting that the socio-political context, and changes to organizational structures, work practices, products and markets could affect acceptance of ICTs. Wolcott et al. (2008) also suggest that one of the challenges for ICT adoption by micro-enterprises is the mismatch between technology and social/business systems.

Alignment of ICT modality with the socio-cultural context can be defined as the adjustment and positioning of ICT modality to match the behavioural patterns and take advantage of strengths within the socio-cultural context, as well as to minimize risks from constraints posed by the same context. Alignment should consider ways of providing positive impacts quickly without disrupting existing practices and requiring minimum effort from users. Barriers and risks need to be addressed to

overcome possible impacts and promote adoption and sustainability of use. Alignment can also target long-term impacts by maximizing on positive aspects of the socio-cultural context to create new opportunities through use of ICTs.

In order to address alignment, detailed knowledge of the socio-cultural context and its influences on business practices is needed, so as to understand and explain how these may impact on ICT adoption. Findings from the literature enable us to get a representation of the characteristics of rural businesses, as well as issues, barriers and management practices which are direct influences of the socio-cultural and economic context of the rural communities they function in (Mitchell & Clark, 1999; Clark et al, 1995; Anderson et al., 2005; Shields, 2005; Rutten, 2001). Similarly, characteristics of rural communities and differences between rural and urban communities and businesses are also documented in the literature (Slack et al., 2003; Loomis & Beegle, 1950; Atkin, 2003; Dewey, 1960; Francis & Henderson, 1992; Wiggins & Proctor, 2001; Gross, 1948; Onyx & Bullen, 2000; Reimer 2000, 2002; Becker, 2004; Helmore & Singh, 2001; IFAD, 2004). These characteristics, issues and practices can provide some knowledge that can be used to identify how alignment should take place. However, most of these studies are focused on analyzing the main differences between urban and rural communities or businesses, or on identifying levels of ICT adoption in rural businesses and the barriers towards adoption. Some studies have looked at impacts of environmental factors on business performance or on ICT adoption, but these focus on general cultural aspects, and on economic aspects such as competitive pressures, economic base, market size and purchasing power (Kean, Gaskill, Leistritz, Jasper, Bastow-Shoop, Jolly & Sternquist, 1998; Chambers & Parker, 2000; Wolcott et al., 2008). However, no scientific studies were found that undertook comprehensive analysis of the factors of the socio-cultural context of rural communities that affected ICT adoption. No detailed explanations were found clarifying how different factors of the socio-cultural context created impacts on ICT adoption and the extent of such impacts.

The claim for alignment of ICT modality with the socio-cultural context to satisfy rural business information needs is based on the core assumption that the socio-cultural context influences information needs, business practices and hence ICT adoption by rural businesses. Since the socio-cultural context has the potential for being a key factor in ICT success (or failure) in rural settings, the exploration of this assumption forms the backbone of this doctoral research: this dissertation investigates the relationship between the socio-cultural context of rural communities and ICT

adoption by rural businesses. Using the foundations from TAM, this research attempts to develop a model to predict impacts from the rural socio-cultural context on ICT adoption decisions.

4.3 The preliminary research model

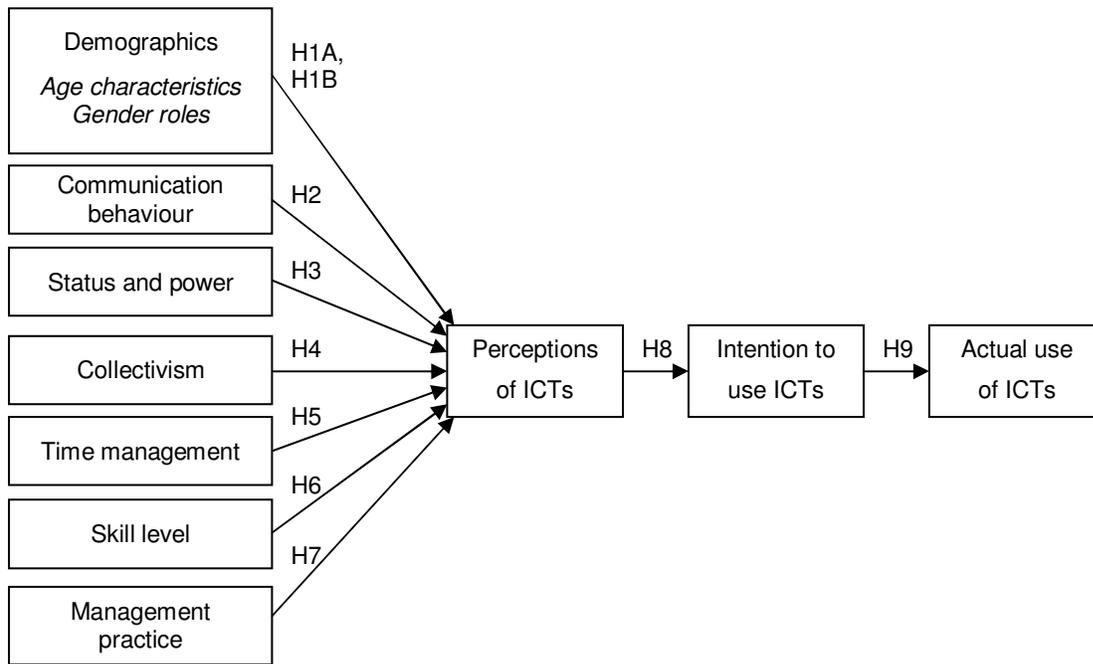
The research agenda is based on testing a model developed to capture the impacts of the socio-cultural context of rural communities on ICT adoption by rural businesses. This model is developed for a base-case rural situation from a developing context and assumes constraints due to distance from urban centres, limited social and economic opportunities and infrastructure, and weak institutions. This research will thus test findings from literature on contextual differences between rural and urban communities, using the study area of Maldives. It will further contribute to the development of a technology adoption model that is suitable for rural contexts, by incorporating contextual factors that could have potential implications for ICT adoption and use.

Thus, the research questions to be addressed are:

1. How does the socio-cultural context of a rural community impact on ICT adoption by rural businesses?
2. What factors within the socio-cultural context pose barriers to ICT adoption and what factors promote adoption?
3. What is the extent of impacts of each factor, and which factors have greater influence and impact than others?
4. How is alignment of ICT modality with the socio-cultural context perceived to impact on ICT adoption by rural businesses?

The research model is shown in Figure 6. Key factors within the socio-cultural context that affect ICT adoption and hence are important for alignment are identified in this model.

Figure 6: The preliminary research model



4.4 Factors of the socio-cultural context

Based on findings from literature, several factors of the socio-cultural context can be identified that could have potential impacts on ICT adoption. These include socio-demographic factors that provide rural communities with characteristics and behaviour that is different to urban communities, as well as factors that characterize rural businesses and their management practices. Furthermore, some of the dimensions of culture, which are used to explain cultural differences between countries or groups of people, as proposed by Hofstede (1980) and Hall (1976) are also included. Selection of these cultural dimensions was limited to those dimensions that were likely to exhibit significant differences in behavioural patterns between urban and rural communities of the same culture.

4.4.1 Demographics

Age and gender are two important factors that moderate outcomes in many studies, and an older population distribution and traditional gender roles were identified from the literature as important aspects in rural communities. With regard to ICT adoption, different aspects related to age distribution and gender roles are likely to create impacts as outlined in Table 6. Age characteristics are defined as the average age of the community and age of the rural business owner/manager.

Gender roles are defined as attitudes regarding acceptable roles for men and women and their status and influence in society.

Table 6: Demographics and potential impacts on ICT adoption

Sub-factor	Findings from literature	How impacts may occur
Age characteristics	Rural communities have a higher proportion of older people due to migration of younger adults (deHaan, 1999) and demographic characteristics lead to low ICT skills of rural owners (Galloway et al., 2004).	An older age distribution is likely to result in lower levels of technology diffusion within the community and low awareness of ICTs. With a high proportion of older people, business owners are more likely to be older will low ICT skills, creating greater resistance to ICT adoption compared to young owners.
Gender roles	Women's involvement in business is limited due to cultural norms (Chitsike, 2000; Shields, 2005).	Type and size of women-owned business may moderate need for ICTs. ICTs may also be seen as a means of crossing culturally acceptable boundaries of status and power for women, thus limiting adoption.

Thus, the following hypotheses are proposed for demographics:

Hypothesis 1A: Age characteristics are negatively related to positive Perceptions of ICTs.

Hypothesis 1B: Increasing difference between gender roles is negatively related to positive Perceptions of ICTs.

Impacts related to demographics could be addressed in the alignment of ICT modality with business information needs. If business owners are generally older and have low awareness of new technologies but choose to adopt ICTs, they may expect ICT applications to be easy to use, and simple to learn within a short time period. In such instances, ICTs have to be designed and provided in a way that matches the user's learning and physiological abilities. Options can be provided for customizing and selecting shortcuts to increase efficiency, so that learning can be progressive. Impacts of gender norms on ICT adoption have to be addressed depending on specific norms and behaviour. One approach is to provide different levels of ICT functionality targeting different information needs so that ICTs can be adopted in stages. Phased adoption can help in moderating community perceptions of acceptable behaviour for women, as well as enable the need for ICTs to be perceived easily.

4.4.2 Communication behaviour

Since interpersonal relations and exchange of information between contacts are an essential driving force of the rural businesses, it is important to identify how communication takes place between such

contacts in order to understand potential impacts on ICT adoption for business information needs. Communication behaviour can be defined as the form and frequency of interactions of a business owner with information sources. Table 7 outlines how sub-elements of communication behaviour could have impacts on ICT adoption.

Table 7: Communication behaviour and potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
High context communication	Oral, face-to-face and intimate communication exists in rural communities (Howard, 1993). The channel used for information transfer could have implications for rural people used to oral communication (Meyer, 2005).	For people used to inferring meaning from the context in addition to the verbal message, ICT adoption may not be preferred unless the ICT modalities support transfer of contextual information.
Interaction patterns and frequency	Interaction patterns may vary depending on the roles, status and relationship between the parties communicating (Saville-Troike, 2003). Rural businesses depend greatly on family and friends, and experts for information (Njoku, 2004; Ikoja-Odongo & Ocholla, 2003). Reliance on personal and informal sources impacts ICT use by reducing the need for formal information (Martinsons & Westwood, 1997) and scientific analysis (Li, 2005).	ICTs may not be essential or a preferred form of communication within the community if interaction is frequent, but ICTs may have potential advantages for communication with contacts outside the community.
Reliability and interpretability of information	Importance of trust and honesty in accepting information (Meyer, 2005). Close relations make information credible and interpretable (Uzzi, 1996). For people used to high context communication, loss of meaning could result if information is encoded when using ICTs (Martinsons & Westwood, 1997).	Face-to-face interactions enable better interpretation through discussions. ICTs may not be preferred if interpretability is felt to be compromised, particularly when individuals have difficulty in clearly expressing their information needs.

The following hypothesis is proposed for impacts from communication behaviour.

Hypothesis 2: Communication behaviour is related to Perceptions of ICTs with frequent high-context communication having a more negative influence on Perceptions of ICTs.

Since communication with interpersonal contacts is crucial for acquiring business information, communication behaviour is important for alignment. The ICT modality provided could support and complement existing communication and interaction patterns in order to meet expectations of users. ICTs provided in parallel with existing communication forms, could remove total reliance on any specific form, and owners would be able to pick and choose appropriate forms depending on the situation. If high context communication is the norm, ICT modalities that support video and sound

may be adopted. Video conferencing and document sharing/editing applications could be utilized for group discussions and negotiations, which could enable the owner to discuss business issues with key contacts both within and outside the community at the same time. Alignment would thus be a process of enabling and complementing existing norms of communication through ICTs.

4.4.3 Status and power

Hofstede (1980) defined power distance as the level of inequality and dependence that exists within a community or organization based on status. Since status, power distance and image can affect people's behaviour, and since these aspects appear to be more profound in the social dynamics of rural communities, it is likely that behaviour related to these aspects could impact ICT adoption. For this research, status and power is defined as the degree to which importance is attached to status and influence in the community, and on maintaining behaviour perceived as proper and appropriate for a given role and status. Table 8 outlines how sub-elements related to status and power could create barriers for ICT adoption.

Table 8: Status and power and their potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
Power distance between business owner and sources of business information	Power distance impacts sources and first steps of information seeking (Komlodi & Carlin, 2004). Rural businesses depend on family and friends, and experts for information (Njoku, 2004; Ikoja-Odongo & Ocholla, 2003).	Low power distance and close relationships (such as with family and friends) or high power distance with formal relationships could limit suitability of ICTs for interactions.
Power distance between business owner and ICT trainer	Importance of understanding goals, norms, power and influence of different groups within the community (Francis and Henderson, 1992) as well as social stratification systems (Wild, 1974).	Owners of businesses who have higher status due to their economic influence may be reluctant to learn the technology from a person of lower status as it may lower their prestige within the community.
Decision-making information as power	If information is used as power, it impacts ICT use by reducing need to share or make information accessible (Martinsons & Westwood, 1997).	Resistance to ICT adoption may stem from perceptions of business owner that adoption of ICTs would take away his/her power over tactical and strategic information by giving ICT-skilled staff, access to controlled information.
Reliance on people of lower status	ICT adoption is higher when power distance is low (Geissler, 2006; Srite, 2000; Bagchi et al., 2004).	New reliance on others for technical support due to ICT adoption can be perceived as a way of reducing the power of the owner over controlled information and business functioning, thus creating barriers to adoption.

Therefore, the following hypothesis is proposed for impacts from status and power:

Hypothesis 3: Increasing emphasis on status and power is negatively related to positive Perceptions of ICTs.

Alignment can address impacts on ICT adoption by providing options that can overcome the constraints posed due to status and power. How ICTs can be utilized for interactions between people of different status depends on the power distance and acceptable deviations from norms of behaviour. One way in which ICTs may be seen as acceptable for interaction between people of different status is to combine ICT interactions with regular patterns of interaction. To address barriers to adoption that result from power imbalances within the business, ICT applications could be designed in ways that make learning and using easy and logical for the owners, by taking into account their skills and thinking processes. Reliance on technical people could be reduced by making applications error-free and teaching basic troubleshooting. Owners could be taught the functionality within ICT applications that could limit or control staff access to key information.

4.4.4 Collectivism

The literature suggests that rural communities exhibit strong community spirit and close knit relationships, as well strong bonding social capital (Atkin, 2003; Gross, 1948; Campfens, 1997, Korten, 1987; Onyx & Bullen, 2000). While some studies (Bagchi et al., 2004; Geissler, 2006) suggest that collectivism limits adoption, a different perspective on how collectivism could promote ICT adoption is outlined in Table 9. The collectivism construct is defined as the existence of collectivistic norms that promote business growth.

Table 9: Collectivism and potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
Collective adoption Access to ICT skills and technical support	Individualism/collectivism impacts on collaborative ICT solutions and information sharing (Komlodi & Carlin, 2004).	Collectivism can promote collective adoption of ICTs by several rural businesses, so that risks, costs and learning experiences can be shared. Collectivism can promote adoption by sharing limited ICT skills within a community.
New business opportunities	Economic behaviour is closely embedded in networks of interpersonal relations (Granovetter, 1985; Reimer 2002) and social relations among businesses create new business opportunities (Uzzi, 1996; Rutten, 2001).	Collectivistic norms of cooperation can be exploited to create new opportunities in terms of new suppliers, customers, products and services as well as new ways of marketing that are facilitated through ICTs.

Sub-element	Findings from literature	How impacts may occur
Cooperation between businesses	Collectivism existing in rural communities and among rural business owners was used to harness the potential of ICTs for business actions (Galloway et al., 2004).	Adoption can result as ICTs can be developed as a tool for several businesses to cooperate as partnerships to exploit new opportunities.

Thus, the following hypothesis is proposed for collectivism:

Hypothesis 4: Collectivism is positively related to positive Perceptions of ICTs.

Alignment could be a process of identifying opportunities that could be enabled through ICTs, given the nature of friendly and hostile relationships that exist within a community. The benefits that could be realized from collective adoption, such as cost reductions in procurement and technical support, and sharing of learning experiences, may need to be explained to one influential business owner, who could then use his/her interpersonal contacts to recruit other business owners to adopt at the same time. Opportunities for venturing into new products and markets, and how such opportunities could be harnessed by individual businesses or collectively as a group of collaborating businesses, could be identified with the help of a technical expert but based on the invaluable knowledge of the business owners.

4.4.5 Skill level

One of the greatest barriers to ICT adoption in rural communities is said to be the low level of education, and ICT skills and knowledge within the community. For this research, skill level is defined as the average education and ICT skill level in the community and that of business owner, including his/her level of language fluency. Related to education and skills, two aspects can be considered that could impact ICT adoption as outlined in Table 10.

Table 10: Skill level and potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
Average level of education and ICT skills within the community (and of owner/manager)	Barriers to rural ICT adoption include lack of awareness and literacy issues (Rao, 2004). Reasons for low adoption of ICTs by rural businesses include business owners' lack of ICT skills, lack of familiarity with ICTs, and lack of awareness of the potential of ICTs (Galloway et al., 2004; Mitchell and Clark, 1999; Richardson and Gillespie, 1996), and difficulties in getting ICT skilled workers as well as after-sales ICT support (Clark et al., 1995).	Low skill levels within the rural community could create barriers to adoption due to low awareness and demand for ICTs as well as limited expertise available to guide and implement ICT projects. Low ICT skills of rural business owners could create greater resistance to adoption and limit perceived need for ICTs.

Sub-element	Findings from literature	How impacts may occur
Language fluency	Language issues pose barriers to adoption (Rao, 2004) and most users in rural communities are said to require a human intermediary due to language barriers (Cecchini & Scott, 2003).	Low levels of education in rural communities are likely to result in lower levels of language fluency. Basic fluency for survival may not be adequate for ICT use. Greater resistance could be created if local language is not English, as applications and information content may not be available in the local language.

The following hypothesis is proposed for impacts due to skill level:

Hypothesis 5: Skill level is positively related to positive Perceptions of ICTs.

Low levels of education and ICT skills in rural communities and language fluency could be perceived as barriers towards adoption of ICTs. If the level of education and awareness of owners are barriers, then increasing awareness about the capabilities of ICTs and potential benefits of using ICTs for business needs should be a necessary part of alignment. Arrangements could be made to train local staff in a phased manner, and to provide back-up technical support from outside the community, in order to convince business owners that the benefits from their investment would not be short-lived. Developing simple interfaces and options for customization could be needed to encourage owners to overcome language fluency barriers. If English is not the local language, applications and digital content may need to be provided in the local language. Thus, alignment could consider ways of addressing the limitations so as to encourage ICT adoption.

4.4.6 Time management

Hall (1976) identified the treatment of time in different cultures as either monochronic or polychronic time. Monochronic time management is when only one task is the focus of attention at a given time and hence is linear. However, in polychronic time, several tasks are attended to at the same time. Rural communities are likely to have polychronic time management because the social dynamics has the potential to provide opportunities to combine business and social interactions. For this research, time management is defined as the degree to which business tasks are combined, and business and personal tasks are mixed. Table 11 outlines how each of the sub-elements related to time management could create impacts on ICT adoption.

Table 11: Time management and potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
Focus on tasks at a given time	Polychronic/monochronic time concepts impact on multiple versus focused search executions and accidental information encountering (Kumlodi & Carlin, 2004).	If informal sources are used for information, the need for ICTs to undertake more focused search for information may not arise.
Combining business information acquisition with other tasks	Due to small population sizes, rural communities exhibit strong community feeling and familiarity among members (Atkin, 2003) as well as close intimate interaction where formal and personal roles are known (Gross, 1948)	Need for ICTs may not be perceived if business information acquisition is regularly combined with socializing and other personal needs. The impact will be more pronounced if the socializing interactions are frequent.

Thus, the following hypothesis is proposed for impacts due to polychronic time management:

Hypothesis 6: Time management is negatively related to positive Perceptions of ICTs.

Understanding time management concepts within the business and community is important for alignment in order to ensure that impacts from use of ICTs are sustained in the long run. If the owner combines business information acquisition with socializing, and ICTs offer a different option for acquiring some of the same types of information, it may negatively impact the relationship with close contacts. In such situations, the owner may choose to stop using ICTs for information transfer, as the social relationships may be more important, not just for business needs but for personal reasons as well. ICTs could be promoted as a channel for getting more timely information in formats that enable better decision-making. Linkages with intermediaries of information could be established using ICT modalities that enable familiar interaction patterns. More efficient exchange of information with contacts outside the community could be enabled using ICTs, combined with regular norms of communication.

4.4.7 Management practice

Management functions and decision-making processes are influenced by business characteristics as well as the socio-cultural context of the community. Management practice is defined as the degree to which informal management practices and economically non-rational decision-making exist in the business. Management practices of rural businesses can impact on ICT adoption in several ways as outlined in Table 12.

Table 12: Management practice and potential impacts on ICT adoption

Sub-element	Findings from literature	How impacts may occur
Informal management practices	In the majority of rural businesses, functions are not clearly separated (Mitchell & Clark, 1999; Becker, 2004), owners do not take a salary (Gladwin et al., 1989), and informal credit arrangements and bartering exchanges exist (Rutten, 2001; Douglas, 2003).	Small size of rural business leads to management practices that are informal, which could limit the perceived need for ICTs.
Economic rationality in decision-making	Business transactions are embedded in social relations and obligations (Shields, 2005; Uzzi, 1996; Reimer, 2002). Transactions based on personal sources and implicit arrangements influence ICT adoption as lack of formal procedures limit ICT use (Li, 2005). Decision-making based on experience and intuition influence ICT adoption as it reduces need for data collection and analysis (Martinsons & Westwood, 1997).	Management practices embedded in personal links and obligations can limit ICT adoption as ICTs may not be felt as required or suitable for existing practices.

Thus, the following hypothesis is proposed for management practice:

Hypothesis 7: Management practice is related to Perceptions of ICTs, with higher levels of informal and non-rational practices having a more negative influence on Perceptions of ICTs.

Alignment could consider ways of providing positive impacts quickly without disrupting existing management practices. In order for rural businesses to be motivated to invest in ICTs that support management functions, particularly due to the small size of most rural businesses, the direct benefits must be clearly perceived and result in quick returns. ICTs could enable provision of decision-making information in ways that are easier and more convenient than existing methods. Adequate flexibility could be provided in the design to cater to existing levels of non-rational decision-making without compromising the quality of data. Managers may be unwilling to change familiar and tested ways of doing things, particularly if they are not confident about the skills required to use ICTs. Management functions involve not just transfer and exchange of information, but creation and transformation of information such as compilation of aggregates that need to be used in decision making. As a result, the level of skills required for using the ICTs for management functions maybe higher than those required for communication. A phased adoption could enable owners /to adjust to new functionalities provided through ICTs.

4.5 Constructs related to ICTs

Constructs for ICT perceptions and intentions for adoption/use are taken from models and theories on technology acceptance and use. A review of technology adoption models was provided in chapter 2. An analysis of the constructs proposed in the different models and theories that predict technology adoption (Venkatesh et al., 2003; Davis, 1989; Davis 1993; Karahanna, Straub & Chervany, 1999) shows that the predictor constructs can be categorized into three different groups: 1) constructs related to effectiveness of technology for a task; 2) constructs related to ease of use of the technology; and 3) constructs related to social norms and conditions. A correlation of the TAM constructs in the above three categories with the proposed impacts of the socio-cultural context on ICT adoption is given in Table 13.

While **intention to use** technology and **actual use** can be directly adopted from TAM literature as constructs for this research, the correlations shown in Table 13, suggest the utilization of many different constructs to test the relationships with the context factors. However, to simplify the research model, a new construct was defined that incorporated the 3 different aspects (usefulness, ease of use and compatibility with norms) of an individual's perception of the technology. Hence, for this research, the construct **perception of ICTs** is defined as an individual's perceptions regarding the effectiveness and complexity of ICTs, and compatibility with behavioural norms. Intention to use ICTs is defined as the self-predicted future usage of ICTs and actual use of ICTs is defined as the self-reported usage of ICTs.

Table 13: Correlation of technology adoption constructs with impacts from context factors

Factors of socio-cultural context	Constructs of technology acceptance		
	Related to task performance	Related to use	Related to social factors
Demographics (age)	-	Ease of use	-
Demographics (gender roles)	Job relevance	-	Subjective norm, Image
Communication behaviour	Perceived usefulness, Output quality, Relative advantage	-	Compatibility
Status and power	Relative advantage	-	Image, Compatibility
Collectivism	Long-term consequences, Relative advantage	-	Facilitating conditions
Skill level	-	Ease of use	Facilitating conditions
Time management	Job relevance	-	Compatibility
Business practice	Perceived usefulness, Job relevance	-	Compatibility

The following hypotheses are taken from TAM to predict the relationship between ICT perceptions and intentions, and between intentions and actual use.

Hypothesis 8: Positive Perceptions of ICTs are positively related to intention to use ICTs.

Hypothesis 9: Positive Intention to use ICTs is positively related to actual use of ICTs.

4.6 Summary

The initial research model attempted to capture key factors of the socio-cultural context of rural communities and related them to potential impacts on ICT perceptions. All seven factors identified in the model are proposed to be important elements of the socio-cultural context that influence the way businesses function in rural communities, and thus are likely to have significant impacts on the adoption of ICTs for business information needs. These factors affect business management practices and decision-making in different ways, and hence are worthy of investigation. These factors are important for ICT alignment for the following reasons:

1. Demographics - Rural communities generally have a majority of older people due to selective out-migration. Older people are more likely to be resistant to technological change than younger people. Differences in norms relating to men and women are more marked in rural communities, and hence affect their involvement in business. Traditional gender norms could potentially affect technology adoption.
2. Communication behaviour - Interpersonal links and networks were found to play an important role in supplying business information. Thus, the communication and interaction with such contacts is of importance, to understand the potential of ICTs as a channel of business communication.
3. Status and power - Cultural norms dictate how people of different status interact and communicate. This can affect options for ICT use for such interactions. The potential of ICTs to change power structures within the business also need to be investigated and addressed.
4. Collectivism and - Collectivistic norms in rural communities create trusted relationships and resulted in higher levels of social capital that provided business support. These norms and practices can provide opportunities for cooperation through use of ICTs.

5. Skill level - Low levels of education and ICT skills are found in many rural communities. ICT adoption is likely to be affected by low awareness and skills as well as lack of adequate technical advice and expertise within the community.
6. Time management - Close relationships among community members result in business tasks being combined with socializing and other personal tasks. Such behavioural norms are likely to impact on perceived need for ICTs.
7. Management practice – Rural business practices are informal, and embedded in social relations and obligations. Need for ICTs and compatibility of ICTs may not be perceived as a result of these informal practices.

The seven factors identified may not be the only elements that are important for ICT adoption, but the model was considered a reasonable starting point for investigating the influence of the socio-cultural context on ICT adoption by rural businesses. It was anticipated that findings from the first part of the field research could provide new insights that would require the model to be revised, either by removing some of the factors identified, or by adding new factors of the context that impact adoption.

Chapter 5

Research Methodology

Due to the exploratory nature of the research, a two-phase research design was used to test and refine the research model. The first phase comprised of qualitative field studies, which were used to undertake a preliminary exploration of the proposed influences from the socio-cultural context of rural communities. The first field phase enabled the refinement of the research model and informed the quantitative survey conducted as the second phase of the research. The research was conducted in the Maldives, a small island nation in the Indian Ocean comprising of about 1,200 small coral islands with a population of 298,968, distributed across 194 inhabited islands (MPND, 2007). The Maldives was considered a good study area for this research because of several reasons: 1) It has a clear rural-urban situation where the capital island is highly urbanized and the majority of the population live in small remote-rural islands separated by vast distances of ocean; 2) ICT infrastructure and access issues can be ignored through sampling methods, as about a third of the rural communities have access to the Internet provided through wireless infrastructure; 3) The potential of ICTs for the development of rural businesses cannot be contested, given the remote geography of the country; and 4) Cross-cultural differences can be dismissed as the population is homogenous having the same ethnicity, religion and language.

All communities selected for both phases of the research had ICT access provided by the government telecommunications company. Rural communities had wireless Internet infrastructure with a bandwidth of 256 kbps, and the urban capital had broadband ADSL with a bandwidth of 2 Mbps. In both phases of the research, ICTs were defined to encompass only the use of personal computers and Internet, and the language used in both research phases reflected this definition. Furthermore, for this research, a business was considered to be any formal and informal income earning activity undertaken, but did not include branches of national or international companies with multiple sites.

This chapter outlines the details of the research methodology.

5.1 Selection of the research methodology

Several different types of research design are available to a researcher including experimental design, cross-sectional or survey design, longitudinal design, and case study design (Bryman & Teevan,

2005). Although experimental designs are strong in internal validity (Bryman & Teevan, 2005), experiments were thought to be unsuitable for this research since it focuses on the actual behaviour and practices of business owners and the influences of the local context on such behaviour.

A qualitative case study design was chosen for the first exploratory phase of the research in order to get a better understanding of the rural context and related issues. A survey design was thought to be unsuitable for this phase, as it cannot help to get an understanding of the context under study (Babbie, 2004). A longitudinal design was ruled out as it was important to get an initial understanding of the rural context and support for the theoretical reasoning first, before moving on to further stages of the research. One of the main criticisms of case studies is that the findings cannot be generalized (Bryman & Teevan, 2005; Yin, 2003). However, a comparative design covering both rural and urban contexts was expected to provide a better understanding and confirmation of the theoretical research framework, which would be sufficient for the purposes of the first phase of the research. The case study design is also flexible as changes can be made as required during the data collection, and it is easier to initiate than survey methods as the sample is smaller (Babbie, 2004). However, the case study design has some weaknesses including the inability to cover larger samples, and inability to support statistical descriptions (Babbie, 2004).

Qualitative data collection methods including ethnography and in-depth interviews were selected for the first phase. The strength of these methods are that they enable the researcher to develop a feel for the situation or context that is being studied, they enable to study the behaviour of the participants in their local settings, and they give better insights into what the participants see as relevant and important (Babbie, 2004; Bryman & Teevan, 2005). However, qualitative methods are criticized as being subjective and difficult to replicate (Bryman & Teevan, 2005).

Business owners and managers were identified as the main participants of the research. Although focus group interviews with other relevant people within the local community or those supporting business operations could have led to an understanding of relevant issues from different perspectives, such interviews were not included in the research design. The main reason was that the research model was focused on testing linkages of behaviour influenced by context on the attitudes and perceptions of business owners towards the use of ICTs for their business needs. As such the focus on business owners and his/her views of the local context and related research issues were thought to be more important than getting a variety of different views related to the topic. Furthermore, focus groups have some limitations including less control of the researcher over group proceedings,

generation of large amounts of data that is difficult to analyze, difficulties in organizing group meetings, and potential problems of group effect and bias (Bryman & Teevan, 2005).

Other data collection options such as diaries and document analysis were also considered but thought to be unfeasible for the research context. Diaries would have been an ideal form of data collection to use as log of information exchanges between business owners and information sources. However, asking business owners to keep a diary of information exchanges was considered to be too much of a burden for them that could make recruitment of potential participants very difficult. The idea of using document analysis to study business documents, including business accounts and transaction records, was dropped because it was deemed that the level of document keeping between rural and urban businesses would be vastly different as suggested in the literature. This was in fact found to be true during the pre-test done for the field studies. In addition, it was believed that urban business owners in particular, may not be willing to share their business records with the researcher.

A research design that would enable large samples and statistical tests of the data to test the research hypothesis was needed for the second phase of the research. As such the best option for this phase was a quantitative survey design covering both rural and urban contexts. A survey design provides strong reliability and generalizability, and the use of a structured questionnaire limits variability in understanding of questions (Babbie, 2004). However, the survey design is criticized as being unable to deal with the context, being inflexible to changes, and to lead to superficial dealing of complex issues due to standardization (Babbie, 2004). A longitudinal survey design would have enabled to understand changes to behaviour and perceptions over a given period of time and added to the research findings. However, a longitudinal study was not possible within the time and resources available for this research.

5.2 Phase one – Field studies of rural and urban businesses

Case studies are claimed to be most suitable for research focusing on contextual conditions (Yin, 2003). Hence, a case study approach was applied in choosing appropriate rural and urban businesses for the qualitative study. Using suggestions by Yin (2003) to use literal and theoretical replication to predict similar and contrasting results, six rural and three urban businesses were included in the study. Businesses involved in the manufacturing sector were chosen to reduce variability resulting from industry differences.

The field studies were utilized to get insights into how business owners perceived different aspects of their context, develop an understanding of the information needs and behaviour of business owners, examine business owners' current use of ICTs, their perceptions regarding use of ICTs for business information needs, and their opinions regarding barriers and enablers for ICT adoption and use. Data was collected using in-depth interviews with business owners/managers and observations of the business owner and his/her business practices (Ellen, 1984; Machin, 2002). An interview guide (Bryman & Teevan, 2005) was used to capture existing behaviour and issues for each context factor and ICT aspects. A specific format was also used to note observations (Bryman & Teevan, 2005), which included areas for which observations were possible, such as interactions with employees and mixing of business and personal tasks.

The questions for the interview guide and observation items were based on preliminary measures developed for research constructs. Measures for context factors were developed using findings from literature and from related cultural studies (Chan, 2005; Bluedorn, Kaufman, & Lane, 1992; Buragga, 2001; Srite, 2000, McCoy, Galletta, & King, 2005; Shields, 2005). Measures to capture attitudes towards ICT adoption and use were adapted from technology adoption studies (Venkatesh & Davis, 2000; Venkatesh et al., 2003; Dishaw & Strong, 1999; Hu, Chau, Sheng, & Tam, 1999; Moore & Benbasat, 1991; Rogers, 1995; Straub, Limayem & Karahanna-Evaristo, 1995; Thompson, Higgins & Howell, 1994) and from usability goals for interaction design (Preece, Rogers, & Sharp, 2002; Chin, Diehl & Norman, 1988).

Interviews were audio-recorded and transcribed. Interview and observation data was analyzed using a coding scheme based on the research model. Data analysis comprised of comparisons of business practices and perceptions between and across rural and urban contexts. The findings were used to undertake a preliminary testing of the contextual differences proposed in the research as well as the relationships between context factors and ICT perceptions.

The field study component enabled identification of context factors that appeared to be more important in differentiating between rural and urban contexts and also informed the development of better measures for the research constructs. Thus, the research model was revised based on the field study observations.

5.3 Phase two – Quantitative survey of rural and urban businesses

The second phase of the research comprised of a survey of rural and urban businesses. The survey was aimed at testing the revised research model and related hypotheses. The sample frame for the survey was a business listing from a national Economic Survey undertaken in 2007/2008 by the Ministry of National Planning and Development, Maldives. Although this frame enabled selection of a homogenous sample based on business characteristics, a limitation was that only 22 % of the inhabited islands were covered in the survey. Nevertheless, the multi-stage and multi-method sampling using census data, administrative data, as well as creation of listings for communities selected in earlier sampling stages ensured a representative sample of the business population. Using stratified sampling, which was restricted to certain criteria (selecting businesses having certain characteristics, and from communities which had access to the Internet) a sample of 200 rural businesses and 200 urban businesses was selected.

A structured questionnaire was used to collect data from participants. The construct measures consisted of multiple items and responses were elicited using Likert scales (Venkatesh & Davis, 2000; Oppenheim, 1992). Factor analysis was used to establish validity of the latent constructs. Factor analysis is a statistical approach that can be used to analyze interrelationships between items and explain the items in terms of common dimensions or factors (Hair, Black, Babin, Anderson, & Tatham, 2006). Construct validity was established using the factor loadings and assessing both convergent and discriminant validity. Convergent validity is the degree to which two measures of the same concept are correlated, and can be checked using the item loadings of its respective factor. High convergent validity is indicated by loadings of 0.50 or greater. Discriminant validity is the degree to which two conceptually similar concepts are distinct. Low cross loadings of items on other factors and low correlation between the summated scales of two distinct constructs suggest discriminant validity (Hair et al., 2006). In addition, reliability of the constructs was established using Cronbach's alpha and item-to-total and inter-item correlations. Reliability measures the degree of consistency between multiple measurements of a variable (Hair et al., 2006).

To test hypotheses presented in the research model a single measure for each construct was calculated using summated scales. Context differences between rural and urban businesses were assessed using two-tailed t-tests. The t-test assesses the statistical significance of the difference between two sample means for a single dependent variable (Hair et al., 2006). Finally, logistic regression was used to test relationships identified in the research model.

5.4 Summary

A two phase research methodology was adopted for this research. A preliminary exploration of research concepts and relationships enabled to clarify and refine the research model before embarking on additional data collection. The qualitative first phase consisting of field studies enabled the researcher to grasp the more critical aspects that influenced businesses in rural contexts, their information seeking behaviour, and their attitudes towards ICTs. Informed by the findings from the field studies, the survey conducted as the second phase enabled to statistically test the context differences between the rural and urban businesses studied, and the relationships between the context factors and ICT perceptions.

The next chapter provides details of the field studies and Chapter 8 presents findings from the survey.

Chapter 6

Phase one – Field studies of rural and urban businesses

Phase one of the data collection consisted of field studies of six rural and three urban small businesses, selected from eight island communities in the Maldives. The author spent between five and seven days in each community. Data collection methods included in-depth interviews with business owners/managers and observation of the business owners and their business operations. The purpose of the initial field work was threefold: i) to undertake a preliminary exploration of issues identified in the proposed theory, in order to discover if the speculated differences were noticeable enough to warrant further field work in the form of surveys, ii) to identify, if possible, some of the factors which seemed to be more prevalent and critical than others, and iii) to better inform the development of appropriate measures for the research constructs. This chapter presents the data analysis and findings from the field studies.

6.1 Community and business backgrounds

Rural businesses were selected from six different island communities, which had small population sizes and were dependent mainly on fishing, agriculture, or tourism. In three of the six communities, the majority of women were found to be active in different income generation activities carried out from home, such as production of local thatch used as roofing material, or fish processing. Table 14 provides a comparison of the selected communities. Some aspects identified in the literature regarding the socio-cultural context of rural communities were observed from the communities, including familiarity among residents, close-knit relationships between families and neighbours, and a slow pace of life. In all communities, people seemed to know each other, and the author was easily spotted as an outsider. People were hospitable and gathered daily in open areas late afternoon to play sports or just to socialize.

Two of the three urban businesses were selected from the capital island of the country, which has about a third of the total population, and the third business was selected from the second largest population centre. The capital, being the centre of government and all economic activities, dealt with high rates of in-migration and was highly congested. Employment opportunities available through government and private organizations as well as trade and service-related businesses were the main sources of income in the selected communities. A faster pace of life was observed with streets bustling with people and large volumes of traffic. People kept to themselves, and familiarity or close

relationships with neighbours was not common. Therefore, even from simple observation of life within the selected communities, differences between socio-cultural contexts of rural versus urban communities could be documented.

Table 14: Field studies - Comparison of home communities of selected businesses

Bus. No.	Category	Population	Land area (sq km)	Economic activity
1	Rural	535	2.00	Agriculture, women active in local crafts
2	Rural	1,759	0.24	Fishing, traditional handicrafts, women active in fish processing
3	Rural	392	0.25	Jobs in nearby tourist resorts, women active in local crafts
4	Rural	1,762	1.60	Agriculture
5	Rural	928	0.41	Fishing
6	Rural	849	0.18	Tourism related jobs (within and outside community)
7	Urban	9,465	4.67	Fishing, trade
8 & 9	Urban	103,693	19.70	Trade, tourism, services

Businesses from the manufacturing sector, between one to ten years since start-up, and with less than fifteen employees were selected for the study. Main characteristics given in Table 15, show differences between the rural and urban businesses in terms of business scale, use of employees, proportion of purchases from the local community, and the main problems faced by the business.

- As expected, rural businesses were smaller, with average monthly incomes at about \$1,000 or less, while incomes ranged from \$2,000 to \$4,000 for the urban businesses. This may be an indication of the smaller markets available to the rural businesses.
- Rural businesses used fewer paid employees compared to the urban businesses. In fact, three of the six rural businesses did not use any paid employees and depended on inputs from family members. While the number of employees can be linked to the scale of the business, informal arrangements with family members in rural businesses may be a possible indication of the collectivistic behaviour and strong family support within the rural communities.
- Rural businesses showed a lower proportion of monthly purchases from their own community compared to the urban businesses, possibly indicating lack of local opportunities and greater dependence on suppliers outside the community.

- The final difference was in the type of problems faced by the businesses: four of the six rural businesses identified problems related to limited markets to sell their products which can be linked to their low incomes, while urban businesses identified problems related to high rents for business premises, indicating a more competitive and commercial environment.

Table 15: Field studies - Background of businesses

	Rural						Urban		
	Bus. 1	Bus. 2	Bus. 3	Bus. 4	Bus. 5	Bus. 6	Bus. 7	Bus. 8	Bus. 9
Main activity	Handicrafts and souvenirs	Traditional handicrafts	Traditional crafts in weaving	Bakery	Carpentry	Processed foods	Tailored goods	Tailored goods	Speciality cakes
Secondary activities	No	No	No	Yes (govt. job)	Yes (govt. job, retail shop and pharmacy)	Yes (sewing)	Yes (part-time job)	No	Yes (supplies shops, training courses)
Age of business	5 years	9 years	10 years	1 year	9 years	3 years	5 years	3 years	10 years
Separate location	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Number of employees	0 (3 relatives work informally)	1	0 (family members work informally)	1	2	0 (family members work informally)	13	3	2 (use 6 paid helpers when needed)
Monthly income	MRf 6,500 (\$500)	MRf 13,500 (\$1,050)	MRf 4,700 (\$365)	MRf 15,000 (\$1,167)	MRf 9,000 (\$700)	MRf 3,000 (\$233)	MRf 60,000 (\$4,600)	MRf 30,000 (\$2,300)	MRf 40,000 (\$3,100)
% sales within community	5%	5%	2%	90%	100%	75%	85%	90%	75%
% purchases from community	80%	5%	50%	25%	0%	10%	70%	80%	50%
Main problem faced	Limited market	Limited market	Limited market for specialized products	Bad weather affecting transport of raw materials	Problems getting employees	Limited market	High staff turnover	High rents	High rents

6.2 Data analysis

Interview data and observations were analyzed using a coding scheme based on the research model. A description of the coding methodology and results are provided in Appendix B. Based on the coding, comparisons were made between the businesses within and across rural/urban contexts. In addition, behaviour or actions that stood out were noted and used to make interpretations. Although the field studies cover a very small number of businesses, a system analysis was conducted using the coding,

rather than simple observation or intuition, in order to make informed decisions for revising the research model. Furthermore, the intention was to ensure a way to catch any potential mistakes made in the revisions during the survey phase.

This analysis first presents information seeking behaviour of the businesses included in the study. Then, the findings for the context factors and ICT related aspects are used to undertake preliminary tests of the relationships identified in the research model.

6.2.1 Information behaviour

Since one of the main benefits of ICTs for rural businesses lies in the potential of ICTs to enable better information transfer and management, details of existing practices for information search and use were sought from study participants in order to get a better understanding of information types, sources and processes involved. Owners were queried on information related practices in two different ways:

- i) General – owners were asked to identify the different types of information they needed for business tasks and explain how they went about acquiring that information.
- ii) Specific – owners were asked to identify two specific situations (a - an important business decision, and b - an action performed by someone else that was useful for the business) and explain the information exchange and transfer related to those situations.

As suggested in literature (Taylor, 1968), it was difficult for business owners to specify their information needs when asked about it in general. Some rural business owners mentioned that they did not “need any information” to do their work, or did not “purposefully look for information”. In contrast, outlining information exchanges related to a specific situation appeared to be easier for the owners.

Types of information: Basic categories of information needed by the rural and urban businesses were found to be the same and related to the basic functioning of any business. Most of the businesses focused on product related information during discussions of information needs in general. This included information on machinery, tools, raw materials, product designs, and ideas for developing new products. However, information practices for the two specific situations (important decision and useful action) showed that market related information was more prominent for the rural businesses (see Appendix B – Table 1), while product related information was central for the urban businesses. Five of the six rural businesses identified important decisions that were related to market demand,

expansion and diversification, and useful actions by others also related to market expansion for four of the six rural businesses. In contrast, the urban businesses identified decisions and useful actions related to product procurement and production expansion. Other information categories did not appear to be as vital for the businesses as product and market information. Only one rural business specified the critical need for business development information that could help strengthen their management and planning processes. Skill related information was sought by all business owners through observation and working with other skilled workers. Regulatory information was only sought when required for permits and approvals, and financial information was not sought by most businesses because of lack of opportunities for credit.

Sources of information: Comparisons between rural and urban businesses showed that the rural businesses relied greatly on informal sources, such as family and friends, for information within and outside the community (see Appendix B – Table 2). Family members and friends acted as intermediaries in transferring information from direct sources such as outlet stores, experts or relevant organizations. Three of the six rural business owners indicated their preference to confirm information provided by intermediaries and check products themselves before making decisions. On the other hand, the urban businesses used formal business sources, with direct involvement of the owner in information transfer. This difference could be explained by the limited availability of direct sources of information within rural contexts, which in turn requires rural businesses to seek information outside their community, and hence possibly greater reliance on intermediaries who travel outside the community.

Channels for information transfer: Face-to-face interactions and telephone were used as the main channels of communication for all of the rural and urban businesses studied. Interview responses and observations showed greater face-to-face interactions in rural businesses. The rural owners used telephone mainly to communicate with people outside the community and only two rural owners used telephone regularly to interact with people within the local community. Face-to-face interactions were also found in urban business, in dealing with customers visiting for services and for finalizing product purchases. However, mobile phones were used to a greater extent in all three urban businesses. The other difference was the additional use of Internet and email by two of the urban businesses as a regular channel of information transfer, particularly for product related information and communication with suppliers. Only one rural business owner identified a single instance of getting someone's help to search for a product using the Internet. Public media was not perceived as a good

source of information by most of the businesses, except for two rural and one urban business owner, who found some useful programmes on television for business development ideas. However, media was used as a marketing opportunity by one rural and two urban businesses.

Advice and opinions: Rural businesses appeared to seek more advice and opinions from different sources such as family members, relatives, friends and experts regarding business decisions and in interpreting information. Five of the six rural business owners indicated that they sought advice in making important business decisions. In contrast, the urban business owners only sought advice or assistance for important decisions from a single close family member, such as the spouse. This could be attributed to a lack of adequate knowledge regarding certain types of information or simply to the cultural practices of sharing and involving family and friends in important events/decisions in rural contexts.

Some excerpts from the interviews which illustrate the information behaviour are given below:

Business 1 (Rural): “People know I do this kind of work, so I don't have to ask them to give me supplies. They will come and tell me or bring me any thing they think I will find useful.”

Business 3 (Rural): “I try to get new orders by asking friends and family. I tell visitors and locals who go to resorts, that we make *sataas* (leaf mats) and if they know anybody looking to place orders, to let them know about us.”

Business 4 (Rural): “My husband worked for the mobile bank and during his travels he visited and checked out the equipment in a bakery in another community.”

Business 6 (Rural): “I found out about the shops which carried useful products through the relative who buys my raw materials. He said the shop carried a lot of things that I will find useful for my business and that I should go and see for myself.”

Business 7 (Urban): “When we initially bought the sewing machines, we went to outlet stores in India and checked out the machines and got information about their quality and durability from the sales people. Now we first search online for good products.”

Business 9 (Urban): “I usually attend cake exhibitions abroad and meet representatives of related companies. I contact them and discuss about their product lines and then follow-up later through Internet and communicate through email ... We place orders for all tools and raw materials required for new products through email”

To summarize, a number of differences between the information needs and information seeking behaviour of rural and urban businesses were observed:

- 1) Market information appeared to be more important than product information for the rural businesses.
- 2) The rural businesses appeared to rely greatly on family members, relatives and friends as intermediaries for information (particularly from outside their community).
- 3) Face-to-face interactions and telephone were found to be the main channels of information transfer for the rural businesses whereas the urban businesses mainly used telephone and ICTs.
- 4) The rural business owners sought advice and opinions from different sources for business decisions, while the urban business owners only sought advice from one key family member.

These differences could have possible implications for adoption of ICTs for business information needs.

6.2.2 Preliminary testing of the research model

As mentioned at the start of this chapter, the main aim of the first phase of the research was to find out if the anticipated differences existed between rural and urban contexts and to see what aspects were more prevalent for the contexts studied. Although the field studies provided an opportunity to observe businesses in practice which in turn enabled a deeper understanding of issues that affected rural businesses, the small number of businesses studied in this initial phase limits the conclusions that may be drawn from the findings, particularly in relation to the hypotheses presented in the research model. However, an attempt was made to identify possible differences between the rural and urban contexts that may be worthy of further exploration, and to see if any relationship in the predicted direction could be observed.

6.2.2.1 Differences between rural and urban contexts

Analysis of data for the seven context factors appear to suggest the existence of possible differences between the rural and urban contexts studied for five factors as summarized in Table 16.

Table 16: Field studies - Findings for contextual differences

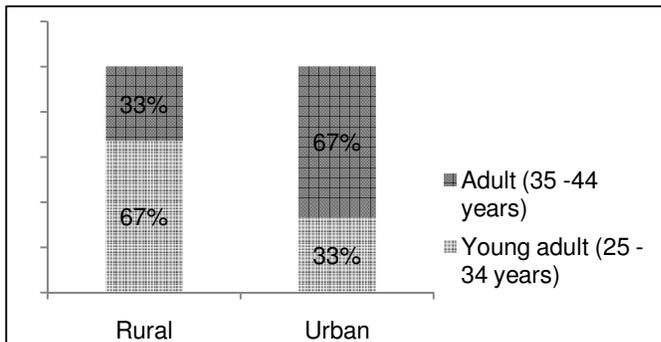
Context factor	Prediction (for rural contexts compared to urban contexts)	Findings	Conclusion
1 - Demographics			
Age characteristics	Population will have an older age distribution	Rural – 4 of 6 categorized as young adults(35 – 44 years), 2 of 3 categorized as adults (25 – 34 years) Urban – 1 of 3 categorized as young adults, 2 of 3 categorized as adults	Expected differences do not appear to exist
Gender roles	Gender disparities will be higher	Rural – all 6 scored 'low' Urban – all 3 scored 'none'	Expected differences do not appear to exist
2 - Communication behaviour	Communication will be more high-context	Rural – 3 of 6 scored 'high', 3 of 6 scored 'medium' Urban – all 3 scored 'medium'	Possible differences exist
3 – Status and power	Emphasis on status and power will be higher	Rural – 3 of 6 scored 'high', 3 of 6 scored 'medium' Urban – 2 of 3 scored 'high' 1 of 3 scored 'medium'	Expected differences do not appear to exist
4 - Collectivism	Collectivistic behaviour will be more prevalent	Rural – 2 of 6 scored 'high', 4 of 6 scored 'medium' Urban – 2 of 3 scored 'medium', 1 of 3 scored 'low'	Possible differences exist
5 - Time management	Time management will be more polychronic	Rural – 4 of 6 scored 'high', 2 of 6 scored 'medium' Urban – 3 of 3 scored 'medium'	Possible differences exist
6 - Skill level	Skill levels will be lower	Rural – 4 of 6 scored 'low', 2 of 6 scored 'medium' Urban – 2 of 3 scored 'medium', 1 of 3 scored 'high'	Possible differences exist
7 - Management practice	Informal management practices are more prevalent	Rural – 1 of 6 scored 'high', 5 of 6 scored 'medium' Urban – 1 of 3 scored 'medium', 2 of 3 scored 'low'	Possible differences exist

Demographics: Two aspects within demographics were assessed in the field studies. They are age characteristics and gender roles.

Age characteristics: Based on the literature, the prediction was that the rural communities would have a majority of older people due to migration, when compared to the urban communities. However, contrary to prediction, the rural and urban community samples both had a younger age distribution when average age of the community was calculated using Census data (see Appendix B – Table 4). Since rural to urban migration is well established in literature, and migration in Maldives is

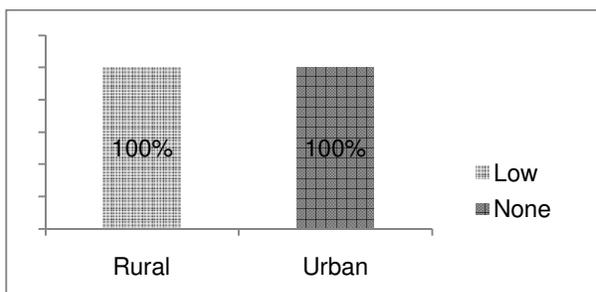
more male dominant, an assessment was done to compare working age men and women in the communities studied. This comparison showed male percentages ranging from as low as 20% to 45% in five year age groups between 20 and 40 years of age, in four of the six rural communities. These percentages provide some support for selective out-migration from the rural communities. However, as shown in Figure 7, when owner age and average community age are considered together, the expected differences between the rural and urban contexts do not appear to exist.

Figure 7: Field studies - Age distribution of the sample



Gender roles: Differences between the urban and rural communities were expected in terms of perceptions and behaviour regarding economic and political role of men and women in society. The prediction was that gender disparities would be higher for rural communities because of traditional roles for income earning activities and cultural influence. As expected, the findings for the urban businesses showed almost no disparities, except for minor differences related to physical abilities of women and men (see Appendix B – Table 5). However, contrary to expectation, the findings from the rural businesses also showed low gender disparity for all six rural businesses. Some level of disparity was identified for general opinion of the community regarding women’s status and influence in the community and these opinions were found to be affected by religious and cultural practices.

Figure 8: Field studies - Level of gender disparities for the sample



Therefore, as shown in Figure 8, gender disparities do not appear to be as prevalent for the communities studied. This observed gap might be caused by a general cultural situation of gender equality of some form, or perhaps by the small sample size. Some excerpts from the interviews which highlight views on gender roles are given below:

Business 3 (Rural): “Most people in this island also feel the same. They accept women doing different types of work. Look at Zoona here. She is a junior island chief. In the early days we did not have women as island chiefs.”

Business 1 (Rural): “Younger generation has a more open outlook but older people still don't look at that very positively. They feel that women should stick to their traditional roles.”

Business 2 (Rural): “I don't support that very much. That is because according to our religion it is not good to have women in the very highest positions ... People will not accept having a women as the person who heads or has final authority/say in any area, be it the island chief or the captain of a boat.”

Business 8 (Urban): “There is no difference now. Both men and women can do any type of work ... It is accepted and we can see that from the role of women in society now, looking at their jobs and their professions.”

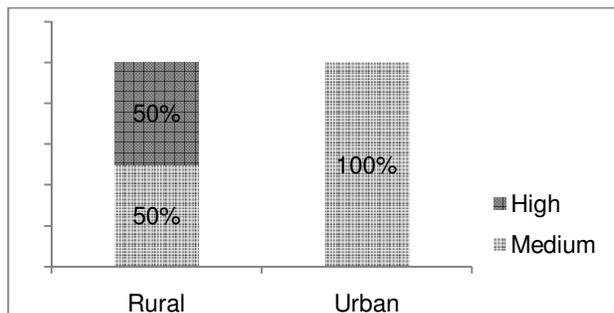
Communication behaviour: Literature suggests that oral face-to-face communication is more prevalent in rural communities (Howard, 1993) and these high-context interactions enable better interpretation and understanding of information conveyed (Hall, 1976). Furthermore, close relationships between residents of rural communities suggest a higher frequency of interactions with people that contribute towards the business. Findings appear to suggest possibly more high-context communication for the rural businesses (see Appendix B – Table 6). Differences between the rural and urban businesses were noted in relation to the commonly used channel for communication, which was face-to-face for four of the six rural businesses, while the other two rural businesses and the urban businesses mainly used telephone as their medium of communication. Overall assessments were based on both interview responses and observed communication patterns. Rural business owners had frequent face-to-face interactions with regular customers and other contacts within the community. On the other hand, while urban businesses also had daily face-to-face contact with customers, they relied more on telephone for business interactions and used ICT forms for communication as well.

Therefore, as shown in Figure 9, findings suggest that communication could possibly be more high-context for rural businesses. Some explanations for why face-to-face communication is preferred are:

Business 6 (Rural): “When someone talks, I can learn a lot from facial expressions, and gestures. The actual meaning understood from words may be different if I take into account actions and tone.”

Business 1 (Rural): “I understand much better when interacting face-to-face because I can instantly clarify if I don't understand anything.”

Figure 9: Field studies - Level of high-context communication for the sample



Status and power: The level of inequality based on status and power was expected to be higher within rural communities compared to urban communities. Two aspects were targeted in assessing differences: i) adjustment of language/behaviour based on status, and ii) power balance within the business. Responses from interviews and observations regarding adjustment of language/behaviour based on status showed some differences in the way the rural owners interacted with senior people, prominent figures of the community, and outsiders (see Appendix B – Table 7). However, responses from interviews and observations regarding power balance within the business did not provide adequate evidence to suggest differences between rural and urban businesses. Overall, three rural businesses and two urban businesses showed high emphasis on status and power while the remaining businesses all showed medium emphasis. These opinions and practices appeared to be linked to the relationship between the owner and employees as evident from owner comments.

Business 2 (Rural): “It is alright because I work with my employee more as a partner. I trust him and he has access to all my books.”

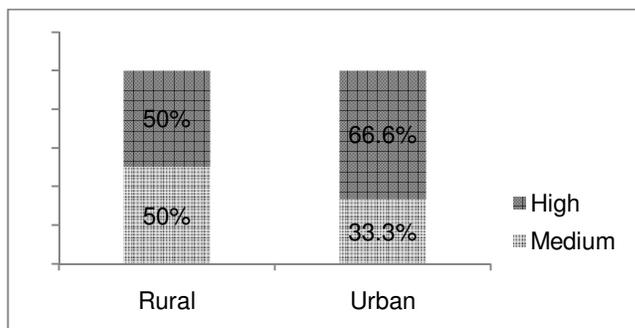
Business 6 (Rural): “Employees should not have access to accounts and other decision making information as decisions need to be made by the owner.”

Business 7 (Urban): “I get opinion and assistance in the production stages, asking opinions about designs and such. But I do not ask for assistance or opinion from employees about managing the business or business decisions. That is my job.”

Business 8 (Urban): “They [employees] have access to the books which have income and expenses noted. They are told how much the expenses are and how much they have to produce to meet the expenses and make profits.”

Therefore, contrary to expectation, substantial differences do not appear to exist between the rural and urban businesses in terms of emphasis on status and power, as shown in Figure 10.

Figure 10: Field studies - Emphasis on status and power for the sample

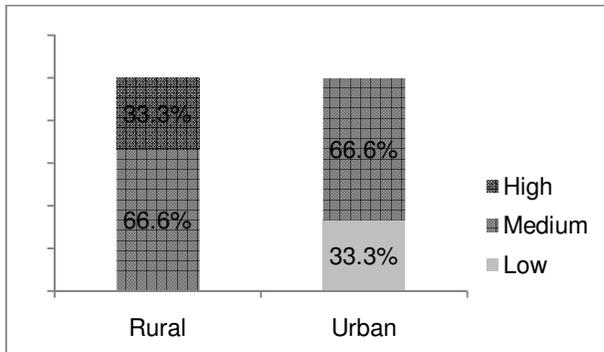


Collectivism: Due to strong community spirit and close-knit relations between residents in rural communities, collectivistic behaviour was expected to be higher for rural communities than urban communities. Contrary to expectation, no distinct pattern for perception about group effort between rural and urban businesses was found (see Appendix B – Table 8). However, findings appear to suggest possible differences between the rural and urban businesses in terms of the levels and nature of contributions from family and friends for business support. The rural businesses had slightly larger number of people in their closest personal network (whom business owners fully trusted and relied on) than the urban businesses studied, and more people outside immediate family members. In contrast, the urban businesses had one or two people who were a spouse, child or sibling. The rural businesses also received greater contributions from their personal networks than the urban businesses, and these contributions were mainly in terms of providing resources and skills. Findings showed sole reliance on family and friends for acquiring and transporting raw materials and in marketing products in four of the six rural businesses, which can be identified as a crucial element for the survival of these businesses. While some contributions from personal networks were received by two of the three urban businesses to procure raw materials or to extend market outreach, other formal arrangements

existed for procurement, and rural family ties of the business owner or spouse were used to market products in his/her childhood community.

One thing that was not initially looked at, but stood out from the field studies was how contributions from personal networks were compensated between the rural and urban businesses. In the rural businesses, inputs were free of charge, or only a nominal fee was paid for regular inputs like purchase of materials. In some cases, payment was made in kind by giving products free or through other barter arrangements. Conversely, most of the contributions from personal networks for the urban businesses were compensated with a comparable fee.

Figure 11: Field studies - Level of collectivism for the sample



Therefore, differences in terms of collectivism linked to contributions from personal networks, appear to exist between the rural and urban businesses studied as shown in Figure 11. Some examples of the types of reliance on personal networks are given below:

Business 4 (Rural): “We have a relative who operates a cargo boat between the capital and our atoll. We depend on him to purchase and deliver raw materials. He takes whatever he takes as a fee, I don't know if he really takes anything.”

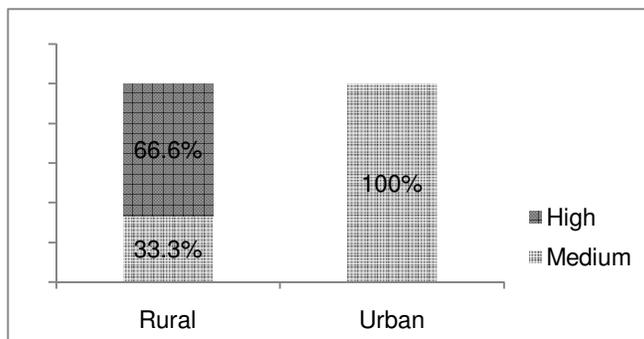
Business 1 (Rural): “They help a lot. If any of my family members find any type of work suited for me, through any of their friends, they will bring that work offer to me. Most of the big work orders that I have done here have been through my family and friends.”

Business 6 (Rural): “We work with high level of trust on both sides. For example we manage a loan for the relative who buys our raw materials. He has a big loan and whenever he comes back from a trip, he gives the money and trusts us to make the payment to the bank.”

Business 7 (Urban): “Only my sister shares in this business. No other member of the family has any involvement. Friends do not provide a big contribution, some of them are involved sometimes in procurement, but I have to pay for any inputs or contributions. So that cannot be taken as a contribution since I have to pay for the services.”

Time management: Hall (1976) defined time management as either monochronic (focusing on one task at a time) or polychronic (attending to several tasks at the same time). The prediction was for rural contexts to have higher levels of polychronic time management due to social dynamics which provide opportunities to combine business and social tasks on a regular basis. The two items considered for this factor were, i) the owner’s focus on one or many tasks at a time, and ii) mixing of business and personal tasks. When these two items are considered together, possible differences appear to exist between the rural and urban businesses studied, as shown in Figure 12.

Figure 12: Field studies - Level of polychronic time management for the sample



However, findings showed more polychronic time in attending to tasks for seven of the nine businesses studied, and this was found to be linked to the functions and management style of the business owner and not necessarily on the context (see Appendix B – Table 9). However, some observations in line with the prediction were found in terms of the extent to which rural business owners combined business and personal tasks. The urban business owners rarely mixed business and personal tasks, while it was found to a greater extent in four of the six rural businesses. Responses from interviews and observations showed rural business owners attending to personal tasks during business hours, such as household or family work, requests from family and friends related to the business activity, and socializing with friends and neighbours. Some examples are:

Business 3 (Rural): “I don't have to do household work. But when I work from home, my children ask me for different things and I can keep an eye on my grandchild. Sometimes my friends come and sit

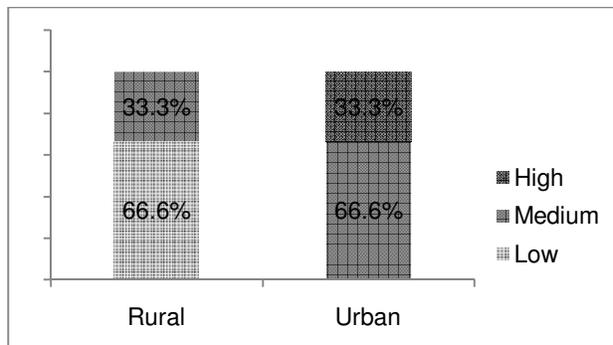
with me to talk, and the afternoon is a time to get together with my friends while we all work”

Business 2 (Rural): “Yes, sometimes I do attend to other things during work hours. For example I have to do little things like sharpen knives for people, or take time out to handle larger problems like fix plumbing at home. Very often friends will come and sit here to observe while I work and talk about things.”

Business 6 (Rural): “I have to manage my time to handle household tasks and business tasks together every day.”

Skill level: Due to lower levels of social and economic opportunities in rural contexts, education and ICT skills were expected to be lower for the rural contexts compared to urban contexts. As expected, findings showed skill levels to be lower in rural contexts, with four of the six rural businesses having an overall low skill levels while urban businesses had medium to high skills levels (see Figure 13). Differences were noted mostly for business owner’s education, ICT knowledge and language fluency (see Appendix B – Table 10). Therefore, the field studies appear to provide some support for differences between skill levels in rural and urban contexts.

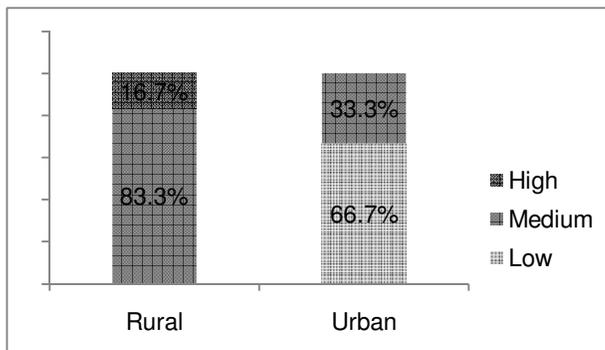
Figure 13: Field studies - Level of skills for the sample



Management practice: In rural contexts, the smaller size of businesses and close linkages with personal networks were expected to result in more informal management practices and business decisions that were embedded in personal relations and obligations leading to some economically non-rational decisions. The rural businesses studied had more informal management practices than the urban businesses when documentation and function separation were considered (see Appendix B – Table 11). Four of the six rural businesses kept account of sales but one business did not keep track of expenses. Where inventory was maintained, it was only of large machinery and tools. On the other hand, the urban businesses had better documentation and separation of functions, and adequate plans

were drawn up for new investments. Furthermore, the rural businesses showed much greater linkages with personal networks for business inputs than urban businesses, with four of the six rural businesses showing high linkages. The level of non-rational decisions also appeared to be higher for rural businesses, in terms of giving products free or at discounts to family and friends and in having barter arrangements in exchange for services.

Figure 14: Field studies - Level of informal management practices for the sample



Therefore, the observations from the field studies appear to suggest possible differences in management practices between rural and urban businesses, as shown in Figure 14. Some examples of the practices in the business studied are given below:

Business 3(Rural): “I don’t have any record of sales or amounts that I make. I know that in my mind. But when we handle large orders, I note down how much everyone makes and how much money we get. If I do not do that, I would not know how to divide up the money.”

Business 3(Rural): “I do not note down inventory or production numbers, but I know the quantity I make based on purchases and quantity used in raw materials. I will know how much is taken free because I know how much is produced each time.”

Business 9 (Urban): “We keep separate accounts of each business entity. Daily expenses, orders and sales are noted and monthly accounts settled. We have detailed records dating back to 2002. They are easily accessible.”

Business 7 (Urban): “No we do not give any product free or at discounts to family or friends. This is a business so we cannot give anything free.”

To summarize, possible differences appear to exist between the rural and urban businesses for five of the seven factors. They are: 1) communication behaviour, 2) collectivism, 3) time management, 4) skill level, and 5) management practice.

6.2.2.2 Relationships between context factors and ICT perceptions

Findings for perceptions of ICTs are presented first, followed by an examination of the relationships between overall scores for each of the context factors and overall ICT perceptions.

Perceptions of ICTs: Perceptions of ICTs were captured using multiple items in 3 sub-categories: effectiveness of ICTs, ease of use of ICTs, and compatibility of ICTs with norms (see Appendix B – Table 12). Contrary to expectation, findings showed that perceptions regarding effectiveness of ICTs for information needs were positive overall for both the rural and urban businesses studied. Items within the effectiveness category included effectiveness for tasks, quality of information and speed of information. Some reservations were expressed by four rural and one urban business about the quality of information, mainly relating to the correctness and currency of information. An example is:

Business 7 (Urban): “Sometimes we search for information and call up on a number given only to find that place is no longer there. So we get some outdated information online. ... Sometimes there are problems with connections and information loads up very slow. ... Identifying useful websites take some amount of time.”

Perceptions regarding ease of use of ICTs (including ease of use, ease of learning and memorability of commands and icons) were positive overall for two of the three urban businesses but negative for three of the six rural businesses. Both the rural and urban business owners found memorability to be an issue. In addition, three of the six rural owners identified difficulties in learning ICTs, and this was explained by lack of fluency in English.

Perceptions regarding compatibility of ICTs with norms showed differences between the rural and urban business samples, when measured using two items: perception about having people available to help with technical difficulties and compatibility of ICTs for information acquisition/transfer. Having access to technical help was not a problem except for two rural business owners. However, more negative perceptions were perceived by the rural business owners regarding compatibility of ICTs for information needs. Only one rural owner viewed ICTs as compatible. Of the remaining five rural owners, one owner perceived ICTs as incompatible, and the other four owners perceived compatibility for only specific types of information, such as product search and accounts.

Compatibility was not perceived for communication with informants or for learning new skills. Urban owners felt ICTs were compatible for their information needs, although one owner identified a requirement to supplement some types of information through face-to-face observation. Some comments by the rural owners are below:

Business 3(Rural): “I don't think I can use computers. I mostly need to find people who will buy products and then we negotiate the details of an offer. I don't think I can do that using computers.”

Business 4(Rural): “It is compatible to keep track of sales, expenses, stock and things like that, but not for other types of information.”

When overall perceptions of ICTs are considered using the eight items, perceptions are positive for all three urban businesses, but only for two of the six rural businesses. For the remaining four rural businesses, perceptions are a mix of positive and negative perceptions. Specific items that showed negative perceptions for the rural businesses include quality of information, ease of learning, memorability and compatibility of ICTs for information needs.

Examination of relationships between context factors and ICT perceptions: Although the number of businesses studied is too small to make conclusive judgements on the relationships predicted in the research hypotheses, assessing the relationships for the nine businesses could give a better understanding of the linkages and possible ways to refine the ICT perceptions construct for later stages of data collection. This assessment is summarized in Table 17 and discussed in more detail below.

Table 17: Field studies - Findings for relationships between context factors and ICT perceptions

Context factor	Prediction (for relationship with ICT perceptions)	Findings ^a	Conclusion
1 - Demographics			
Age characteristics	Negative	Young adults – 3 P, 2 P+N Adults – 2 P, 2 P+N	No relationship observed
Gender roles	Negative	No disparity – 3 P Low – 2 P, 4 P+N	Possible negative relationship
2 - Communication behaviour	Negative	Medium – 5 P, 1 P+N High – 3 P+N	Possible negative relationship
3 – Status and power	Negative	Medium – 3 P, 1 P+N High – 2 P, 3 P+N	No relationship observed
4 - Collectivism	Positive	Low – 1 P Medium – 4 P, 1 P+N High – 2 P+N	Possible negative relationship

Context factor	Prediction (for relationship with ICT perceptions)	Findings ^a	Conclusion
5 - Time management	Negative	Medium – 4 P, 1 P+N High – 1 P, 3 P+N	Possible negative relationship
6 - Skill level	Positive	Low – 1 P, 3 P+N Medium – 3 P, 1 P+N High – 1 P	Possible positive relationship
7 - Management practice	Negative	Low – 2 P Medium – 3 P, 3 P+N High – 1 P+N	Possible negative relationship
a – for each category of the context factor, number of businesses for each category of ICT perceptions are listed. ICT perceptions are categorized using: N = Negative, P+N = Positive + negative, P = Positive			

Age distribution: Older age was predicted to create greater resistance to adoption of new technologies and thus have a negative influence on adoption/use of ICTs. Since average community age was not found to be different for the rural and urban communities studied, it was possible that only business owner age could be compared with their ICT perceptions to check if any relationship existed. However, comparisons of owner age with ICT perceptions failed to show any relationship to support a negative influence on ICT perceptions as age increased (see Table 18). Adequate support may not have been found due to limited number of businesses included in the study.

Table 18: Field studies - Owner age compared with ICT perceptions

	Rural B2	Rural B4	Urban B1	Rural B5	Rural B6	Rural B1	Urban B2	Rural B3	Urban B3
Owner age	35	35	44	44	45	38	39	50	51
Overall ICT perceptions	P	P+N	P	P	P+N	P+N	P	P+N	P
P = positive, P+N = positive + negative									

Gender roles: A negative relationship between gender disparities and ICT perceptions were predicted, as perceived need for ICTs could be limited in businesses run by women and to match with culturally accepted norms for women in society. Although level of gender disparities was low in all rural contexts studied, a possible negative relationship with ICT perceptions may be observed (see Table 19). This negative relationship could possibly be linked to negative perceptions regarding compatibility of ICTs for information needs, as only 1 rural business showed positive perceptions regarding compatibility.

Table 19: Field studies - Gender roles compared with ICT perceptions

	Urban B1	Urban B2	Urban B3	Rural B2	Rural B5	Rural B1	Rural B3	Rural B4	Rural B6
Overall gender roles (disparity)	N	N	N	L	L	L	L	L	L
Overall ICT perceptions	P	P	P	P	P	P+N	P+N	P+N	P+N
N = none, L = low P = positive, P+N = positive + negative									

Communication behaviour: The prediction was that high-context communication will limit preference and usefulness of ICTs for communication and thus result in negative perceptions of ICTs. Findings showed that all three rural businesses which scored ‘high’ on high-context communication had both positive and negative perceptions of ICTs, while businesses which scored ‘medium’ had overall positive perceptions except for one (see Table 20). Comparisons showed clear relationships between opinions about compatibility of ICTs and frequency and channels of communication. Rural businesses with higher frequency of interactions and relying mostly on face-to-face interactions showed more negative opinions about compatibility of ICTs for business information needs. Therefore, the findings appeared to show a possible negative relationship as predicted.

Table 20: Field studies - Communication behaviour compared with ICT perceptions

	Rural B2	Rural B5	Urban B1	Urban B2	Urban B3	Rural B1	Rural B3	Rural B4	Rural B6
Overall communication behaviour	M	M	M	M	M	M	H	H	H
Overall ICT perceptions	P	P	P	P	P	P+N	P+N	P+N	P+N
M = medium, H = high P = positive, P+N = positive + negative									

Status and power: Greater emphasis on status and power was predicted to negatively influence perceptions about adoption and use of ICTs for business needs, as adoption of ICTs could potentially create power imbalances within the business or create new reliance on people of lower status. However, no relationship between the level of emphasis on status and power, and ICT perceptions could be identified (see Table 21).

Table 21: Field studies - Status and power compared with ICT perceptions

	Rural B2	Rural B5	Urban B2	Rural B3	Urban B1	Urban B3	Rural B1	Rural B4	Rural B6
Overall status & power distance	M	M	M	M	H	H	H	H	H
Overall ICT perceptions	P	P	P	P+N	P	P	P+N	P+N	P+N
M = medium, H = high P = positive, P+N = positive + negative									

Collectivism: The hypothesis related to collectivism suggests positive influences on perceptions of ICTs due to opportunities that may be realized through collectivistic efforts in the use of ICTs for business needs, such as adoption as a group, sharing expertise, and utilizing ICTs as a new tool for cooperation. However, observations showed a possible negative relationship with ICT perceptions as shown in Table 22. This could be due to preference stated by the owners for individual rather than group effort in working towards goals, which could possibly limit opportunities for collective practices in the adoption/use of ICTs. Furthermore, the findings suggest continued reliance and trust on personal networks which were mainly comprised of family and friends, but not other business owners in related areas. Reliance on family and friends for business transactions are in fact likely to decrease the potential need for ICTs for business information transfer. Therefore, contrary to expectation, the findings suggest a possible negative relationship as a result of greater linkages with personal networks.

Table 22: Field studies - Collectivism compared with ICT perceptions

	Urban B1	Rural B2	Rural B5	Urban B2	Urban B3	Rural B1	Rural B4	Rural B3	Rural B6
Overall collectivism	L	M	M	M	M	M	M	H	H
Overall ICT perceptions	P	P	P	P	P	P+N	P+N	P+N	P+N
L = low, M = medium, H = high P = positive, P+N = positive + negative									

Time management: Polychronic time management was suggested to influence perceptions of ICTs by limiting the need for ICTs for business information, as transfer of information may be regularly combined with other social interactions. While a possible negative relationship may be observed as expected (see Table 23), a higher level of mixing of business and personal tasks by rural businesses

was the item that indicated main differences between the rural and urban businesses. Hence, interactions that enable business information transfer in such situations need to be targeted.

Table 23: Field studies - Time management compared with ICT perceptions

	Rural B2	Urban B1	Urban B2	Urban B3	Rural B3	Rural B5	Rural B1	Rural B4	Rural B6
Overall time management	M	M	M	M	M	H	H	H	H
Overall ICT perceptions	P	P	P	P	P+N	P	P+N	P+N	P+N
L = low, M = medium, H = high P = positive, P+N = positive + negative									

Skill level: Higher skill levels were predicted to lead to positive perceptions of ICTs. Observations showed a possible positive relationship between skill level and ICT perceptions (see Table 24). Comparison of individual items also appeared to provide some support for the predicted relationship. For example, a positive relationship appeared to exist between the number of people with ICT knowledge within the community and perception about having people to help with technical difficulties relating to ICTs. A positive relationship also appeared to exist between the skill level and perception about compatibility of ICTs, where business owners with comparatively higher level of skills perceived ICTs to be compatible, while those with lesser skills perceived compatibility only for some types of information. No clear relationship was observed between skill level and ease of use or ease of learning.

Table 24: Field studies - Skill level compared with ICT perceptions

	Rural B1	Rural B3	Rural B6	Rural B2	Rural B4	Rural B5	Urban B1	Urban B2	Urban B3
Overall skill level	L	L	L	L	M	M	M	M	H
Overall ICT perceptions	P+N	P+N	P+N	P	P+N	P	P	P	P
L = low, M = medium, H = high P = positive, P+N = positive + negative									

Management practice: Informal management practices were expected to negatively impact on perceptions of ICTs by limiting perceived need for ICTs due to informal nature in handling business functions, and limiting suitability of ICTs due to economically non-rational decisions. Observations showed a possible negative relationship as predicted (see Table 25). The rural businesses, having higher levels of informal practices, showed both positive and negative perceptions, particularly

relating to compatibility of ICTs, whereas the urban businesses with more formal practices and more economically rational decision making processes appeared to have more positive perceptions of ICTs.

Table 25: Field studies - Management practice compared with ICT perceptions

	Urban B1	Urban B3	Rural B2	Urban B2	Rural B5	Rural B3	Rural B4	Rural B6	Rural B1
Overall management practice	L	L	M	M	M	M	M	M	H
Overall ICT perceptions	P	P	P	P	P	P+N	P+N	P+N	P+N
M = medium, H = high P = positive, P+N = positive + negative									

6.2.2.3 Relationships between ICT perceptions and Intentions to adopt/use ICTs

Differences existed between the rural and urban businesses for intentions to adopt/use ICTs for business needs. While all three urban businesses intended to continue the use of ICTs and find ways to increase efficiency through ICTs, only three of the six rural businesses expressed their intentions to adopt or continue their use ICTs in the coming year (see Appendix B – Table 13). The two rural businesses that intended to adopt ICTs wanted to use just computers or the Internet alone for a specific purpose, such as manage accounts or search for product designs.

An attempt was made to identify if any possible relationship existed between overall ICT perceptions and intentions to adopt/use ICTs. However, no relationship could be observed, as shown in Table 26. Findings suggest that overall positive perceptions of ICTs do not necessarily translate into a positive intention to use ICTs as evident from rural business number five. The businesses that had both positive and negative perceptions were equally divided in their intentions to adopt or not adopt ICTs.

Table 26: Field studies - ICT perceptions compared with Intentions to adopt/use ICTs

	Rural B1	Rural B3	Rural B4	Rural B6	Rural B2	Rural B5	Urban B1	Urban B3	Urban B3
Overall ICT perceptions	P+N	P+N	P+N	P+N	P	P	P	P	P
Intentions to adopt use ICTs	N	N	P	Y	P	N	Y	Y	Y
P = positive, P+N = positive + negative N = No (N), P = Partly, only computer or only Internet, Y = Yes, both computer and Internet.									

The businesses that did not intend to adopt ICTs cited lack of need due to the current scale of the business or the management style. This links back to possible negative influences of informal management practices on perceptions of ICTs. Small business size and informal practices are likely to limit the need for ICTs as well as limit perceived value from investing in ICTs for the business. Therefore, low intention to use ICTs by rural businesses suggest the importance of exploring perceived barriers to adoption and perceived value from ICTs, and such aspects need to be incorporated into the measure of perceptions for the second phase.

ICT use: Although the predicted relationship in the research model between intentions to adopt ICTs and actual use could not be tested as the research was not longitudinal, differences were observed in the existing levels of ICT use. The rural businesses had very low levels of ICT use compared to the urban businesses studied (see Appendix B – Table 14). Only one of the six rural businesses used computers regularly for word-processing and simple account keeping, and one other business used computers occasionally for word processing. Although wireless Internet access was available in all the rural communities, Internet was not used by the rural businesses. Only one rural business cited a single instance of Internet use to search for a product. These findings highlight the limited value gained from ICTs by rural businesses. Conversely, two of the urban businesses had extensive use of ICTs for business tasks, and used Internet regularly for product search and business communication.

An interesting point noted from observations and discussions from three rural and two urban businesses was the role of immediate family members (who had adequate knowledge of ICTs) in helping business owners to learn and use ICTs for different needs, and in providing technical help when needed. Therefore, level of assistance available from immediate family members may be an important item to include in the measure of ICT perceptions since it has the potential to act as an enabler for ICT adoption and use.

6.3 Summary

The field studies of six rural and three urban businesses provided some preliminary evidence that suggests differences between rural and urban contexts. A coding scheme based on the research model was used to analyze the interview responses and observations regarding opinions and practices relating to the context factors and ICT aspects. The observations enabled a better understanding of the rural context and practices of rural businesses. Specifically:

- Initial research suggests that information behaviour is different in rural contexts, with greater reliance on family and friends as information sources or intermediaries.
- Of the seven context factors studied, observations suggest possible differences between rural and urban contexts for five factors. They are: 1) communication behaviour, 2) collectivism, 3) time management, 4) skill level, and 5) management practice.
 - Comparison of the above factors and ICT perceptions appear to suggest possible relationships between the above context factors (except collectivism) and ICT perceptions as predicted in the research hypotheses.
 - Observations suggest a possible contradictory relationship between collectivism and ICT perceptions (negative rather than positive) and strong dependence on family and friends for business support imply that a negative relationship is possible.
- Expected differences were not observed for demographics (age characteristic and gender roles) and status and power. Support for the predicted relationship with ICT perceptions were also not found for age characteristics and status and power. However, a possible relationship appeared to exist between ICT perceptions and gender roles.
- Data suggests that positive perceptions of ICTs does not necessarily relate to a positive intention to adopt/use ICTs, and that elements that pose barriers to adoption need to be explored in more detail.

Since the aim of the field studies was to inform further research, these findings provide preliminary evidence to justify continuing the research in the form of surveys, and present numerous ways to refine the research model. Changes to the research model are discussed in the next chapter.

Chapter 7

Revisions to the research model

The field studies enabled a better understanding of the issues outlined in the proposed theory and highlighted numerous ways to refine the research model for the second stage of the research. This chapter discusses the implications of the field study findings and outlines the revised research model.

7.1 Implications of findings

The field studies provided some evidence to support the existence of differences between rural and urban contexts, and suggested ways to refine the measures for the research constructs. They also provided some supporting and contradictory evidence regarding possible relationships between the contexts factors and ICT perceptions. Changes to the research model are discussed below.

7.1.1 Changes to context factors

Possible rural/urban differences appeared to exist for five of the seven factors explored in the field studies and they were expanded upon in the second phase of research. The five factors are: 1) communication behaviour, 2) collectivism, 3) time management, 4) skill level, and 5) management practice. In addition, changes are proposed for two of the above factors:

- Collectivism: The field studies did not reveal practices of collectivism in rural communities entirely as anticipated. Collectivistic practices that supported group effort, which in turn enabled business collaboration were expected, but the field studies identified prevalence of collectivistic efforts in terms of dependence on family and friends for business support. Although group effort is common in the selected rural communities for community development activities, lack of collectivistic efforts for economic collaboration may be influenced by cultural norms. Nevertheless, a terminology change was made to reflect the manner of collectivism that existed in the rural communities studied, by renaming this factor as “contribution from personal networks”.
- Time management: Findings suggested that the rural and urban businesses differed only in terms of the extent to which they combined business tasks and personal tasks. Since this has implications for business information transfer and exchange that is combined with

social interactions, a structural change incorporated this element into the communication behaviour factor and renamed it as the “communication and interaction” factor.

As noted, significant differences were not found from the field studies for two of the seven factors explored. The two factors are demographics (age characteristics and gender roles), and status and power. In order to focus on the more prevalent differences between rural and urban contexts in the next stage of research, these two factors were dropped from the research model.

Since practices related to information seeking and transfer appeared to be different between the rural and urban businesses studied and since such aspects were not reflected in the research model, a new factor focused on information sources was introduced in order to capture potential influences from the context.

Therefore, with the revisions, five factors were included in the final research model: 1) Management practice, 2) Contribution from personal networks, 3) Information sources, 4) Communication and interaction, and 5) Skill level.

7.1.2 Changes to construct measures

The following changes were also made to the context factors as a result of the field studies:

- **Management practice:** Besides aspects relating to management of business functions and handling of business income, the field studies looked at linkages with personal networks and how they affected business decisions. Since, contribution from personal networks was considered as a separate factor in the final model, the focus for the management practice construct was changed to informal practices and decision making in relation to level of economic benefits considered in the decision process.
- **Contribution from personal networks:** The field studies identified a higher dependence on family and friends for procurement and marketing by the rural businesses. The nature of informal arrangements and nominal compensation was also highlighted. These aspects were incorporated into the measure of this factor.
- **Information sources:** Information seeking practices of the rural businesses identified greater reliance on family and friends for business information and advice. The measure for information sources incorporates the level of reliance as well as opinions about reliability of the information provided by personal networks.

- **Communication and interaction:** The field studies suggested that actual communication practice was a better measure than opinions and preference for different communication channels. Thus, frequency and channels of communication within and outside the local community were included in the measure. In addition, as identified in relation to time management, the level to which business and social interactions were mixed was also added as another aspect of interaction. Information seeking practices identified the preference by some rural owners to personally inspect goods before making decisions. This aspect was felt to be important as rural owners are likely to have to travel outside their own community in order to personally confirm information received through other sources.
- **Skill level:** Besides level of education and ICT knowledge of the business owner, the field studies identified an important role played by immediate family members and other relatives and friends within the community in assisting rural owners to learn and use ICTs for business needs. This aspect was incorporated into the measure.

In addition to the context factors, the field studies suggested ways to improve the ICT perceptions measure. Responses regarding effectiveness of ICTs were found to be positive for all the rural businesses studied, which may have been influenced by the owners' general perception about ICTs rather than in relation to applying ICTs to their business needs. Hence other aspects that were found to be important such as perceived benefits from ICTs, perceived need for ICTs, and perceived barriers to adoption, needed to be explored. Prior studies (Saffu, Walker & Hinson, 2007; Bharadwaj & Soni, 2007; Kartiwi & MacGregor, 2007) provided some guidance for identifying relevant measurement items. Compatibility of ICTs for business information needs came out as the most relevant item that supported predicted relationships, but further breakdown was required to capture perceptions of compatibility for different types of information and different sources.

7.1.3 Changes to relationships between factors and ICT perceptions

The field studies provided some support for the predicted relationships between context factors and ICT perceptions except for collectivism. The observations indicated a possible negative relationship between the collectivism and ICT perceptions. This may be explained by the prevalence of collectivism in the form of high levels of contribution from family and friends for business support rather than the expected collectivism between business owners that could lead to business collaboration. Higher levels of dependence on family and friends for business information,

procurement of supplies and marketing of products are likely to reduce perceived need and compatibility of ICTs for business needs. A negative relationship is supported by findings from studies related to impacts of culture on ICT adoption, where collectivism was found to result in low adoption of ICTs (Bagchi et al., 2004; Geissler, 2006). The related hypothesis (Hypothesis 4) was changed to reflect the observations from the field studies.

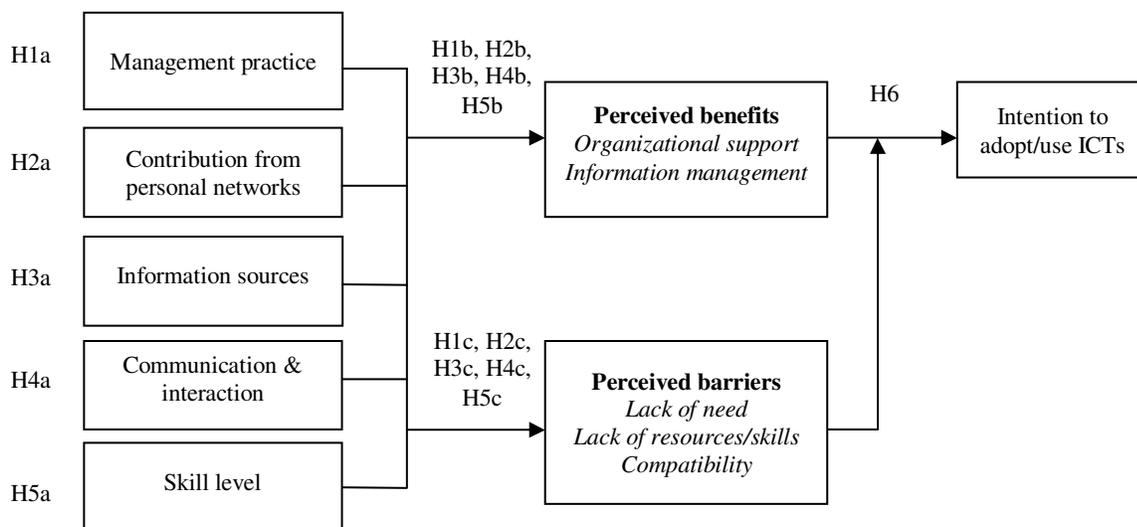
7.1.4 Changes to ICT perceptions

The field observations suggested that positive perceptions did not necessarily lead to positive intentions to adopt ICTs, but such intentions were impacted by perceptions of potential barriers to adoption. For example, three of the six rural businesses cited lack of need due to the current scale of the business or management style, and three rural businesses identified problems related to language fluency. This resulted in separating impacts from perceived benefits and perceived barriers on intentions to adopt/use ICTs.

7.2 Revised research model and hypotheses

After incorporating the changes discussed above, the final research model is presented in Figure 15. Items were finalized based on the findings from the field studies as well as from literature and prior studies focused on ICT adoption.

Figure 15: Final research model



The definitions for the revised research constructs are given in Table 27.

Table 27: Definitions for revised research constructs

Construct	Definitions
Management practice	The degree to which informal management practices and economically non-rational decision making exists in the business.
Contribution from personal networks	The level of contributions a business owner gets from family members, relatives and friends for business operations.
Information sources	The degree to which informal sources and intermediaries are used as main sources of business information.
Communication & interaction	The close nature of interactions with main business information sources
Skill level	The level of education and ICT knowledge of business owner and his/her personal network.
Perceived benefits	The degree to which business owner believes ICTs would provide benefits to the business in terms of organizational support and information management.
Perceived barriers	The degree to which business owner believes barriers exist that limits the adoption/use of ICTs for business tasks.
Intention to adopt/use ICTs	The self-predicted future use of ICTs.

The following hypotheses predict differences between rural and urban businesses in terms of the influence of the socio-cultural context on business practices.

Hypothesis 1a: Rural businesses will have more informal management practices than urban businesses.

Hypothesis 2a: Rural businesses will have greater contribution from personal networks than urban businesses.

Hypothesis 3a: Rural businesses will make greater use of informal information sources and information intermediaries than urban businesses.

Hypothesis 4a: Rural businesses will have more frequent face-to-face and close interaction than urban businesses.

Hypothesis 5a: Rural business owners/managers will have lower skill levels than urban business owners/managers.

The following hypotheses predict the relationship between the socio-cultural factors and perceived benefits of ICTs as well as perceived barriers to ICT adoption/use.

Hypothesis 1b: Management practice is related to Perceived benefits, with more informal management practices having a negative effect on Perceived benefits.

Hypothesis 1c: Management practice is related to Perceived barriers, with more informal management practices having a positive effect on Perceived barriers.

Hypothesis 2b: Contribution from personal networks is related to Perceived benefits, with greater levels of contribution having a negative effect on Perceived benefits.

Hypothesis 2c: Contribution from personal networks is related to Perceived barriers, with greater levels of contribution having a positive effect on Perceived barriers.

Hypothesis 3b: Information sources are related to Perceived benefits, with greater use of informal sources and intermediaries having a negative effect on Perceived benefits.

Hypothesis 3c: Information sources are related to Perceived barriers, with greater use of informal sources and intermediaries having a positive effect on Perceived barriers.

Hypothesis 4b: Communication and Interaction is related to Perceived benefits, with more frequent face-to-face and close interaction having a negative effect on Perceived benefits.

Hypothesis 4c: Communication and Interaction is related to Perceived barriers, with more frequent face-to-face and close interaction having a positive effect on Perceived barriers.

Hypothesis 5b: Skill level is related to Perceived benefits, with lower skill levels having a negative effect on Perceived benefits.

Hypothesis 5c: Skill level is related to Perceived barriers, with lower skill levels having a positive effect on Perceived barriers.

The following Hypothesis predicts the relationship between Perceived benefits of ICTs, and Perceived barriers to ICT adoption/use and Intention to adopt/use ICTs.

Hypothesis 6: The positive relationship between Perceived benefits and Intention to adopt/use ICTs will be moderated by Perceived barriers such that the influence is stronger when Perceived barriers are low.

7.3 Summary

Based on findings from the field studies of six rural and three urban businesses, the research model was revised to reflect practices that were more prevalent for rural contexts compared to urban contexts and to incorporate important elements into the measures of the research constructs. The main changes to the research model were:

- Reduction in number of context factors from seven to five. Two factors that were omitted from the research model are demographics and status and power, as adequate differences were not found from the field studies. Collectivism was renamed to reflect greater contributions from personal networks. Communication behaviour was renamed to reflect actual communication and interaction, and time management aspects were also incorporated into the new communication construct to reflect business information transfer within social interactions. A new factor was added to consider the differences found in terms of information sources used for business needs.
- Construct measures were revised to better capture the elements that were found to be crucial from the field observations. In particular, ICT perceptions construct was revised to focus on perceived benefits from ICTs and perceived barriers to ICT adoption.
- Relationship between contribution from personal networks and ICT perceptions was changed to reflect possible negative impacts due to the likelihood that high levels of dependence on personal networks for business support could limit perceived need and perceived compatibility of ICTs.
- Impacts on intentions to adopt/use ICTs was examined separately for perceived benefits of ICTs and perceived barriers for ICTs.

The objective of the field studies was to inform the survey used to test the research model. Although two of the original factors were removed from the revised research model, these aspects were included and tested using the survey. The results of the survey confirmed the removal of these factors, as discussed in the next chapter.

Chapter 8

Phase two – Survey of rural and urban businesses

Phase two of the research consisted of a quantitative survey of rural and urban businesses conducted to analyze the influences of contextual factors on ICT perceptions and intentions to adopt/use ICTs. This chapter presents the data analysis and findings from this survey. First, data collection methods, response rates and descriptive statistics of businesses included in the survey are provided followed by outcomes of statistical tests conducted to establish validity of research constructs. Finally, details of analysis conducted to test research hypotheses are provided.

8.1 Data collection

The survey questionnaire was first translated into the local language. It was pre-tested using five participants from urban businesses and five participants from rural businesses. These participants were selected using author's contacts in the urban capital and nearby rural communities. Participants were asked to respond to the questions and provide feedback on any of the items or any other issue related to the questionnaire. The pre-test identified issues with the layout of the questionnaire, wording issues and the length of the questionnaire. The initial questionnaire was organized by subject content: business background, business practices, and ICT-related aspects. However, based on the feedback, questionnaire layout was revised to put questions before opinion statements. This enabled easier response as participants had to switch between styles of responses just once. Issues relating to wording were mainly as a result of translations used and were adjusted to make interpretation clearer without changing content. Although the length of the questionnaire was raised in the pre-test, no changes were made as all items were deemed to be important to test the research model. Reference to ICTs was clearly worded as the use of computers and Internet, and pre-tests showed that respondents had no difficulties in interpreting this definition.

The survey was conducted mainly using face-to-face interviews through use of enumerators. However, phone interviews and self-completion were also used to some extent in the urban capital based on preference expressed by respondents. In rural communities, an enumerator was recruited for each community who conducted face-to-face interviews to complete printed questionnaires (refer to Appendix C for survey instrument). Verbal and written instructions on how to recruit potential participants and how to conduct the interview were provided to all enumerators.

The respondents were owners or managers of the businesses included in the sample. Only the owner or manager from each business was selected as the respondent based on the findings from the field studies. The field studies revealed that the rural businesses in particular, were very small and run by the owner, with a few employees who were either relatives or skilled workers. The management and decision-making of business aspects were controlled by the owner or manager. Hence, it was felt that the owner/manager could provide the best responses regarding the business. Eliciting a variety a responses from different employees of the same business may be useful when considering larger businesses, where specific functions are assigned to specialized staff.

8.2 Response rate

The final urban sample comprised of 200 businesses from the urban capital included in the initial sample and 69 businesses indentified through additional sampling undertaken due to difficulties in locating many of the businesses in the original sample. Additional sampling included identification of new businesses in the area blocks that were included in the initial sample. Of the total 269 businesses, 43 could not be located, 37 indicated that the business activity was no longer being undertaken, the business owner could not be met for 17 businesses and 8 businesses declined to respond. However, responses were received from a total of 164 businesses, of which 12 responses were incomplete and therefore not included in the analysis. Hence, the survey yielded 152 usable responses giving a response rate of 56.5%. According to Babbie (2004), a response rate of 50% is adequate for analysis and reporting.

Rural sample was drawn from 17 rural communities. Although no problems were encountered in locating rural businesses, additional sampling was also done to follow similar procedures for both samples. Discontinued businesses were the main problem for the rural sample. The final rural sample comprised of a total of 258 businesses including the 200 businesses in the original sample and 58 businesses identified through additional sampling. Of these, 41 businesses in the original sample were discontinued, business owner could not be met for 23 businesses, and the survey could not be conducted in two rural communities due to problems with enumerators eliminating a further 26 businesses. Hence, responses were received from 168 businesses, of which 6 were incomplete. Therefore, the survey yielded 162 usable responses giving a response rate of 62.8%.

8.3 Background data of respondents

A number of details about the business background were collected in the survey including aspects such as the legal status, business sector, number of years since start up, number of employees, and monthly income. Descriptive statistics and a discussion of findings are provided in Appendix D, and a summary is given in Table 28.

Age and gender of business owners/managers were collected and comparison of data shows that urban sample had a larger percentage of younger owners, while the rural sample had more owners who were 60 years or older (see Appendix D – Table 19). Comparison of owner gender across the two samples showed males representing 56% of the urban sample compared to 75% for the rural sample.

Table 28: Survey findings – Summary of businesses included in survey

	Urban sample (N=152)		Rural Sample (N=162)	
	Frequency	Percent	Frequency	Percent
Registered businesses	103	67.8	114	70.4
Legal status				
Sole proprietor	60	58.3	94	82.5
Private company	24	23.3	12	10.5
Business sector				
Food and beverages	49	32.2	69	42.6
Apparel and tailored products	38	25.0	21	13.0
Wood products and furniture	11	7.2	22	13.6
Paper products, printing and publishing	14	9.2	4	2.5
Metal products	14	9.2	9	5.6
Cement products	3	2.0	12	7.4
Boat building and repair	2	1.3	8	4.9
Other	21	13.8	17	10.5
Secondary income earning activities	55	36.2	78	48.1
Years since startup				
1-5 years	63	41.4	88	54.3
6-10 years	44	28.9	47	29.0
11-15 years	45	29.6	27	16.7
Location				
Within residence	62	40.8	112	69.1
Outside residence	89	58.6	49	30.2
Permanent employees				
0	48	31.6	81	50.0
1 - 5	60	39.5	65	40.1
6 - 10	21	13.8	12	7.4
11 - 15	8	5.3	6	2.5
16 - 20	15	9.9	0	0.0

	Urban sample (N=152)		Rural Sample (N=162)	
	Frequency	Percent	Frequency	Percent
Monthly Income				
Less than Rf 1000 (CAN\$ 84)	8	5.3	28	17.3
Rf 1,000 - 4,999 (CAN\$ 84 - 418)	32	21.1	56	34.6
Rf 5,000 - 14,999 (CAN\$ 418 - 1,254)	30	19.7	42	25.9
Rf 15,000 - 24,999 (CAN\$ 1,254 - 2,089)	28	18.4	19	11.7
Rf 25,000 - 49,999 (CAN\$ 2,089 - 4,179)	18	11.8	10	6.2
More than Rf 50,000 (CAN\$ 4,179)	36	23.7	5	3.1

Level of current ICT use within the businesses shows that computer use and Internet use were relatively low for rural businesses compared to urban businesses, as given in Table 29. For both samples, Internet use was lower than computer use. Length of ICT use shows that ICT use was fairly new for both samples, but more so for the rural sample. Results show ICTs being used mostly to search for information and to manage information within the business for both samples (see Appendix D – Table 23).

Table 29: Survey findings – ICT use by businesses

	Urban sample (N=152)		Rural Sample (N=162)	
	Frequency	Percent	Frequency	Percent
Current use (own)				
Computers	111	73.0	60	37.0
Internet	96	63.2	40	24.7
Length of ICT use (years)				
1	16	14.4	21	35.0
2	32	28.8	23	38.3
3	17	15.3	6	10.0
4	43	38.7	10	16.7
5	2	1.8	0	.0
6	1	.9	0	.0
Current use (using others)				
Computer use	10	24.4	12	11.8
Internet use	6	14.6	2	2.0

8.4 Construct measures

The revised research model contains five constructs for context factors and five constructs for ICT perceptions. In addition, two more constructs for context factors were included in the research instrument to test factors that were removed from the final research model based on findings from the field studies. This section covers the reliability and validity tests for these constructs.

8.4.1 Missing data

Responses which had large sections of missing data were considered as unusable and not included in the analysis. However, some amount of missing data still remained within items that form part of the latent variables used for construct measures. Since the amount of missing data was very low for any given item (see Appendix H) and appeared to be random, it was not expected to affect the results of the analysis. Hair et al. (2006) suggest that missing data under 10% for any given observation can generally be ignored if it is random. To deal with missing data, the all-available approach or pairwise deletion was chosen in order to maximize use of available data. Instead of deleting entire cases with missing data as in listwise deletion, pairwise deletion only omits cases with missing variables required for a given calculation. Pairwise deletion is recommended when there are relatively low levels of missing data (Hair et al., 2006). Results of factor analysis using listwise and pairwise deletion showed no differences in factor loadings.

8.4.2 Reverse coding

Several items included in the construct measures required reverse coding before data analysis, as the wording included in the survey instrument was adjusted to avoid negative items that could lead to potential misinterpretation (Babbie, 2004). As such, many of the items included as perceived barriers to ICTs had to be reverse-coded. For example, item on owner ICT skills was worded as “I have the technical knowledge to implement ICTs”, and the responses were reverse coded so that lack of skills would give a higher value on a scale of one to five indicating that ICT skill was a barrier to adoption. Items that required reverse-coding are indicated in the survey questionnaire given in Appendix C.

8.4.3 Reliability and validity of context factor measures

Construct validity had to be established for all seven constructs related to context factors as they were measured using multiple items. These are the five constructs included in the revised research model (**management practice, contribution from personal networks, information sources, communication and interaction, and skill level**) and two additional constructs (**status and power and gender roles**).

8.4.3.1 Reliability

Reliability measures the degree of consistency between multiple measurements of a variable. Hair et al. (2006) suggest a series of diagnostic measures to assess reliability, including measures related to

individual items and measures related to entire scales. The first test of reliability looks at inter-item correlations and item-to-total correlations. According to Hair et al. (2006) inter-item correlations should exceed 0.30 and item-to-total correlations should exceed 0.50 to establish reliability. However at this stage of analysis, only items that violated both inter-item and item-to-total correlations were considered for omission. Majority of correlations were above the recommended values, but some were below acceptable levels. For the urban sample, correlations were far below acceptable levels for three constructs, and 4 of 30 items from the constructs were identified for omission. For the rural sample, correlations were below acceptable levels for two constructs and 3 of 30 items were identified for omission. Appendix E provides details of the reliability tests conducted.

The second test for reliability is the Cronbach's alpha, which is the most widely used measure for assessing the consistency of a scale. Values of 0.70 and above for Cronbach's alpha are considered to denote reliability, although values of 0.60 and above are suggested to be sufficient for exploratory research (Hair et al., 2006; Nunnally & Bernstein, 1994). Measures used for context factor constructs were tested twice for reliability using Cronbach's alpha: first test was on all items in the scale and second test was done after removing the problematic items identified through inspection of item correlations. Scales for all constructs showed values of 0.70 and above for both samples when problematic items were removed, thus indicating internal consistency of remaining items in the scale (see Appendix E).

8.4.3.2 Construct validity

Validity is the extent to which a scale or set of measures accurately represents the concept of interest (Hair et al., 2006). Both convergent and discriminant validity can be established empirically, and exploratory factor analysis was chosen as the method of analysis for establishing construct validity. Exploratory factor analysis is a statistical approach used to analyze interrelationships between items and explain the items in terms of common dimensions or factors (Hair et al., 2006).

Factor analysis was conducted using SPSS 17 with principal components method for extraction. Components analysis was chosen because the main objective is to summarize the items into a minimum number of factors, taking into account the total variance represented in the set of items. Latent root criterion, the most commonly used technique for extraction of factors, was used with eigenvalues greater than one as the criterion for factor selection. Loadings greater than +/- 0.50 were considered as significant for any given factor, and factor structure was simplified using Varimax rotation (Hair et al., 2006).

Details of the exploratory factor analysis conducted for 26 reliability-established items included in context factor measures is given in Appendix F. Bartlett’s test of sphericity and measure of sampling adequacy (MSA), showed appropriateness of data for factor analysis. The initial factor matrix for the urban sample had eight factors and identified two items that violated validity conditions. The factor matrix for the rural sample had seven factors and two items that violated validity. After removing problematic items, seven factors were extracted for both samples, and accounted for 65.3% of the variance in all items for the urban sample and 69.4% of the variance for the rural sample. These variances are greater than the 60% suggested for social sciences (Hair et al., 2006).

Validity was established for four of seven constructs as originally defined (**management practice, contribution from personal networks, status and power** and **gender roles**). Validity was established for the remaining three constructs (**information sources, communication and interaction, and skill level**) after omission of one or two items. Of the total 30 items included in seven constructs, six items had to be omitted for the urban sample and five items had to be omitted for the rural sample, based on both reliability and validity tests. Reliability for the revised constructs was established using Cronbach’s alpha, achieving alpha scores above 0.70.

Comparison of the final rotated component matrices showed that items of five of the seven constructs were the same for both samples (see Appendix F – Table 3 and Table 5). However, differences in items were observed for two constructs: **information sources** and **communication and interaction**. Therefore, to enable comparisons between the two samples in subsequent stages of analysis, only items that were common to both samples were considered for these two constructs. The two revised constructs would thus include the items shown in Table 30.

Table 30: Survey Findings – Items of revised constructs for context factors

Construct	Item	Statement used in questionnaire
Information sources	“Information2_Products”	I mainly use family members, relatives and friends to find information about raw materials and tools.
	“Information4_Advice”	I usually get advice and opinions from family members, relatives and friends for business decisions.
	“Information5_Reliability”	I find the information supplied by family members, relatives and friends to be accurate and reliable.
Communication and interaction	“Interaction2_Social”	When I interact with the people who contribute to my business, it is often a personal/social interaction as well.
	“Interaction3_Within_community”	Within my own community, I mostly communicate face-to-face with the people who help in my business.

8.4.4 Reliability and validity of ICT perception measures

ICT perceptions were divided into two groups in the research model: perceived benefits and perceived barriers. Perceived benefits group was made up of two constructs, namely **organizational support** and **information management**. Perceived barriers groups consisted of three constructs – **lack of need**, **lack of resources/skills**, and **compatibility**. This section covers the reliability and validity tests for these 5 constructs.

8.4.4.1 Reliability

Inter-item correlations and item-to-total correlations showed reliability for all constructs except **lack of resources/skills** (see Appendix E), in which item relating to language fluency was found to be problematic. Cronbach's alpha scores for all constructs were higher than 0.80 except for resources/skills, which had a score of 0.741 for the urban sample and a score of 0.791 for the rural sample. The alpha score increased to 0.757 for the urban sample and to 0.801 for the rural sample when the problematic item was deleted from the scale.

8.4.4.2 Construct validity

Details of the exploratory factor analysis conducted for 22 reliability-established items included in ICT perceptions measures are given in Appendix G. Bartlett's test of sphericity and Measure of sampling adequacy (MSA), showed appropriateness of data for factor analysis. The urban sample had five items that violated validity conditions specific to individual constructs, but none were found for the rural sample. Specific items that violated validity were removed from the analysis.

The initial factor matrix for both samples had three factors, which meant that three constructs were loading on the same factor. However, since loadings for items related to the positive benefits included in the **organizational support** construct had the opposite sign to that of loadings for items related to negative barriers included in the **lack of need** construct and **compatibility** construct, this combined factor will be treated as 2 different constructs based on the theoretical foundations of the research model. This means that items of **organizational support** construct would be considered as it was previously defined, while items for the other 2 constructs would be combined to form a single construct and labelled **suitability**. Reliability for the revised constructs was established using Cronbach's alpha, achieving alpha scores above 0.70.

Comparison of rotated factor matrices for urban and rural samples (see Appendix G - Table 3 and Table 5) showed some differences between items in three of the four revised constructs. The factor

matrix for the urban sample had fewer items for the three constructs when compared to the rural sample. Therefore, to enable comparisons between the two samples in subsequent stages of analysis, only items that were common to both samples were considered for each construct. The revised constructs would thus include the items shown in Table 31.

Table 31: Survey Findings – Items of revised constructs for ICT perceptions

Construct	Item	Statement used in questionnaire
Organizational support	"OrgSupport1_Tasks_faster"	ICTs (would) enable me to accomplish specific tasks more quickly.
	"OrgSupport2_Useful"	ICTs would be/are useful for my business
	"OrgSupport3_Effective_support"	ICTs (would) provide an effective support role to my business operations.
Lack of resources/skills	"Resources1_Own_skills"	I have the technical knowledge to implement ICTs.
	"Resources3_Staff_skills"	My work force has the skills and technical knowledge to use ICTs.
	"Resources4_People_to_assist"	I have access to people to help with ICTs.
	"Resources5_Time"	I have time to implement ICTs.
Suitability	"Need2_Importance"	ICTs are strategically important for my business.
	"Need3_Business_scale"	ICTs are needed for the current scale of my business.
	"Compatibility2_Communication"	ICTs are compatible for communicating with my existing sources of business information.
	"Compatibility3_Info_acquisition"	ICTs are compatible for acquiring information on products/services needed for my business.

8.5 Data analysis

8.5.1 Summated scales

Since all construct measures consisted of multiple items, summated scales were selected as the approach to represent each measure with a single value to be used in subsequent analysis. Summated scales were chosen instead of factor scores because factor scores take into account loadings of all variables on a given factor, whereas summated scales are calculated using only the variables that make up a given factor or measure (Hair et al., 2006). Items validated through factor analysis and common to both samples were used in calculating mean of items for each construct. Using item means enable easier interpretation of computed values based on the one-five scale used in the survey instrument, as opposed to sum of items. For cases with missing data on some items, scale mean was calculated using only items with available data (De Vaus, 2001). Summated scales were calculated for seven context factor constructs and four ICT perceptions constructs. In addition, the two higher level ICT perceptions constructs were calculated using mean of sub-constructs: **perceived benefits**

was calculated using mean of **organizational support** and **information management** measures; and **perceived barriers** was calculated using mean of **lack of resources** and **suitability** measures.

8.5.2 Contextual differences

The theoretical framework proposed in this research suggests differences between rural and urban businesses due to influences from their socio-cultural contexts. In this regard, hypotheses were presented in the research model relating to five context factors. These can be tested using the summated scale for each construct and calculating sample means for the two samples.

8.5.2.1 Sample means testing

The most common statistical test to compare a variable across two groups is the *t*-test. The *t*-test assesses the statistical significance of the difference between two sample means for a given variable. To obtain a statistically significant difference, the *t* statistic, which is the ratio of difference between sample means to their standard error, is compared against the critical value of the *t* statistic (t_{crit}) for a given Type 1 error level or significance level (α). The value of t_{crit} is 1.96 for an α of 0.05 and 2.58 for an α of 0.01 (Hair et al., 2006).

Two-tailed *t*-tests were conducted for seven context factor constructs and the results are given in Table 32. Since multiple *t*-tests inflate the Type 1 error rate, the 0.05 significance level was adjusted to 0.007. Results show differences between the urban and rural sample means are statistically significant for five constructs. For the remaining two constructs, difference in sample means was not found to be statistically significant.

Table 32: Survey findings – T-tests for rural/urban sample means for context factor constructs

Construct	Mean		Levene's Test for Equality of Variances		t-test		
	Urban	Rural	F	Sig.	Equal variances assumed	Equal variances not assumed	Sig.
Management practice	2.3592	3.0858	.263	.609	-5.767	-5.775	.000
Contribution from personal networks	2.4938	3.1358	4.557	.034	-4.439	-4.452	.000
Information sources	3.1316	3.7490	.003	.958	-4.383	-4.384	.000
Communication and Interaction	2.8947	3.8796	5.173	.024	-6.142	-6.125	.000
Skill level	2.8224	1.9753	6.751	.010	7.463	7.415	.000
Status and power	3.4035	3.5905	.527	.468	-1.373	-1.372	.171
Gender roles	2.1776	2.4074	10.098	.002	-1.550	-1.558	.120

8.5.2.2 Confirmation of research model relating to contextual differences

The research hypotheses related to contextual differences suggest that due to socio-cultural influences, rural businesses would have more informal management practices, greater contribution from personal networks, more informal information sources, and more personal and face-to-face interaction compared to urban businesses. Furthermore, rural businesses were suggested to have lower skill levels than urban counterparts. As shown in Table 33, all five hypotheses relating to differences between urban and rural contexts were supported using the *t*-test.

Differences relating to **status and power** and **gender roles** were not found to be statistically significant. These two constructs were removed from the final research model based on findings from the field studies. However, relevant items were included in the survey instrument to confirm (or disconfirm) the findings from the field study component and to ensure that the revisions to the research model were justified. Consequently, the *t*-test results confirmed that no major differences existed between the rural and urban businesses in terms of perceived importance of status and power and gender differences.

Table 33: Survey findings – Summary of findings for contextual differences

Hypotheses	Finding	Conclusion
Hypothesis 1a: Rural businesses will have more informal management practices than urban businesses.	Sample mean higher by 0.73	Supported
Hypothesis 2a: Rural businesses will have greater contribution from personal networks than urban businesses.	Sample mean higher by 0.64	Supported
Hypothesis 3a: Rural businesses will make greater use of informal information sources and information intermediaries than urban businesses.	Sample mean higher by 0.62	Supported
Hypothesis 4a: Rural businesses will have more frequent face-to-face and close interaction than urban businesses.	Sample mean higher by 0.98	Supported
Hypothesis 5a: Rural business owners/managers will have lower skill levels than urban business owners/managers.	Sample mean lower by 0.85	Supported

Management practice: Comparison of sample means for **management practice** construct shows that the rural sample mean was higher at 3.09 (on a scale of one to five, where a higher value shows more informal practices) compared to the urban sample mean of 2.36. Using descriptive statistics for

individual items included in the construct (see Appendix H) the item which showed the largest difference between rural and urban businesses was the item about giving products free or at discounts. Item about decision making based on economic gain and item about use of earnings also showed substantial differences between the two samples. Although differences were found in items related to documentation and inventory, they were only minor. Therefore, as predicted the survey findings showed that rural businesses had more informal management practices than urban businesses, and these were mainly influenced by the way business income is perceived and handled.

Contribution from personal networks: Rural sample mean for network contribution construct was higher at 3.14 compared to the urban sample mean of 2.49. Analysis of descriptive statistics of items in the construct (see Appendix H) showed that the largest difference in sample means was for the item relating to compensation for business contribution, followed by the item for contribution for procurement of raw materials and supplies. Existence of informal arrangements with network contributors and contributions for marketing also showed considerable differences between the two samples. However, only a minor difference was noted in the number of people assisting with business operations. Therefore, as predicted, findings showed that rural businesses received larger contributions from personal networks for business operations and these differences were influenced by the compensation and arrangements for assistance and level of reliance for procurement and marketing.

Information sources: Sample mean for rural businesses for the **information sources** construct was 3.75 compared to the mean of 3.13 for the urban sample. Only three of five items included in the construct were validated and common to the two samples, and these 3 items were used for the summated scale. Item statistics (see Appendix H) showed that using family and friends for information about products had the largest difference between the samples followed by level of advice sought from family and friends for business decisions. Therefore, as expected, survey results showed that rural businesses used more informal sources of information for business decision making than urban businesses. Although two items included in the construct were not validated, results illustrated substantial differences in favour of predictions for these two items: use of informal sources for market information and in having local access to information sources.

Communication and Interaction: Comparison of sample means for the **communication and interaction** construct showed that the rural sample was higher at 3.88 compared to the urban sample mean of 2.89. Of the five items included in the measure, only two were validated and common to the

two samples, and thus used for the summated scale. Item statistics (see Appendix H) showed a substantial difference between urban and rural samples for these two items. Therefore, as predicted, rural businesses had more face-to-face interaction as well as more informal and social interactions than urban businesses. Only minor differences were observed between the two samples for the three items that failed to be validated.

Skill level: The rural sample mean was 1.98 for the **skill level** construct, which was lower than the urban sample mean of 2.82. Only two of four items included in the measure were reliable and validated. Analysis of item statistics (see Appendix H) showed that both items used for the summated scale demonstrated substantial differences between the urban and rural samples. Therefore, as predicted, skill levels were lower for rural businesses when compared to urban businesses. Of the two items which were not validated, differences were found for level of ICT skills within owner's family, again going in the direction of prediction.

8.5.3 Logistic regression

Multiple regression was initially considered for data analysis to test research hypotheses. However, assumptions of normality could not be established as the data demonstrated both skew and kurtosis (see Appendix I) and transformations failed to show improvements. As a result, logistic regression was chosen as the method of analysis and the dependent variables (**perceived benefits**, **perceived barriers** and **intention to adopt**) were converted into categorical variables. Using the survey instrument scale as a basis, values above three were taken as agreement and categorized as one, indicative of respondents who perceived benefits/barriers of ICTs and had intentions to adopt/use ICTs. Values three and below were taken as disagreement and categorized as zero.

Using SPSS 17, logistic regression analysis was undertaken, first with **perceived benefits** as the dependent variable and then with **perceived barriers** as the dependent variable, using five context factor measures as the independent variables in both analyses. To test the hypothesis relating to intention to adopt/use ICTs, a third logistic regression analysis was conducted with **intention to adopt** as the dependent variable, **perceived benefits** as the independent variable and an interaction term made up of **perceived benefits** and **perceived barriers** to represent moderation effect of barriers. Since the analyses were conducted on the combined urban and rural sample, a dummy variable was included in the regression to take into account the independent samples and to examine if the urban/rural context affected the results. Supplementary analyses were also conducted to

consider impacts of business characteristics and level of ICT knowledge on the dependent variables and the results are included in Appendix J.

8.5.3.1 Confirmation (disconfirmation) of theoretical framework relating to ICT perceptions

8.5.3.1.1 Perceived benefits of ICTs

The results of the logistic regression for **perceived benefits** are given in Table 34. Statistical measures for overall model fit showed that the model was acceptable: -2 Log Likelihood value decreased for the final model, showing an increase in model fit that was statistically significant; the Hosmer and Lemeshow measure of overall fit (correspondence of actual and predicted values) gave an insignificant value showing model fit; and predictive accuracy increased from 77% for the base model to 82%. The Nagelkerke R² value showed that the research model accounted for 33.5% of the variation in the dependent variable. The R² value increased to 35.5% when the dummy variable for rural context was entered into the model. Although the change in R² was relatively small, it affected the significance of the context factor measures in the model.

Table 34: Survey findings – Logistic regression – Context factors on perceived benefits

Variables	Model 1 (without Rural variable)	Model 2 (with Rural variable)
Constant	1.614 + (.831)	1.732 * (.827)
Management practice	-.575 *** (.141)	-.526 *** (.144)
Contribution from networks	-.604 *** (.155)	-.576 *** (.156)
Information sources	.284 + (.156)	.301 + (.160)
Communication & Interaction	.171 (.115)	.258 * (.125)
Skill level	.766 *** (.182)	.690 *** (.186)
Rural ^a		-.867 * (.385)
Goodness-of-Fit Measures		
-2 Log Likelihood (-2LL)	255.600 ***	250.313 ***
Cox and Snell R ²	.219	.232
Nagelkerke R ²	.335	.355
Hosmer and Lemeshow χ^2	8.473 (sig. 0.389)	7.116 (sig. 0.524)
% correctly predicted	82.5	82.2
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for rural context with 0 = urban, 1 = rural		

Hypotheses presented in the research model relating to impact of context factors on **perceived benefits** of ICTs can be tested by analyzing the logistic coefficients (defined as odds or change in ratio of probabilities) and their statistical significance. A summary of findings is given in Table 35. Results show that three of five hypotheses were supported by the logistic regression model. All three context factors on **management practice**, **contribution from personal networks** and **skill level** were highly significant ($p < 0.001$) and the direction of the relationships supported the predicted relationship with the dependent variable. Using exponentiated logistic coefficients to reflect the magnitude of change in the odds value with a unit change in the independent variable, **skill level** was found to have the largest impact on perceived benefits. A unit change in **skill level** resulted in a 99% increase in the dependent variable. Similarly, a unit change in **management practice** and **contribution from personal networks** resulted in a decrease in the dependent variable by 41% and 44% respectively.

Table 35: Survey findings – Hypotheses related to perceived benefits of ICTs

Hypotheses	Prediction	Findings	Conclusion
1b	Management practice → Perceived benefits (negative)	Significant *** (negative)	Supported
2b	Contribution from personal networks → Perceived benefits (negative)	Significant *** (negative)	Supported
3b	Information sources → Perceived benefits (negative)	Significant + (positive)	Not supported
4b	Communication & interaction → Perceived benefits (negative)	Significant * (positive)	Not supported
5b	Skill level → Perceived benefits (positive)	Significant *** (positive)	Supported
+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$			

Although the **information sources** factor was significant only at the 0.1 level, the direction of the relationship was opposite to what was predicted. Hence the hypothesis was not supported for this factor. The **communication and interaction** factor was not significant for the combined sample, but when the dummy variable for rural context was entered into the model, this factor became significant at the 0.05 level. This suggests that the factor was important for the rural context. However, the direction is opposite to what was predicted, and hence the hypotheses relating to this factor was not supported. These contradictory results are discussed in the next chapter.

Although not specified in a hypothesis, dummy variable for rural context demonstrates the significance of the rural context in affecting perceptions about benefits of ICTs. The variable was significant at the 0.05 level and showed a negative relationship with **perceived benefits**. This supports the prediction that business practices are affected by the rural/urban context, which decreases the perceived benefits of ICTs for rural contexts.

8.5.3.1.2 Perceived barriers of ICTs

Results of the logistic regression for perceived barriers (see Table 36) showed that the model has good overall fit measures: -2 Log Likelihood value decreased for the final model, showing an increase in model fit that was statistically significant; the Hosmer and Lemeshow measure of overall fit gave an insignificant value showing model fit; and predictive accuracy increased from 66% for the base model to 79%. The Nagelkerke R² value showed that the research model accounted for 47.9% of the variation in the dependent variable. The R² value increased to 49.3% when the dummy variable for rural context was entered into the model. These R² values are higher than for **perceived benefits**. The change in R² was again relatively small but did not affect the significance of the context factor measures in the model.

Table 36: Survey findings – Logistic regression – Context factors on perceived barriers

Variables	Model 1 (without Rural variable)	Model 2 (with Rural variable)
Constant	-1.075 (.769)	.732 * (.827)
Management practice	.829 *** (.141)	.783 *** (.142)
Contribution from networks	.111 (.140)	.090 (.142)
Information sources	.125 (.150)	.102 (.152)
Communication & Interaction	-.055 (.113)	-.126 (.120)
Skill level	-1.195 *** (.181)	-1.125 *** (.183)
Rural ^a		.771 * (.351)
Goodness-of-Fit Measures		
-2 Log Likelihood (-2LL)	270.324 ***	265.445 ***
Cox and Snell R ²	.347	.357
Nagelkerke R ²	.479	.493
Hosmer and Lemeshow χ^2	9.263 (sig. 0.321)	5.378 (sig. 0.716)
% correctly predicted	79.6	79.0
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for rural context with 0 = urban, 1 = rural		

Analysis of the logistic coefficients and their statistical significance showed that only two of the five hypotheses relating to impact of context factors on **perceived barriers** towards ICTs were supported. These findings are summarized in Table 37. Two context factors - **management practice** and **skill level** - were highly significant ($p < 0.001$) and the direction of the relationships supported the predicted relationship with the dependent variable. Using exponentiated logistic coefficients, **management practice** was found to have the largest impact on perceived barriers. A unit change in **management practice** results in a 119% increase in the dependent variable. Values exceeding 100% change are possible as they represent change in odds (Hair et al., 2006). Similarly, a unit change in **skill level** resulted in a 68% decrease in the dependent variable. The three remaining context factors failed to be statistically significant and hence the hypotheses relating to these factors were not supported. Again as in the first regression results, rural/urban context was found to affect perceptions about barriers towards ICTs. The dummy variable for rural context was significant at the 0.05 level and showed a positive relationship with **perceived barriers**. This supports the prediction that business practices are affected by the rural/urban context, which in turn increases the perceived barriers towards ICTs for rural contexts.

Table 37: Survey findings – Hypotheses related to perceived barriers towards ICTs

Hypotheses	Prediction	Findings	Conclusion
1c	Management practice → Perceived barriers (positive)	Significant *** (positive)	Supported
2c	Contribution from personal networks → Perceived barriers (positive)	Not significant	Not supported
3c	Information sources → Perceived barriers (positive)	Not significant	Not supported
4c	Communication & interaction → Perceived barriers (positive)	Not significant	Not supported
5c	Skill level → Perceived barriers (negative)	Significant *** (negative)	Supported
+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$			

8.5.3.1.3 Intentions to adopt/use ICTs

Hypothesis on intentions to adopt/use ICTs predicted that **perceived benefits** will have a positive relationship with **intention to adopt**, which will be moderated by **perceived barriers** such that the influence is stronger when barriers are low. In order to test this hypothesis, the main effects were contrast coded to values of -0.5 and $+0.5$, and an interaction term made up of the two variables was added to the regression model. The results of the logistic regression are given in Table 38.

Perceived benefits alone gave a statistically significant R^2 value of 10%. The model fit increased with the two main effects (first model in Table 38) and the explained variance increased to 22.5%. **Perceived barriers** variable was highly significant ($p < 0.001$) but **perceived benefits** variable was significant only at the 0.1 level. Addition of the interaction term in the second model increased the explained variance to 24.3% and increased the significance of **perceived benefits** variable to the 0.05 level. The interaction term was also significant at the 0.05 level. However, the addition of dummy variable for rural context decreased overall model fit measures, such as the Hosmer and Lemeshow test significance, although explained variance increased by 2.4%. Since significance differences were shown to remain between actual and expected values for model three, this model was taken as statistically unacceptable and model two was used to test hypothesis. One conclusion that may be drawn from results for model three is that the perceptions about ICTs may be used to predict intentions to adopt/use ICTs without specifically accounting for the rural context, as the differences in perceptions due to context factors may already be accounted for within perceptions of ICTs.

Table 38: Survey findings – Logistic regression on Intentions to adopt/use ICTs

Variables	Model One (without interaction term)	Model Two (with interaction term)	Model Three (with Rural variable)
Constant	-.046 (.153)	-.209 (.167)	.273 (.248)
Perceived benefits	.063 + (.033)	.078 * (.033)	.064 + (.034)
Perceived barriers	-.160 *** (.029)	-.122 *** (.033)	-.114 ** (.033)
Interaction (benefits x barriers)		-.015 * (.007)	-.012 + (.007)
Rural ^a			-.722 ** (.272)
Goodness-of-Fit Measures			
-2 Log Likelihood (-2LL)	368.439 ***	363.450 ***	356.472 ***
Cox and Snell R^2	.167	.181	.199
Nagelkerke R^2	.225	.243	.267
Hosmer and Lemeshow χ^2	5.108 (sig. 0.078)	.000 (sig. 1.0)	12.57 (sig.0.014)
% correctly predicted	72.0	72.9	73.2
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for rural context with 0 = urban, 1 = rural			

Using the logistic coefficients and their statistical significance for variables in model two, the hypothesis relating to intentions to adopt/use ICTs was partly supported (see Table 39). As predicted, coefficients for **perceived benefits** showed a positive relationship with the dependent variable that

was significant at the 0.05 level. The hypothesis also predicted a moderation effect by **perceived barriers** on the previously mentioned positive relationship. However, the interaction term demonstrated only a 1.8% increase in explained variance and the magnitudes of the exponentiated coefficients showed the interaction term as having the least impact on the dependent variable. Therefore, the prediction for moderation was not supported. The results in fact show that **perceived barriers** was the main effect on **intentions to adopt** rather than being a moderating effect, having a negative relationship. Comparison of exponentiated coefficient magnitudes showed that a unit change in **perceived barriers** resulted in a decrease of 11.5%, while a unit change in perceived **benefits** resulted in an 8.1% increase in the dependent variable. Therefore, perceived barriers may be concluded as having the greatest impact on the decision to adopt ICTs.

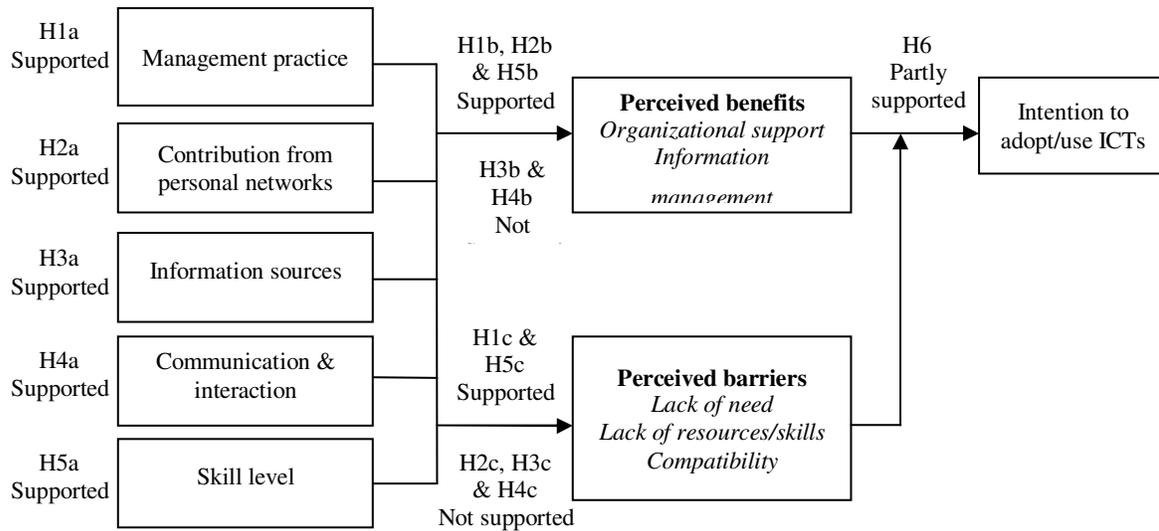
Table 39: Survey findings – Hypothesis related to Intentions to adopt/use ICTs

Hypotheses	Prediction	Findings	Conclusion
6	Perceived barriers → Intentions to adopt/use ICTs (positive) Moderated by perceived barriers	Significant * (positive) Moderation effect not strong Strong individual effect of perceived barriers Significant *** (negative)	Partly supported
+ p < .1, * p < .05, ** p < .01, *** p < .001			

8.6 Summary

The main findings from the survey showed that 10 of 16 hypotheses presented in the research model were supported and one hypothesis was partly supported as shown in Figure 16. The first set of hypotheses predicted differences in context factors between urban and rural contexts and all five hypotheses were fully supported. The second set of hypotheses predicted impacts of context factors on perceived benefits of ICTs, and three of five hypotheses were supported. The third set of hypotheses predicted impacts of context factors on perceived barriers towards adoption of ICTs, and only two of five hypotheses were supported. The final hypothesis predicted the impact of perceived benefits and barriers on intentions to adopt/use ICTs and this hypothesis was partly supported.

Figure 16: Survey findings – Support for research hypotheses



Predictions on differences in business practices due to impacts from the socio-cultural context were supported. Differences in scale means for the five context factor measures were statistically significant ($p < 0.001$) for the two samples. As predicted, rural businesses were found to have more informal management practices, greater contribution for business operations from personal networks, greater use of informal sources and intermediaries for business information needs, more personal and face-to-face interaction with people who contribute to the business, and lower education and ICT skill levels when compared to urban businesses.

Consequently, these contextual differences were predicted to impact both the perceived benefits of ICTs for business needs and perceived barriers towards adoption of ICTs for business needs. Analysis results showed that management practice, contribution from personal networks, and skill level were all highly significant ($p < 0.001$) in impacting perceptions about benefits from ICTs. When management was more informal and businesses received greater contributions, perceived benefits decreased. When skill level increased, perceived benefits increased. Although information sources and communication/interaction were found to be significant at the 0.1 and 0.05 levels respectively, the direction of the relationship was found to be opposite to the prediction, and thus the related hypotheses were not supported. In terms of the impacts of the five context factors on perceived barriers, management practice and skill level were found to be highly significant ($p < 0.001$). Informal management increased perceived barriers and increasing skill level decreased perceived

barriers. The remaining three context factors were found to have statistically insignificant relationships with perceived barriers. The dummy variable used to represent the rural context was found to be significant in affecting perceptions about ICTs. Rural businesses had lower perceptions of benefits and higher perceptions of barriers when compared with urban businesses.

Intentions to adopt/use ICTs were predicted to be positively influenced by perceived benefits and moderated by perceived barriers. However, this hypothesis was only partly supported as evidence for the moderation effect was not found. While perceived benefits construct was found to be significant at the 0.05 level, perceived barriers was found to have greater statistical significance ($p < 0.001$) and impact on intentions to adopt/use ICTs. Further discussion and interpretations of these findings are given in the next chapter.

Chapter 9

Findings

Findings from the field studies and quantitative survey provide potentially important insights into the impacts of the socio-cultural context of rural communities on ICT adoption by rural businesses, and how to address alignment of ICT modality with the socio-cultural context. These findings and their correspondence with literature are discussed in this chapter. This discussion will be based on the following research questions:

1. How does the socio-cultural context of a rural community impact on ICT adoption by rural businesses?
2. What factors within the socio-cultural context pose barriers to ICT adoption and what factors promote adoption?
3. What is the extent of impacts of each factor, and which factors have greater influence and impact than others?
4. How is alignment of ICT modality with the socio-cultural context perceived to impact on ICT adoption by rural businesses?

9.1 Research Question 1: Impacts of the rural socio-cultural context

Rural context was predicted to impact on ICT adoption as a result of influences of the context on how businesses function, which could potentially affect perceptions of ICTs for business information needs, and in turn on adoption of ICTs. Literature suggests that geo-demographic characteristics and socio-cultural aspects of rural communities affect both the characteristics of rural businesses as well as their business practices.

Findings from the field studies and the survey support findings from literature (Mitchell & Clark, 1999; Clark et al., 1995; Anderson et al., 2005) regarding characteristics of average rural businesses: small in size, with few employees, having private ownership, located on a single site, and dependent on links outside the community. Findings of this research also suggest differences between rural and urban businesses in terms of business practices, communication and interaction and skill levels. The field studies initially provided qualitative support for possible contextual differences and implied that some of the identified context factors were worthy of further analysis. The survey then provided

statistically significant results of differences between the rural and urban samples. These findings seem to suggest that the majority of rural businesses are likely to have more informal management practices, greater contribution from personal networks for business operations, greater use of informal sources and intermediaries for information, more personal and face-to-face interaction and lower skill levels, when compared to similar urban businesses. These findings are in line with suggestions from literature regarding the practices of rural businesses (Shields, 2005; Rutten, 2001; Mitchell & Clark, 1999; Clark et al., 1995; Gladwin et al., 1989; Douglas, 2003).

Analysis of the business characteristics provide some explanations for the informal practices and high levels of dependence on family and friends for business support found in the rural businesses. The size of rural businesses was found to be smaller in comparison to the urban businesses. Fifty percent of the rural businesses had no paid employees and 40% had one-five employees, compared to 32% and 40% for the urban sample respectively. Rural businesses also had lower sales with 52% earning less than \$500 per month compared to 26% for the urban businesses. Therefore, the prevalence of micro-enterprises in the rural contexts studied could be a critical aspect that should be considered when promoting ICT adoption in similar rural settings.

The theory proposed in this research outlines potential ways in which context factors could impact perceptions about utilizing ICTs for business needs. The relationship between each of the context factors and ICT perceptions were tested using the survey and results showed statistically significant linkages. Furthermore, the survey highlighted the significance of the rural context in affecting perceptions of ICTs. Results indicated that perceived benefits of ICTs decreased for the rural sample and perceived barriers towards adoption of ICTs increased for the rural sample. Furthermore, intentions to adopt ICTs were found to be influenced by these perceptions of ICTs. Therefore, the research findings seem to suggest a possible way of exploring impacts of the socio-cultural context on adoption of ICTs – by first analyzing business practices, which are prevalent in a given rural context and are likely to be influenced by the socio-cultural values and practices existing in that context, and then assessing how each of these practices could affect perceptions of ICTs. The research model presented in this research provides a new approach to examine the impacts of the context on ICT adoption.

9.2 Research Question 2: Factors that promote/hinder ICT adoption

The second research question focuses on identifying factors of the rural context that promote ICT adoption and those that pose barriers to adoption. Contrary to expectation, the field studies revealed that all the rural business owners had positive perceptions about the effectiveness of ICTs. However, five of six rural businesses indicated that ICTs were not compatible for some business tasks, and three of six businesses indicated that they did not need ICTs given the small scale of the business or its management style. These findings suggested that despite positive perceptions about benefits of ICTs, opinions about perceived barriers to adoption could potentially impact intentions to adopt ICTs. As such, perceptions about perceived benefits and perceived barriers were analyzed separately through the survey.

9.2.1 Factors that promote adoption

The survey findings demonstrated positive relationships between three context factors and perceived benefits of ICTs. These are skill level, communication and interaction and information sources. Skill level was found to be highly significant ($p < 0.001$). However, since the research findings support findings from the literature regarding lower skill levels in rural contexts (Shields, 2005; Mitchell & Clark, 1999), these findings could be interpreted to suggest that average rural business owners are likely to have lower skill levels and therefore could perceive lower benefits from ICTs for their businesses. Furthermore, skill level showed a significant negative relationship with perceived barriers, suggesting that when skill levels increased, perceived barriers decreased. These findings are in line with findings from literature which suggested low ICT skills of owners, lack of familiarity with ICTs and low awareness of the potential of ICTs as some of the reasons for low adoption of ICTs by rural businesses (Galloway et al., 2004; Mitchell & Clark, 1999; Richardson & Gillespie, 1996). Hence, this research signifies the importance of skill levels as a crucial factor that could promote ICT adoption not just by reducing perceived barriers but also by increasing perceived benefits.

The prediction for communication and interaction was that since interaction was more personal and face-to-face within rural communities and consequently between business owners and their business contacts, ICTs may not be a preferred choice for such interactions, thus reducing perceived benefits. However, survey results show a positive relationship suggesting that as communication and interaction become more personal and face-to-face, perceived benefits increased. One possible explanation could be that while benefits of ICTs for business support and information management

are perceived by the business owner, the close nature of interactions with business contacts may be seen as a means to harness these benefits and also as a backup for communication during early periods of ICT adoption. As such further research is required to explore the nature of interactions with business contacts, how interaction patterns change once ICT adoption takes place, and if these interactions are used for ICT support.

Contrary to prediction, information sources were also found to have positive relationship with perceived benefits, but this relationship was significant only at the 0.1 level. This finding suggests that businesses utilizing more informal information sources and intermediaries are likely to perceive benefits from ICTs. Since findings from the field studies and the survey as well as findings from the literature (Njoku, 2004; Ikoja-Odonga & Ocholla, 2003) suggest greater use of informal sources by rural businesses, this positive relationship requires further research to understand its rationale. One possible explanation could be that informal sources are used due to a lack of direct sources of information within rural communities, but owners may prefer greater control over the search, collection and dissemination of business information and less dependence on others. ICTs may be perceived as a medium to facilitate such control. Therefore, further research is needed to better understand owner's preferences and choices of sources and interaction mediums for different information types.

9.2.2 Factors that pose barriers

Survey findings showed two factors as having negative impacts on ICT perceptions. These are informal management practice and contribution from personal networks for business operations. Management practice was found to have a statistically significant ($p < 0.001$) positive relationship with perceived barriers suggesting that more informal practices could increase the perceived barriers to adoption. The field studies also appeared to suggest a possible linkage with informal practices and perceived incompatibility of ICTs for business needs. Furthermore, the survey showed a significant ($p < 0.001$) negative relationship of management practice with perceived benefits, suggesting that informal management practices could decrease perceived benefits from ICTs. Both the field studies and the survey found rural businesses to have more informal management practices than urban businesses and these findings are in line with findings from literature (Shields, 2005; Gladwin et al., 1989; Douglas, 2003; Rutten, 2001). Therefore, these findings provide new insights into the possible dual role of informal management practices within rural businesses in reducing perceived benefits and

increasing perceived barriers to adoption. This research thus highlights the importance of addressing management practices of rural businesses in order to facilitate ICT adoption, where appropriate.

Although no direct linkage with perceived barriers was found for contributions from personal networks, it was found to be highly significant ($p < 0.001$) in affecting perceived benefits of ICTs. This finding suggests that when contributions increase, perceived benefits were likely to decrease. Both the field studies and the survey showed existence of high levels of dependence on family and friends for business functions in rural businesses, and these support findings from literature (Rutten, 2001, Uzzi, 1996). An explanation for this relationship is that existence of high levels of dependence on family and friends for business operations, combined with the nature of the close relationships with them, could likely reduce the perceived relative advantage of utilizing ICTs for some of the business tasks undertaken using the personal networks. Although collectivism has been linked to low ICT adoption in cross-cultural studies (Bagchi et al., 2004; Geissler, 2006), this research provides evidence of direct links between collectivistic practices of rural businesses and perceived barriers to ICT adoption. Therefore, the extent and dependence on contributions as well as the types of tasks for which contributions are sought have to be explored and understood in facilitating ICT adoption.

9.3 Research Question 3: Level of impacts from context factors

Literature did not reveal any empirical studies that tested the level of impacts from rural context factors on ICT adoption. Thus, this research provides initial empirical evidence of the level of impacts from different context factors. All five context factors explored in the survey were found to have significant relationships with perceptions of ICTs, although the significance and magnitudes of the relationships differed. Management practices and skill levels showed linkages with both perceived benefits and perceived barriers, and therefore are likely to be the main aspects that need to be considered for ICT adoption. Comparison of magnitudes (calculated using exponentiated logistic coefficients) of the relationships showed skill levels as having the largest impact on perceived benefits and management practice as having the largest impact on perceived barriers. The combined magnitudes for both perceived benefits and perceived barriers for the two factors are almost the same. However, analysis using intentions to adopt ICTs as the dependent variable showed that perceived barriers had a larger impact on intentions to adopt ICTs than perceived benefits. Therefore, findings from these analyses suggest that informal management practice could potentially have the largest impact on ICT adoption. Using significance and magnitudes of relationships, a ranking order of context factors by decreasing impact on ICT adoption could be as follows:

1. Management practice
2. Skill level
3. Contribution from personal networks
4. Communication and interaction
5. Information sources

Management practice: Descriptive statistics for individual items within the management practice construct (see Appendix F) showed that rural and urban businesses in the survey sample differed mainly in terms of use of business earnings, in decision-making, and in provision of free or discounted goods. Therefore, informal management practices of rural businesses appear to be linked mainly to how business earnings (actual incomes and amounts forfeited through free/discounted goods) are perceived and acted upon by owners. Similar issues relating to handling of business income, social influence and obligations within businesses, and informal credit and barter arrangements are highlighted in literature (Gladwin et al., 1989; Douglas, 2003; Rutten, 2001).

These informal management practices can also be linked to the issues identified in the literature regarding the informal economy. As suggested in the literature regarding prevalence of informal activities and undertaking of multiple activities by rural households to support livelihoods (Dalglish & Bradley, 2006; Shaw, 2004), the analysis shows that about 30% of both rural and urban businesses are not formally registered, but close to half of the rural sample undertook other secondary income earning activities to support their families (see Appendix D – Table 1 & 4). Furthermore, half of the rural owners manage the business on their own without any employees, compared to about a third for the urban sample (see Appendix D – Table 7). Self employment, together with lower sales of rural businesses (see Appendix D – Table 10) could imply that the majority of the rural businesses are engaged in small-scale operations that require low entry requirements (Becker, 2006). Involvement of rural owners in multiple small-scale operations could explain why proper accounting is not maintained (Becker, 2006), why owners do not take a salary but use business income for household expenses (Dalglish & Bradley, 2006), and the prevalence of sharing, barter and exchange of goods and services (Ratner, 2000)

Skill level: Skill level may be suggested as the factor that has the second largest impact on ICT adoption as this factor was shown to have impacts on both perceived benefits and barriers. Education of business owner and ICT skill level were considered in the relationship analyses, and descriptive

statistics showed considerable differences between the urban and rural samples (see Appendix F). These findings appear to suggest the importance of increasing awareness and skill levels of rural business owners in order to facilitate ICT adoption. Although reliability could not be established for the language fluency item, it was one of the most important barriers identified from the field studies. Descriptive statistics showed that 45% of rural owners identified language as a barrier and hence this aspect warrants further research as well.

Contribution from personal networks: Using magnitude of variables in dependent relationships, contribution from personal networks may be concluded as the third most influential factor for ICT adoption. As predicted, descriptive statistics (see Appendix F) showed high levels of reliance on personal networks by rural businesses. An unexpected finding was that about a third of the urban sample also depended on personal networks for procurement and marketing. Since no relationship for this dependence with business size was found, a possible explanation may be social and cultural practices of the nation as a whole. Largest differences between rural and urban businesses were observed for items relating to how contributions were compensated (either free, through barter arrangements or in-kind/nominal fees), and for procurement of supplies. Such practices were also found in five of the six rural businesses included in the field studies, and the findings suggested that the rural businesses were completely dependent of the network contributions for their operations.

These practices support the findings from the literature regarding higher social capital in rural communities (Onyx & Bullen, 2000; Hofferth and Iceland, 1998; Zuwarimwe, 2007). Given the dispersed geography of Maldives, it is not surprising to see higher dependence by rural businesses, on personal networks made up of family, relatives and friends, to support inputs that need to be acquired from outside their own community. These finding support the prevalence of bonding social capital (Onyx & Bullen, 2000) in rural communities, or higher communal social capital in communities distant from urban centres and in communities with low institutional capacity (Reimer, 2006). The manner in which compensation is made for different contributions also suggest more exchange or barter oriented norms within social networks and higher levels of trust and reciprocity to maintain the relationships.

This research provides new insights into the extent of informal arrangements and nominal compensations for business support existing in the study area, and provides evidence on direct impacts of such practices on perceived benefits of ICTs. Therefore, understanding the level and

nature of dependence on personal networks appear to be critical aspects in identifying relative advantage that may be achieved through ICTs, particularly for procurement and marketing.

Communication and interaction: The form and nature of interactions was found to be more significant ($p < 0.05$) than information sources ($p < 0.1$) in the relationship of these factors to perceived benefits. Therefore, communication and interaction could be considered as the factor ranking fourth in terms of the level of impact on ICT adoption. Considerable differences were found between the samples in terms of face-to-face interaction and personal/social interactions that are combined with business interactions. However, since the hypothesis for a negative relationship between communication and interaction and perceived benefits was not supported, further research is required to explore how close interaction could lead to perceptions of benefits. Although not included within the final measure due to validity issues, the item on preference of owners to personally inspect goods before purchasing them may be an important aspect, which could explain the current limited use of ICTs for procurement in both survey samples. The field studies also identified the practice of personally checking goods before purchase, or the reliance on someone trustworthy to do the same. Another aspect that has to be looked at in future research is if there is dual purpose in procurement trips made outside the community, either by the owner or by someone who contributes to business operations, which could potentially make a personal trip more attractive than using ICTs for the same purpose.

Information sources: This factor was found to have the least impact on ICT adoption among the five factors tested in the research model. As expected, the majority of rural businesses included in the survey used family and friends as sources of information and business advice. However, about a third of urban businesses also used personal networks for information. This percentage is higher than expected and could be explained by cultural practices of the country. The lack of support for the predicted relationship between informal information sources and perceived benefits require further research to understand the positive linkage. The dual use made of personal networks for both business information and business support and possible integration of these processes warrants further study.

9.4 Research Question 4: Alignment with socio-cultural context

Alignment of the ICT modality with the socio-cultural context was defined earlier in this research as the adjustment and positioning of ICT modality to match with behavioural patterns and take advantage of strengths within the socio-cultural context, as well as to minimize risks from constraints

posed by the same context. Once the influences from the rural context on ICT adoption can be determined, alignment of ICTs could consider those influences, and help to facilitate ICT adoption by promoting positive perceptions of benefits and reducing negative perceptions about potential barriers to adoption. So the question is how can alignment take place? This research appears to suggest that management practice, skill level and contributions from personal networks are the three most important context factors that impact on ICT adoption. Hence, alignment will be addressed in relation to these three factors.

Management practice: About 60% of rural businesses included in the survey indicated that ICTs were not required for the current scale of their business and about 50% indicated that ICTs were not important for their business (see Appendix F). Cross tabulation showed that it was mainly businesses in the low income categories that did not perceive ICTs as important. Business size thus appears to provide an explanation for these perceptions and since three quarters of rural businesses in the survey sample were in the lowest three of six income categories, business size and related management practices are key aspects to be considered for alignment.

Very small businesses may be informal activities that are just surviving at a given level, and investments in ICTs may not be a priority for the business at that level. Therefore, future research could attempt to determine priorities and long term targets of business and how and when ICTs are perceived to provide potential benefits. Using findings from this research, potential for alignment is possible through development of better documentation and accounting practices as well as planning processes for which the potential of ICTs may be easily demonstrated to business owners. Although substantial differences were not found in the level of documentation and inventory keeping by rural and urban businesses in the survey, overall findings for management practice raises questions about how well accounts are prepared by businesses and if free/discounted goods are taken into consideration – details that were not captured in the survey. The field study findings showed that some businesses did not keep record of free goods, and others did not factor in expenses such as electricity, which was considered as part of household expenses. The literature suggests that limited capital of informal businesses limit their ability to enter into contracts and transactions, which results in lack of accounting systems (Becker, 2006). Therefore, the extent and nature of accounting and planning practices by rural businesses may need to be explored in more detail to understand how alignment should take place. This issue also could relate to the volume and variety of production, as it is likely to affect the level of documentation and accounting that is required.

Skill level: Education and knowledge of ICTs were found to be crucial aspects that promoted ICT adoption. Therefore, alignment should focus on increasing skill levels of rural businesses owners, particularly by providing basic ICT training and increasing awareness of ICTs to make them understand how ICTs may be usefully applied to reap potential benefits for business development. One aspect that may be worth exploring further is the finding of about a third of urban businesses having low skills but having comparatively higher ICT utilization in practice (see Appendix B) compared to the rural sample. This appears to suggest that while ICT skills are important, other related aspects may also impact ICT adoption. These may include aspects such as ICT-advocating roles of business contributors and vision of the owner for the business. Research suggests that a key driving force of ICT adoption is the personal attributes of the owner/manager, which include not just the ICT knowledge or experience but also his/her marketing ability and entrepreneurial characteristics (Simmons, Armstrong & Durkin, 2008). Lack of a vision and related business strategies/plans could possibly explain why many of the businesses in the survey sample no longer existed. Owners may simply be starting a business as a secondary income earning activity to check viability and stop when unprofitable. This links well to the findings from the informal economy literature, which suggests that rural households engage in multiple informal activities to support livelihoods, and such activities involve minimum capital, small-scale operations, local resources, and family labour (Becker, 2006). Rural business owners may not have any long-term goals for such informal activities, and it may not be a priority when livelihood support is more crucial. Therefore, goals and objectives of rural businesses, and any plans for business growth could be considered in future research to identify appropriateness of ICTs for the business activity.

Contribution from personal networks: Research findings suggest that rural businesses survive through informal arrangements with family and friends for business information, as well as procurement and marketing, and compensation for such contributions are often free or nominal. This links well with the findings from the literature regarding higher bonding social capital in rural communities, and the trust and reciprocity within network relationships, which enable different forms of exchange (Onyx & Bullen, 2000; Hofferth & Iceland, 1998). This dependence and possibly the kinship or close relationship between the two parties may explain why business owners could potentially be reluctant to change their practices. Alignment should consider how relationships between owner and contributor may change if ICTs were to be used for similar tasks, and how costs may be impacted when the existing nominal compensations for contributions are replaced or complemented through establishment of formal relationships with business contacts. On a different

note, alignment should also assess if local suppliers are ready for ICT enabled transactions, including aspects such as availability of digital catalogues of products/prices, having content in local language, availability of online transactions, and arrangements for shipping goods. Similarly, alignment should consider the potential for ICT-enabled marketing, including aspects such as development of marketing websites, if customers in potential markets would be able to access the websites and have the knowledge to use them, and arrangements to ship goods to new markets. A further point to consider may be whether owners are satisfied with the current level of business and if they have a long term vision for their business. These aspects may be important for how business owners perceive benefits from ICTs.

9.5 Support for rural business development through policy interventions

The findings from this research also bring out a more important issue that is related to broader mechanisms of financial and non-financial support available to rural businesses. The findings from the literature regarding sustainable livelihoods and other public policy interventions reveal the successes gained by governments, development agencies and NGOs through different interventions in supporting rural business development (Helmore & Singh, 2001; DFID, 2008; Nagarajan & Meyer, 2005; IFAD, 2005). These interventions include financial support such as micro-credit, and other business development support such as access to new technologies and methods, skills training, business management and planning, and building partnerships and linkages for marketing. The public policy and sustainable livelihoods literature highlights the new direction of interventions taken by governments and donors to support rural business development as a cross-sectoral concern, including not just some selected areas of business support, but other broader aspects such as infrastructure and transport, technology and innovation, social well-being, market competitiveness and environmental concerns (Helmore & Singh, 2001; Nagarajan & Meyer, 2005).

This research suggests that promoting ICT adoption in rural businesses is not simply about identifying the potential of ICTs and how ICTs may be applied to existing business operations, but is a far more complex issue that requires the basic fundamentals of a business and its operation to be in place first, before application of ICT may be usefully considered. Appropriateness of ICTs is questionable when the fundamentals of a business are lacking and it is not managed as a proper business, but rather a part of the household activity. As such, adequate support for business development may be crucial to strengthen and develop rural businesses, before ICTs can be utilized to enhance business growth. The following quotation included in a report of the UK Commission for

Rural Communities (2005, p. 26) highlights the importance of support for rural businesses: “The notion of using ICT would be great as a supplement if we actually promoted local businesses in real life”. Similarly, focusing on the links between different sectors, the World Bank report on e-development (2005, p. 18) suggests that “in the case of e-commerce, the interdependency of the postal and transport sectors as well as the need for a developed and well-functioning financial system, must be considered”.

The rural business owners included in the field studies were of the opinion that both financial support and business advisory services were not available. The survey findings show that when rural business owners were asked about the main barrier for their business operations, 29% identified small or limited market opportunities, 28.4% identified difficulties with getting raw materials, and 20.4% identified difficulties in obtaining credit. These percentages are much lower for the urban businesses (see Appendix D – Table 18). The government itself recognizes the impediments to small business development, including both rural and urban businesses. These include “skill deficiencies, start-up costs, limited access to finance, high collateral requirements, imperfect market information, inadequate levels of business development services and lack of access to banking facilities (especially in the atolls), and high costs of inter-island transportation and electricity” (Government of Maldives, 2009, p. 363)

In the past, Maldives has had some interventions supported by donors such as the IFAD and United Nations Development Program (UNDP) to provide rural business support. These mainly include provision of micro-credit and some capacity building support aimed at income-generation activities and poverty alleviation. A review of past donor supported interventions (Ministry of Atolls Development, 2004) suggest that although demand for credit was high and repayment rates were high, the distribution of the credit was not socially equitable as poorer households and women tended to be relatively marginalized. The review also raised concerns over conflicting goals as a commercial bank was charged with managing the credit provision. One key concern identified was the lack of support for forward and backward linkages of the businesses, except in one intervention. Government continues to provide a small loan scheme for businesses through the national commercial bank. However, new government policies that aim at providing business development support, skill development, marketing linkages, financial support and innovation options (Government of Maldives, 2009) appear to be very promising for rural businesses. One strategy is aimed at developing “ICT

channels to link and create business opportunities for SMEs” (Government of Maldives, 2009). Such policy interventions will likely make rural businesses more ready to take up ICTs.

Further research is required that incorporates multiple aspects including business characteristics, owner characteristics, business practices, business development support, ICT advocacy and other ICTs aspects in order to fully understand impacts and linkages.

9.6 A technology adoption model for the rural context

This research has attempted to develop a model that captures the influences of important factors of the rural socio-cultural context on ICT adoption decisions by rural businesses. Focusing on the developing country context, and using the Maldives as the study area, the model was empirically tested, and provided useful insights on rural adoption decisions. As discussed above, three context factors were found to have significant relationships with business owner’s perceptions of ICTs and their intentions to adopt/use ICTs. These include informal management practices, low skill levels and high contributions from personal networks. The empirical tests failed to show any impacts for two factors included in the model: information sources and communication and interaction. The model also showed that perceptions about barriers to adoption had a larger impact of adoption decisions than perceptions about benefits.

Although the research was successful in identifying important influences of the rural socio-cultural context on ICT adoption, further research is needed to refine and develop the model further. The research identified many other relevant aspects and that need to be explored before full impacts from the rural context could be understood. It also needs to be compared and tested across different cultural contexts to make it more broadly applicable.

9.7 Conclusions

Impacts of the context of rural communities on ICT adoption by rural businesses may be explored through influences of the context on business characteristics and practices and how these affect rural business owners’ perceptions about the benefits and barriers of ICTs for business needs. The main research findings are summarized below:

- Three context factors appear to have significant impacts on ICT perceptions. The findings suggest that informal management practices may have the largest impact on ICT adoption by affecting perceptions about ICTs negatively. Skill levels of business owners appear to

have the second largest impact on ICT adoption, where increasing skill levels impact positively on ICT perceptions. Contributions from personal networks also have significant impacts, by impacting negatively on perceived benefits of ICTs.

- Although, the majority of both samples in the survey had positive perceptions of benefits of ICTs, these opinions do not appear to match with ICT utilization in practice. For example, about 80% of urban businesses and about 50% of rural businesses indicated that ICTs will enable access to new markets (see Appendix F), but only a very small percentage utilized ICT functionality that may enable such access, such as web pages or interacting with business partners using ICTs. This raises questions about why there appears to be a disjoint between opinions of ICTs and actual use, and what drives actual implementation of ICTs. This is in contradiction to the literature that suggests positive perceptions about a technology lead to adoption or utilization of that technology (Legris et al, 2003). Hence, a longitudinal study may be required to understand how positive perceptions lead to actual use over time.
- Another important aspect is the limited value derived by businesses currently utilizing ICTs for business tasks. ICTs appear to be mainly used for information search and management of information within the business. Application of ICTs to bring in added value to the business appears to be limited, even for urban businesses, and reasons for such practices need to be investigated. These aspects could be explored further, focusing only on businesses that use ICTs.
- The research also revealed that ICT adoption is not simply about applying ICTs to existing business operations, but that it has to be supplemented with other business support mechanisms to ensure maximum benefits. Public policy interventions to support rural business development could strengthen business management practices and facilitate other supply chain linkages, so as to make ICT applications more appropriate and beneficial to small rural businesses. Weak management practices and lack of streamlined operations limit the potential application of ICTs. Future research could target impact of policy interventions on business development and explore potential influences on ICT adoption.
- A technology adoption model for the rural socio-cultural was developed and tested in this research. It provided evidence for influences from key context factors on adoption decisions. However, further research is required to refine the model.

Chapter 10

Contributions, limitations and future research

This chapter outlines the theoretical and practical contributions from this research, as well as its limitations. Directions for future research are also discussed.

10.1 Contributions

Being exploratory in nature, this research is an initial effort to try and understand socio-cultural impacts on ICT adoption in rural contexts. The findings provide some insights into the complex dynamics that exist in rural settings that have implications for ICT use. The theoretical and practical contributions of this research are discussed below.

10.1.1 Theoretical contributions

This research adds to existing knowledge on ICT adoption in several ways. First, the research focused specifically on understanding the differences between socio-cultural contexts of rural and urban communities and the impacts on ICT adoption resulting from these differences. This is important because a review of literature did not reveal any scientific studies that analyzed the impacts of the socio-cultural context of rural settings on ICT adoption. Past studies have focused on main differences between rural and urban communities, or on levels of ICT adoption and potential barriers in rural communities. Studies on impacts of culture on ICT adoption make comparisons across cultures and countries but not between rural and urban contexts within a given culture or country. Although differences would exist across rural contexts within and across countries and culture, the findings from this research provide valuable insights into the more prevalent socio-cultural dynamics of rural contexts, and evidence to consider the special nature of rural contexts in addressing ICT adoption by rural businesses.

Second, the research draws from multiple disciplines to clarify how rural context could affect ICT adoption. Starting with the importance of context identified in information behaviour literature that suggested how behaviour could be influenced by the context, and using literature on rural studies to understand differences between rural and urban contexts, as well as studies on impacts of culture on ICT adoption, this research presents a way to explore important factors within a given rural context in order to understand characteristics and behaviour that could affect how ICTs are perceived. Using behaviour guided by social/cultural values and practices found common to rural contexts, this

research provides explanations as to how specified factors could potentially create impacts on ICT adoption and gives suggestions on ways to address these impacts.

Third, the research provides initial empirical evidence to illustrate differences between socio-cultural context of rural and urban communities, as well as the levels of influence from different context factors on ICT adoption by rural businesses. Past studies have empirically assessed practices of rural businesses or elements that affect ICT adoption in general, but not on how practices of rural businesses influence ICT adoption. This research gives an indication of the most important factors within the rural context that affect rural business owners' perceptions of ICTs. Furthermore, the findings are able to shed light on which factors have the greatest influence on promoting adoption and which factors pose barriers to adoption. Further research is needed to confirm these linkages and to explore if addressing identified behaviour results in changes to perceptions of ICTs.

The three contributions noted above relate to new or confirmed insights about the situation, and the development of a deeper understanding of the problem components. The fourth contribution is the main theoretical advancement: the development of an extended TAM model incorporating specific rural versus urban elements. The literature on technology acceptance has included numerous studies that add different external variables to the basic TAM model to identify impacts on perceptions of usefulness and ease of use. Historically, these predictor variables have been mainly concentrated on task characteristics, user characteristics and subjective norms. This research attempted to address the lack of broader organizational and contextual variables in TAM, and develop a model suitable to capture the influences resulting from the socio-cultural context of rural communities. Hence, one of the main contributions of this research is the development of an information technology adoption model applicable to the rural context of developing countries.

10.1.2 Practical contributions

In terms of practical contributions, this research has utmost relevance for organizations working towards the development of rural communities such as government and non-governmental institutions and donor agencies. Although rural businesses that perceive the need for ICTs (perhaps as a result of economies related to business size or business activity) are likely to adopt ICTs without any external influence, findings from this research suggest that the smaller rural businesses perceive additional barriers that hinder adoption. Therefore, an external push may be required to encourage rural businesses to adopt ICTs in order to overcome limitations posed by the rural context. ICTs have the potential to enable rural businesses to expand and grow by accessing new markets and suppliers. This

research identifies key factors within the rural context and explains how they could affect perceptions of ICTs. These findings may be usefully applied by organizations working towards the development of rural communities to address practices that affect negative perceptions of ICTs and thus facilitate ICT use for business needs.

About 60% of the rural businesses included in the survey indicated that ICTs were not required for the current scale of the business. Management practice was found to have the largest impact on ICT adoption by reducing perceived benefits and increasing perceived barriers of ICTs. Contributions from personal networks also increased perceived barriers. Therefore, rural development organizations could potentially focus on strengthening management practices and information management within rural businesses before potential for ICTs may be realized. As mentioned in the findings, fundamental aspects of the business have to be in place before ICTs may be usefully applied for business needs. Role of personal networks in business operations have important implications for procurement and marketing by rural businesses and potential use of ICTs to supplement these operations may be identified.

Skill level was identified as the most important factor that reduced perceived barriers and increased perceived benefits of ICT adoption. However, since average education and ICT skill levels of rural business owners and managers were found to be low, this may be one crucial area to be addressed to encourage adoption. Organizations could play a greater role in increasing awareness of ICTs and demonstrate potential uses of ICTs for small rural businesses. Such organizations could play the role of ICT advocates. Survey findings identified that ICT skills were available within the family and friends of business owners. Therefore, ways of utilizing existing skills and ways to provide continued ICT support to business owners could be determined. Therefore, the findings from this research may be applied to determine ways of encouraging rural businesses to adopt ICTs by addressing some of their negative perceptions on ICT use for business needs.

10.2 Limitations

There are several limitations of this research. One of the main limitations relates to generalization of findings. The small number of businesses included in the field studies and the sampling used for the survey limits the ability to generalize the findings beyond the sampling frame used for the research. Due to lack of viable options, the survey sample was drawn from a national sample survey which restricts the ability to generalize the findings even at the country level. However, since the sample for

the national survey was a representative one, and since the research is exploratory in nature, the findings may be usefully applied to understand potential differences between rural and urban contexts in the study area. The findings may not be generalized to other countries because several factors relating to the rural context as observed for the study area may be different in other countries. These include aspects such as cultural norms, levels of social stratification, rural situation in terms of linkages to urban centres, situation in terms of abundance and dependence on natural resources for income earning activities, linkages to the national and global economy, as well as policy interventions. However, the factors identified might be a good starting point to explore existing behaviour related to those factors and in turn analyze potential impacts on ICT adoption.

The exploratory nature of the research required use of new and untested measurement scales for context factors, which may be considered as a limitation of this research. Although findings from literature were used in developing initial measures, they were tested using only nine businesses before being revised for use in the survey. Nevertheless, tests for reliability and validity indicated that measures were acceptable, except for a few items.

A third limitation is the potential for bias due to nature of self-reporting on business practices and opinions regarding ICTs. Although items regarding business practices attempted to capture current practice of businesses, self-reporting may introduce some bias, which cannot be avoided in a quantitative survey. A qualitative research could attempt to correlate self-reports and actual observations. The use of subjective perceptions for ICT related aspects could also potentially bias the findings. However, similar subjective measures are extensively used in research on technology adoption. Future research could focus on presenting specific scenarios of ICT application to business needs to get more real and useful feedback about owner perceptions rather than getting views on ICT use in general. This approach may be particularly useful if business owners have little or no knowledge about ICTs.

A fourth limitation is the possibility that the type of businesses included in the sample could have had an effect on the results. In particular, a majority of the rural sample were very small businesses having low incomes and a few employees. The nature of these businesses could have affected the results relating to the context factors, as well as perceptions about the usefulness of ICTs for their businesses. Future research would need to target different sizes of rural businesses to identify if business size or income levels affect the perceptions about ICTs.

A final limitation of this research is that many details were not captured in the research, which could have better explained the relationships that were found. While the quantitative survey was useful to test hypotheses and establish the linkages of context factors with perceptions of ICTs, the complex nature of existing practices and inter-relationships with personal networks highlight the importance of exploring these complexities in order to better understand the relationships found. Hence, a mixed quantitative-qualitative approach may be better suited to address these issues. Ethnographic studies could be used to get a better understanding of actual business process and ICT use in different types and sizes of businesses and to evaluate the benefits from ICTs and any barriers to effective use. Longitudinal studies may also be useful to analyze how perceptions of ICTs eventually lead to actual use of ICTs and what factors facilitate and promote the adoption process.

10.3 Future research directions

In order to address generalization issues, future research should target samples that may be generalized to larger populations or geographic areas. Samples could be drawn to enable comparisons between different business sectors and different sizes of businesses. Cross-cultural comparison may be drawn by selecting rural samples from different countries. These could confirm if similar relationships exist between context factors and ICT adoption.

Further research should be undertaken to re-test the hypotheses that were not supported. Contradictory findings, for impacts of communication and interaction, and information sources on perceptions of ICTs, require further research to confirm the findings and to better understand how impacts are created. In terms of communication and interaction, the nature of interactions with business contacts, how interaction patterns change once ICT adoption takes place, and how close and personal interactions may be used for ICT support need to be studied further. In terms of information sources, owner's preferences and choices of information sources and communication mediums for different types of information have to be better understood to identify linkages to ICT adoption.

This research also identified many additional details that could be considered in future research in order to fully understand how impacts occur. For management practice, the extent and nature of accounting and planning practices, as well as production levels and varieties could be studied. For network contributions, the extent and dependence on contributions, as well as the types of tasks for which contributions are sought could be explored to identify relative advantage for ICTs. In terms of skill levels, extent of awareness and level of understanding of the potential of ICTs, as well as

language barriers might be investigated. Different scenarios of ICT application could be proposed to get owner perceptions and reactions towards such scenarios to identify which ones are perceived more positively. This approach of using specific scenarios of ICT use could be more useful in eliciting real responses from owners than asking general questions relating to ICT use, particularly from owners who have only a little or no understanding of ICT capabilities. A hybrid approach combining quantitative and research methods might be able to better address these issues.

New aspects identified through this research include potential dual purpose in procurement trips made outside the community, multiple uses of personal networks for business information as well as business support and possible integration of these processes, ICT-advocating roles of business contributors, and owner's vision, long term goals and objectives for the business, as well as impact from any public policy interventions. These aspects could be considered in future research. Specific research could also target only businesses that use ICTs to analyze if there is a disjoint between opinions of ICTs and actual use, and also to better understand the specific motivations for ICT adoption in rural businesses. Owners that intend to adopt ICTs may also be included in such studies to study the eventual adoption process over time and specific motivations and barriers.

Appendix A

Interview guide used in field studies

Part 1- Background of the business

1. What is the ownership structure of the business?
2. What is the main activity of the business? What are the main commodities produced?
3. Are any secondary activities undertaken? If yes, what are these activities?
4. Which year did the business commence its operations in?
5. Did the business operate for the whole duration of the past year?
 - 5.1 If not, for how many months was the operation suspended? Why was the business suspended?
6. Is there a specific location from which business activities are carried out?
 - 6.1 If yes, what is this location(s)? If not, how are the business operations carried out?
7. How many paid, permanent employees work for the business?
8. How many paid, casual/seasonal employees are used on average per year?
9. How many unpaid employees work for the business? Why are these employees not paid?
10. What is the total income on average per month from sales?
11. Who are the main customers of the business within and outside the community?
12. What proportion of sales is from customers within and outside the community?
13. Who are the main suppliers for the business, within and outside the community?
14. What proportion of purchases is from suppliers within and outside the community?
15. What are main problems faced in conducting business operations? How do these problems affect the business? Why do you think these problems exist? In your opinion, how can these problems be resolved?

Part 2- Information needs and behaviour

16. What types of information do you need on a regular basis for business operations?

17. What types of information have you needed in special circumstances or for irregular, unforeseen tasks?
18. For each type of information:
 - 18.1 Can you describe the information and the tasks for which it is needed/used?
 - 18.1.1 How often do you need this information?
 - 18.1.2 How would you describe the nature of the information in terms of a) Complexity? b) Adequacy? c) Ambiguity? d) Currency? e) Timeliness?
 - 18.2 What are the main sources of this information? Why do you use these sources and not others?
 - 18.3 Who else is involved in getting the information?
 - 18.3.1 Where is the person located and what is your relationship with him/her? What is his/her role in the information transfer? Why is this person involved and not someone else?
 - 18.4 What is the channel of communication used to get the information (eg: face-to-face, telephone, TV, radio etc)? Why do you use this channel and not others?
 - 18.5 How would you describe the interactions that occur in the transfer/exchange of information? How long do average interactions take?
 - 18.6 Do you usually get advice and opinions to better understand the information? If so, who provides the advice/opinion and how does this help in understanding the information?

Part 3- ICT use, intention and perceptions

3.1 – Actual use of ICT

19. Do you use a personal computer for business tasks?

If yes,

- 19.1. What tasks do you use a computer for? When did you first start using a computer?
- 19.2 Have there been any changes in the way you use of the computer since you first started using it? If so, what are the changes?

19.3 How often do you use the computer for business information needs? How many hours on average per week do you use the computer for business information needs?

If no,

19.4 Have you ever considered using a computer for business tasks? Why/why not?

19.5 Have you ever had someone else use a computer on your behalf? If yes, for what tasks?

20. Do you use Internet for business tasks?

If yes,

20.1 What tasks do you use the Internet for? When did you first start using Internet?

20.2 Have there been any changes in the way you use of the Internet since you first started using it? If so, what are the changes?

20.3 How often do you use the Internet for business information needs? How many hours on average per week do you use the Internet for business information needs?

If no,

20.4 Have you ever considered using Internet for business tasks? Why/why not?

20.5 Have you ever had someone else use the Internet on your behalf? If yes, for what tasks?

21. Do you use email for business tasks?

If yes,

21.1 Whom do you communicate with through email, and for what purpose? When did you first start using email?

21.2 Have there been any changes in the way you use of the email since you first started using it? If so, what are the changes?

21.3 How often do you use email for business information needs? How many hours on average per week do you use email for business information needs?

If no,

21.4 Have you ever considered using email for business tasks? Why/why not?

21.5 Have you ever had someone else use email on your behalf? If yes, for what purpose?

3.2 – Intention to use ICT

(Questions were asked separately for use of computers and use of Internet)

22. Do you intend to use (adopt) computers/Internet for business information needs in the next 12 months?
23. Do you predict that you will use (adopt) computers/Internet for business information needs in the next 12 months?
24. Do you plan to use (adopt) computers/Internet for business information needs in the next 12 months?

3.3 – Perceptions of ICT

(Questions were asked separately for use of computers and use of Internet)

25. What is your opinion about the effectiveness of computers/Internet for business information needs?
26. What is your opinion about the quality of information received/transferred using computers/Internet?
27. What is your opinion about the speed of information acquisition/transfer using computers/Internet?
28. Do you think computers/Internet are (will be) easy or difficult to use?
29. In your opinion, how easy or difficult is it (will it be) to learn to use computers/Internet?
30. In your opinion, how easy or difficult is it (will it be) to remember names and use of different commands?
31. Do you have (believe you will have) people available to help you with technical difficulties in the use of computers/Internet?
32. What is your opinion about the compatibility of using computers/Internet with the way you acquire/transfer business information?

3.4 – Barriers and enablers for ICT adoption and use

33. What are the main barriers faced in adopting computers / Internet?

33.1 How do these issues affect adoption? In your opinion, how can these problems be resolved?

34. What are the main barriers faced in continuing effective utilization of computers / Internet?
 - 34.1 How do these issues affect continued use? In your opinion, how can these problems be resolved?
35. What is your opinion about the adequacy of the ICT infrastructure available to the community?
36. What is your opinion about the adequacy of support infrastructure (eg: electricity) available to the community?
37. What is your opinion about the cost of computers and related expenses?
38. What is your opinion about Internet charges?
39. Do you think there are any aspects/issues that can help to promote the adoption/continued use of computers / Internet? How can these issues help to promote adoption/continued use?
40. Are there any other issues or comments with regard to adopting/using computers/Internet for business tasks?

Part 4- Factors of the socio-cultural context

4.1 - Age characteristics

41. What is your age?
 - 41.1 Average age of the community (to be taken from Census data)

4.2 – Gender roles

42. What is your opinion about acceptable work roles for men and women?
43. In your opinion, what is the general attitude of community members on acceptable work roles for men and women?
44. What is your opinion about women having higher status and influence than men in the community?
45. In your opinion, what is the general attitude of community members about women having higher status and influence than men in the community?

4.3 – Communication behaviour

46. Can you state your preference for different forms of communication, starting with most preferred choice?
47. When you are having a conversation, do you take the meaning from the verbal message alone or do you look for other signals? What kind of signals do you look for, and how do these help you to understand the meaning?
48. What is your opinion about the degree of understanding of information when provided through face-to-face interaction? Explain reasons for opinion.
49. How often do you interact with your main sources of business information (include all interactions for business and personal reasons, face-to-face or otherwise)?

4.4 – Emphasis on status and power

50. Do you adjust your language and communication behaviour according to the status of the person with whom you are communicating? If yes, give some examples.
51. What is your opinion about asking your employees for assistance to help you with your job? In what situations or for what tasks would you be willing to ask for and get assistance? In what situations or for what tasks would you be unwilling to ask for and get assistance?
52. What is your opinion about giving employees access to information that is used to make business decisions? What types of decision-making information do you want kept confidential unless authorized?
53. What is your opinion about the level of control that you should have over all aspects of the business?

4.5 – Collectivism

54. What is your opinion about achievement of outcomes when you work with other people as a group versus working individually?
55. How many close personal contacts do you have whom you rely on for business support, both within and outside the community? What is the level of trust and obligations that exist with closest contacts?

56. How do you perceive your personal network in providing you with opportunities to share resources and skills for business growth?
57. How do you perceive your personal network in helping you to pursue new business opportunities?
58. How do you perceive your personal network in supporting you to develop joint opportunities for business collaboration?
59. Are there any individuals or groups within the community that you have negative relations with? What was the cause of this? Does it affect the operation of your business? If so, how?

4.6 – Skill level

60. What is the highest level of education you have completed?
 - 60.1. Average level of education within the community (to be taken from Census data)
61. How would you rate your knowledge of computers, Internet and email?
62. Within your community, how many people do you know who have considerable knowledge of computers?
63. Within your community, how many people do you know who have considerable knowledge of Internet?

4.7 – Polychronic time

64. Do you work on several things at the same time or do you focus on one thing and finish that before starting on another?
65. Do you ever mix business tasks with personal tasks (during business hours or otherwise)? If yes, how often do you think it happens and why?

4.8 – Management practice

67. How are different business functions (such as administration, accounts, inventory management, planning) managed within the organization?
 - 67.1 To what extent are such functions separated? Are there specific staff allocated for different functions?
 - 67.2 Do you take a monthly salary or take money from the business as and when needed?

67.3 Do you keep proper accounts?

67.4 Do you formulate business plans and budgets?

68. What are the linkages between the business and your relationship with family and friends? Are business decisions influenced by these relationships? If so, how?

69. What is your opinion about the level of economic rationality that is maintained with regard to business decisions and transactions? Are there any instances of non-rational decisions? If so, give some examples. Are there informal credit arrangements or barter exchanges?

Part 4- Concluding interview

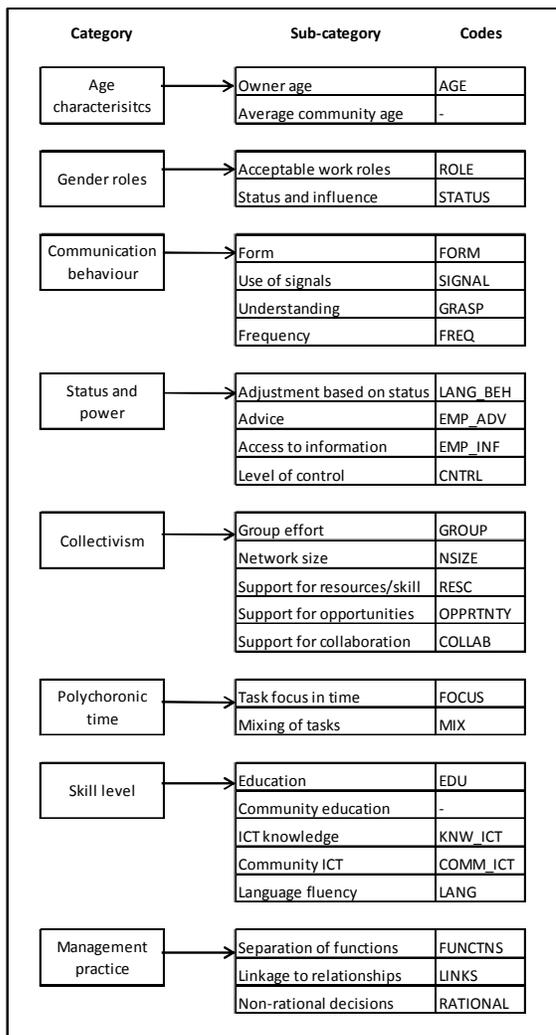
70. Are there any other issues or comments that you would like to note in relation to any of the questions asked?

Appendix B

Coding and results of field studies

Interview responses and observations were coded using the main constructs of the research model as the main categories for analysis. Within each category, sub-categories were identified and interview questions were allocated to each sub-category. Sub-categories for which observations were possible were also identified. Codes were developed for each sub-category and the responses/observations were then coded and assigned to sub-categories. An illustration of the coding scheme for context factors is shown in Figure 1.

Figure 1: Coding for context factors



Within each sub-category, the responses and observations were analyzed and values assigned using appropriate scales. Finally, an overall rank for each main category was developed, based on the average of the results of the sub-categories. The results for main categories and subcategories are given below.

Information seeking – types of information

Business owners were asked to identify the types of information they needed for their business. The information type they discussed in most detail was identified. Owners were also asked to explain a situation related to an important business decision, and another situation relating to a useful act for the business by another person, and then explain the information exchange in those situations. The information exchanged in the two situations was used to identify the information type for the two situations.

The types of information used for the coding are: P = Product information, M = market information, BD = Business development information. An overall assessment for the type of information that was most important for a given business was calculated by identifying the type of information mentioned for two or more of the three sub-categories as shown below in Table 1.

Table 1: Information seeking behaviour – Types of information

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Discussed in most detail	P	P	M	P, M	P	P, BD	P	P	P
Related to the identified important business decision	M	P	M	M	M	M	P	M	P
Related to the identified useful action by another person	P	M	P	M	M	M	-	P	P
Important information type overall	P	P	M	M	M	M	P	P	P
<u>Coding scheme:</u> Values assigned using the following type: P = Product information, M = market information, BD = Business development information. Overall importance identified based on information type mentioned for 2 or more of the sub-categories.									

Information seeking –information sources

Business owners were asked to identify the sources they most commonly used to get information from within and outside their community. The sources were coded based using the following two categories: I = Informal sources (who may be family, relatives, and friends), F = formal sources (which may be business sources, formal institutions, books and catalogues). Overall importance of information sources was identified based on type of source used most, as shown below in Table 2.

Table 2: Information seeking behaviour – Sources of information

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Within community	I	F	I	I	I, F	I	F	F	F
Outside community	F	I, F	I	I, F	I, F	I	F	I, F	F
Important sources overall	I, F	F	I	I	I, F	I	F	F	F
<u>Coding scheme:</u> Values assigned using the following categories: I = Informal sources (family, relatives, friends), F = business sources, formal institutions, books and catalogues. Overall importance identified based on type of source used most.									

Information seeking – other details

Other details regarding the information seeking process was sought. A simple coding of yes or no was used to indicate if a channel was used or opinion stated (see Table 3).

Table 3: Information seeking behaviour – Other details

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Channels of communication									
Face-to-face	Y	Y	Y	Y	Y	Y	Y	Y	Y
Telephone	Y	Y	Y	Y	Y	Y	Y	Y	Y
Internet	N	N	N	N	N	N	Y	N	Y
Use public media	N	N	Y	Y	N	Y	N	Y	Y
Seek advice and opinions	N	N	Y	Y	Y	Y	N	Y	Y
Expressed need for more information	Y	Y	N	Y	N	Y	N	N	N
<u>Coding scheme:</u> Values assigned using the following categories: Y = Yes, N = No.									

Context factor 1 – Demographics (Age characteristics)

Respondent age and the average community age was categorized using the following coding categories: Young Adults (YA) = 25 to 34 years, Adults (A) = 35 to 44 years, Middle Aged (MA) = 45 - 54 years. An overall age characteristic was calculated by taking an average of the two ages - participant age and average community age (see Table 4).

Table 4: Context factor 1 – Demographics (Age characteristics)

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Participant age	38	35	50	35	44	45	44	39	51
Average age of community (Census data)	25.1	25.0	25.5	26.2	23.4	28.3	25.9	25.5	25.5
Overall age characteristic	YA	YA	A	YA	YA	A	A	YA	A
Coding scheme: Overall age characteristic: Calculated by taking average of owner age and community age and using the following categorization: Young Adults (YA) = 25 to 34 years, Adults (A) = 35 to 44 years, Middle Aged (MA) = 45 - 54 years									

Context factor 1 – Demographics (Gender roles)

Responses for gender related questions were coded using a judgement about the level of disparity between genders expressed for each question. Level of disparity was coded using the following: 1 - None (N), 2 - Low (S), 3 - Medium (M), and 4 - High (H). An overall gender disparity level was calculated using an average of the levels for the 4 items (see Table 5).

Table 5: Context factor 1 – Demographics (Gender roles)

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Level of gender disparity regarding acceptable work roles for men and women									
Participant's own opinion	L	L	N	N	L	N	L	N	L
Participant opinion about general perception of community members	M	N	N	M	L	N	N	N	N
Level of gender disparity regarding levels of influence and status between men and women									
Participant's own opinion	N	M	M	N	N	L	N	N	N
Participant opinion about general perception of community members	M	M	M	N	N	M	N	N	N
Overall gender roles	L	L	L	L	L	L	N	N	N
Coding scheme: Values assigned for level of disparity using the following scale: 1 - None (N), 2 - Low (S), 3 - Medium (M), and 4 - High (H). Overall gender roles calculated by using the scale values (1 to 4 as shown above) and taking an average of the 4 items. Average value < .5 is rounded down and >= .5 is rounded up to the next number (e.g. 1.4 is rounded down to 1, and 1.5 is rounded up to 2).									

Context factor 2 – Communication behaviour

Responses for communication related questions were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Common channel of communication was coded as follows: Low = Written forms, Medium = Telephone; and High = Face-to-face.

The two items - use of verbal and non-verbal signals in understanding meaning, and level of increase in understanding in face-to-face interactions - was coded as follows: Low = to a little extent, Medium = to some extent, High = to a great extent.

Frequency of interaction was coded as follows: Low = Once or more/month. Medium = Once or more/ week, and High = Once or more/day.

Overall communication behaviour was calculated using an average of the levels for the 4 items (see Table 6).

Table 6: Context factor 2 – Communication behaviour

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Common channel of communication	H	M	H	H	M	H	M	H	M
Use of verbal/non-verbal signals in conversations to infer meaning	L	H	M	H	H	H	M	M	H
Increase in level of understanding in face-to-face interaction	H	H	H	M	H	H	M	M	H
Frequency of interaction	M	L	H	H	L	M	L	L	L
Overall Communication behaviour	M	M	H	H	M	H	M	M	M
<p><u>Coding scheme:</u> Values assigned for high-context communication using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Channel: Low = Written forms, Medium = Telephone; and High = Face-to-face. Signals/understanding: Low = to a little extent, Medium = to some extent, High = to a great extent. Frequency: Low = Once or more/month. Medium = Once or more/ week, and High = Once or more/day. Overall communication behaviour calculated by using the scale values (1 to 3 as shown above) and taking an average of the 4 items.</p>									

Context factor 3 – Status and power distance

Responses for status and power distance related questions were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Level of adjustment of behaviour and language depending on status was coded as follows: Low = to a little extent, Medium = to some extent, High = to a great extent.

Opinion about asking advice from employees and opinion about giving employees access to decision-making information was coded as follows: Low = All tasks/information, Medium = Some tasks/information, and High = Few tasks/information.

Opinion about level of control needed by business owner over all aspects of the business was coded as follows: Low = none/little, Medium = some, High = Full.

Overall ranking for emphasis on status and power distance was calculated using an average of the levels for the 4 items (see Table 7).

Table 7: Context factor 3 – Status and power distance

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Adjustment of language /behaviour based on status	M	M	M	H	H	H	L	H	L
Asking employees for help / advice	M	L	M	H	H	H	H	L	H
Giving employees access to decision-making information	H	M	L	M	L	H	H	L	H
Level of owner’s control over business	H	L	H	H	L	H	H	M	H
Overall status & power distance	H	M	M	H	M	H	H	M	H
<p><u>Coding scheme:</u> Values assigned to level of emphasis on status/power using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Adjustment: Low = to a little extent, Medium = to some extent, High = to a great extent. Advice/Access: Low = All tasks/information, Medium = Some tasks/information, and High = Few tasks/information. Control (level needed): Low = none/little, Medium = some, High = Full. Overall emphasis on status/power calculated by using the scale values (1 to 3 as shown above) and taking an average of the 4 items.</p>									

Context factor 4 – Collectivism

Responses for questions related to collectivism were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Opinion about preference for group effort for different ventures was coded as follows: Low = no ventures, Medium = some ventures, High = all ventures.

The size of the personal network was coded as follows: Low = 1-2 people, Medium = 3-4 people, High = 5 or more people.

Level of support from personal networks for different tasks was coded as follows: Low = to a little extent, Medium = to some extent, High = to a great extent.

Overall ranking for collectivism was calculated using an average of the levels for the 5 items (see Table 8).

Table 8: Context factor 4 – Collectivism

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Achievement of outcomes as group (vs individual effort)	L	M	H	M	H	M	L	H	M
Size of personal network (trusted contacts)	M	L	M	M	L	H	L	L	L
Support from personal network in providing resources and skills	H	H	H	H	M	H	L	M	M
Support from personal network in providing new business opportunities	M	M	M	M	M	H	L	M	M
Support from personal network in providing opportunities for business collaboration	L	L	H	H	M	M	L	L	L
Overall collectivism	M	M	H	M	M	H	L	M	M
<p><u>Coding scheme:</u> Values assigned to level of collectivism using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Group achievement (better for): Low = no ventures, Medium = some ventures, High = all ventures. Network Size: Low = 1-2 people, Medium = 3-4 people, High = 5 or more people Support: Low = to a little extent, Medium = to some extent, High = to a great extent. Overall collectivism calculated by using the scale values (1 to 3 as shown above) and taking an average of the 5 items</p>									

Context factor 5 – Time management

Responses for questions related to time managed were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Responses regarding behaviour in attending to many tasks at a time were coded as follows: Low = never/rarely, Medium = sometimes, High = always.

Responses regarding behaviour in mixing of business and personal tasks were coded as follows: Low = to a little extent, Medium = to some extent, High = to a great extent.

Overall ranking for time management was calculated using an average of the levels for the 2 items (see Table 9).

Table 9: Context factor 5 – Time management

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Focus on many tasks at a time	H	L	L	M	M	M	M	M	M
Mixing of business and personal tasks	M	M	H	H	H	H	L	L	L
Overall polychronic time management	H	M	M	H	H	H	M	M	M
<p><u>Coding scheme:</u> Values assigned to level of polychronic time management using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Task focus (attending to many tasks at a time): Low = never/rarely, Medium = sometimes, High = always. Task mixing: Low = to a little extent, Medium = to some extent, High = to a great extent. Overall polychronic time calculated by using the scale values (1 to 3 as shown above) and taking an average of the 2 items.</p>									

Context factor 6 – Skill level

Responses for questions related to skill levels were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Participant’s level of education and average community education level were coded as follows: Low = Basic/primary, Medium = Secondary, High = Certificate/diploma.

Participant’s level of ICT knowledge was coded as follows: Low = Poor, Medium = Adequate, High = Good.

Number of people known to the participant in the community with adequate knowledge of computers and Internet was coded as follows: Low = <=5 people, Medium = 6-10 people, High = > 10 people.

Level to which English fluency was indicated as a problem in using computers and Internet was coded as follows: Low = language is a problem to a great extent, Medium = language is a problem to some extent, High = language is not a problem.

Overall ranking for skill level was calculated using an average of the levels for the 5 items (see Table 10).

Table 10: Context factor 6 – Skill level

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Owner’s education level	L	L	L	H	H	L	M	L	H
Average education within community (Census data)	L	L	L	L	M	L	L	M	M
Owner’s knowledge of computers/ Internet	L	L	L	M	M	M	H	M	M
Number of people known in community with considerable knowledge of computers/ Internet	L	M	L	L	M	M	H	H	H
Language fluency for ICT adoption/use	L	M	L	H	H	L	H	H	H
Overall skill level	L	L	L	M	M	L	M	M	H
Coding scheme: Values assigned to skill level using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Education level: Low = Basic/primary, Medium = Secondary, High = Certificate/diploma. ICT knowledge: Low = Poor, Medium = Adequate, High = Good. Skills within community: Low = <=5 people, Medium = 6-10 people, High = > 10 people. Fluency: Low = language is a problem to a great extent, Medium = language is a problem to some extent, High = language is not a problem. Overall skill level calculated by using the scale values (1 to 3 as shown above) and taking an average of the 5 items.									

Context factor 7 – Management practice

Responses for questions related to business management practices were coded using an intensity scale from low to high. Different items were coded based on different judgements.

Level to which different business functions were not separated but handled in a mixed manner was coded as follows: Low = All tasks, Medium = Some tasks, High = Few tasks.

Level of linkages of business operations with personal relationships, and level of non-economic decision-making as a result of personal linkages, were coded as follows: Low = none/to a little extent, Medium = to some extent, High = to a great extent.

Overall ranking for management practice was calculated using an average of the levels for the 3 items (see Table 11).

Table 11: Context factor 7 – Management practice

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Function mixing	H	M	H	M	H	M	L	M	L
Linkages of business with personal relationships	H	M	H	H	L	H	L	M	M
Level of non-economic business decisions	H	H	L	M	L	M	L	L	L
Overall (informal) management practice	H	M	M	M	M	M	L	M	L
Coding scheme: Values assigned to informal management practices using the following scale: 1 - Low (L), 2 - Medium (M), and 3 - High (H). Function mixing: Low = All tasks, Medium = Some tasks, High = Few tasks. Linkages/non-economic decisions: Low = none/to a little extent, Medium = to some extent, High = to a great extent. Overall management practice calculated by using the scale values (1 to 3 as shown above) and taking an average of the 3 items.									

ICT aspects – Perceptions of ICTs

Responses for questions related to perceptions of ICTs were coded using the following categories:

1 – Negative (N), 2 – Positive and Negative (P + N), 3 - Positive (P).

Overall ranking for perceptions of ICTs was calculated using an average for the 8 items (see Table 12).

Table 12: ICT aspects – Perceptions of ICTs

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
<i>Effectiveness of ICTs</i>									
Effectiveness	P	P	P	P	P	P	P	P	P
Quality of information	P + N	P	P + N	P + N	P + N	P	P + N	P	P
Speed of information transfer	P	P	P	P	P	P	P + N	P	P
<i>Ease of use of ICTs</i>									
Ease of use	P	N	N	P	P	P	P	P	P
Ease of learning	P	P	N	N	P	N	P	N	P
Memorability	N	P	N	N	N	N	N	N	P
<i>Compatibility with norms</i>									
Help available for technical difficulties	N	P	N	P	P	P	P	P	P
Compatibility with information acquisition/transfer	P + N	P + N	N	P + N	P	P + N	P	P	P
Overall perceptions of ICTs	P + N	P	P + N	P + N	P	P + N	P	P	P
<u>Coding scheme:</u> Values assigned to perceptions using the following scale: 1 – Negative (N), 2 – Positive and Negative (P + N), 3 - Positive (P). Overall perceptions of ICTs calculated by using the scale values (1 to 3 as shown above) and taking an average of the 8 items.									

ICT aspects – Intentions to adopt/use ICTs

Responses regarding intentions to adopt or use computers and Internet were coded using the following categories:

1 – No (N), 2 – Partly, only computer or only Internet (P), 3 – Yes, both computer and Internet (Y).

Overall ranking for intentions to adopt/use ICTs was calculated using an average for the 3 items (see Table 13).

Table 13: ICT aspects – Intentions to adopt/use ICTs

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Intention to use ICTs	N	P	N	P	N	Y	Y	Y	Y
Prediction to use ICTs	N	P	N	P	N	Y	Y	Y	Y
Plan to use ICTs	N	N	N	P	N	Y	Y	Y	Y
Overall intention	N	P	N	P	N	Y	Y	Y	Y
<u>Coding scheme:</u> Values assigned to intentions using the following scale: 1 – No (N), 2 – Partly, only computer or only Internet (P), 3 – Yes, both computer and Internet (Y).									

ICT aspects – Level of ICT use

Level of current ICT use was coded using the following categories:

None (N) = Not used, Low (L) = used for few tasks, Medium (M) = used for some tasks, and High (H) = used for many tasks.

Table 14: ICT aspects – Level of ICT use

	Rural Business						Urban Business		
	1	2	3	4	5	6	7	8	9
Computer use	N	N	N	N	L	M	H	L	H
Internet use	N	N	N	N	N	N	H	L	H
Main problem	Low education and language fluency	Low education and time availability	Language fluency	Learning and remembering use of ICTs	-	Language fluency	-	Time availability	-
<p><u>Coding scheme:</u> Values assigned using the following scale: None (N) = Not used, Low (L) = used for few tasks, Medium (M) = used for some tasks, and High (H) = used for many tasks.</p>									

Appendix C

Survey Instrument

Part 1- Background of the business

1. Is your business legally registered?
 - 1.1 Yes
 - 1.2 No (Skip to question 3)
2. What is the legal type of your business?
 - 2.1 Individual proprietorship (registered)
 - 2.2 Partnership
 - 2.3 Private company
 - 2.4 Other: Specify _____
3. What is the primary activity of the business? _____
 - 3.1 Food & beverages
 - 3.2 Apparel
 - 3.3 Wood products & carpentry
 - 3.4 Paper, printing & publishing
 - 3.5 Metal products
 - 3.6 Cement products
 - 3.7 Shipbuilding & repair
 - 3.8 Other
4. Do you undertake any other income generating activities?
 - 4.1 Yes
 - 4.2 NoIf yes, what are these activities? _____
5. How many years has it been since you started this business? years
6. What is the main location from which you carry out your business activities?
 - 6.1 Within residence – using common residential areas
 - 6.2 Within residence – specific area designated for business
 - 6.3 Outside residence (owned or free of rent)
 - 6.4 Outside residence (rented)
 - 6.5 Other - Specify : _____

7. How many paid, permanent employees work for the business?
8. How many paid, casual/seasonal employees are used on average per year?
9. How many unpaid family or other workers work in the business?
10. What is the total income on average per month from sales?
- 10.1 Less than Rf. 1,000
- 10.2 Between Rf. 1,000 and Rf, 4,999
- 10.3 Between Rf. 5,000 and Rf, 14,999
- 10.4 Between Rf. 15,000 and Rf, 24,499
- 10.5 Between Rf. 25,000 and Rf, 49,999
- 10.6 More than 50,000
11. What proportion of sales is to customers within the community? %
12. What proportion of purchases is from suppliers within the community? %
13. What is the main problem faced in conducting business operations?
- 13.1 Small/limited market opportunities
- 13.2 Availability of raw materials
- 13.3 Availability of land
- 13.4 High rental costs
- 13.5 Difficulties in recruiting and retaining employees
- 13.6 Difficulties in obtaining credit
- 13.7 Other - Specify : _____

Part 2 – Owner/Manager Background

1. What is your age? Years
2. What is your gender?
- 2.1. Male
- 2.2. Female
3. What is the highest level of education you have completed?
- 3.1. Basic literacy/No formal education
- 3.2. Primary level (Grades 1-7)
- 3.3. Secondary (Grades 8-12)
- 3.4. Certificate/Diploma
- 3.5. University degree

4. How would you rate your knowledge of computers and Internet?

- | | Computers | Internet |
|------|------------------------------------|------------------------------------|
| 4.1. | <input type="checkbox"/> None | <input type="checkbox"/> None |
| 4.2. | <input type="checkbox"/> Poor | <input type="checkbox"/> Poor |
| 4.3. | <input type="checkbox"/> Adequate | <input type="checkbox"/> Adequate |
| 4.4. | <input type="checkbox"/> Good | <input type="checkbox"/> Good |
| 4.5. | <input type="checkbox"/> Very good | <input type="checkbox"/> Very good |

5. How many of your family members who live with you have adequate knowledge of computers and Internet?

- | | Computers | Internet |
|------|---|---|
| 5.1. | <input type="checkbox"/> None | <input type="checkbox"/> None |
| 5.2. | <input type="checkbox"/> 1 person | <input type="checkbox"/> 1 person |
| 5.3. | <input type="checkbox"/> 2 – 3 people | <input type="checkbox"/> 2 – 3 people |
| 5.4. | <input type="checkbox"/> 4 – 5 people | <input type="checkbox"/> 4 – 5 people |
| 5.5. | <input type="checkbox"/> More than 5 people | <input type="checkbox"/> More than 5 people |

6. How many of your relatives and friends living in your community have adequate knowledge of computers and Internet?

- | | Computers | Internet |
|------|---|---|
| 6.1. | <input type="checkbox"/> None | <input type="checkbox"/> None |
| 6.2. | <input type="checkbox"/> 1 person | <input type="checkbox"/> 1 person |
| 6.3. | <input type="checkbox"/> 2 – 3 people | <input type="checkbox"/> 2 – 3 people |
| 6.4. | <input type="checkbox"/> 4 – 5 people | <input type="checkbox"/> 4 – 5 people |
| 6.5. | <input type="checkbox"/> More than 5 people | <input type="checkbox"/> More than 5 people |

Part 3 – Current use of ICTs

1. Do you use computers and Internet for business tasks?

- | | Computers | Internet |
|------|------------------------------|---|
| 1.1. | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes (If yes to either, go to question 2) |
| 1.2. | <input type="checkbox"/> No | <input type="checkbox"/> No (If no, skip to question 4) |

2. How long have you been using computers/Internet for business tasks?
 - 2.1. Less than 1 year
 - 2.2. 1- 3 years
 - 2.3. 4 - 5 years
 - 2.4. More than 5 years
3. For what tasks do you use computers and Internet?
 - 3.1. Documentation and word processing
 - 3.2. Account keeping
 - 3.3. Inventory management
 - 3.4. Business plans and estimates
 - 3.5. Searching for information
 - 3.6. Communicating with business partners
 - 3.7. Linking with customers (webpage)
 - 3.8. Enabling transactions via webpage
 - 3.9. Other (Specify) _____

(For people currently using computers/Internet, skip to Part 4 **)**

4. Have you ever had someone else use a computer and/or Internet on your behalf?

Computers	Internet
4.1. <input type="checkbox"/> Yes	<input type="checkbox"/> Yes (If yes to either, go to question 5)
4.2. <input type="checkbox"/> No	<input type="checkbox"/> No (If no, end of questionnaire)
5. If yes, for what tasks did you get someone to use computers/Internet?
 - 5.1. Documentation and word processing
 - 5.2. Account keeping
 - 5.3. Inventory management
 - 5.4. Business plans and estimates
 - 5.5. Searching for information
 - 5.6. Communicating with business partners
 - 5.7. Other (Specify) _____

Part 4 – Business practices

In the following sections are statements regarding business management practices, information seeking behaviour and communication norms. For each of the statements, please indicate the extent to which you agree or disagree with the statement based on how you manage your business and your communication and information seeking practices. Using the scale below, please indicate the number that represents your level of agreement with the statement:

1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, 5) Strongly agree

	1. Strongly disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly agree
4.1 Management practice (<i>Item 1,2 and 4 reverse coded</i>)					
1. I keep proper documentation of all sales and expenses.	1	2	3	4	5
2. I keep proper inventories of tools, raw materials and goods produced.	1	2	3	4	5
3. I take money from business earnings for personal needs as and when needed.	1	2	3	4	5
4. I make all business decisions based on economic gain.	1	2	3	4	5
5. I often give products/services free or at discounts to family and friends.	1	2	3	4	5
4.2 Contribution from personal networks					
1. I have many family members, relatives and friends who regularly help with my business operations.	1	2	3	4	5
2. The majority of raw materials and tools needed for my products are bought with the help of family members, relatives and friends.	1	2	3	4	5
3. The majority of sales and marketing of my products are conducted with the help of family members, relatives and friends.	1	2	3	4	5
4. Informal arrangements I have with family members, relatives and friends for business support exceed formal arrangements I have with business partners.	1	2	3	4	5
5. The help I get from family members, relatives and friends for business operations are either free or compensated through in-kind goods, discounted rates or barter arrangements.	1	2	3	4	5
4.3 Information sources (<i>Item 1 reverse coded</i>)					
1. I have direct access to sources of information required for business tasks within my own community.	1	2	3	4	5
2. I mainly use family members, relatives and friends to find information about raw materials and tools.	1	2	3	4	5

	1. Strongly disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly agree
3. I mainly use family members, relatives and friends to exchange information about market opportunities.	1	2	3	4	5
4. I usually get advice and opinions from family members, relatives and friends for business decisions.	1	2	3	4	5
5. I find the information supplied by family members, relatives and friends to be accurate and reliable.	1	2	3	4	5
4.4 Communication & interaction					
1. I have one or more interactions per week with the people who contribute to my business operations.	1	2	3	4	5
2. When I interact with the people who contribute to my business, it is often a personal/social interaction as well.	1	2	3	4	5
3. Within my own community, I mostly communicate face-to-face with the people who help in my business.	1	2	3	4	5
4. If outside my community, I mostly communicate via telephone with the people who help in my business.	1	2	3	4	5
5. I need to personally inspect some raw materials and tools to verify information received from other sources before making decisions about the products.	1	2	3	4	5
4.5 Status and power					
1. I (will) fully trust my employees regarding all aspects of my business.	1	2	3	4	5
2. I (will) ask employees for assistance and advice to make management decisions.	1	2	3	4	5
3. Information used for business decision-making is accessible to employees.	1	2	3	4	5
4.6 Gender differences					
1. My gender affects the type of business activities that I can run /manage.	1	2	3	4	5
2. My gender affects the way I manage my business operations.	1	2	3	4	5
3. Most people in my community believe that both men and women have certain work roles that are more acceptable to their gender.	1	2	3	4	5

Part 5 – Perceptions of ICTs and intention to use ICTs

In the following sections are statements regarding your perceptions of benefits and barriers of computers and Internet, and your intention to adopt or use computers and Internet. For each of the statements, please indicate the extent to which you agree or disagree with the statement based on your opinions and views of computers and Internet. Using the scale below, please indicate the number that represents your level of agreement with the statement.

1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, 5) Strongly agree

	1. Strongly disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly agree
5.1 Perceived benefits					
a) Organizational support					
1. Computers and Internet (would) enable me to accomplish specific tasks more quickly.	1	2	3	4	5
2. Computers and Internet would be/are useful for my business.	1	2	3	4	5
3. Computers and Internet (would) provide an effective support role to my business operations.	1	2	3	4	5
4. Computers and Internet (would) enable me to access to new markets.	1	2	3	4	5
b) Information management					
1. Computers and Internet (would) improve my access to information.	1	2	3	4	5
2. Computers and Internet (would) provide information for strategic decision making.	1	2	3	4	5
3. Computers and Internet (would) improve information exchange with customers.	1	2	3	4	5
4. Computers and Internet (would) improve information exchange with suppliers.	1	2	3	4	5
5. Computers and Internet (would) improve information management within the business.	1	2	3	4	5
6. The quality of the information output from computers and Internet is high.	1	2	3	4	5
5.2 Perceived barriers					
a) Perceived need (all items reverse coded)					
1. Computers and Internet offer advantages to my business.	1	2	3	4	5
2. Computers and Internet are strategically important for my business.	1	2	3	4	5

	1. Strongly disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly agree
3. Computers and Internet are needed for the current scale of my business.	1	2	3	4	5
b) Resources/ skills (all items reverse coded except item 2)					
1. I have the technical knowledge to use computers and Internet.	1	2	3	4	5
2. Language fluency is a problem for me in using computers and Internet.	1	2	3	4	5
3. My work force has the skills and technical knowledge to use computers and Internet.	1	2	3	4	5
4. I have access to people to help with computers and Internet.	1	2	3	4	5
5. I have time to use computers and Internet.	1	2	3	4	5
6. The financial investment required to utilize Computers and Internet is acceptable for me.	1	2	3	4	5
c) Compatibility (all items reverse coded)					
1. Computers and Internet are suited to my way of doing business.	1	2	3	4	5
2. Computers and Internet are compatible for communicating with my existing sources of business information.	1	2	3	4	5
3. Computers and Internet are compatible for acquiring information on products/services needed for my business.	1	2	3	4	5
4. Computers and Internet are compatible for disseminating information about my products/services.	1	2	3	4	5
5.3 Intention to use/adopt computers and Internet					
1. I intend to use /adopt computers for business needs in the next 6 months?	1	2	3	4	5
2. I predict that I will use /adopt computers for business needs in the next 6 months?	1	2	3	4	5
3. I intend to use /adopt Internet for business needs in the next 6 months?	1	2	3	4	5
4. I predict that I will use /adopt Internet for business needs in the next 6 months?	1	2	3	4	5

Appendix D

Descriptive statistics for survey background data

Business characteristics

Registered businesses

67.8% of the urban sample comprised of registered businesses while 32.2 % were not formally registered with government authorities. The rural sample had a slightly larger percent of registered businesses with 70.4%, and unregistered businesses made up 29.6% of that sample. It is not surprising to find that about a third of the businesses were not registered, since the Maldives does not have income tax laws and many small businesses operate without proper legal status. Of the registered businesses in the urban sample, individual proprietors made up the largest group with 58.3%, followed by private companies with 23.3% and partnerships with 18.4 %. Sole proprietors also made up the largest group in the rural sample, but the percentage was much higher than the urban sample, with 82.5% of the rural sample consisting of sole proprietors. Private companies formed a tenth of the rural sample and partnerships a mere 6%.

Table 1: Registered businesses

	Urban Sample		Rural Sample	
	Frequency	Percent	Frequency	Percent
Registered	103	67.8	114	70.4
Not registered	49	32.2	48	29.6
Total	152	100.0	162	100.0

Table 2: Legal type of businesses

	Urban Sample			Rural Sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Sole proprietor	60	58.3	58.3	94	82.5	82.5
Partnership	19	18.4	76.7	7	6.1	88.6
Private company	24	23.3	100.0	12	10.5	99.1
Other	0	.0		1	.9	100.0
Total	103	100.0		114	100.0	

Business sector

Two sectors covered the majority of businesses included in the urban sample. These were food and beverages with 32.2% of businesses and apparel and tailored products with 25% of businesses. Other sectors represented in the sample at comparable proportions were wood products and carpentry (7.2%), paper products, printing and publishing (9.2%) and metal products (9.2%). Businesses involved with cement products and boat building and repair covered only 2.0% and 1.3% respectively. Other businesses made up 13.8% of the sample and included activities mainly falling into other/multiple categories such as gifts and souvenirs, jewellery, traditional tools, upholstery and fiber works. Food and apparel sectors were the most common small businesses found in the Maldives besides retail trade. This may be due to ease of starting up such businesses compared to other manufacturing sectors. These sectoral proportions were also represented in the sample frame and can perhaps be explained by the limitations placed on business characteristics (such as number of employees and number of years since start-up) when selecting the sample, as well as the limited scale of the manufacturing industry in the Maldives, contributing only 6.7% share to the country's gross domestic product (Ministry of Planning and National Development, 2008).

Table 3: Business activity

	Urban Sample			Rural Sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Food and beverages	49	32.2	32.2	69	42.6	42.6
Apparel and tailored products	38	25.0	57.2	21	13.0	55.6
Wood products and furniture	11	7.2	64.5	22	13.6	69.1
Paper products, printing and publishing	14	9.2	73.7	4	2.5	71.6
Metal products	14	9.2	82.9	9	5.6	77.2
Cement products	3	2.0	84.9	12	7.4	84.6
Boat building and repair	2	1.3	86.2	8	4.9	89.5
Other	21	13.8	100.0	17	10.5	100.0
Total	152	100.0		162	100.0	

The rural sample exhibited a different distribution pattern across the business sectors, when compared to the urban sample. The largest sector was still food and beverages but the percentage was higher than the urban sample, with 42.6% of the rural businesses belonging to this sector. Sectors that showed higher percentages than the urban sample include wood products and carpentry (13.6%), cement products (7.4%) and boat building and repair (4.9%). Three sectors that showed significant

decreases in number of business in the rural sample include apparel and tailored products (13.0%), paper products, printing and publishing (2.5%) and metal products (5.6%). Other businesses made up 10.5% and covered activities such as thatch weaving, jewellery and handicrafts. One explanation for the differences in sectoral distribution between the urban and rural sample could be that more small businesses exist in rural areas that cater to basic needs such as housing and transport needs, compared to secondary needs catered to by businesses in printing and publishing, or metal product sectors.

Secondary income earning activities

Results show that 36.2% of the urban business owners/managers were engaged in other income earning activities besides their primary activity. In contrast, almost half (48.1%) of the rural sample were engaged in secondary activities. These included regular jobs at government or private organizations, owning and managing retail shops, providing services, and import trade activities. In addition, rural business owners also undertook agriculture, fishing and sand mining activities. Perhaps due to the relatively low public pay scale (averaging around CAN\$ 400/month) compared to private sector, it is common practice to see government employees undertake small businesses to supplement their income. Similarly, due to the small market available in the Maldives with its 298,968 population (Ministry of Planning and National Development, 2007), and particularly for rural islands, many businesses diversify into different areas to increase their profits. The continuation of these practices is supported by the findings on secondary activities.

Table 4: Secondary activity

	Urban Sample		Rural Sample	
	Frequency	Percent	Frequency	Percent
Yes	55	36.2	78	48.1
No	97	63.8	84	51.9
Total	152	100.0	152	100.0

Number of years since start up

Businesses up to 15 years of age were included in the sample and findings show a relatively comparable distribution between 1 to 15 years, in both samples. In the urban sample, new start-ups constituted the largest percentage with 11.2%. Half of the businesses in the sample were only seven years old or less, and a quarter of the businesses had been in operation for more than 12 years. Businesses were slightly younger in the rural sample, where about half of the businesses were up to

five years of age and 83.3% were ten years or younger. Less than 20% formed the oldest group of businesses in the rural sample, being older than ten years.

Table 5: Years in operation

	Urban Sample			Rural Sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	17	11.2	11.2	19	11.7	11.7
2	12	7.9	19.1	22	13.6	25.3
3	14	9.2	28.3	16	9.9	35.2
4	10	6.6	34.9	18	11.1	46.3
5	10	6.6	41.4	13	8.0	54.3
6	7	4.6	46.1	9	5.6	59.9
7	8	5.3	51.3	9	5.6	65.4
8	6	3.9	55.3	10	6.2	71.6
9	10	6.6	61.8	7	4.3	75.9
10	13	8.6	70.4	12	7.4	83.3
11	8	5.3	75.7	7	4.3	87.7
12	11	7.2	82.9	3	1.9	89.5
13	7	4.6	87.5	2	1.2	90.7
14	9	5.9	93.4	7	4.3	95.1
15	10	6.6	100.0	8	4.9	100.0
Total	152	100.0		162	100.0	

Location

Data on business location was anticipated to give an idea about the operation of small businesses, particularly in the urban capital where land is scarce and residential areas are congested. Findings showed that over half of the urban businesses used rented spaces to run their businesses from, which is likely to increase operation costs as rents are very high in the capital compared to rural areas. Despite the congestion and limited space availability in residential areas, results showed that 40% of urban businesses used their residences as the business location. In contrast, 69.1% of rural businesses conducted their businesses from their residences, either using common residential areas or designated areas within residential compounds. Compared to half of the urban sample, only 20.4% of rural businesses used rented spaces for their business activities. One business from each sample identified customer locations as their business location.

Table 6: Business location

	Urban Sample			Rural Sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Using residential areas	44	28.9	28.9	70	43.2	43.2
Specific area within residence	18	11.8	40.8	42	25.9	69.1
Own/rent free space outside residence	7	4.6	45.4	16	9.9	79.0
Rented space	82	53.9	99.3	33	20.4	99.4
Other	1	.7	100.0	1	.6	100.0
Total	152	100.0		162	100.0	

Number of employees

Number of employees can potentially be used as a measure of relative size of businesses and this was one of the characteristics used to reduce variation in the sample. Findings for permanent employees showed that the businesses included in the urban sample were relatively small in terms of total work force, with about a third of the businesses being undertaken without any permanent employees and about 85% having ten employees or less. Only 10% of the sample had more than 15 employees. Rural businesses were found to be smaller than the urban businesses, with half of the businesses being run without any permanent employees. Majority of the remaining half of the sample (40%) had five employees or less. None of businesses in the rural sample had more than 15 permanent employees.

Table 7: Number of Permanent Employees

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	48	31.6	31.6	81	50.0	50.0
1 - 5	60	39.5	71.1	65	40.1	90.1
6 - 10	21	13.8	84.9	12	7.4	97.5
11 - 15	8	5.3	90.1	6	2.5	100.0
16 - 20	15	9.9	100.0	0	0	
Total	152	100.0		162	100.0	

Use of temporary or seasonal employees did not appear to be a common practice as about three quarters of the both urban and rural businesses did not use any temporary employees. Majority of those that used temporary employees appeared to use no more than five employees. However, differing trends were observed in the use of unpaid help in the two samples. In the urban sample, 75%

of businesses did not use unpaid help, while this percentage was lower in the rural sample at 48.8%. Therefore, as predicted from the field study component, more rural businesses used unpaid help than urban businesses. Furthermore, more rural businesses had more than five unpaid helpers compared to the urban sample. These results provide some evidence for the high levels of contribution received by rural businesses from family, relatives and friends.

Table 8: Temporary employees

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	118	77.6	77.6	128	79.0	79.0
1 - 5	27	17.8	95.4	26	16.1	95.1
6 - 10	7	4.6	100.0	8	4.9	100.0
11 - 15	0	.0		0	.0	
16 - 20	0	.0		0	.0	
Total	152	100.0		162	100.0	

Table 9: Unpaid employees

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	114	75.0	75.0	79	48.8	48.8
1 - 5	35	23.0	98.0	73	45.1	93.9
6 - 10	3	2.0	100.0	10	6.1	100.0
11 - 15	0	.0		0	.0	
16 - 20	0	.0		0	.0	
Total	152	100.0		162		

Income

Average monthly income was collected as a measure of the size of businesses and findings showed that only a small percent (5.3%) of the urban sample were very small businesses earning less than Rf 1,000 (CAN\$ 84) per month and about a quarter earned less than Rf 5,000 (CAN\$ 418). Similarly, highest earning businesses made up a quarter of the urban sample, earning more than Rf 50,000 (CAN\$ 4,179) per month. The remaining half was distributed within the medium income categories. In contrast, rural businesses were distributed mostly within the lower income categories. 17.3% of the rural businesses fell into the lowest income category, earning less than Rf 1000, and over half of the

sample earned less than Rf 5,000. Less than ten percent was represented in the highest two income categories.

Table 10: Monthly income

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Less than Rf 1000 (CAN\$ 84)	8	5.3	5.3	28	17.3	17.3
Rf 1,000 - 4,999 (CAN\$ 84 - 418)	32	21.1	26.3	56	34.6	51.9
Rf 5,000 - 14,999 (CAN\$ 418 - 1,254)	30	19.7	46.1	42	25.9	77.8
Rf 15,000 - 24,999 (CAN\$ 1,254 - 2,089)	28	18.4	64.5	19	11.7	89.5
Rf 25,000 - 49,999 (CAN\$ 2,089 - 4,179)	18	11.8	76.3	10	6.2	95.7
More than Rf 50,000 (CAN\$ 4,179)	36	23.7	100.0	5	3.1	98.8
Missing				2	1.2	100.0
Total	152	100.0		162	100.0	

Table 11: Monthly income and Business activity Cross-tabulation – Urban sample

		Business activity								Total
		Food and beverages	Apparel and tailored products	Wood products and furniture	Paper products, printing and publishing	Metal products	Cement products	Boat building and repair	Other	
Monthly_income										
Less than Rf 1000	Count	4	2	0	0	1	0	0	1	8
	% within activity	8.2%	5.3%	.0%	.0%	7.1%	.0%	.0%	4.8%	5.3%
Rf 1,000 - 4,999	Count	21	7	1	1	1	0	0	1	32
	% within activity	42.9%	18.4%	9.1%	7.1%	7.1%	.0%	.0%	4.8%	21.1%
Rf 5,000 - 14,999	Count	7	9	3	4	1	2	0	4	30
	% within activity	14.3%	23.7%	27.3%	28.6%	7.1%	66.7%	.0%	19.0%	19.7%
Rf 15,000 - 24,999	Count	5	12	3	2	3	0	0	3	28
	% within activity	10.2%	31.6%	27.3%	14.3%	21.4%	.0%	.0%	14.3%	18.4%
Rf 25,000 - 49,999	Count	4	4	2	1	2	0	1	4	18
	% within activity	8.2%	10.5%	18.2%	7.1%	14.3%	.0%	50.0%	19.0%	11.8%
More than Rf 50,000	Count	8	4	2	6	6	1	1	8	36
	% within activity	16.3%	10.5%	18.2%	42.9%	42.9%	33.3%	50.0%	38.1%	23.7%
Total	Count	49	38	11	14	14	3	2	21	152
	% within activity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Since comparison of business characteristics could give a better understanding of the businesses in the sample, income was compared with activity type, business age and number of employees. Cross tabulation of income and activity type for the urban sample showed that businesses in the food sector were concentrated more in the low income categories, while majority of businesses in the apparel sector were found to be mid-income businesses. Businesses with higher incomes were found in the paper, printing and publishing sector as well as in metal products. A large proportion of other businesses also fell into higher income categories. For the rural sample, businesses in food and beverages, apparel and other areas such as handicrafts, fell mainly into lower income categories. Larger percentages of rural business working in wood products, metal products, cement products and boat building and repair were found to be in mid-income categories.

Table 12: Monthly income and Business activity Cross-tabulation – Rural sample

		Business activity								Total
		Food and beverages	Apparel and tailored products	Wood products and furniture	Paper products, printing and publishing	Metal products	Cement products	Boat building and repair	Other	
Monthly_income										
Less than Rf 1000	Count	14	3	1	1	0	2	1	6	28
	% within activity	20.9%	14.3%	4.5%	25.0%	.0%	16.7%	12.5%	35.3%	17.5%
Rf 1,000 - 4,999	Count	29	11	5	2	2	2	1	4	56
	% within activity	43.3%	52.4%	22.7%	50.0%	22.2%	16.7%	12.5%	23.5%	35.0%
Rf 5,000 - 14,999	Count	12	5	8	0	3	4	5	5	42
	% within activity	17.9%	23.8%	36.4%	.0%	33.3%	33.3%	62.5%	29.4%	26.3%
Rf 15,000 - 24,999	Count	5	1	5	0	4	2	1	1	19
	% within activity	7.5%	4.8%	22.7%	.0%	44.4%	16.7%	12.5%	5.9%	11.9%
Rf 25,000 - 49,999	Count	5	1	1	1	0	1	0	1	10
	% within activity	7.5%	4.8%	4.5%	25.0%	.0%	8.3%	.0%	5.9%	6.3%
More than Rf 50,000	Count	2	0	2	0	0	1	0	0	5
	% within activity	3.0%	.0%	9.1%	.0%	.0%	8.3%	.0%	.0%	3.1%
Total	Count	67	21	22	4	9	12	8	17	160
	% within activity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		%	%	%	%	%	%	%	%	%

A comparison of income with business age showed some relationship between the two variables. For the urban business, lower incomer categories had a higher proportion of younger businesses,

while businesses in the mid to high income categories had larger percentages of older businesses. However, for rural businesses a similar trend was observed only for lower to mid income categories, and no relationship was evident for the higher income categories. This may be due to the small number of rural businesses falling into the higher income categories.

Table 13: Monthly income and Age-category Cross-tabulation

		Urban sample				Rural sample			
		Age-category			Total	Age-category			Total
		1 - 5 years	6 - 10 years	11 - 15 years		1 - 5 years	6-10 years	11-15 years	
Monthly_income									
Less than Rf 1000	Count	5	2	1	8	17	10	1	28
	% within income	62.5%	25.0%	12.5%	100.0%	60.7%	35.7%	3.6%	100.0%
Rf 1,000 - 4,999	Count	19	8	5	32	34	13	9	56
	% within income	59.4%	25.0%	15.6%	100.0%	60.7%	23.2%	16.1%	100.0%
Rf 5,000 - 14,999	Count	13	12	5	30	19	14	9	42
	% within income	43.3%	40.0%	16.7%	100.0%	45.2%	33.3%	21.4%	100.0%
Rf 15,000 - 24,999	Count	7	9	12	28	9	8	2	19
	% within income	25.0%	32.1%	42.9%	100.0%	47.4%	42.1%	10.5%	100.0%
Rf 25,000 - 49,999	Count	8	5	5	18	4	2	4	10
	% within income	44.4%	27.8%	27.8%	100.0%	40.0%	20.0%	40.0%	100.0%
More than Rf 50,000	Count	11	8	17	36	4	0	1	5
	% within income	30.6%	22.2%	47.2%	100.0%	80.0%	.0%	20.0%	100.0%
Total	Count	63	44	45	152	87	47	26	160
	% within income	41.4%	28.9%	29.6%	100.0%	54.4%	29.4%	16.3%	100.0%

Comparison of income with total number of employees (including temporary and unpaid employees) showed an expected positive relationship between the two variables. For the urban sample, majority of businesses in the lower income categories either did not use employees, or had only five employees or less. Conversely, the higher income categories did not have any businesses run by the owner alone without employees but had more businesses with larger number of employees. A similar trend was observed for rural businesses, where majority of businesses in lower income categories had either no employees or only five employees or less. However, mid to high income businesses in the rural sample did not exhibit a similar trend to the urban sample, where high income businesses had larger number of employees, although no businesses in the high income categories of the rural sample were also run by the owner alone as exhibited in the urban sample.

Table 14: Monthly income and Employees Cross-tabulation – Urban sample

		Employees					Total
		no employees	1 - 5 employees	6 - 10 employees	11 - 15 employees	15 employees or more	
Monthly income							
Less than Rf 1000	Count	3	4	1	0	0	8
	% within income	37.5%	50.0%	12.5%	.0%	.0%	100.0%
Rf 1,000 - 4,999	Count	15	14	2	1	0	32
	% within income	46.9%	43.8%	6.3%	3.1%	.0%	100.0%
Rf 5,000 - 14,999	Count	6	16	5	1	2	30
	% within income	20.0%	53.3%	16.7%	3.3%	6.7%	100.0%
Rf 15,000 - 24,999	Count	0	16	7	3	2	28
	% within income	.0%	57.1%	25.0%	10.7%	7.1%	100.0%
Rf 25,000 - 49,999	Count	0	6	6	1	5	18
	% within income	.0%	33.3%	33.3%	5.6%	27.8%	100.0%
More than Rf 50,000	Count	0	11	12	3	10	36
	% within income	.0%	30.6%	33.3%	8.3%	27.8%	100.0%
Total	Count	24	67	33	9	19	152
	% within income	15.8%	44.1%	21.7%	5.9%	12.5%	100.0%

Table 15: Monthly income and Employees Cross-tabulation – Rural sample

		Employees					Total
		no employees	1 - 5 employees	6 - 10 employees	11 - 15 employees	15 employees or more	
Monthly income							
Less than Rf 1000	Count	11	14	3	0	0	28
	% within income	39.3%	50.0%	10.7%	.0%	.0%	100.0%
Rf 1,000 - 4,999	Count	14	34	7	1	0	56
	% within income	25.0%	60.7%	12.5%	1.8%	.0%	100.0%
Rf 5,000 - 14,999	Count	6	20	12	2	2	42
	% within income	14.3%	47.6%	28.6%	4.8%	4.8%	100.0%
Rf 15,000 - 24,999	Count	0	12	5	2	0	19
	% within income	.0%	63.2%	26.3%	10.5%	.0%	100.0%
Rf 25,000 - 49,999	Count	0	4	3	2	1	10
	% within income	.0%	40.0%	30.0%	20.0%	10.0%	100.0%
More than Rf 50,000	Count	0	1	3	0	1	5
	% within income	.0%	20.0%	60.0%	.0%	20.0%	100.0%
Total	Count	31	85	33	7	4	160
	% within income	19.4%	53.1%	20.6%	4.4%	2.5%	100.0%

Percentage of local sales and supply

In order to assess the significance of the local community in terms of marketing potential and availability of supplies, businesses were asked to give an estimate of the percentage of their income through local sales and percentage of supplies bought locally. Results showed that the trend for local income appeared similar for both urban and rural businesses. About half of the businesses got their income from local sales, and only about a third of the businesses had up to a quarter of their income coming from outside their community.

Table 16: Percent local income

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0%	2	1.3	1.3	4	2.5	2.5
1 - 25%	14	9.2	10.5	17	10.5	13.0
26 - 50%	15	9.9	20.4	13	8.0	21.0
51 - 75%	19	12.5	32.9	19	11.7	32.7
76 - 99%	30	19.7	52.6	37	22.8	55.5
100%	72	47.4	100.0	72	44.4	100.0
Total	152	100.0		162	100.0	

Table 17: Percent local supply

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0%	14	9.2	9.2	38	23.5	23.5
1 - 25%	22	14.5	23.7	35	21.6	45.1
26 - 50%	13	8.6	32.2	19	11.7	56.8
51 - 75%	6	3.9	36.2	7	4.3	61.1
76 - 99%	17	11.2	47.4	13	8.0	69.1
100%	80	52.6	100.0	50	30.9	100.0
Total	152	100.0		162	100.0	

However, trends for local supply differed between the two samples, with more rural businesses purchasing most of their supplies from outside their community compared to the urban sample. While about half of the urban businesses purchased all their supplies locally, this compared with 30.9% for the rural sample. A third of the urban sample purchased up to half of their supplies from outside, while about half of the rural sample did the same. Only about 10% of urban businesses

bought all their supplies from outside, but this figure was almost a quarter for the rural sample. Although these findings failed to show a difference in local income for the rural sample as expected, the prediction for supplies for rural businesses is being supported. Having to purchase most of their supplies from other communities (mostly from the capital for the Maldives case) puts additional burden on rural businesses and increases the time and effort business owner have to put in as well as cost of production as goods have to be transported by sea.

Main barrier for business operations

22.4% of the urban sample identified availability of raw materials as the main barrier and this may be related to the fact that almost all goods are imported to the country. As predicted, due to land scarcity in the urban capital, land availability and rental costs were identified as the main barrier by about a third of the urban businesses. Limited market opportunities were identified as the main barrier by 17.1% and problems relating to employees and problems in obtaining credit were identified by about a tenth of the sample. For the rural sample, the main barriers were the anticipated problems related to sales and supplies: 29% of the rural businesses identified small/limited market opportunities as the main barrier while 28.4% identified availability of raw materials as the main problem. Land issues, rental costs or problems with employees did not feature high on list of barriers for rural businesses as in the case of urban businesses, but difficulties in obtaining credit was identified as the next biggest barrier by 20.4% of rural businesses. Other problems that were noted included difficulties in securing payment from customers, obtaining foreign currency, transporting goods and increasing cost of raw materials.

Table 18: Main barrier for business operations

	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Small/limited market opportunities	26	17.1	17.1	47	29.0	29.0
Availability of raw materials	34	22.4	39.5	46	28.4	57.4
Availability of land	33	21.7	61.2	11	6.8	64.2
High rental costs	21	13.8	75.0	3	1.9	66.0
Difficulties in recruiting and retaining employees	16	10.5	85.5	11	6.8	72.8
Difficulties in obtaining credit	14	9.2	94.7	33	20.4	93.2
Other	8	5.3	100.0	11	6.8	100.0
Total	152	100.0		162	100.0	

Owner/manager characteristics

The findings for the urban sample showed that business owner age ranged from 20 to 66 and close to half of the respondents were below age 40 while about 80% were below age 50 (see Table 15). About 15% were between ages 50 and 60 and only about 4% were above 60 years. The rural sample also had 80% below age 50, but the distribution within the age categories were different to that of the urban sample. Rural businesses had fewer younger owners/managers below 30 years (5.6%) and more owners in the 40 to 49 age group (41.4%). The rural sample also had a bigger percentage (9.2%) of older owners who are over 60 years of age.

Table 19: Owner age

Age group	Urban sample			Rural sample		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
20 - 29	27	17.8	17.8	9	5.6	5.6
30 - 39	45	29.6	47.4	52	32.1	37.7
40 - 49	51	33.6	80.9	66	40.7	78.4
50 - 59	23	15.1	96.1	19	11.7	90.1
60 - 69	6	3.9	100.0	13	8.0	98.1
70 - 79	0	0.0		2	1.2	99.3
Missing		0.0		1	0.6	100.0
Total	152	100.0		162	100.0	

Gender distribution for the urban sample showed a relatively comparable distribution of males and females, with males represented slightly higher in the sample with 55.9% and females at 44.1%. However, males were represented to a greater extent in the rural sample, with almost three quarters of the sample being males compared to a quarter of females. This bias may be due to a wider distribution of the rural sample across different manufacturing sectors compared to the urban sample, and the traditional work roles for men and women. This explanation could be substantiated by doing a cross tabulation of activity type by gender.

Table 20: Owner gender

	Urban sample		Rural sample	
	Frequency	Percent	Frequency	Percent
Male	85	55.9	121	74.7
Female	67	44.1	41	25.3
Total	152	100.0	162	100.0

Cross tabulation of business activity by gender shows that 97% of females in the urban sample and 95% of females in the rural sample were engaged in food and beverages and apparel and tailored products. Furthermore, four of the manufacturing sectors in each sample did not have any female business owners or managers. Although opinions in general may be in favour of gender equality, these findings give evidence to the existence of a gender bias in terms of work roles in real every day lives. This bias may be explained by perceptions of appropriate or common work roles for males and females that could be affected by traditional and cultural values of the Maldivian people. Women have traditionally been more involved in food products and apparel as well as traditional crafts, while men are engaged in more manual jobs such as carpentry, boat building and masonry.

Table 21: Business activity and Owner gender Cross-tabulation

		Urban sample			Rural sample		
		Male	Female	Total	Male	Female	Total
Business activity							
Food and beverages	Count	12	37	49	41	28	69
	% within gender	14.1%	55.2%	32.2%	33.9%	68.3%	42.6%
Apparel and tailored products	Count	10	28	38	10	11	21
	% within gender	11.8%	41.8%	25.0%	8.3%	26.8%	13.0%
Wood products and furniture	Count	11	0	11	21	1	22
	% within gender	12.9%	.0%	7.2%	17.4%	2.4%	13.6%
Paper products, printing and publishing	Count	13	1	14	4	0	4
	% within gender	15.3%	1.5%	9.2%	3.3%	.0%	2.5%
Metal products	Count	14	0	14	9	0	9
	% within gender	16.5%	.0%	9.2%	7.4%	.0%	5.6%
Cement products	Count	3	0	3	12	0	12
	% within gender	3.5%	.0%	2.0%	9.9%	.0%	7.4%
Boat building and repair	Count	2	0	2	8	0	8
	% within gender	2.4%	.0%	1.3%	6.6%	.0%	4.9%
Other	Count	20	1	21	16	1	17
	% within gender	23.5%	1.5%	13.8%	13.2%	2.4%	10.5%
Total	Count	85	67	152	121	41	162
	% within gender	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ICT use

Results for use of computers and Internet by business owners/managers showed that close to three quarters of the urban sample used computers for business purposes. However, the percentage using

Internet for business purposes was slightly lower at 63.2%. As predicted, these numbers were much smaller for the rural sample. Only 37% of rural business owners used computers and this percentage was lower at 24.7% for Internet use. Use of computers/Internet for business appeared to be relatively new for businesses in both samples. For the urban sample, 97.3% of businesses had been using ICTs for only four years or less. Only two businesses had been using ICTs for five years and just one business had been using ICTs for 6 years in the urban sample. Length of ICT use is even shorter for the rural sample, with 35% of the businesses having used ICTs for just one year and 38.3% for two years.

Table 22: Own use of ICTs

	Urban sample				Rural sample			
	Use computers		Use Internet		Use computers		Use Internet	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Yes	111	73.0	96	63.2	60	37.0	40	24.7
No	41	27.0	56	36.8	102	63.0	122	75.3
Total	152	100.0	152	100.0	162	100.0	162	100.0

Table 23: Tasks ICTs used for

Tasks	Urban sample		Rural sample	
	Frequency	% of businesses using ICTs	Frequency	% of businesses using ICTs
Searching for information	81	73.0	27	45.0
Documentation and word processing	68	61.3	40	66.7
Account keeping	62	55.9	34	56.7
Communicating with business partners	56	50.5	11	18.3
Business plans and estimates	49	44.1	22	36.7
Inventory management	42	37.8	15	25.0
Linking with customers (webpage)	28	25.2	5	8.3
Enabling transactions via webpage	24	21.6	3	5.0
Other	15	13.5	2	3.3

Information was collected on the type of tasks for which ICTs were used within the business. Findings showed that the most common use for the urban sample was to search for information, with 73% of the 111 businesses using ICTs, using it for this purpose. Other common uses for the urban sample included documentation (61.3%), account keeping (55.9%), and communicating with business partners (50.5%). Only about a quarter of the urban businesses using ICTs had a webpage and 21.6%

enabled transactions via the webpage. 13.5% utilized ICTs for other purposes which are related to production tasks such as developing designs for products. Rural businesses appeared to use ICTs more for internal management of business including documentation (66.7%), account keeping (56.7%) and business plans and estimates (36.7%). In addition, ICTs were used to search for information by 45% of rural businesses which use ICTs. Only 5 of the 60 rural businesses using ICTs had a webpage of which three enabled online transactions.

Business owners/managers who did not use ICTs themselves were asked if they got other people to apply ICTs for any business tasks. Findings show that only 10 of the 41 urban businesses owners/managers (24.4%) who did not use ICTs themselves, got others to use computers for business tasks, while only 6 (14.6%) got others to use Internet for business tasks. Therefore, in total only 31 of the 152 businesses (20.4%) included in the urban sample did not use ICTs for any business tasks. Rural businesses do not appear to use other people for applying ICTs to their businesses, as only 11.8% of owners/managers who did not use ICTs themselves, got others to use computers, while only 2% used others for Internet use. Therefore overall 72 of the 162 rural businesses (44.4%) utilized ICTs for business tasks. The types of business tasks for which other people were used to apply ICTs included mainly information search and documentation for both samples but rural sample also used others' help for inventory management.

Table 24: ICTs use by other people

	Urban sample				Rural sample			
	Use computers		Use Internet		Use computers		Use Internet	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Yes	10	24.4	6	14.6	12	11.8	2	2.0
No	31	75.6	35	85.4	90	88.2	100	98.0
Total	41	100.0	41	100.0	102	100.0	102	100.0

Table 25: Tasks ICTs used by others

Tasks	Urban sample		Rural sample	
	Frequency	% of businesses using ICTs	Frequency	% of businesses using ICTs
Searching for information	5	50.0	4	33.3
Documentation and word processing	2	20.0	7	58.3
Account keeping	1	10.0	5	41.7
Communicating with business partners	1	10.0	1	8.3
Business plans and estimates	1	10.0	1	8.3
Inventory management	0	0.0	0	0.0
Other	3	30.0	0	0.0

Appendix E

Reliability of constructs

Context factor measures

Inter-items Correlations

Context factor constructs	Urban sample				Rural sample			
	Inter-item Correlations		Item-to-total Correlations		Inter-item Correlations		Item-to-total Correlations	
	Min	Max	Min	Max	Min	Max	Min	Max
Management practice	0.279	0.706	0.438	0.678	0.271	0.710	0.510	0.583
Contribution from personal networks	0.272	0.509	0.395	0.598	0.275	0.619	0.509	0.705
Information sources	0.048	0.561	0.077	0.625	0.252	0.564	0.396	0.600
Communication and Interaction	0.115	0.554	0.342	0.675	0.244	0.660	0.549	0.619
Skill level	0.092	0.659	0.430	0.467	0.051	0.560	0.513	0.615
Status and power	0.336	0.555	0.450	0.611	0.348	0.843	0.364	0.707
Gender roles	0.356	0.775	0.378	0.686	0.384	0.848	0.420	0.760

For the urban sample, inter-item correlations were far below acceptable levels for 3 constructs.

Within the information sources construct, the problematic item was the one about having direct access locally to information sources, while frequency of interaction was the problematic item in the communication and interaction construct. Skill level construct had two problematic items, namely ICT knowledge within family and ICT knowledge of family and friends within the community. For the rural sample, correlations were below acceptable levels for skill level construct with the same two problematic items as the urban sample. Similarly, the same item regarding local access to information in the information sources construct appeared to be problematic for the rural sample as well.

Therefore, these problematic items were removed from further analysis as reliability could not be established.

Cronbach's alpha

Scales for five constructs showed alpha values of 0.70 and above for both samples, which indicates internal consistency of items included in the scale. Original scale used for **information sources** construct only scored 0.676 for the urban sample and 0.481 for the rural sample. However, the alpha

scores increased to 0.799 for the urban sample and 0.812 for the rural sample, when the problematic item relating to information access was removed from the scale.

Context factor constructs	Urban sample				Rural sample			
	Original items		Problematic items removed		Original items		Problematic items removed	
	No. of items	alpha	No. of items	alpha	No. of items	alpha	No. of items	alpha
Management practice	5	0.767	-	-	5	0.781	-	-
Contribution from personal networks	5	0.772	-	-	5	0.823	-	-
Information sources	5	0.676	4	0.799	5	0.481	4	0.812
Communication and Interaction	5	0.706	4	0.706	5	0.783	-	-
Skill level	4	0.418	2	0.783	4	0.569	2	0.716
Status and power	3	0.703	-	-	3	0.747	-	-
Gender roles	3	0.738	-	-	3	0.787	-	-

Original measures used for **skill level** showed a very low alpha score of 0.418 for the urban sample and 0.569 for the rural sample. This may be because this construct was measured differently to other constructs, by using actual value and level categories for items rather than opinion statements. While other scale items consisted of a statement for which respondents had to indicate their agreement using a scale of one to five, items for the skill construct required the respondent to indicate their education and skills using predefined categories which were based on education level, knowledge level and number of people known to respondent with adequate ICT skills. These items were developed based on the findings of the field study component, which showed that while education and skills of the owner could be related to his perceptions and use of ICT, the level of ICT skills available to the owner within his family and within the community both appeared to have a positive influence on the extent to which ICT was utilized within the business. Therefore, the low alpha score for **skill level** may be explained by the lack of correspondence between the items included in the construct, as logically there need not necessarily be a linkage between the ICT skills of the business owner, ICT skills of his family members and ICT skills of other relatives and friends within the community. However, when only the education level and ICT skills of the owner are considered as a scale, alpha scores improved.

ICT perceptions measures

Inter-items Correlations

Inter-item correlations and item-to-total correlations for constructs relating to ICT perceptions showed reliability of all constructs except **lack of resources/skills**, which had inter-item correlations less than 0.30 and item-to-total correlations less than 0.50 for both urban and rural samples. Within this construct, item relating to language fluency appeared to be problematic within both samples and was therefore removed from the analysis.

ICT perceptions constructs	Urban sample				Rural sample			
	Inter-item Correlations		Item-to-total Correlations		Inter-item Correlations		Item-to-total Correlations	
	Min	Max	Min	Max	Min	Max	Min	Max
Organizational support	0.570	0.718	0.673	0.789	0.621	0.848	0.830	0.931
Information Management	0.565	0.764	0.747	0.815	0.724	0.915	0.818	0.928
Lack of need	0.681	0.771	0.755	0.823	0.677	0.817	0.758	0.874
Lack of resources/skills	0.097	0.507	0.315	0.629	0.181	0.708	0.308	0.679
Compatibility	0.600	0.736	0.686	0.796	0.635	0.78	0.725	0.803

Cronbach's alpha

The alpha scores for all ICT perceptions constructs were higher than 0.80 except for construct **lack of resources/skills**. The alpha scores improved when the problematic item relating to language fluency was deleted from the scale. Language fluency was included in the scale as the field study component highlighted it as an important barrier in the adoption of ICTs in a country where English is not the native language.

ICT perceptions constructs	Urban sample				Rural sample			
	Original items		Problematic items removed		Original items		Problematic items removed	
	No. of items	alpha	No. of items	alpha	No. of items	alpha	No. of items	alpha
Organizational support	4	0.883	-	-	4	0.928	-	-
Information Management	6	0.923	-	-	6	0.963	-	-
Lack of need	3	0.889	-	-	3	0.895	-	-
Lack of resources/skills	6	0.741	5	0.757	6	0.791	5	0.801
Compatibility	4	0.884	-	-	4	0.893	-	-

Appendix F

Exploratory Factor Analysis of context factor measures

Table 1: Factorability

	Bartlett's test of sphericity (sig.)	Kaiser-Meyer-Olkin (KMO) MSA	Individual item MSAs
Urban sample	0.000	0.746	> 0.50
Rural sample	0.000	0.738	>0.50

Table 2: Initial rotated factor matrix – Urban sample

	Component							
	1	2	3	4	5	6	7	8
Eigen value	3.24	2.57	2.18	2.16	2.05	2.05	1.99	1.34
Variance extracted	12.47	9.87	8.40	8.29	7.89	7.89	7.66	5.16
Network3_Marketing	.771							
Network2_Procurement	.753							
Network1_Number_assisting	.701							
Information3_Markets	.635							
Network4_Informal_arrangements	.562							
Network5_Compensation	.509							
Management4_Decision_making		.756						
Management1_Documentation		.722						
Management2_Inventory		.702						
Management5_Discounts		.651						
Management3_Use_of_Earnings		.620						
Information4_Advice			.772					
Information5_Reliability			.660					
Information2_Products			.567					
Gender2_Affect_work_practice				.895				
Gender1_Affect_work_type				.887				
Gender3_Opinion_work_roles				.583				
Skills1_Owner_education					.856			
Skills2_ICT_knowledge					.838			
Interaction2_Social						.848		
Interaction3_Within_community						.791		
Interaction5_Need_to_inspect						.622		
Status1_Employee_trust							.776	
Status2_Employee_opinion							.755	
Status3_Employee_info_access							.519	
Interaction4_Outside_community								.803

Convergent and discriminant validity: Except from two items, both convergent and discriminant validity was established for the seven constructs as items included in each measure had high loadings on its intended factor and low cross loadings with other factors.

Items violating validity:

- Item “Information3_markets” from the **information sources** construct did not load on the intended factor for the urban sample, but loaded on a different factor together with items from the **contribution from personal networks** construct. One reason for this unexpected loading could be that personal networks were used more for market information compared to other types of information. However, in order to maintain discriminant validity, this item was removed from the analysis.
- Item “Interaction4_Outside_community” loaded on different factor by itself, thus violating validity conditions. Therefore, this item was removed from the **communication and interaction** construct.

Table 3: Final rotated factor matrix – Urban sample

	Component						
	1	2	3	4	5	6	7
Eigen value	2.91	2.51	2.12	2.06	2.05	2.02	1.99
Variance extracted	12.11	10.44	8.83	8.58	8.56	8.43	8.30
Network3_Marketing	.786						
Network2_Procurement	.782						
Network1_Number_assisting	.691						
Network4_Informal_arrangements	.578						
Network5_Compensation	.524						
Management4_Decision_making		.764					
Management1_Documentation		.708					
Management2_Inventory		.694					
Management5_Discounts		.664					
Management3_Use_of_Earnings		.605					
Gender2_Affect_work_practice			.897				
Gender1_Affect_work_type			.888				
Gender3_Opinion_work_roles			.555				
Skills1_Owner_education				.868			
Skills2_ICT_knowledge				.848			
Interaction2_Social					.832		
Interaction3_Within_community					.811		
Interaction5_Need_to_inspect					.701		
Status1_Employee_trust						.775	
Status2_Employee_opinion						.775	
Status3_Employee_info_access						.528	
Information4_Advice							.782
Information5_Reliability							.612
Information2_Products							.551

Table 4: Initial rotated factor matrix – Rural sample

	Component						
	1	2	3	4	5	6	7
Eigen value	3.46	3.04	2.71	2.64	2.51	2.34	1.67
Variance extracted	12.80	11.25	10.03	9.78	9.30	8.66	6.18
Network2_Procurement	.809						
Network3_Marketing	.798						
Network4_Informal_arrangements	.774						
Network1_Number_assisting	.642						
Network5_Compensation	.614						
Status1_Employee_trust		.868					
Status2_Employee_opinion		.854					
Status3_Employee_info_access		.606					
Interaction5_Need_to_inspect		.513					
Interaction4_Outside_community							
Management3_Use_of_Earnings			.836				
Management5_Discounts			.790				
Management4_Decisions			.755				
Management2_Inventory			.615				
Management1_Documentation			.584				
Interaction1_Frequency				.757			
Interaction3_Within_community				.745			
Interaction2_Social				.745			
Gender1_Affect_work_type					.899		
Gender2_Affect_work_practice					.892		
Gender3_Opinion_work_roles					.610		
Information2_Products						.705	
Information3_Markets						.678	
Information5_Reliability						.634	
Information4_Advice						.624	
Skills1_Owner_education							.862
Skills2_ICT_knowledge							.837

Convergent and discriminant validity: Except from two items, both convergent and discriminant validity was established for the seven constructs as items included in each measure had high loadings on its intended factor and low cross loadings with other factors.

Items violating validity:

- Item “Interaction4_Outside_community” did not load on any factor. Therefore, this item was removed from the **communication and interaction** construct.
- Item “Interaction5_Need_to_inspect” also violated validity conditions as it loaded on a different factor than the intended one, and was removed from the analysis.

Table 5: Final rotated factor matrix – Rural sample

	Component						
	1	2	3	4	5	6	7
Eigen value	3.40	2.69	2.60	2.38	2.35	2.28	1.65
Variance extracted	13.61	10.78	10.41	9.53	9.38	9.11	6.58
Network2_Procurement	.806						
Network3_Marketing	.797						
Network4_Informal_arrangements	.773						
Network1_Number_assisting	.646						
Network5_Compensation	.611						
Management3_Use_of_Earnings		.835					
Management5_Discounts		.788					
Management4_Decisions		.760					
Management2_Inventory		.614					
Management1_Documentation		.585					
Status1_Employee_trust			.878				
Status2_Employee_opinion			.867				
Status3_Employee_info_access			.599				
Gender1_Affect_work_type				.905			
Gender2_Affect_work_practice				.900			
Gender3_Opinion_work_roles				.611			
Interaction1_Frequency					.779		
Interaction2_Social					.772		
Interaction3_Within_community					.723		
Information2_Products						.727	
Information3_Markets						.702	
Information5_Reliability						.618	
Information4_Advice						.609	
Skills1_Owner_education							.874
Skills2_ICT_knowledge							.838

Table 6: Initial/final rotated factor matrix – Combined rural/urban sample

	Component						
	1	2	3	4	5	6	7
Eigen value	3.446	2.800	2.556	2.416	2.250	2.206	1.773
Variance extracted	12.762	10.371	9.467	8.949	8.332	8.171	6.567
Network2_Procurement	.792						
Network3_Marketing	.759						
Network4_Informal_arrangements	.735						
Network1_Number_assisting	.673						
Network5_Compensation	.624						
Management4_Decision_making		.780					
Management5_Discounts		.757					
Management3_Use_of_Earnings		.745					
Management1_Documentation		.648					
Management2_Inventory		.639					
Interaction3_Within_community			.761				
Interaction2_Social			.712				
Interaction5_Need_to_inspect			.711				
Interaction4_Outside_community			.569				
Interaction1_Frequency			.524				
Status1_Employee_trust				.823			
Status2_Employee_opinion				.798			
Status3_Employee_info_access				.598			
Information5_Reliability					.678		
Information4_Advice					.676		
Information2_Products					.649		
Information3_Markets					.634		
Gender1_Affect_work_type						.893	
Gender2_Affect_work_practice						.876	
Gender3_Opinion_work_roles						.644	
Skills1_Owner_education							.881
Skills2_ICT_knowledge							.839

Convergent and discriminant validity: Both convergent and discriminant validity was established for all seven constructs for the combined sample, as items included in each measure had high loadings on its intended factor and low cross loadings with other factors. Reliability tests required omission of one item from **information sources** construct and two items from **skill level** construct.

Appendix G

Exploratory Factor Analysis of ICT Perceptions measures

Table 1: Factorability

	Bartlett's test of sphericity (sig.)	Kaiser-Meyer-Olkin (KMO) MSA	Individual item MSAs
Urban sample	0.000	0.925	> 0.80
Rural sample	0.000	0.918	>0. 50

Table 2: Initial rotated factor matrix – Urban sample

	Component		
	1	2	3
Eigen value	6.06	5.28	3.33
Variance extracted	27.55	24.00	15.14
Need3_Business_scale	.780		
OrgSupport2_Useful	-.754		
Compatibility3_Info_acquisition	.732		
OrgSupport1_Tasks_faster	-.722		
Need2_Importance	.707		
OrgSupprt3_Effective_support	-.700		
Compatibility2_Communication	.665		
Need1_Benefit	.642	-.516	
Compatibility1_Way_of_business	.592		.544
Resources6_Cost	.545		
Compatibility4_Info_dissemination			
InfoMngmt6_Information_quality		.777	
InfoMngmt4_Supplier_information		.776	
InfoMngmt5_Management_information		.764	
InfoMngmt3_Customer_information		.753	
InfoMngmt1_Information_access		.709	
InfoMngmt2_Strategic_information		.694	
OrgSupport4_Access_markets	-.515	.582	
Resources5_Time			.700
Resources1_Own_skills			.679
Resources4_People_to_assist			.622
Resources3_Staff_skills			.568

Convergent and discriminant validity: Both convergent and discriminant validity was established for two constructs (**information management** and **lack of resources/skills**) as items included in each scale had high loadings on its intended factor and low cross loadings with other factors.

Items violating validity:

- Contrary to expectation, items from three constructs (**organizational support**, **lack of need** and **compatibility**) all loaded on the same factor, thus violating discriminant validity. However, items from the other two constructs loaded with the opposite sign to the items from the **organizational support** construct. According to Hair et al. (2006) items with the same sign are positively related to each other, while items with opposite signs are negatively related to each other. Therefore, the opposite signs on item loadings can provide an explanation as to why many items from different constructs are loading on the same factor. While items of organizational support construct are intended to capture perceptions about benefits to the business through use of ICTs, lack of need construct and compatibility construct also capture similar perceptions about level of need and suitability of ICTs for the business. This may be the reason why these items are loading on the same factor. However, while items of organizational support construct were taken to be perceptions about positive benefits, lack of need construct and compatibility construct items were coded as perceived barriers to ICT use. Since the items are capturing 2 different aspects (benefits versus barriers), it is logical that items in each group will be negatively related to each other.
- Item “OrgSupport4_Access_markets” also loaded on its original factor but also loaded on a different factor with a higher value. Therefore, this item was deleted from further analysis as discriminant validity was violated.
- Item “Need1_Benefit” loaded on two factors. Therefore, this item was removed from the analysis.
- Item “Resources6_Cost” did not load on the intended factor, but loaded on a different factor with items from other constructs. Therefore, as convergent validity was violated, this item was removed from further analysis.
- Item “Compatibility1_Way_of_business” loaded on two different factors and failed discriminant validity. Item “Compatibility4_Info_dissemination” failed to load on any factor. Therefore, these two items were removed from the analysis.

Table 3: Final rotated factor matrix – Urban sample

	Component		
	1	2	3
Eigen value	4.77	4.48	2.52
Variance extracted	28.09	26.34	14.83
OrgSupport2_Useful	.778		
OrgSupprt3_Effective_support	.734		
OrgSupport1_Tasks_faster	.732		
Need3_Business_scale	-.787		
Compatibility3_Info_acquisition	-.727		
Need2_Importance	-.710		
Compatibility2_Communication	-.690		
InfoMngmt5_Management_information		.801	
InfoMngmt4_Supplier_information		.789	
InfoMngmt6_Information_quality		.788	
InfoMngmt3_Customer_information		.748	
InfoMngmt1_Information_access		.700	
InfoMngmt2_Strategic_information		.696	
Resources5_Time			.745
Resources4_People_to_assist			.687
Resources1_Own_skills			.641
Resources3_Staff_skills			.555

Table 4: Initial rotated factor matrix – Rural sample

	Component		
	1	2	3
Eigen value	6.26	5.15	3.06
Variance extracted	28.47	23.40	13.91
Compatibility2_Communication	.784		
Need3_Business_scale	.773		
Compatibility3_Info_acquisition	.751		
OrgSupport2_Useful	-.732		
Need2_Importance	.726		
Need1_Benefit	.721		
Compatibility4_Info_dissemination	.698		
Compatibility1_Way_of_business	.687		
OrgSupport1_Tasks_faster	-.671		
OrgSupprt3_Effective_support	-.669		
OrgSupport4_Access_markets	-.619		
InfoMngmt2_Strategic_information		.871	
InfoMngmt6_Information_quality		.863	
InfoMngmt5_Management_information		.846	
InfoMngmt4_Supplier_information		.801	
InfoMngmt1_Information_access		.798	
InfoMngmt3_Customer_information		.728	
Resources5_Time			.777
Resources4_People_to_assist			.774
Resources6_Cost			.662
Resources3_Staff_skills			.635
Resources1_Own_skills			.580

Convergent and discriminant validity: Both convergent and discriminant validity was established for two constructs (**information management** and **lack of resources/skills**) as items included in each scale had high loadings on its intended factor and low cross loadings with other factors.

Items violating validity:

As for the urban sample, items from 3 constructs (**organizational support**, **lack of need** and **compatibility**) were all loading on the same factor, thus violating discriminant validity. However, items from the other two constructs loaded with the opposite sign to the items from the **organizational support** construct.

Table 5: Final rotated factor matrix – Rural sample

	Component		
	1	2	3
Eigen value	6.26	5.15	3.06
Variance extracted	28.47	23.40	13.91
OrgSupport2_Useful	-.732		
OrgSupport1_Tasks_faster	-.671		
OrgSupprt3_Effective_support	-.669		
OrgSupport4_Access_markets	-.619		
Compatibility2_Communication	.784		
Need3_Business_scale	.773		
Compatibility3_Info_acquisition	.751		
Need2_Importance	.726		
Need1_Benefit	.721		
Compatibility4_Info_dissemination	.698		
Compatibility1_Way_of_business	.687		
InfoMngmt2_Strategic_information		.871	
InfoMngmt6_Information_quality		.863	
InfoMngmt4_Supplier_information		.846	
InfoMngmt5_Management_information		.801	
InfoMngmt1_Information_access		.798	
InfoMngmt3_Customer_information		.728	
Resources5_Time			.777
Resources4_People_to_assist			.774
Resources6_Cost			.662
Resources3_Staff_skills			.635
Resources1_Own_skills			.580

Table 6: Initial/final rotated factor matrix – Combined rural/urban sample

	Component		
	1	2	3
Eigen value	6.67	5.29	3.22
Variance extracted	30.32	24.05	14.63
Need3_Business_scale	.780		
Compatibility2_Communication	.767		
OrgSupport2_Useful	-.756		
Compatibility3_Info_acquisition	.751		
Need2_Importance	.737		
Need1_Benefit	.708		
OrgSupprt3_Effective_support	-.698		
OrgSupport1_Tasks_faster	-.681		
Compatibility4_Info_dissemination	.672		
Compatibility1_Way_of_business	.668		
OrgSupport4_Access_markets	-.623		
InfoMngmt6_Information_quality		.838	
InfoMngmt5_Management_information		.826	
InfoMngmt2_Strategic_information		.812	
InfoMngmt1_Information_access		.782	
InfoMngmt4_Supplier_information		.772	
InfoMngmt3_Customer_information		.710	
Resources5_Time			.738
Resources4_People_to_assist			.714
Resources3_Staff_skills			.643
Resources1_Own_skills			.627
Resources6_Cost			.550

Convergent and discriminant validity: Both convergent and discriminant validity was established for two constructs (**information management** and **lack of resources/skills**). However, as shown for both samples, items from three constructs (**organizational support, lack of need** and **compatibility**) all loaded on the same factor.

Appendix H

Descriptive statistics for construct items

Context factor 1 - Management practice

		1	2	3	4	5	Total	Missing	Mean
Management1 Documentation									
Urban	Count	108	14	0	7	23	152	0	1.84
	% within Context	71.1%	9.2%	.0%	4.6%	15.1%	100.0%		
Rural	Count	101	17	0	7	37	162	0	2.15
	% within Context	62.3%	10.5%	.0%	4.3%	22.8%	100.0%		
Total	Count	209	31	0	14	60	314	0	2.00
	% within Context	66.6%	9.9%	.0%	4.5%	19.1%	100.0%		
Management2 Inventory									
Urban	Count	83	14	2	12	41	152	0	2.43
	% within Context	54.6%	9.2%	1.3%	7.9%	27.0%	100.0%		
Rural	Count	77	21	5	4	55	162	0	2.62
	% within Context	47.5%	13.0%	3.1%	2.5%	34.0%	100.0%		
Total	Count	160	35	7	16	96	314	0	2.53
	% within Context	51.0%	11.1%	2.2%	5.1%	30.6%	100.0%		
Management3 Use of earnings									
Urban	Count	37	35	10	35	35	152	0	2.97
	% within Context	24.3%	23.0%	6.6%	23.0%	23.0%	100.0%		
Rural	Count	12	31	12	25	82	162	0	3.83
	% within Context	7.4%	19.1%	7.4%	15.4%	50.6%	100.0%		
Total	Count	49	66	22	60	117	314	0	3.41
	% within Context	15.6%	21.0%	7.0%	19.1%	37.3%	100.0%		
Management4 Decision making									
Urban	Count	83	33	9	10	17	152	0	1.98
	% within Context	54.6%	21.7%	5.9%	6.6%	11.2%	100.0%		
Rural	Count	44	24	19	36	39	162	0	3.01
	% within Context	27.2%	14.8%	11.7%	22.2%	24.1%	100.0%		
Total	Count	127	57	28	46	56	314	0	2.51
	% within Context	40.4%	18.2%	8.9%	14.6%	17.8%	100.0%		
Management5 Discounts									
Urban	Count	43	46	9	41	13	152	0	2.57
	% within Context	28.3%	30.3%	5.9%	27.0%	8.6%	100.0%		
Rural	Count	5	34	13	42	67	161	1	3.82
	% within Context	3.1%	21.1%	8.1%	26.1%	41.6%	100.0%		
Total	Count	48	80	22	83	80	313	1	3.21
	% within Context	15.3%	25.6%	7.0%	26.5%	25.6%	100.0%		

Context factor 2 - Contribution from personal networks

		1	2	3	4	5	Total	Missing	Mean
Network1_Number assisting									
Urban	Count	50	16	2	22	61	151	1	3.19
	% within Context	33.1%	10.6%	1.3%	14.6%	40.4%	100.0%		
Rural	Count	34	20	1	33	74	162	0	3.57
	% within Context	21.0%	12.3%	.6%	20.4%	45.7%	100.0%		
Total	Count	84	36	3	55	135	313	1	3.39
	% within Context	26.8%	11.5%	1.0%	17.6%	43.1%	100.0%		
Network2_Procurement									
Urban	Count	86	13	1	21	30	151	1	2.31
	% within Context	57.0%	8.6%	.7%	13.9%	19.9%	100.0%		
Rural	Count	60	15	5	27	55	162	0	3.01
	% within Context	37.0%	9.3%	3.1%	16.7%	34.0%	100.0%		
Total	Count	146	28	6	48	85	313	1	2.67
	% within Context	46.6%	8.9%	1.9%	15.3%	27.2%	100.0%		
Network3_Marketing									
Urban	Count	70	18	3	22	39	152	0	2.62
	% within Context	46.1%	11.8%	2.0%	14.5%	25.7%	100.0%		
Rural	Count	55	12	6	34	55	162	0	3.14
	% within Context	34.0%	7.4%	3.7%	21.0%	34.0%	100.0%		
Total	Count	125	30	9	56	94	314	0	2.89
	% within Context	39.8%	9.6%	2.9%	17.8%	29.9%	100.0%		
Network4_Informal arrangements									
Urban	Count	86	14	5	18	29	152	0	2.28
	% within Context	56.6%	9.2%	3.3%	11.8%	19.1%	100.0%		
Rural	Count	67	10	11	18	56	162	0	2.91
	% within Context	41.4%	6.2%	6.8%	11.1%	34.6%	100.0%		
Total	Count	153	24	16	36	85	314	0	2.61
	% within Context	48.7%	7.6%	5.1%	11.5%	27.1%	100.0%		
Network5_Compensation									
Urban	Count	94	13	6	18	21	152	0	2.07
	% within Context	61.8%	8.6%	3.9%	11.8%	13.8%	100.0%		
Rural	Count	62	12	6	21	61	162	0	3.04
	% within Context	38.3%	7.4%	3.7%	13.0%	37.7%	100.0%		
Total	Count	156	25	12	39	82	314	0	2.57
	% within Context	49.7%	8.0%	3.8%	12.4%	26.1%	100.0%		

Context factor 3 - Information sources

		1	2	3	4	5	Total	Missing	Mean
Information1 Access									
Urban	Count	58	56	9	10	19	152	0	2.18
	% within Context	38.2%	36.8%	5.9%	6.6%	12.5%	100.0%		
Rural	Count	63	16	4	18	60	161	1	2.98
	% within Context	39.1%	9.9%	2.5%	11.2%	37.3%	100.0%		
Total	Count	121	72	13	28	79	313	1	2.59
	% within Context	38.7%	23.0%	4.2%	8.9%	25.2%	100.0%		
Information2 Products									
Urban	Count	68	26	2	22	34	152	0	2.53
	% within Context	44.7%	17.1%	1.3%	14.5%	22.4%	100.0%		
Rural	Count	41	21	8	25	66	161	1	3.34
	% within Context	25.5%	13.0%	5.0%	15.5%	41.0%	100.0%		
Total	Count	109	47	10	47	100	313	1	2.94
	% within Context	34.8%	15.0%	3.2%	15.0%	31.9%	100.0%		
Information3 Markets									
Urban	Count	69	19	1	28	35	152	0	2.61
	% within Context	45.4%	12.5%	.7%	18.4%	23.0%	100.0%		
Rural	Count	43	20	6	27	65	161	1	3.32
	% within Context	26.7%	12.4%	3.7%	16.8%	40.4%	100.0%		
Total	Count	112	39	7	55	100	313	1	2.97
	% within Context	35.8%	12.5%	2.2%	17.6%	31.9%	100.0%		
Information4 Advice									
Urban	Count	40	24	2	42	44	152	0	3.17
	% within Context	26.3%	15.8%	1.3%	27.6%	28.9%	100.0%		
Rural	Count	26	17	5	32	82	162	0	3.78
	% within Context	16.0%	10.5%	3.1%	19.8%	50.6%	100.0%		
Total	Count	66	41	7	74	126	314	0	3.49
	% within Context	21.0%	13.1%	2.2%	23.6%	40.1%	100.0%		
Information5 Reliability									
Urban	Count	12	19	26	41	54	152	0	3.70
	% within Context	7.9%	12.5%	17.1%	27.0%	35.5%	100.0%		
Rural	Count	20	7	6	25	101	159	3	4.13
	% within Context	12.6%	4.4%	3.8%	15.7%	63.5%	100.0%		
Total	Count	32	26	32	66	155	311	3	3.92
	% within Context	10.3%	8.4%	10.3%	21.2%	49.8%	100.0%		

Context factor 4 - Communication and Interaction

		1	2	3	4	5	Total	Missing	Mean
Interaction1 Frequency									
Urban	Count	27	14	5	26	80	152	0	3.78
	% within Context	17.8%	9.2%	3.3%	17.1%	52.6%	100.0%		
Rural	Count	37	9	7	32	77	162	0	3.64
	% within Context	22.8%	5.6%	4.3%	19.8%	47.5%	100.0%		
Total	Count	64	23	12	58	157	314	0	3.70
	% within Context	20.4%	7.3%	3.8%	18.5%	50.0%	100.0%		
Interaction2 Social									
Urban	Count	50	28	5	21	48	152	0	2.93
	% within Context	32.9%	18.4%	3.3%	13.8%	31.6%	100.0%		
Rural	Count	30	9	2	28	93	162	0	3.90
	% within Context	18.5%	5.6%	1.2%	17.3%	57.4%	100.0%		
Total	Count	80	37	7	49	141	314	0	3.43
	% within Context	25.5%	11.8%	2.2%	15.6%	44.9%	100.0%		
Interaction3 Within community									
Urban	Count	50	28	8	25	41	152	0	2.86
	% within Context	32.9%	18.4%	5.3%	16.4%	27.0%	100.0%		
Rural	Count	30	8	5	30	89	162	0	3.86
	% within Context	18.5%	4.9%	3.1%	18.5%	54.9%	100.0%		
Total	Count	80	36	13	55	130	314	0	3.38
	% within Context	25.5%	11.5%	4.1%	17.5%	41.4%	100.0%		
Interaction4 Outside community									
Urban	Count	23	11	3	19	96	152	0	4.01
	% within Context	15.1%	7.2%	2.0%	12.5%	63.2%	100.0%		
Rural	Count	21	7	0	22	112	162	0	4.22
	% within Context	13.0%	4.3%	.0%	13.6%	69.1%	100.0%		
Total	Count	44	18	3	41	208	314	0	4.12
	% within Context	14.0%	5.7%	1.0%	13.1%	66.2%	100.0%		
Interaction5 Need to inspect									
Urban	Count	5	31	11	16	88	151	1	4.00
	% within Context	3.3%	20.5%	7.3%	10.6%	58.3%	100.0%		
Rural	Count	18	16	8	22	98	162	0	4.02
	% within Context	11.1%	9.9%	4.9%	13.6%	60.5%	100.0%		
Total	Count	23	47	19	38	186	313	1	4.01
	% within Context	7.3%	15.0%	6.1%	12.1%	59.4%	100.0%		

Context factor 5 - Skill level

		1	2	3	4	5	Total	Missing	Mean
Skills1 Owner education									
Urban	Count	29	30	63	24	6	152	0	2.66
	% within Context	19.1%	19.7%	41.4%	15.8%	3.9%	100.0%		
Rural	Count	65	59	25	11	2	162	0	1.93
	% within Context	40.1%	36.4%	15.4%	6.8%	1.2%	100.0%		
Total	Count	94	89	88	35	8	314	0	2.28
	% within Context	29.9%	28.3%	28.0%	11.1%	2.5%	100.0%		
Skills2 ICT Knowledge									
Urban	Count	28	24	51	20	29	152	0	2.99
	% within Context	18.4%	15.8%	33.6%	13.2%	19.1%	100.0%		
Rural	Count	63	41	39	16	3	162	0	2.02
	% within Context	38.9%	25.3%	24.1%	9.9%	1.9%	100.0%		
Total	Count	91	65	90	36	32	314	0	2.49
	% within Context	29.0%	20.7%	28.7%	11.5%	10.2%	100.0%		
Skills3 Family ICT Knowledge									
Urban	Count	0	9	40	35	68	152	0	4.07
	% within Context	.0%	5.9%	26.3%	23.0%	44.7%	100.0%		
Rural	Count	23	34	55	29	21	162	0	2.90
	% within Context	14.2%	21.0%	34.0%	17.9%	13.0%	100.0%		
Total	Count	23	43	95	64	89	314	0	3.47
	% within Context	7.3%	13.7%	30.3%	20.4%	28.3%	100.0%		
Skills4 Community ICT Knowledge									
Urban	Count	1	2	4	6	139	152	0	4.84
	% within Context	.7%	1.3%	2.6%	3.9%	91.4%	100.0%		
Rural	Count	9	4	11	9	129	162	0	4.50
	% within Context	5.6%	2.5%	6.8%	5.6%	79.6%	100.0%		
Total	Count	10	6	15	15	268	314	0	4.67
	% within Context	3.2%	1.9%	4.8%	4.8%	85.4%	100.0%		

Context factor 6 - Status and power

		1	2	3	4	5	Total	Missing	Mean
Status1_Employee_trust									
Urban	Count	18	9	22	21	82	152	0	3.92
	% within Context	11.8%	5.9%	14.5%	13.8%	53.9%	100.0%		
Rural	Count	20	8	32	23	79	162	0	3.82
	% within Context	12.3%	4.9%	19.8%	14.2%	48.8%	100.0%		
Total	Count	38	17	54	44	161	314	0	3.87
	% within Context	12.1%	5.4%	17.2%	14.0%	51.3%	100.0%		
Status2_Employee_opinion									
Urban	Count	24	17	16	33	62	152	0	3.61
	% within Context	15.8%	11.2%	10.5%	21.7%	40.8%	100.0%		
Rural	Count	20	9	32	31	68	160	2	3.74
	% within Context	12.5%	5.6%	20.0%	19.4%	42.5%	100.0%		
Total	Count	44	26	48	64	130	312	2	3.67
	% within Context	14.1%	8.3%	15.4%	20.5%	41.7%	100.0%		
Status3_Employee_info_access									
Urban	Count	66	12	16	20	38	152	0	2.68
	% within Context	43.4%	7.9%	10.5%	13.2%	25.0%	100.0%		
Rural	Count	44	8	32	22	53	159	3	3.20
	% within Context	27.7%	5.0%	20.1%	13.8%	33.3%	100.0%		
Total	Count	110	20	48	42	91	311	3	2.95
	% within Context	35.4%	6.4%	15.4%	13.5%	29.3%	100.0%		

Context factor 7 - Gender roles

		1	2	3	4	5	Total	Missing	Mean
Gender1_Affect_work_type									
Urban	Count	111	1	7	11	22	152	0	1.89
	% within Context	73.0%	.7%	4.6%	7.2%	14.5%	100.0%		
Rural	Count	104	6	9	5	38	162	0	2.18
	% within Context	64.2%	3.7%	5.6%	3.1%	23.5%	100.0%		
Total	Count	215	7	16	16	60	314	0	2.04
	% within Context	68.5%	2.2%	5.1%	5.1%	19.1%	100.0%		
Gender2_Affect_work_practice									
Urban	Count	119	5	8	5	15	152	0	1.63
	% within Context	78.3%	3.3%	5.3%	3.3%	9.9%	100.0%		
Rural	Count	110	4	8	5	35	162	0	2.08
	% within Context	67.9%	2.5%	4.9%	3.1%	21.6%	100.0%		
Total	Count	229	9	16	10	50	314	0	1.86
	% within Context	72.9%	2.9%	5.1%	3.2%	15.9%	100.0%		
Gender3_Opinion_work_roles									
Urban	Count	46	10	25	39	32	152	0	3.01
	% within Context	30.3%	6.6%	16.4%	25.7%	21.1%	100.0%		
Rural	Count	57	13	21	21	50	162	0	2.96
	% within Context	35.2%	8.0%	13.0%	13.0%	30.9%	100.0%		
Total	Count	103	23	46	60	82	314	0	2.98
	% within Context	32.8%	7.3%	14.6%	19.1%	26.1%	100.0%		

Perceived benefits 1 – Organizational support

		1	2	3	4	5	Total	Missing	Mean
Organizational_Support1_Tasks_faster									
Urban	Count	19	9	7	32	85	152	0	4.02
	% within Context	12.5%	5.9%	4.6%	21.1%	55.9%	100.0%		
Rural	Count	29	14	24	57	38	162	0	3.38
	% within Context	17.9%	8.6%	14.8%	35.2%	23.5%	100.0%		
Total	Count	48	23	31	89	123	314	0	3.69
	% within Context	15.3%	7.3%	9.9%	28.3%	39.2%	100.0%		
Organizational_Support2_Useful									
Urban	Count	16	8	3	29	96	152	0	4.19
	% within Context	10.5%	5.3%	2.0%	19.1%	63.2%	100.0%		
Rural	Count	31	27	16	48	40	162	0	3.24
	% within Context	19.1%	16.7%	9.9%	29.6%	24.7%	100.0%		
Total	Count	47	35	19	77	136	314	0	3.70
	% within Context	15.0%	11.1%	6.1%	24.5%	43.3%	100.0%		
Organizational_Support3_Effective_support									
Urban	Count	12	6	7	23	104	152	0	4.32
	% within Context	7.9%	3.9%	4.6%	15.1%	68.4%	100.0%		
Rural	Count	33	27	22	40	40	162	0	3.17
	% within Context	20.4%	16.7%	13.6%	24.7%	24.7%	100.0%		
Total	Count	45	33	29	63	144	314	0	3.73
	% within Context	14.3%	10.5%	9.2%	20.1%	45.9%	100.0%		
Organizational_Support4_Access_markets									
Urban	Count	14	5	6	15	112	152	0	4.36
	% within Context	9.2%	3.3%	3.9%	9.9%	73.7%	100.0%		
Rural	Count	37	26	17	20	62	162	0	3.27
	% within Context	22.8%	16.0%	10.5%	12.3%	38.3%	100.0%		
Total	Count	51	31	23	35	174	314	0	3.80
	% within Context	16.2%	9.9%	7.3%	11.1%	55.4%	100.0%		

Perceived benefits 2 – Information management

		1	2	3	4	5	Total	Missing	Mean
Information_Management1 Information_access									
Urban	Count	9	5	7	14	117	152	0	4.48
	% within Context	5.9%	3.3%	4.6%	9.2%	77.0%	100.0%		
Rural	Count	29	11	18	28	76	162	0	3.69
	% within Context	17.9%	6.8%	11.1%	17.3%	46.9%	100.0%		
Total	Count	38	16	25	42	193	314	0	4.07
	% within Context	12.1%	5.1%	8.0%	13.4%	61.5%	100.0%		
Information_Management2 Strategic information									
Urban	Count	11	6	11	20	104	152	0	4.32
	% within Context	7.2%	3.9%	7.2%	13.2%	68.4%	100.0%		
Rural	Count	24	13	21	50	54	162	0	3.60
	% within Context	14.8%	8.0%	13.0%	30.9%	33.3%	100.0%		
Total	Count	35	19	32	70	158	314	0	3.95
	% within Context	11.1%	6.1%	10.2%	22.3%	50.3%	100.0%		
Information_Management3 Customer information									
Urban	Count	9	6	7	22	108	152	0	4.41
	% within Context	5.9%	3.9%	4.6%	14.5%	71.1%	100.0%		
Rural	Count	29	29	19	48	37	162	0	3.22
	% within Context	17.9%	17.9%	11.7%	29.6%	22.8%	100.0%		
Total	Count	38	35	26	70	145	314	0	3.79
	% within Context	12.1%	11.1%	8.3%	22.3%	46.2%	100.0%		
Information_Management4 Supplier information									
Urban	Count	10	6	7	18	111	152	0	4.41
	% within Context	6.6%	3.9%	4.6%	11.8%	73.0%	100.0%		
Rural	Count	29	23	15	56	39	162	0	3.33
	% within Context	17.9%	14.2%	9.3%	34.6%	24.1%	100.0%		
Total	Count	39	29	22	74	150	314	0	3.85
	% within Context	12.4%	9.2%	7.0%	23.6%	47.8%	100.0%		
Information_Management5 Management information									
Urban	Count	9	1	6	15	121	152	0	4.57
	% within Context	5.9%	.7%	3.9%	9.9%	79.6%	100.0%		
Rural	Count	25	7	17	32	79	160	2	3.83
	% within Context	15.6%	4.4%	10.6%	20.0%	49.4%	100.0%		
Total	Count	34	8	23	47	200	312	2	4.19
	% within Context	10.9%	2.6%	7.4%	15.1%	64.1%	100.0%		
Information_Management6 Information quality									
Urban	Count	9	0	10	23	110	152	0	4.48
	% within Context	5.9%	.0%	6.6%	15.1%	72.4%	100.0%		
Rural	Count	24	6	18	43	69	160	2	3.79
	% within Context	15.0%	3.8%	11.3%	26.9%	43.1%	100.0%		
Total	Count	33	6	28	66	179	312	2	4.13
	% within Context	10.6%	1.9%	9.0%	21.2%	57.4%	100.0%		

Perceived barriers 1 – Lack of need

		1	2	3	4	5	Total	Missing	Mean
Need1_Benefit									
Urban	Count	101	15	11	11	14	152	0	1.83
	% within Context	66.4%	9.9%	7.2%	7.2%	9.2%	100.0%		
Rural	Count	41	38	18	41	24	162	0	2.81
	% within Context	25.3%	23.5%	11.1%	25.3%	14.8%	100.0%		
Total	Count	142	53	29	52	38	314	0	2.33
	% within Context	45.2%	16.9%	9.2%	16.6%	12.1%	100.0%		
Need2_Importance									
Urban	Count	102	21	4	7	18	152	0	1.80
	% within Context	67.1%	13.8%	2.6%	4.6%	11.8%	100.0%		
Rural	Count	11	47	17	56	31	162	0	3.30
	% within Context	6.8%	29.0%	10.5%	34.6%	19.1%	100.0%		
Total	Count	113	68	21	63	49	314	0	2.58
	% within Context	36.0%	21.7%	6.7%	20.1%	15.6%	100.0%		
Need3_Business_scale									
Urban	Count	88	22	6	13	22	151	1	2.07
	% within Context	58.3%	14.6%	4.0%	8.6%	14.6%	100.0%		
Rural	Count	9	42	12	55	44	162	0	3.51
	% within Context	5.6%	25.9%	7.4%	34.0%	27.2%	100.0%		
Total	Count	97	64	18	68	66	313	1	2.81
	% within Context	31.0%	20.4%	5.8%	21.7%	21.1%	100.0%		

Perceived barriers 2 – Lack of resources/skills

		1	2	3	4	5	Total	Missing	Mean
Resources1 Own skills									
Urban	Count	58	32	3	22	37	152	0	2.66
	% within Context	38.2%	21.1%	2.0%	14.5%	24.3%	100.0%		
Rural	Count	30	34	6	42	50	162	0	3.30
	% within Context	18.5%	21.0%	3.7%	25.9%	30.9%	100.0%		
Total	Count	88	66	9	64	87	314	0	2.99
	% within Context	28.0%	21.0%	2.9%	20.4%	27.7%	100.0%		
Resources2 Language									
Urban	Count	74	16	6	12	44	152	0	2.58
	% within Context	48.7%	10.5%	3.9%	7.9%	28.9%	100.0%		
Rural	Count	41	21	11	16	73	162	0	3.36
	% within Context	25.3%	13.0%	6.8%	9.9%	45.1%	100.0%		
Total	Count	115	37	17	28	117	314	0	2.98
	% within Context	36.6%	11.8%	5.4%	8.9%	37.3%	100.0%		
Resources3 Staff skills									
Urban	Count	67	32	12	8	33	152	0	2.39
	% within Context	44.1%	21.1%	7.9%	5.3%	21.7%	100.0%		
Rural	Count	26	50	25	22	39	162	0	2.99
	% within Context	16.0%	30.9%	15.4%	13.6%	24.1%	100.0%		
Total	Count	93	82	37	30	72	314	0	2.70
	% within Context	29.6%	26.1%	11.8%	9.6%	22.9%	100.0%		
Resources4 People to assist									
Urban	Count	125	13	1	5	8	152	0	1.41
	% within Context	82.2%	8.6%	.7%	3.3%	5.3%	100.0%		
Rural	Count	56	56	18	8	24	162	0	2.31
	% within Context	34.6%	34.6%	11.1%	4.9%	14.8%	100.0%		
Total	Count	181	69	19	13	32	314	0	1.87
	% within Context	57.6%	22.0%	6.1%	4.1%	10.2%	100.0%		
Resources5 Time									
Urban	Count	86	25	5	13	23	152	0	2.09
	% within Context	56.6%	16.4%	3.3%	8.6%	15.1%	100.0%		
Rural	Count	39	42	19	22	40	162	0	2.89
	% within Context	24.1%	25.9%	11.7%	13.6%	24.7%	100.0%		
Total	Count	125	67	24	35	63	314	0	2.50
	% within Context	39.8%	21.3%	7.6%	11.1%	20.1%	100.0%		
Resources6 Cost									
Urban	Count	96	15	7	7	27	152	0	2.04
	% within Context	63.2%	9.9%	4.6%	4.6%	17.8%	100.0%		
Rural	Count	41	22	21	20	56	160	2	3.18
	% within Context	25.6%	13.8%	13.1%	12.5%	35.0%	100.0%		
Total	Count	137	37	28	27	83	312	2	2.62
	% within Context	43.9%	11.9%	9.0%	8.7%	26.6%	100.0%		

Perceived barriers 3 – Compatibility

		1	2	3	4	5	Total	Missing	Mean
Compatibility1_Way_of_business									
Urban	Count	76	27	6	12	31	152	0	2.31
	% within Context	50.0%	17.8%	3.9%	7.9%	20.4%	100.0%		
Rural	Count	35	33	22	19	53	162	0	3.14
	% within Context	21.6%	20.4%	13.6%	11.7%	32.7%	100.0%		
Total	Count	111	60	28	31	84	314	0	2.74
	% within Context	35.4%	19.1%	8.9%	9.9%	26.8%	100.0%		
Compatibility2_Communication									
Urban	Count	84	28	7	11	22	152	0	2.07
	% within Context	55.3%	18.4%	4.6%	7.2%	14.5%	100.0%		
Rural	Count	25	41	15	34	47	162	0	3.23
	% within Context	15.4%	25.3%	9.3%	21.0%	29.0%	100.0%		
Total	Count	109	69	22	45	69	314	0	2.67
	% within Context	34.7%	22.0%	7.0%	14.3%	22.0%	100.0%		
Compatibility3_Information_acquisition									
Urban	Count	102	26	1	5	17	151	1	1.74
	% within Context	67.5%	17.2%	.7%	3.3%	11.3%	100.0%		
Rural	Count	31	42	15	38	36	162	0	3.04
	% within Context	19.1%	25.9%	9.3%	23.5%	22.2%	100.0%		
Total	Count	133	68	16	43	53	313	1	2.41
	% within Context	42.5%	21.7%	5.1%	13.7%	16.9%	100.0%		
Compatibility4_Information_dissemination									
Urban	Count	98	24	6	7	17	152	0	1.82
	% within Context	64.5%	15.8%	3.9%	4.6%	11.2%	100.0%		
Rural	Count	39	42	13	22	46	162	0	2.96
	% within Context	24.1%	25.9%	8.0%	13.6%	28.4%	100.0%		
Total	Count	137	66	19	29	63	314	0	2.41
	% within Context	43.6%	21.0%	6.1%	9.2%	20.1%	100.0%		

Intention to adopt/use ICTs

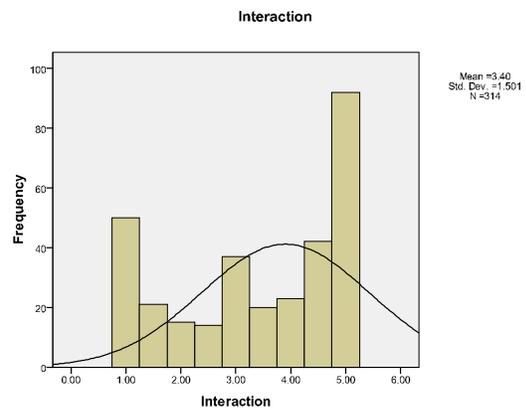
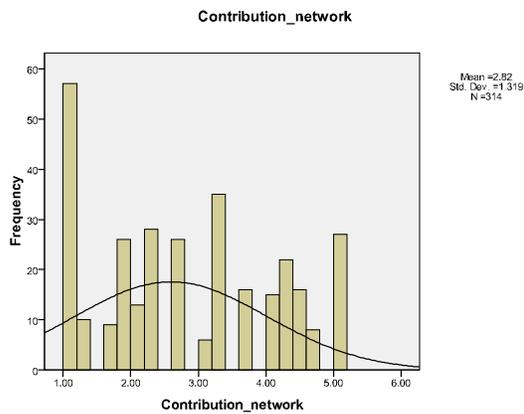
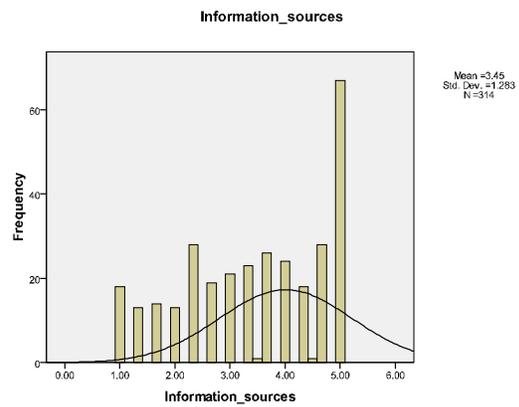
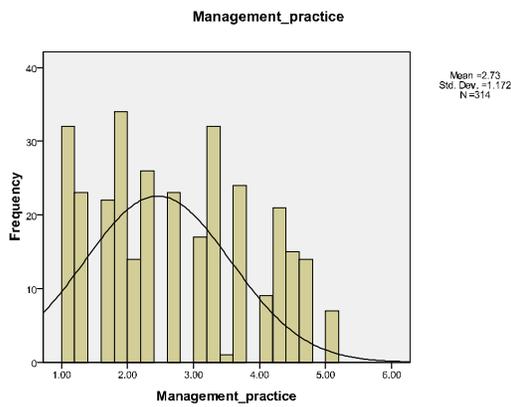
		1	2	3	4	5	Total	Missing	Mean
Intention1_Intend_computer_use									
Urban	Count	15	1	12	23	101	152	0	4.28
	% within Context	9.9%	.7%	7.9%	15.1%	66.4%	100.0%		
Rural	Count	60	6	9	16	71	162	0	3.20
	% within Context	37.0%	3.7%	5.6%	9.9%	43.8%	100.0%		
Total	Count	75	7	21	39	172	314	0	3.72
	% within Context	23.9%	2.2%	6.7%	12.4%	54.8%	100.0%		
Intention2_Predict_computer_use									
Urban	Count	12	3	11	25	101	152	0	4.32
	% within Context	7.9%	2.0%	7.2%	16.4%	66.4%	100.0%		
Rural	Count	58	9	9	16	70	162	0	3.19
	% within Context	35.8%	5.6%	5.6%	9.9%	43.2%	100.0%		
Total	Count	70	12	20	41	171	314	0	3.74
	% within Context	22.3%	3.8%	6.4%	13.1%	54.5%	100.0%		
Intention3_Intend_Internet_use									
Urban	Count	29	4	9	13	97	152	0	3.95
	% within Context	19.1%	2.6%	5.9%	8.6%	63.8%	100.0%		
Rural	Count	69	7	13	9	64	162	0	2.95
	% within Context	42.6%	4.3%	8.0%	5.6%	39.5%	100.0%		
Total	Count	98	11	22	22	161	314	0	3.44
	% within Context	31.2%	3.5%	7.0%	7.0%	51.3%	100.0%		
Intention4_Predict_Internet_use									
Urban	Count	25	9	8	13	97	152	0	3.97
	% within Context	16.4%	5.9%	5.3%	8.6%	63.8%	100.0%		
Rural	Count	69	8	14	5	65	161	1	2.93
	% within Context	42.9%	5.0%	8.7%	3.1%	40.4%	100.0%		
Total	Count	94	17	22	18	162	313	1	3.44
	% within Context	30.0%	5.4%	7.0%	5.8%	51.8%	100.0%		

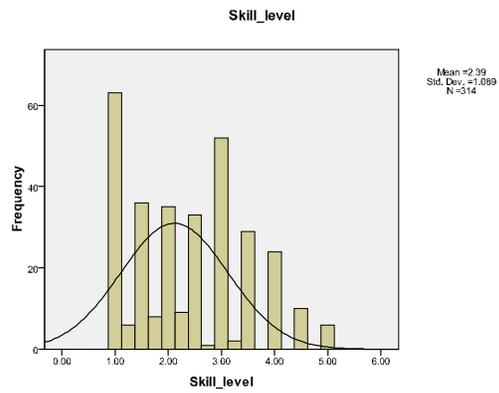
Appendix I

Descriptive statistics for summated scales

Independent variables

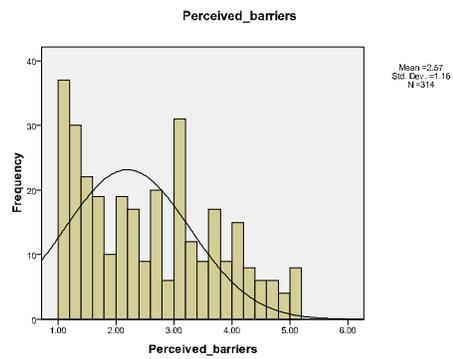
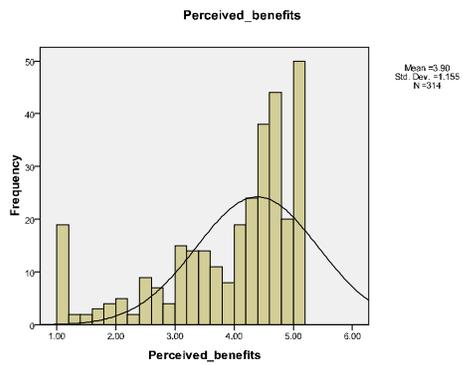
	Management practice	Contribution from networks	Information sources	Interaction	Skill level
Mean	2.734	2.825	3.450	3.403	2.385
Median	2.600	2.600	3.667	3.750	2.375
Mode	1.80	1.00	5.00	5.00	1.00
Skewness	.310	.159	-.365	-.435	.376
Std. Error of Skewness	.138	.138	.138	.138	.138
Kurtosis	-1.158	-1.259	-1.079	-1.315	-.803
Std. Error of Kurtosis	.274	.274	.274	.274	.274

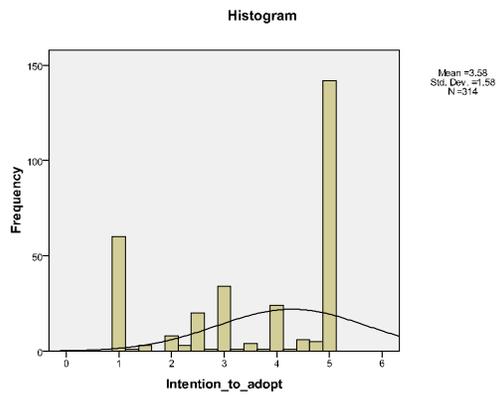




Dependent variables - metric

	Perceived benefits	Perceived barriers	Intention to adopt
Mean	3.90	2.57	3.58
Median	4.33	2.50	4.00
Mode	5.00	1.00	5.00
Skewness	-1.178	.370	-.593
Std. Error of Skewness	.138	.138	.138
Kurtosis	.426	-.982	-1.234
Std. Error of Kurtosis	.274	.274	.274





Dependent variables - categorical

	Perceived Benefits		Perceived Barriers		Intention to adopt	
	Frequency	%	Frequency	%	Frequency	%
No	70	22.3	206	65.6	130	41.4
Yes	244	77.7	108	34.4	184	58.6
Total	314	100.0	314	100.0	314	100.0

Appendix J

Supplementary analysis

Impact of business characteristics on dependent variables

Analyses were conducted on dependent variables (perceived benefits and perceived barriers) using dummy variables for business age, location, income, number of employees and percent of supplies from outside local community.

Results showed that dummy variables for businesses with 5 employees or less, and businesses in lowest income categories (less than Rf 5000 or \$420) were significant. Therefore, these 2 dummy variables were added as the first set of variables into the original analyses.

Logistic regression: Business characteristics and context factors on perceived benefits

Variables	Model 1 (business characteristics)	Model 2 (plus context factors)	Model 3 (plus rural variable)
Constant	2.742 *** (.521)	2.033 * (.937)	2.060 * (.941)
Employees – less than 5 ^a	-1.146 * (.556)	-.423 (.605)	-.280 (.614)
Income category - low ^b	-1.026 *** (.293)	-.400 (.341)	-.389 (.346)
Management practice		-.504 ** (.148)	-.470 ** (.149)
Contribution from networks		-.597 *** (.156)	-.574 *** (.157)
Information sources		.304 + (.158)	.318 + (.162)
Communication & Interaction		.161 (.116)	.244 + (.126)
Skill level		.711 *** (.185)	.643 ** (.189)
Rural ^c			-.826 * (.387)
Goodness-of-Fit Measures			
-2 Log Likelihood (-2LL)	307.676 ***	253.229 ***	248.506 ***
Cox and Snell R ²	.078	.225	.236
Nagelkerke R ²	.119	.344	.362
Hosmer and Lemeshow χ^2	.869 (sig. 0.648)	6.577 (sig. 0.583)	3.248 (sig. 0.918)
% correctly predicted	77.7	81.8	81.5
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for no. of permanent employees with 0 = 6 or more, 1 = 5 and less b - dummy variable for income category with 0 = Rf 5000 and more, 1 = less than Rf 5000. c - dummy variable for rural context with 0 = urban, 1 = rural			

Results show that the business characteristics related to income and employees explain 11.9% variance on perceived benefits, where lower incomes and small number of employees decrease perceived benefits. However, these variables became insignificant when the context variables were entered into the model. This analysis shows that the context factors are indeed the main factors affecting perceived benefits of ICTs for the survey sample.

Logistic regression: Business characteristics and context factors on perceived barriers

Variables	Model 1 (business characteristics)	Model 2 (plus context factors)	Model 3 (plus rural variable)
Constant	-2.361 *** (.439)	-1.712 + (.889)	-1.739 + (.896)
Employees – less than 5 ^a	1.209 * (.469)	.541 (.536)	.445 (.548)
Income category - low ^b	1.483 *** (.267)	.819 * (.319)	.800 * (.322)
Management practice		.728 *** (.147)	.693 *** (.148)
Contribution from networks		.077 (.143)	.061 (.145)
Information sources		.107 (.155)	.091 (.156)
Communication & Interaction		.025 (.117)	-.089 (.123)
Skill level		-1.135 *** (.184)	-1.076 *** (.186)
Rural ^c			.685 + (.359)
Goodness-of-Fit Measures			
-2 Log Likelihood (-2LL)	348.570 ***	260.959 ***	257.2280 ***
Cox and Snell R ²	.162	.366	.374
Nagelkerke R ²	.224	.506	.516
Hosmer and Lemeshow χ^2	.046 (sig. 0.977)	15.877 (sig. 0.044)	11.286 (sig. 0.186)
% correctly predicted	72.0	77.1	79.0
Coefficients listed are logistic coefficients. Standard errors are in parenthesis <i>+ p < .1, * p < .05, ** p < .01, *** p < .001</i> <i>a - dummy variable for no. of permanent employees with 0 = 6 or more, 1 = 5 and less</i> <i>b - dummy variable for income category with 0 = Rf 5000 and more, 1 = less than Rf 5000.</i> <i>c - dummy variable for rural context with 0 = urban, 1 = rural</i>			

Results show that the business characteristics related to income and employees explain 22.4% variance on perceived barriers, where lower incomes and small number of employees increase perceived barriers. However, dummy variable for employees became insignificant when the context variables were entered into the model. The new model explained 50.6% of variance, compared to 49.3% in the model without the two business characteristics. Therefore, although low income also affects perceptions of barriers towards ICTs, it adds only 1.3% to the explained variance on the dependent variable.

Impact of owner ICT knowledge on dependent variables

Analyses were conducted on dependent variables (perceived benefits and perceived barriers) using a dummy variable for level of ICT knowledge of business owner (adequate or better ratings were coded as 1). Results showed that the dummy variable for owner ICT knowledge was not significant when entered into the original models in Chapter 8. Therefore, the analyses were conducted separately for business owners who had adequate knowledge of ICTs and those that did not.

Logistic regression: Context factors on perceived benefits, by level of ICT knowledge

Variables	Owners with adequate ICT knowledge		Owners without adequate ICT knowledge	
	Model 1 (without Rural variable)	Model 2 (with Rural variable)	Model 1 (without Rural variable)	Model 2 (with Rural variable)
Constant	7.351 ** (2.673)	7.368 ** (2.680)	.338 (.959)	.427 (.958)
Management practice	-1.131 *** (.316)	-1.073 ** (.325)	-.390 * (.161)	-.350 * (.164)
Contribution from networks	-1.033 ** (.341)	-.972 ** (.333)	-.529 ** (.187)	-.511 ** (.192)
Information sources	.341 (.305)	.331 (.308)	.280 (.188)	.312 (.195)
Communication & Interaction	-.094 (.246)	.008 (.265)	.215 (.140)	.295 + (.152)
Skill level	.143 (.507)	.067 (.517)	.952 * (.369)	.914 * (.374)
Rural ^a		-.894 (.717)		.853 + (.467)
Goodness-of-Fit Measures				
-2 Log Likelihood (-2LL)	66.933 ***	65.312 ***	179.766 ***	176.252 ***
Cox and Snell R ²	.160	.169	.171	.189
Nagelkerke R ²	.346	.365	.237	.261
Hosmer and Lemeshow χ^2	3.321 (sig. 0.913)	7.362 (sig. 0.498)	5.921 (sig. 0.656)	9.873 (sig. 0.274)
% correctly predicted	93.3	93.3	72.6	74.4
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for rural context with 0 = urban, 1 = rural				

Results showed that when only the responses from business owners who have adequate knowledge of ICTs are considered, only 2 context factors (management practice and contribution from personal networks) were significant and differences between rural and urban sample were not significant. This suggests that for owners with adequate ICT knowledge, skill level was not an issue that affected their perceptions of the benefits from ICTs. Conversely, when responses from business owners who did not have adequate knowledge of ICTs were considered, in addition to management practice and contribution from personal networks factors, skill level was also shown as a significant factor that affected perceived benefits. Rural/urban differences were also significant but only at the 0.1 level.

Logistic regression: Context factors on perceived barriers, by level of ICT knowledge

Variables	Owners with adequate ICT knowledge		Owners without adequate ICT knowledge	
	Model 1 (without Rural variable)	Model 2 (with Rural variable)	Model 1 (without Rural variable)	Model 2 (with Rural variable)
Constant	-2.706 (1.960)	-2.804 (1.935)	-.764 (.901)	-.848 (.908)
Management practice	1.186 *** (.300)	1.151 *** (.306)	.724 *** (.165)	.684 *** (.167)
Contribution from networks	.426 (.263)	.415 (.260)	-.020 (.170)	-.061 (.177)
Information sources	-.140 (.273)	-.157 (.276)	.206 (.184)	.188 (.188)
Communication & Interaction	-.137 (.204)	-.199 (.214)	-.025 (.144)	-.094 (.152)
Skill level	-.960 + (.495)	-.905 + (.500)	-1.169 ** (.336)	-1.134 ** (.342)
Rural ^a		-.654 (.629)		.844 (.429)
Goodness-of-Fit Measures				
-2 Log Likelihood (-2LL)	78.629 ***	77.537 ***	186.560 ***	182.605 ***
Cox and Snell R ²	.167	.173	.211	.230
Nagelkerke R ²	.329	.341	.282	.307
Hosmer and Lemeshow χ^2	2.182 (sig. 0.975)	6.556 (sig. 0.585)	16.754 (sig. 0.033)	9.778 (sig. 0.281)
% correctly predicted	86.7	90.0	70.7	68.9
Coefficients listed are logistic coefficients. Standard errors are in parenthesis + $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$ a - dummy variable for rural context with 0 = urban, 1 = rural				

Results showed that when only the responses from business owners who had adequate knowledge of ICTs were considered, management practice was highly significant and skill level was significant only at the 0.1 level. However, differences between rural and urban sample were not significant. Similarly, when responses from business owners who did not have adequate knowledge of ICTs were considered, only management practice and skill level were again shown to be significant, but the level of significance was higher for skill level in this group of responses. Rural and urban differences also did not appear to exist.

Overall, the analyses using level of ICT knowledge suggests that if only business owners with adequate knowledge of ICTs are considered, skill level is not significant in the research model and no rural/urban differences exist. It also suggests that lack of adequate ICT knowledge significantly impacts on both perceptions of benefits and perceptions of barriers of ICTs. Therefore, it points to the importance of addressing skill levels in promoting ICT adoption as rural skill levels were found to be lower than urban skill levels for the sample.

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