Sustaining the Growth of Micro-enterprises that Adopt Information and Communication Technologies

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ABSTRACT

While recent studies have shown that ICTs can bring about development at the macro-economic level, it is not clear how this process takes place. This paper throws light on this issue by investigating how micro-enterprises adopt ICTs. The majority of businesses in under developed regions of the world are micro-enterprises which are often owned by a single entrepreneur with very limited resources. It appears that when these micro-enterprises adopt ICTs, their ability to survive and grow increases. This paper investigates the effects of processes in which training, technology and trust building interventions enable micro-entrepreneurs faced with limited resources to adopt ICTs to grow their businesses. By building upon current studies, it furthers the analytic role of the livelihoods framework to provide a more functional role to enable sustainable capacity building efforts to be undertaken using ICTs. Based on this analysis, the contribution of this paper to global development is in the processes it provides micro-entrepreneurs to continue to adopt ICTs in innovative ways to stimulate growth.

INTRODUCTION

The importance of human and social capital to enable ICT investments to succeed has been stressed by a number of authors (Hosman, Fife and Armey 2008, Bollou, and Ngwenyama 2007, Adam and Urquhart 2007, Kottemann, J. E. and K. M. Boyer-Wright 2009). Where there appears to be a positive relationship between countries in which ICT investments are connected to a rising human development index and education (Bollou, and Ngwenyama 2007, Diaz Andrade and Urquhart 2008, Kottemann and Boyer-Wright 2009).It appears therefore that the social capital in a country affects its ability to develop using its ICT investments (Díaz Andrade and Urquhart 2009, Hosman, Fife and Armey 2008).

The levels of education in a country can affect the level of utilization of ICT capacity while at the same time may also marginalize groups of people from the opportunities made possible by ICT. The concept of information literacy has been used to denote people who are able to interact using ICTs (Queau 2002; Stoler 2001). This suggests that a new culture is emerging of

'information literacy' through online interactions comprised of visual representations and mental images that can potentially increase the disparities between people who are part of this culture in industrialized countries and those who are not, as well as within societies themselves (Queau 2002, Norris 2001). This is where the most impoverished segments of a society get left behind. These are often street vendors, subsistence farmers, fishermen and women, restaurants, plumbers, small and service providers and manufacturers that sustain the communities that they live in – if they survive. The survival of micro-enterprises has been a concern for developed regions of Europe and the USA where the demise of rural villages and inner city communities have increased the struggle micro-entrepreneurs have to survive.

Micro-enterprises are the predominant form of business in developing communities - especially in areas where infrastructure and resources are limited. At the same time growth of micro-enterprises is essential to the development of these communities. The survival of these businesses remains a challenge because they are led by the one micro-entrepreneur who trades their skills and/or products to earn a living. This makes the adoption of ICT difficult as the resources to purchase equipment are limited and training is often unavailable or inadequate. However when they do adopt IT, the growth of these micro-enterprises increases by a factor of 3.4 (Qiang et al. 2003). Research over a period of time has shown that ICTs can contribute to poverty reduction when applied in a manner that is appropriate to the context (Avgerou 1998, Kenny 200, Cecchini and Christopher 2003, Akpan 2003, and Krishna and Walsham 2005). It has also been demonstrated that ICTs contribute to growth (Baliamoune-Lutz 2003, Kauffman and Kumar 2008). This suggests that there are opportunities that need to be addressed when applying ICTs to enable development.

Research in the adoption of ICTs in micro-enterprises suggests that the basic requirements of access, affordability and skills are often lacking (Duncome and Heeks 2002). Yet there are examples in which innovative uses of ICTs have enabled micro-enterprises to succeed; these include the use of mobile technologies by fishermen to access markets and increase efficiencies and lead to improved economic growth (Abraham, 2007; Waverman, Meschi, and Fuss, 2005), the use of Cybercafe to enable access to information and skills (Salvador et al 2005). Raymond et al. (2005) observed that a 4% increase in sales as well as 5% increase in export performance was obtained when e-business techniques were adopted by SMEs in the manufacturing sector in Canada. Specifically, by using technologies such as websites, email and telephones to

communicate with customers, SMEs can provide better customer service as well as expand their customer base to help reach out to both local as well as international consumers for their products. Increased utilization in IT is not always evident through increased revenue of businesses. As a study by Southwood (2004) shows, IT investments by SMEs in South Africa, resulted in profitability gains from cost savings rather than from an increase in sales.

However, while these efforts may appear to be very successful, they do not address the sustainability and growth of these businesses or of the communities and regions within which they reside. This is because the adoption of IT by micro-enterprises is not straightforward. It requires assistance on a number of levels. First an assessment of their needs has to be made in order to find out how they can be assisted. Every micro entrepreneur has very unique needs and aspirations. They are also part of communities that determine what the micro entrepreneur considers important. Hence a needs assessment not only should consider the micro-enterprise by itself but also the community. Second, the technology itself is often not the solution; it is the innovative ways in which the technology is used that enable the micro entrepreneur to grow their business using IT. Third, the implementation requires a combination of training, technology and most importantly education on resources available to the business. Finally the sustainability of these initiatives needs to be considered in the light of economic, social and human considerations.

This paper addresses the above needs through a process in which technology, training and trust building interventions are used to assist the adoption of IT in micro-enterprises. This is called IT Therapy because it enables the micro-entrepreneurs to increase their human capital through training, technology enhances their physical capital; and the trust-building enhances their socio-cultural capital. The IT therapy process and the social, human and economic development outcomes from it are described in previous studies (Wolcott, Qureshi, & Kamal, 2007; Wolcott, Kamal, & Qureshi, 2008; Qureshi, Kamal, & Wolcott, 2008). This paper provides a framework through which such interventions can provide sustainable ICT solutions to pressing problems faced by micro-enterprises struggling to survive. The contribution of this paper is in furthering the analytic role of the livelihoods framework to provide a more functional role to enable sustainable capacity building efforts to be undertaken using ICTs. The IT therapy provides evidence that this framework can serve both the analytic as well as the functional purposes for achieving sustained capacity building. It is analytic because it allows us to identify

the challenges faced by micro-enterprises and design appropriate interventions; it is functional because the interventions are implemented to benefit the micro-enterprises.

THEORETICAL BACKGROUND

The theoretical background guiding this study is founded on two specific research streams: 1. Development studies, and 2. IT for development (IT4D) research. We extract relevant ideas and frameworks within these two disciplines to help understand how Micro-enterprises, Information Technology, and Development come together. Development has traditionally been viewed from three perspectives: economic, social, and human. Development is viewed to be an economic occurrence when there is a decline in the poverty levels of a society coming from the effects of a nation's monetary and fiscal policies. According to Hamelink (1999, 2002), development is considered to be a social concept when people participate to improve their circumstances through the development of healthcare, education, environment, and community services. Midgley (2003) states that social development deals with practical matters and as a result of which prior literature in this area is devoid of any concepts or theoretical basis to guide future investigation or help provide insight into any form of interventions to guide social development activities. And finally, human development according to (Sen, 1999) suggests that people need to be in control of their lives in order to take the opportunities presented to them. There have been numerous studies to date that have addressed either one or all of these development perspectives.

However, there is a sense that most Development studies have been lacking of theory or framework guiding their investigations (Carney 1999, Duncombe 2006). Therefore there was a need for a systematic approach for analyzing poverty which subsequently gave way to the formulation of the livelihoods framework (Carney 1999). The livelihoods framework was initially developed as a means to understand the reasons for poverty through detailed analysis of social relations in a specific poverty context and to provide a means to empirically investigate the conditions of the poor (Chambers and Conway 1992; Carney 1999; Ellis and Bahiigwa 2003; Homewood 2005). The livelihoods framework is a useful approach for analysis because it provides a way of thinking which views the poor and underserved populations as operating in a context of vulnerability (see Figure 1, adapted from Carney [1999]). Within this context, the poor have access to certain assets or poverty-reducing factors. These gain meaning and value through the structures and processes of the prevailing institutional, organizational, and social

environment. This environment also influences livelihood strategies— ways of combining and using assets—that are open to people in pursuit of beneficial livelihood outcomes that meet their own objectives (Chambers and Conway 1992; Bebbington 1999; Carney 1999). Thus, "a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Chambers and Conway 1992, p.6). This framework is illustrated in Figure 1 as follows:

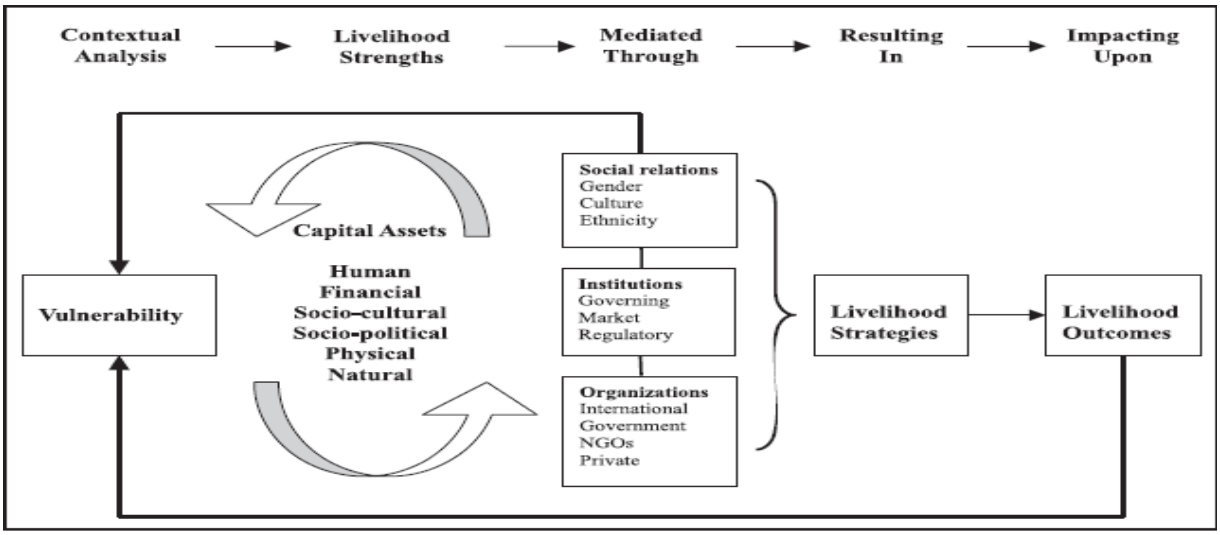

Figure 1. The Livelihoods Framework (in Duncomber 2006, adapted from Carney, 1999)

Duncombe (2006) states that livelihoods analysis and action is intended to be "bottom-up" rather than "top-down" and employs participatory methods for data collection and analysis that fully involve the poor. A bottom-up perspective then suggests that the livelihoods approach may be considered as a research-led analytical framework and as a developmental objective in its own right. It then appears that a dual role for ICT with regard to the livelihoods framework has:

• An *analytical* role that focuses on accessing and assessing empirical evidence (both quantitative and qualitative) to understand livelihoods—by researchers, project/program planners, policy makers, and the poor themselves.

• A *functional* role that focuses on action—the manner in which information is used within livelihood strategies (by the poor themselves and via the structures and processes that impinge on the lives of the poor) to create favorable livelihood outcomes.

Duncombe (2006) outlines a model that encapsulates these ideas and provides a livelihoods-based model for analyzing ICT applications for poverty reduction. The model specifies for ICTs an analytical role in terms of how information can be used in an applied research capacity to assess vulnerability, identify and measure assets, and investigate structures and processes; and a functional role in terms of how information and ICTs can be applied within livelihood strategies to create favorable outcomes. The arrows signify an iterative, participative and communicative process that incorporates both research and action. This model is given in figure 2 below.

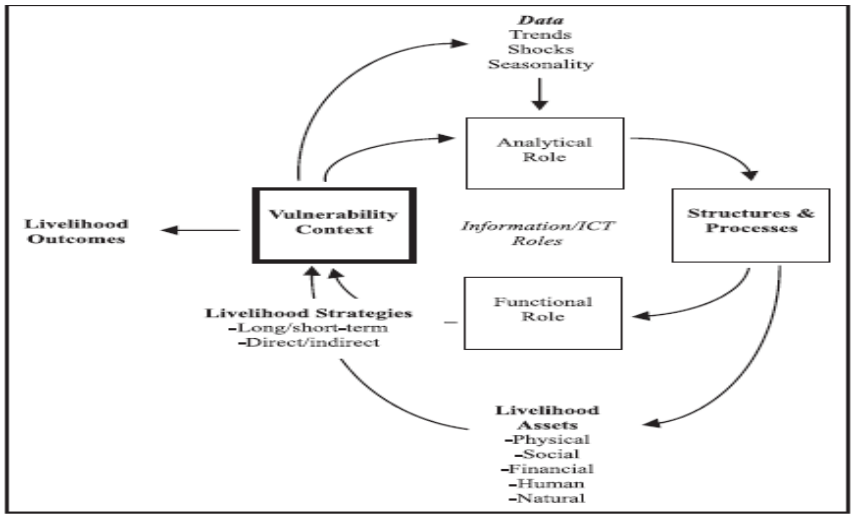

Figure 2. Model for understanding Information and ICTs within a livelihoods framework (Duncombe, 2006)

Through a case study of micro-enterprises in Botswana, Duncombe (2006) provides an example of how this dual nature of the livelihoods framework with respect to ICTs may be employed to investigate the role it may play in poverty reduction. The conclusions from the case study provide some insight into the ways in which ICTs may help manage each of the components within the livelihoods framework such as managing the various capital assets, managing relationships with governmental and institutional agencies as well as attempting to reduce vulnerabilities that poor micro-enterprises face. Although the study discusses micro-enterprises, it is viewed from the country level and not within the context of individual micro-enterprises. It then appears that in order to truly understand how ICTs may enable livelihood outcomes and foster development, there is a need to drill even deeper to study the context of individual micro-enterprises. Only then will we deepen our understanding as to both the process of ICT implementations as well as the impact of outcomes after the implementations that may

facilitate effective livelihood strategies for favorable outcomes in micro-enterprises in underserved communities.

The second research stream guiding this study is IT for Development (IT4D). IT4D entails the implementation, use and management of Information Technology infrastructures to stimulate human, social and economic development (Qureshi 2005). IT4D research has made contributions in providing equitable access to information and knowledge in areas such as education and literacy (Rodrigo 2003; Rodrigues et al. 2003; Scheepers et al. 2000); healthcare (Braa et al. 2004; Kimaro et al. 2005; Mosse et al. 2005); software development (Chudnovsky et al. 2005; Tan et al. 2005); reduction in poverty (Cecchini et al. 2003; Kenny 2000); better government (Nidumolu et al. 1996; Qureshi 1998; Tan et al. 2005; Walsham et al. 1999) and off-Shore outsourcing (Hawk et al. 2005; Preis-Heje et al. 2005). These studies are distilled by Qureshi (2005) in an interpretive study of multiple cases to investigate the relationships that might be in play as we talk about IT and its impact on development. Qureshi (2005) points out that positive cycles of development come about when the effects from ICT implementations with the help of better tools and techniques will result in increased human development as well as improved macro-economic growth. It is seen that this also results in increased per capital income which then creates a ripple effect for improved social and economic development. These relationships are summarized in a process model which shows the effects of IT implementations on development. This is given in figure 3 below.

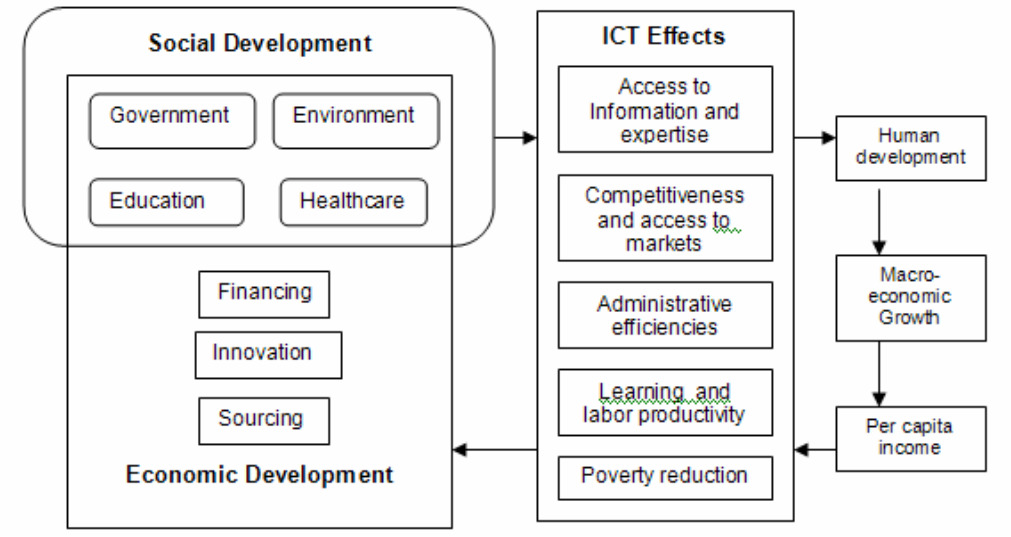

Figure 3. Model of IT for Development (adapted from Qureshi, 2005)

The livelihoods framework and the model of IT for development together from the theoretical foundation on which we investigate the IT Therapy process and any impact that it may have on development (Wolcott, Qureshi, & Kamal, 2007; Wolcott, Kamal, & Qureshi, 2008; Qureshi, Kamal, & Wolcott, 2008). This model enables us to understand how IT brings about development in micro-enterprises by assessing outcomes in terms of access to information, expertise and new markets, competitiveness, administrative efficiencies, learning and labor productivity as they lead to poverty reduction. Yet these gains are not easy to achieve. In a study of a set of eleven micro-enterprises in an underserved community, Wolcott et al. (2008) found the numerous challenges that micro-enterprises face when it comes to adopting ICTs. Figure 4 summarizes the various challenges identified. As can be seen from the figure, the challenges are clustered under categories such as capabilities, resources, access, attitude, context, and operations.

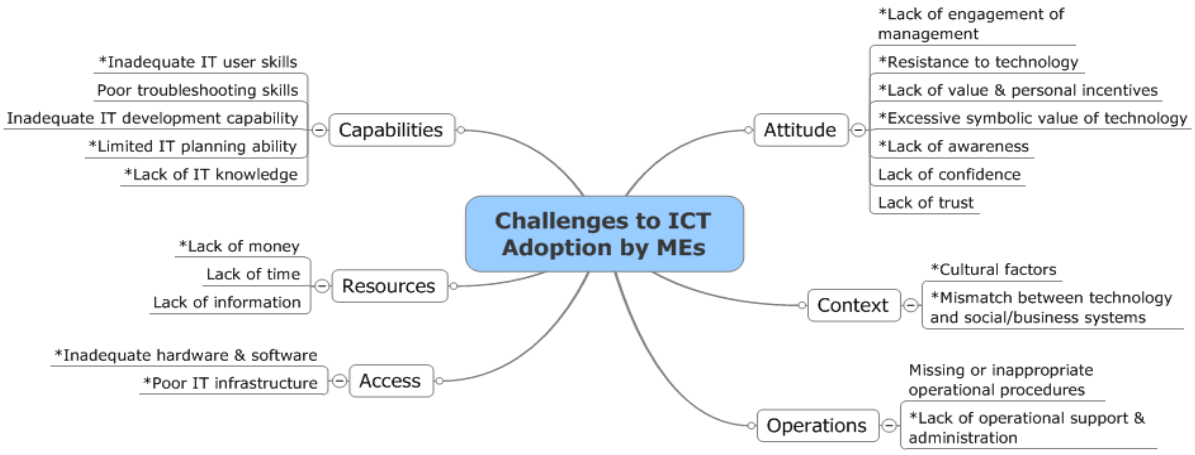

Figure 4. Challenges to ICT adoption by Micro-enterprises (Source: Wolcott et al. 2008)

The findings from that study showed that in terms of attitudinal changes, there were variations in the level of motivation and engagement of the micro-entrepreneurs with the ICT adoption and implementation phase. They also differed on their knowledge of technical skills and became frustrated easily when they were not able to control the technology for their purposes. The set of micro-enterprises in the study all portrayed the common feeling that technology could potentially help their business. The issue was that, they just did not know how - resulting in a lack of awareness and lack of confidence. In terms of operational challenges, almost all the micro-enterprises have little to no ICT support to turn to for assistance. Limited

budgets restrict them from being able to hire IT consultants or having a dedicated IT staff for their business. To add to the mix, the small business owners have poor troubleshooting skills resulting in increased discouragement and frustrations towards ICTs. In terms of resources, lack of money, time and information play a major role in hindering micro-entrepreneurs to adopt ICTs. Most micro-enterprises also have poor IT infrastructures that prevent them from conducting their daily business efficiently.

Despite the numerous challenges faced by small firms, there is a sense that they hold the promise of growing incrementally on existing capabilities, and providing a seedbed for the emergence of dynamic and efficient larger national firms (Levy et al., 2001; Mathews, 2007; Servon and Doshna, 2000). In their study of 1000 small business enterprises in the US, Riemenschneider et al (2003) found that businesses were prepared to overcome obstacles to IT adoption to achieve web presence. This is because pressures to keep with the competition and promote services to customers are greater than the obstacles to setting up websites. It also appears that the promise of eBusiness adoption by micro-enterprises can potentially provide these businesses with the ability to access new markets and reduce costs through administrative efficiencies (Brown and Lockett, 2004; Pateli and Giaglis, 2004).

However, the use of ICT by Small and medium Sized Enterprises (SMEs) remains a challenge in both developed as well as developing countries (Schreiner and Woller, 2003; Sanders, 2002; Lichtenstein and Lyons, 2001; Hyman and Dearden, 1998; Honig, 1998; Piscitello and Sgobbi, 2004). In particular the opportunities opened up by the internet are limited in SMEs especially due to the challenges faced by globalization (Piscitello and Sgobbi 2004). Past studies have shown that the use of ICT can play an important role on the growth of small businesses (Matthews, 2007; Sullivan, 1985; Qiang et al., 2003; Raymond et al., 2005). Cragg and King (1993) have shown that there is a gradual increase in the number of small firms that either adopt various new technologies or take steps to upgrade what they currently possess. The studies suggest that IT can be employed to bring about increased competitiveness if it enables businesses to create new jobs, increase productivity and sales through access to new markets and administrative efficiencies (Qureshi, 2005; Matthews, 2007).

Small and medium sized businesses that have adopted and used ICTs have seen positive outcomes related to operational efficiencies, increased revenues, and are able to better position

themselves within their market niche. Qiang et al. (2003) observed that businesses that utilized e-mail to communicate with their customers experienced sales growth 3.4 per cent greater than those which did not. Similar outcomes were also observed for productivity and reinvestment. Both these components were found to be greater for more intensive users of IT (Qiang et al., 2003). Other research in this area also highlights the positive impact of IT use within small businesses. A 4% increase in sales as well as 5% increase in export performance was obtained when e-business techniques were adopted by SMEs in the manufacturing sector in Canada (Raymond *et al.,* 2005). Specifically, Raymond et al. (2005) mention that by using technologies such as websites, email and telephones to communicate with customers, SMEs can provide better customer service as well as expand their customer base to help reach out to both local as well as international consumers for their products. This means that ICT investments by SMEs can result in profitability gains from cost savings rather than from increase in sales (Southwood 2004).

It then appears that in order to help micro-enterprises overcome the many challenges that they face – particularly paying attention to their constraints of tight limited budgets and time – there is a need to arm them with ICTs to help them reap the many benefits that technology has to offer. This can be achieved through a process of IT therapy (Wolcott et al., 2007; Wolcott et al., 2008; Qureshi et al., 2008). This paper assesses current IT therapy initiatives in terms of their sustainability of micro-enterprises and their communities for human, social and economic development. The following sections delineate the process of IT therapy and discuss outcomes from current IT therapy initiatives. Analysis of the IT therapy initiatives gives way to guidelines that can be used by practitioners as well as recommendations to foster & bring about sustainable development in this context.

METHODOLOGY: THE IT THERAPY PROCESS

The IT therapy process can best be described as a very context-sensitive IT assistance process that involves applying innovative IT interventions to help micro-enterprises grow. It is important to note that IT assistance comprises the gamut of not only IT implementations, but also training, educating, and creating awareness by providing information on the potential power of IT and how it can be tailored to fit each business. The IT therapy process entails a number of steps. The first step is to meet with the micro-entrepreneur to get an understanding of the micro-entrepreneur's goals and aspirations for his/her business. To obtain such an understanding, the

researchers ask the micro-entrepreneur questions relating to their current business conditions, and what is currently obstructing them from reaching their business goals. The researcher also asks the owner as to how he/she feels towards technology and what if any form of technology they have used in their business.

The second step of the IT therapy process is for the researcher to formulate an action plan comprising of specific IT interventions that may be beneficial for the business and move it one step forward towards achieving the micro-entrepreneur's business goals. The designs of the IT interventions are based on the unique needs of each micro-enterprise. As an example, an IT intervention for a micro-enterprise could be as simple as providing the owner with information about a certain commercial software package. The third step in the IT therapy process involves the researcher developing what he/she thinks are the appropriate IT interventions for the specific micro-enterprise.

The next step then entails the researcher explaining to the micro-entrepreneur, the chosen IT intervention and why and how it would help the micro-enterprise. Once a shared understanding has been reached on the mode of action, the IT intervention is then applied. A point to highlight here is that the process of getting a shared understanding between the researcher and the micro-enterprise is not always an easy or a one-shot process as highlighted by Wolcott et al. (2008). To achieve shared understanding, developing and fostering a sense of trust is crucial. The researchers need to build a relationship of trust with the micro-entrepreneur so that he/she has confidence in the process being carried out. The IT therapy was carried out within an action research cycle as illustrated below:

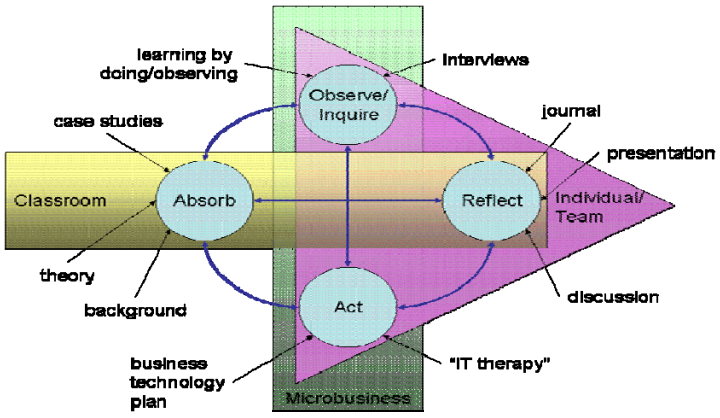

Figure 5: Applying the Action Research Methodology (Source: Qureshi et al., 2008)

The action research cycle shown in figure 5 was used in the studies by Wolcott et al. (2007) and Qureshi et al. (2008). The actual IT implementations or interventions that can be applied to each micro-business takes place in the 'Act' phase of the action research cycle. It is important to emphasize that the process of IT therapy is a cyclical process. In other words, after an intervention is applied to a micro-enterprise, researchers observe whether the intervention fixed the needs expressed by the micro entrepreneur. If not, then modifications are made to the interventions and they are re-applied. This is represented by the connection between the 'Act' phase and the 'Observe/Inquire' phase in figure 5. The following sections report on two contrasting studies that show the effects of IT therapy in two micro-enterprises. These were selected because they are representative of the challenges faced by micro-entrepreneurs and type of micro-enterprises found in developing communities.

Study of a Micro-enterprise that has benefitted from IT therapy: Real-estate agent – RC

Diagnosis: RC is a real-estate agent. Hispanic clients are his target customer base. In order to reach his Hispanic clients, RC's main form of marketing and advertising is by word-of-mouth and social networking. His primary mode of communication with his customers is by phone. RC is a very social individual and involved with a number of organizations – one such organization that he is heavily involved with, is the Hispanic Chamber of Commerce. RC recently bought a laptop (approximately 6 months old) and has a number of software on it which he is not using due to his lack of IT skills coupled with his disinterest with technology.

Planning: RC is interested in learning more about Publisher so that he may use it more effectively. He would also like to learn QuickBooks so that his accounting process for tax purposes is organized. And finally, RC would like to be more knowledgeable regarding the basics of using his computer. He also mentioned that he is sharing a wireless connection with one of his tenants (in the same building that his office is in), and did complain that his connection was sometimes slow. To sum up, RC wants to become comfortable with his machine and become productive in his business using the tools he has on his laptop.

Intervention: The following interventions were finalized to be carried out for RC:

1. Publisher training
2. QuickBooks training

Observation: Following is a description of the observations made in RC as the interventions were being carried out.

Based on the interviews conducted with RC, the researcher was under the impression that assisting RC by showing him how to use Publisher more effectively as well as how he could use QuickBooks to record and manage his finances for the business would be the ideal interventions to help meet the immediate needs of RC. But during the first session with RC, it was discovered that RC had very low familiarity with a computer. This conclusion was made based on the types of rudimentary questions that RC had asked about the use of the computer such as how to make a folder and organize files more efficiently; how to upload pictures onto his computer and also onto the multiple listing service website when he was at the office. And so RC's immediate needs were re-assessed and the intervention re-designed to now focus on providing RC training on basic use of his laptop.

Immediate time savings in business activity resulting from learning how to handle simple IT task: It was seen that each time RC tried to upload a picture from his laptop to the multiple listing service website, the web browser prevented him from doing so by showing a pop-up message asking whether he wants to access the website which may contain a potential cause of a problem to his laptop. All RC had to do was click on the "Yes" choice but he just did not know what to do or read what the pop-up message was actually saying. On guiding RC to click on the "Yes" choice, he was able to upload the picture files onto the website. The issue of RC not being able to upload pictures to the website from his office previously is significant since he had to make a trip to a different location to upload the pictures. The travel time to accomplish this task used to take him approximately 45 minutes which meant that he was wasting that amount of time which he could have been spending being carrying out other business activities. On showing RC how to accomplish this simple task of uploading the pictures from his office has significantly improved his productivity since being able to upload picture files onto the Multiple Listing Service is a core component of being able to advertise his real estate properties. RC uploads picture files 2-3 times a week. As a result, two to three hours a week of traveling time has been saved from learning how to carry out this simple IT task from RC's office.

Implications for Sustainable Development

RC was contacted 4 months after the interventions described above were completed. Changes in RC's operations and any changes in the owner's perception and use of IT are given below. These changes have implications for the effects of IT interventions on the sustainable development potential of the micro-enterprise.

Effects on business: By showing RC how to create folder and manage files on his computer, RC is much better organized. He mentioned that prior to receiving the IT assistance, he used to save documents haphazardly on his computer and so everything was unorganized. Having all his files more organized has saved him time in being able to locate the necessary documents and create reports for his business. Better file organization has also improved his efficiency in communicating with clients. It now takes RC less time in locating the necessary files that he needs to send to clients as attachments via email. Whereas previously this simple task would take up a significant portion of time since all his documents were not filed away on his computer systematically. It is therefore safe to conclude that the IT interventions in RC resulted in improved administrative efficiencies. The time savings obtained from such efficiencies may be used for targeting new clients or towards other crucial business tasks.

Effects on owner: RC mentions that after going through the IT assistance, he feels more confident. He now has a greater awareness of what IT can do for his business. On getting some exposure to some additional features in the publisher program, RC was very excited and was eager to learn new skills to be able to incorporate those into his business. He also mentioned that the better organization of the files on his computer has helped his self-esteem and made him more confident when he is dealing with clients since he is now able to locate and get to the right information on his computer whenever the need arises.

Following are portions of the transcript of the interview conducted with RC that show the effects that the IT interventions had with respect to their impact on development. The transcript portion extractions have been organized and categorized based on Qureshi's (2005) Model of IT for Development categories of ICT effects as shown in figure 3.

Administrative Efficiency

"…showed me how to organize my files better…"
"…showed me to access to a website where you could use to do designs on the computer."
"…organizing my files, my archive, my computer helped me a lot."

"…I'm better organized and save me some time."
"Now I have a file for each of them."
"It's easier to find the information I need."
"Looking for files took me a while before…now, I know where they are."
"…I have more time to deal with my clients."
"…actually gives me some time."
"…don't need to sit down and spend time looking for it."
"…my day is more effective…"
"…I don't have to spend much time looking for files."

Learning and Labor Productivity
"…learning that way by socializing."
"…I wanted to know it or to improve my knowledge about it in the case I need it."
"I like to learn."
"I didn't learn as much as I wanted…"
"…it actually opened my mouth like wow those are things and actually going to help me out or cool to learn."
"…organizing my computer…I don't think I need more help now"
"…my day is…more productive…"
"I saw that there are some other things to do in a design…"
"It helped me to realize more things."
"I have used publisher after they left."
"Learning those additional features has helped me."
"…I'm 120% sure it is going to help me out if I learn more."
"I would like to learn…"

Competitiveness and Access to New Markets
"…make me look more professionalized."
"…can give me access to different profile of clients or prospects."

Access to Knowledge and Expertise
"…I need more knowledge…"

These transcripts reveal that RC was able to achieve the greatest benefits in terms of administrative efficiencies. In addition, he realizes that there are a lot of features of technology that could help him manage his business more efficiently. The sustainability of these interventions lie in the processes that are made possible as a result of the interventions. The technology itself varies according to the circumstances and availability of the ICT resources for the micro-entrepreneur.

Study of a micro-enterprise that has benefitted *less* from IT therapy: *Bicycle seat maker - TC*

Diagnosis: TC is a micro-enterprise that manufactures custom padded seat cushions for spinner bikes. It was started in 2007, to help make the experience of working out on spinner bikes more comfortable. The owner designed a template, produced a prototype, and immediately began to turn heads with her new product. TC is an African American one-woman firm operating out of the owner's home in North Omaha. The owner sometimes collaborates with a seamstress, when doing custom cushions. She has the ability to expand quickly if she needs to, though as of yet this has not been a huge concern. TC has several competitors, ranging from vendors who make the same fabric style seat to vendors who make seats filled with gel and seats that can be pumped up with air. Hers is a niche market, composed mostly of people who ride spinner bikes, though TC has branched out into additional seat-making possibilities.

Planning: In this case, a solution for TC's marketing difficulties was only a beginning. A process was also needed that would teach the owner the IT skills that she needs to compete in an aggressive Web environment, and most of all, the owner needed help to build community and confidence. This diagnosis was based on three ideas. First, the website needed a complete redesign. One of the reasons that she was unable to turn browsers into customers was that the website did not have a professional presence. It was littered with misspellings and bad grammar, as well as a bit tricky to navigate. It looked like it might have been built as an afterthought. A redesign would help TC achieve a more successful first impression to potential buyers, and it might also give the owner access to the information she needed to manage and update her website. In addition to the redesign, the owner really needed to be able to update her own website. The owner lacked the necessary information. The owner was relying heavily on her nephew to assist with the website due to a lack of skills on the part of the owner – which was delaying and hampering the marketing of the product. Also, frequent changes to websites can be a significant traffic driver.

The second basic idea of the diagnosis was the fact that the owner is an imminently social being, just dying to tell potential buyers about her wonderful product. The trouble was she had not been reaching her target audience. The trips to the Farmer's Market, while enjoyable for herself, had not had much of an economical impact. And so the issue of designing a marketing

program for TC that harnessed the owner's sociability and connected it to her target market needed to be put in place. Social networking seemed to be the answer. The owner had mentioned that she had frequented Internet chat rooms years ago, often losing hours of time chatting with her friends. It then seemed wise to harness that energy and drive it toward the marketing of her product. Finally, there was a need to identify every sort of low-cost opportunity for TC to advertise its product. This included creation of brochures and flyers that the owner might use to hand out in the Omaha area.

Intervention: The following interventions were carried out for TC:

1. Redesigning the website: The website was built using Microsoft Publisher – a program that the owner possesses. The website had PayPal functionality and Google Analytics included. The new website was more professional and attractive than the former version.
2. Marketing through social networking: This was done to drive traffic toward the website. There were two parts to this goal: first, identifying the location of her target market on the Internet. And secondly, making consistent contact with those communities. This involved covering a vast amount of new territory with the owner. She was quite willing and eager to try new things. She had some experience with Internet chat rooms a few years ago, but many things have changed since then. Social networking sites such as MySpace, Facebook, and Ning.com were targeted. These social networks can be structured around interests/hobbies (like exercise), and can also serve to strengthen TC's support network. In the course of this intervention, the owner discovered other additional networks on her own, such as LinkedIn and Twitter. The goal of these social networks was to give the owner an advanced set of Web surfing skills and provide a set of online guideposts, all pointing to TC's main website. This would provide the essential traffic that TC needs to create a community of buyers and spread the word about her product.
3. Training: In order to use the online social networks identified, the owner needed to learn many new IT skills. These skills included setting up passwords, signing up for website participation, and posting photos of her product.

Observation: Following is a description of the observations made in TC as the interventions were being carried out.

Frustration with IT: It was observed that while the owner was trying to attain the IT skills needed to use the online social networks, she experienced much frustration. It appears that the source of such frustration is that she has an underlying assumption that she is not intelligent enough to accomplish what she wants to do. Also adding to the problem was the owner's tendency to quit when frustrated, especially if someone wasn't there to help her.

A change in the way the training intervention was being carried out was made to address the owner's IT frustration issue. The original training intervention was based on the response that the owner had originally provided regarding her use of Internet chat rooms and she had also talked about her capabilities on AOL. Such responses had made the researcher assume that the owner's web surfing skills were fair. But on working with the owner it became apparent that the Internet chat room experience she had was years ago, and the Internet has changed tremendously since then. Also, AOL is almost entirely self-contained. Subsequently, it was concluded that the owner didn't have any experience with the web browser – Explorer was being used. Therefore, the training intervention was switched to a different method of learning and teaching IT skills. Every time, the owner ran into a stumbling block, researchers would talk the owner through the problem, and make an entry into a table, noting the program/website, the problem, and the step by step solution. It was a simple idea that worked very well. A copy of the table of problems and solutions was also sent to the owner after the researchers left, so she could have something to reference later.

Confidence builder from modified teaching/learning style: The new "holding-your-hand" style IT training seemed to be a great confidence builder for the owner. This was apparent during a session where she was being shown how to make a simple flyer in Publisher. The owner was at the computer and one student was providing a little over the shoulder guidance. It was clearly visible that when the owner was finished that it was a powerful experience for her, perhaps her most powerful yet. She needed a flyer, she had a vision of what she wanted, and one of the researchers showed her how to do it in ten minutes, with the other researcher taking copious notes of the steps. The owner was looking at a finished product that she had made herself, and the process hadn't taken much time at all. The researchers felt that the owner was beginning to grasp her own possible capabilities on the computer, not just admire everyone else's.

Implications for Sustainable Development

TC was contacted 4 months after the interventions described above were completed. Changes in TC's operations and any changes in the owner's perception and use of IT are given below. These changes have implications for the effects of IT interventions on the sustainable development potential of the micro-enterprise.

Effects on business: TC is now able to market the product in a more professional way than before. The products are better organized on the website and customers are able to make purchases online. TC is also able to reach more customers as a result of having the website. These changes make TC have greater access to new customers and improve its competitiveness. The owner states that the fact TC now has a professional presence on the Internet will help to transform the business. The owner has been able to obtain information for the business by searching the Internet. Having registered on the various social networks has not had any impact on the business. The owner hasn't explored the various features of those sites and has been unable to use them to market her product. A reason for this could be her disinterest in IT coupled with her fear of IT which restricts her from using IT more to benefit her business.

Effects on owner: She felt at ease and comfortable with the style of teaching. The owner states that after the interventions, she feels that she can do a task after trying it several times. She points out how this is very different from what she used to think before the intervention which was that she was literally scared that she would not be able to learn the IT skills – this has implications for the learning and improved labor productivity that occurred as a result of the interventions. Although she is still hesitant to use IT, she does realize that being a micro-enterprise, you need to be able to not only manage the business aspect but also the technical aspect of the business. In that context, she states that even if she doesn't like IT, she needs to handle it. But she would rather hire an IT person and delegate that component of the business. The owner does however attribute the fact that she is somewhat more eager to adopt new IT because of the IT assistance she received – she gave the example of getting a new computer from her husband and how she has started using it. Her slight attitude shift may be summarized with the following quote "*I want to know how to do it and definitely look at it and know what's going on but actual mechanical stuff just frustrates me if it doesn't go right the first time. You know I'm trying to click on this and click on that. Although I'm doing a lot better because I used to think that if you click on the wrong thing it would mess up stuff, but now I know that I won't learn*

unless I click on it - so I just click on it! But I would like to hire somebody that has the skills and mentality for IT."

Following are portions of the transcript of the interview conducted with RC that show the effects that the IT interventions had with respect to their impact on development. The transcript portion extractions have been organized and categorized based on Qureshi's (2005) Model of IT for Development categories of ICT effects as shown in figure 3.

Administrative Efficiency
"…put a name to each different pattern and so it's great."
"…having a website, will transform business…"
"…hasn't impacted my day-to-day business operations yet."

Learning and Labor Productivity
"…learned how to get into…"
"…how to navigate…"
"…I was eager to learn how to do that…"
"…Was like a revelation to me."
"…I was able to go to…"
"…I was able to print out…"
"…I was able to send…"
"I signed up some business thing…"

Competitiveness and Access to New Markets
"…getting my product in a more business way now."
"…website is very beneficial for you know people to see it…"
"…people can go there…"
"People can buy from the website…"
"…the website is there…"
"It has given me a presence."
"…website helps me reach more customers."

Access to Knowledge and Expertise
"…that's what I googled and all of this stuff came up…"
"…recently I do try to go to different stuff, just sign up."
"…I got a lot of responses…"

The above transcript shows that as a result of having a website, TC now is more competitive and has access to greater customers for its products. In addition, the TC entrepreneur was able to experience a number of new IT skills that will help her manage her business. However, her fear factor continued to increase and she has not been able to utilize these effects to grow her business.

IT THERAPY TASKS AND OUTCOMES

The differences between the two cases suggest that IT interventions in themselves do not enable micro-enterprises to sustain themselves. It is the ability of these micro-enterprises to learn new ways of doing business using whatever ICTs are available that enable these businesses to survive. In essence, it is the learning processes and information literacy that these interventions make possible in order for growth to be achieved. Some examples of IT interventions or IT therapy tasks that were conducted in prior IT therapy initiatives (Wolcott et al. 2008, Qureshi et al. 2008) are: fixing one micro-entrepreneur's Internet connection which was very unreliable; setting up an excel spreadsheet for another owner to enable him to provide better statistics to stakeholders; teaching another owner how to create PowerPoint presentations of her products to show to potential clients; setting up a central data repository for customer information so that it was no longer scattered in many different places; synchronizing accounting systems so that the owner did not have to maintain duplicate accounting systems for work and for home; updating and teaching a micro-entrepreneur how to make changes to the business website; upgrading software and installing virus protection for another micro-entrepreneur; training a micro-entrepreneur to make backups of data. In summary, the IT therapy tasks can be grouped into a number of categories. These are shown in table 1 below.

Category	**Interventions**	**Example**
1	☐ Hardware/Software installation ☐ Training	☐ Internet connectivity ☐ Connecting various computer peripherals to work in synch.
2	☐ Use of simple office software packages to enable administrative efficiencies	☐ Word processing software ☐ Excel spreadsheets ☐ Simple accounting packages
3	☐ Website development ☐ Basic e-commerce functionality	☐ Developing a website to sell the business's products/services
4	☐ Maintaining own website ☐ Training	☐ Being able to update one's own website by adding or deleting products/services.

Table 1. Categories of IT interventions

In her model of IT for development, Qureshi (2005) shows how through the implementation, adoption and use of ICTs within a society might give rise to effects in the form of (i) better access to information, knowledge, and expertise, (ii) improved competitiveness and access to markets, (iii) administrative efficiencies, (iv) learning and increased labor productivity, and finally (v) poverty reduction. Table 2 below classifies the IT therapy interventions performed by

researchers in prior IT therapy initiatives (Wolcott et al. 2007, Wolcott et al. 2008, Qureshi et al. 2008) in the major categories of IT effects on development as mentioned in Qureshi (2005).

Effect of IT implementation on development (Qureshi 2005)	Number of IT Therapy tasks
Access to information, knowledge, and expertise	2
Competitiveness and access to markets	8
Administrative efficiencies	14
Learning and increased labor productivity	0
Contribution to poverty reduction (e.g. job creation)	1

Table 2. Outcomes from the IT therapy interventions (Wolcott et al. 2007, Wolcott et al. 2008, Qureshi et al. 2008)

It is evident from table 2 that, most of the micro-enterprises faced immediate needs in the areas of administrative efficiencies and, to a lesser extent, access to markets. Access to information, knowledge, and expertise was a less pressing concern; the entrepreneurs understood their businesses quite well and in most cases had sufficient information and expertise to run them. Using technology to connect with, for example, other entrepreneurs or business development resources certainly offers great potential, but likely future benefit. The Learning and increased labor productivity category focuses on the use of technology to provide training and education. The example of job creation observed during a span of 4 months was of a micro-enterprise that was a halfway house in which a guest residing there was able to find a job by using the new Internet connection that was set up as part of an IT intervention applied to that micro-enterprise to post his resume on the web.

Social development took place as the micro-entrepreneurs acquired skills and access to information and expertise to grow their businesses. Economic development took place when the micro-entrepreneurs were able to generate income, reduce costs and employ additional people and resources to grow their businesses. The combined benefits enabled the micro-entrepreneurs to become empowered in their own abilities to take control of their businesses. Together there is the effect of increasing the ability of the communities in which the micro-entrepreneurs work to grow. While detailed case studies have been published in Qureshi et al (2009) that depict how the micro-enterprises were able to adopt technology to grow their businesses, this paper focuses

on how capacity can be built to sustain the micro-enterprise growth and enable similar outcomes to be achieved.

CAPACITY BUILDING USING IT THERAPY

While capacity building is a general concept that is frequently addressed in the development literature, Adam and Urquhart (2007) suggest that there has been no research done on *IT* or *ICT* capacity building that focuses on the industrial sectors of developing countries. ICT Capacity is used to describe infrastructures for innovative communication using mobile and internet technologies to access resources, markets and increase the competitiveness of countries. A World Bank definition suggests that the term ICT "… comprises hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information" (World Bank 2003, p.1). However, there is a sense that building *sustainable capacity* entails training people to be able to use technology to achieve tasks where performance outcomes can be assessed and compensated. Grindle and Hilderbrand (1995) suggest that building sustainable capacity entails in addition to institutional structures, improvements in individual performance through training and technology transfer activities that improve skill levels. Based on these insights, the following IT Therapy steps comprise the training and technology transfer activities needed for sustainable improvements in the capacity of micro-enterprises to grow. The two cases outlined in the earlier sections of this paper have also been described along each of these steps.

1. *Diagnosis:* This involves understanding the needs faced by the micro-entrepreneur. Given that each micro-entrepreneur is unique as are the challenges faced by them, a questionnaire is administered to understand the key challenges and opportunities. The history, aims, social and economic background is also ascertained at this point.
2. *Planning:* Once the needs have been ascertained, a decision then needs to be taken as to whether the micro-entrepreneur is a candidate for IT Therapy. Criteria for selection include, size, income, motivation, potential for growth, training and access to technology.
3. *Intervention:* Both technology and training interventions to solve pressing problems get the micro-entrepreneur working with the technology. Such interventions include but are not limited to hardware or software installation, quick fixes and showing how to use a certain program.
4. *Observation:* After each intervention, it is important to observe and record the progress made by the micro-entrepreneur. These observations need to be shared with other IT therapists in case there is a larger problem or project to be addressed with an IT solution.

Subsequent interventions lead to progress in the micro-entrepreneurs ability to adopt IT. The effects of these interventions in enabling the micro-entrepreneur to grow their business should be recorded and shared at various intervals. These guidelines for capacity building are based upon the research described in this paper and practical experiences of the authors as they worked with the micro-entrepreneurs to help them adopt IT to grow their businesses.

SUSTAINABLE DEVELOPMENT IN MICRO-ENTERPRISES

Although the IT therapy process described in this paper has proven to bring about substantial improvements to micro-enterprises in underserved regions through a means of capacity building, steps need to be taken to foster and bring about sustainable development through such innovative efforts. The concept of sustainable development according to the World Bank entails the simultaneous achievement of economic (growth, equity and efficiency), social (empowerment, participation, social mobility, social cohesion, cultural identity and institutional development) and ecological objectives (ecosystem integrity, carrying capacity, biodiversity and protection of global commons) (Vargas, 2000). It appears that community development efforts to support micro-enterprise growth can enable sustained improvements to be achieved (Vargas, 2000; Steinberg, 2003; Southwood, 2004; Warschauer, 2003). A sustainable development strategy will have to support the community in which the micro-enterprises operate. The following figure 6 incorporates the discussion so far by tying together the IT therapy process with capacity building to show how it provides a roadmap for micro-enterprises in underserved communities to survive and sustain themselves.

It shows how the IT therapy process and the outcomes that have been evidenced in studies employing the process fit into the broader development agenda through the livelihoods framework. It can be seen in the figure that when institutions such as local universities partner with non-profit organizations, they are able to target the micro-enterprises that are in need of assistance. Once micro-enterprises are identified, a contextual analysis sheds insight into the challenges that they face in terms of adopting IT to grow their businesses. The identification and contextual investigation of the needs and challenges facing micro-enterprises represents the analytic role that the livelihoods framework enables us to perform as outlined by Duncombe (2006). The IT therapy process is then able to take this analytic role provided by the livelihoods framework one step further by designing appropriate interventions and applying the interventions

within the micro-enterprise context as has been shown by the cases described in this paper and in earlier studies.

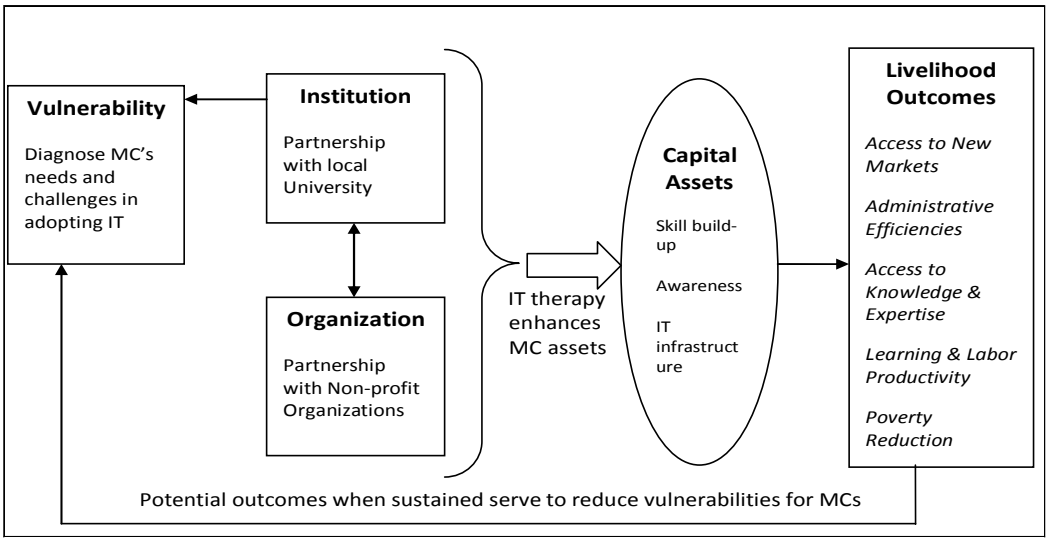

Figure 6. IT therapy within the Livelihoods Framework

The application of the interventions then represents the functional role that the livelihoods framework enables us to carry out. This is where the IT therapy process is most beneficial as it is an innovative approach that helps to improve the capital assets that micro-enterprises possess through the context-sensitive assistance. Specifically, the IT therapy interventions enable the micro-entrepreneurs to increase their human capital through training, and technology enhances their physical capital and the trust-building enhances their socio-cultural capital. Therefore the IT therapy is a means through which micro-enterprises are able to enhance their capital assets. The outcomes coming out from such initiatives are then potential sources for livelihood (e.g. better access to new markets, improved competitiveness, increased learning and labor productivity, and improved access to knowledge and expertise) and when such outcomes are sustainable serve to mitigate the vulnerabilities that these micro-enterprises face.

CONCLUSIONS

This paper addresses a very ubiquitous, well known yet ill understood constituent of global development – how micro-enterprises can enable sustainable capacity to be developed by adopting ICTs. It describes an innovative process in which technology, training and trust building interventions are used to assist the adoption of IT in micro-enterprises. This IT Therapy enables the micro-entrepreneurs to increase their human capital through training, technology

enhances their physical capital; and the trust-building enhances their socio-cultural capital. Following the theoretical development of the livelihoods framework from the development literature and the model of IT for development within the IT for development research stream, this paper presents a framework through which such interventions can provide sustainable ICT solutions to pressing problems faced by micro-enterprises struggling to survive. The IT therapy approach when viewed from the perspective of the model of IT for development provides us with a reference to assess the types of outcomes resulting from the interventions and what the outcomes mean in terms of their impact on economic, social, and human development such as access to new markets, administrative efficiencies, competitiveness, learning and labor productivity, etc. The livelihoods approach provides a systematic approach to implementing the IT therapy approach and setting the scene for various societal agencies to come together to form partnerships to assist micro-enterprises build capacity and therefore give them the necessary tools to eliminate some of the vulnerabilities that the micro-enterprises face. It is important to note that existing development studies have focused more on the analytical role of the livelihoods framework i.e. the livelihoods framework has been used in analyzing poverty situations. However, by incorporating the IT therapy approach within the livelihoods framework, this paper has contributed to furthering the analytic role of the livelihoods framework to provide a more functional role to enable sustainable capacity building efforts to be undertaken using ICTs. The IT therapy provides evidence that this framework can serve both the analytic as well as the functional purposes for achieving sustained capacity building.

REFERENCES

Abraham, R. (2007). "Mobile Phones and Economic Development: Evidence from the Fishing Industry in India," *Information and Technologies and International Development* (4:1).

Adam, M. S. and C. Urquhart (2007). "IT capacity building in developing countries: A model of the Maldivian tourism sector" Information Technology for Development. Volume 13, Issue 4, Pages: 315-335

Akpan, P. I. (2003). "Basic-needs to globalization: Are ICTs the missing link?" *Information Technology for Development* 10, pp. 261–274 261

Avgerou, C. "How can IT Enable Economic Growth in developing Countries?" *Information Technology for Development*" Vol 8. No1. 1998.

Baliamoune-Lutz, M. "An analysis of the determinants and effects of ICT diffusion in developing countries." *Information Technology for Development*, Vol. 10 Issue 3, p151-170. 2003.

Bebbington, A. (1999). "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty." *World Development* 27(12): 2021–44.

Bollou, F. and O. Ngwenyama (2008). "Are ICT investments paying off in Africa? An analysis of total factor productivity in six West African countries from 1995 to 2002." Information Technology for Development. Volume 14, Issue 4, Pages: 294-307.

Braa, J., Monteiro, E., and Sahay, S. (2004). "Networks of Action: Sustainable Health Information Systems across Developing Countries," *MIS Quarterly* (28:3), pp 337-363.

Brown, D.H., and Lockett, N. (2004). "Potential of critical e-applications for engaging SMEs in e-business: a provider perspective", *European Journal of Information Systems*, Vol. 13, pp. 21-34.

Carney, D. (1999). *Sustainable Livelihood Approaches Compared.* London: Department for International Development.

Cecchini, S. and S. Christopher., "Can information and communications technology applications contribute to poverty reduction? Lessons from rural India." Information Technology for Development 10 (2003) 73–84 73.

Chambers, R., and G. R. Conway. (1992). "Sustainable Rural Livelihoods: Practical Concepts for the 21st Century." Discussion paper 296, Institute for Development Studies, University of Sussex, UK.

Chudnovsky, D., and Lopez, A. (2005). "The Software and Services Sector in Argentina: the pros and cons of an inward-oriented development strategy," *Information Technology for Development* (11:1).

Cragg, P. B., and King, M. (1993). "Small-Firm Computing: Motivators and Inhibitors," *MIS Quarterly*, Vol. 17, No. 1, pp. 47-60.

Díaz Andrade, A. E. and C. Urquhart. (2009). "The value of extended networks: Social capital in an ICT intervention in rural Peru." Information Technology for Development. Volume 15, Issue 2, Pages: 108-132

Duncombe, R. (2006). "Using the Livelihoods Framework to Analyze ICT Applications for Poverty Reduction through Microenterprise." *Information Technologies and International Development*, Vol. 3, No. 3.

Duncombe, R., and Heeks, R. (2002). "Enterprise Across the Digital Divide: Information Systems and Rural Microenterprises in Botswana", *Journal of International Development*, Vol. 14, No. 1.

Ellis, F., and G. Bahiigwa. (2003). "Livelihoods and Rural Poverty Reduction in Uganda." *World Development* 31(6): 997–1013.

Grindle, M.S. and M.E. Hilerbrand (1995). "Building sustainable capacity in the public sector:what can be done? " *Public Administration and Development.*(15:5) p.441.

Hawk, S., and McHenry, W. (2005). "The Maturation of the Russian Offshore Software Industry," *Information Technology for Development* (11:1).

Homewood, K. (2005). *Rural Resources and Local Livelihoods in Africa.* Oxford: James Currey.

Honig, B. (1998). "What determines success? Examining the human, financial, and social capital of Jamaican microentrepreneurs," *Journal of Business Venturing* (13:5), p 371.

Hosman, L., Fife, E. and L. E. Armey. (2008). "The case for a multi-methodological, cross-disciplinary approach to the analysis of ICT investment and projects in the developing world." Information Technology for Development. Volume 14, Issue 4, Pages: 308-327.

Hyman, E.L., and Dearden, K. (1998). "Comprehensive impact assessment systems for NGO microenterprise development programs," *World Development* (26:2), pp 261-276.

Kauffman, R.J. and Kumar, A. (2008). "Mapping the multi-tiered impacts on the growth of IT industries in India: A combined scale-and-scope externalities perspective." *Information Technology for Development.* Volume 14, Issue 3, Date: Summer 2008, Pages: 225-252

Kenny, C.J. (2000)."Expanding Internet access to the rural poor in Africa'. Information Technology for Development, Vol. 9 Issue 1, p25-32.

Kimaro, H.C., and Nhampossa, J.L. (2005). "Analyzing the problem of unsustainable health information systems in less-developed economies: Case studies from Tanzania and Mozambique.," *Information Technology for Development* (11:3), pp 273-298.

Kosempel, S. (2007). "Interaction between knowledge and technology: a contribution to the theory of development". Canadian Journal of Economics, Vol. 40, No. 4.

Kottemann, J. E. and K. M. Boyer-Wright. (2009). "Human resource development, domains of information technology use, and levels of economic prosperity." Information Technology for Development. Volume 15, Issue 1, Pages: 32-42

Krishna, S. and G. Walsham (2005). "Implementing Public Information Systems in Developing Countries: Learning from a Success Story." Journal of Information Technology for Development. Vol 11 issue 2.

Levy, M., P. Powell & P. Yetton. (2001) "SMEs: Aligning IS and the Strategic Context", Journal of Information Technology, forthcoming,

Lichtenstein, G.A., and Lyons, T.S. (2001). "The Entrepreneurial Development System: Transforming Business Talent and Community Economies," *Economic Development Quarterly* (15:1), pp 3-20.

Matthews, P. (2007). "ICT Assimilation and SME Expansion," *Journal of International Development.* (19), pp. 817–827.

Midgeley, J. (2003). "Social Development: The Intellectual Heritage," *Journal of International Development* (15), pp 831-844.

Mosse, E.L., and Sahay, S. (2005). "The role of communication practices in the strengthening of counter networks: Case experiences from the health care sector of Mozambique.," *Information Technology for Development* (11:3), pp 207-225.

Nidumolu, S., Goodman, S., Vogel, D., and Danowitz, A. (1996). "Information Technology for Local Administration Support," *Information Technology for Development*).

Norris, P. (2001). "Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide". Cambridge University Press, Cambridge. 320 pages.

Pateli, A.G., and Giaglis, G.M. (2004). "A research framework for analyzing eBusiness models", *European Journal of Information Systems*, Vol. 13, pp. 302 – 314.

Piscitello, L., and Sgobbi, F. (June 2004). "Globalisation, E-Business and SMEs: Evidence from the Italian District of Prato ", *Small Business Economics*, Vol. 22, No. 5, pg. 333.

Preis-Heje, J., Baskerville, R., and Hansen, G. (2005). "Strategy Models for Enabling Offshore Outsourcing: Russian Short-Cycle-Time Software Development," *Information Technology for Development* (11:1).

Qiang, C., Pitt, A., and S. Ayers. (2003). "Contribution of Information and Communication Technologies to Growth." World Bank Working Paper No. 24. World Bank. http://lnweb18.worldbank.org/ict/projects.nsf/WSISPublication

Qiang, C.Z., Clarke, G.R., and Halewood, N. (2003). *The Role of ICT. In Doing Business Information and Communications for Development—Global Trends and Policies* World Bank, Washington DC.

Queau, P. (2002) Global governance and knowledge societies, Society for International Development's Development Journal, 5.

Qureshi, S. (1998). "Fostering Associations in Africa through Networking," *Information Infrastructure and Policy*), pp 1-13.

Qureshi, S. (2005). "How does information technology effect Development? Integrating theory and practice into a process model," Proceedings of the 11th Americas Conference on Information Systems, pp.500-509.

Qureshi, S., Kamal, M., and P. Wolcott. (January 2009). "Information Technology Therapy for Competitiveness in Micro-Enterprises." *International Journal of E-Business Research. Idea Group International*. 5(1).

Qureshi, S., Keen, P. and M. Kamal. (2007). "Knowledge Networking for Development: Building Bridges across the Digital Divide" hicss, p. 226c In (eds) R. Sprague and J. Nunamaker The Fortieth Annual Hawaii International Conference on Systems Sciences. IEEE Computer Society Press.

Raymond, L., Bergeron, F.O., and Blili, S. (2005). "The Assimilation of E-business in Manufacturing SMEs: Determinants and Effects on Growth and Internationalization," *Electronic Markets* (15:2), pp 106-118.

Riemenschneider, C. Harrison, D. and P. Mykytyn. (2003) "Understanding IT Adoption Decisions in Small Business: Integrating Current Theories" Information and Management, Vol 40.

Rodrigo, M.M.T. (2003)."Tradition or transformation? An evaluation of ICTs in Metro Manila schools," *Information Technology for Development* (10:2), pp 95-123.

Rodrigues, A.J., and Govinda, S. (2003). "Towards an integrated management information system: A case of the University of Mauritius," *Information Technology for Development* (10:1), pp 41-57.

Röller, L. and Waverman, L. (2001) "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach".The American Economic Review, Vol. 91, No. 4, pp. 909-923.

Salvador, T., Sherry, J.W, and Urrutia, A.E. (2005). "Less Cyber, more Cafe: Enhancing existing small businesses across the digital divide with ICTs." *Journal of Information Technology for Development*, Vol. 11, No. 1

Sanders, C.K. (2002). "The impact of microenterprise assistance programs: A comparative study of program participants, nonparticipants, and other low-wage workers," *Social Service Review* (76:2), pp 321-340.

Scheepers, H., and de Villiers, C. (2000). "Teaching of a computer literacy course in South Africa: A case study using traditional and co-operative learning.," *Information Technology for Development* (9:3), pp 175-188.

Schreiner, M., and Woller, G. (2003). "Microenterprise Development Programs in the United States and in the Developing World," *World Development* (31:9), pp 1567–1580.

Servon, L. J. and Doshna, J.P. (2000). "Microenterprise and the economic development toolkit: A small part of the big picture" *Journal of Developmental Entrepreneurship.* (5:3), pp. 183.

Southwood, R. (2004). *ICTs and Small Enterprise: A Motor of Economic Development in Africa* IICD Research Briefs 9, The Hague.

Steinberg, J. (2003). "Information Technology and Development Beyond Either/Or". *The Brookings Review*. (21:2). pp. 45-48.

Stoler, A. (2001) “Electronic commerce and WTO,” WTO Webcasting, Accessed February 27, 2006: http://www.wto.org/english/res_e/webcas_e/webcas_e.htm#ecom.

Sullivan, B. C. (1985). “Economics of Information Technology” *International Journal of Social Economics*. Bradford. (12:1), pp. 37.

Tan, F., and Leewongcharoen, K. (2005). "IT Industry Success In A Developing Country: The Case Of Thailand," *Journal of Information Technology for Development* (11:2).

Vargas, C.M., (2000). “Community development and microenterprises: fostering sustainable development,’ *Sustainable Development.*; (8:1), pp. 11.

Walsham, G., and Sahay, S. (1999). "GIS for district-level administration in India: Problems and opportunities," *MIS Quarterly* (23:1), pp 39-65.

Warschauer, M. (August 2003.). “Demystifying the Digital Divide”, *Scientific American.* Pp. 42-27.

Waverman, L., Meschi, M., and Fuss, M. (2005)."The impact of telecoms on economic growth in developing countries," *The Vodafone Policy Paper*, *Series 2*).

Wolcott, P., Kamal, M**.**, & Qureshi, S. (2008). Meeting the Challenges of ICT Adoption by Micro-enterprises. *Journal of Enterprise Information Management*, 21(6).

Wolcott, P., Qureshi, S., and Kamal, M. (2007). "Information Technology Therapy Approach to Microenterprise Adoption of ICTs," in: *Americas Conference on Information Systems*, Keystone, Colorado.

World Bank. (2003). “ICTs and MDGs A World Bank Perspective” *Global ICT Department. The World Bank Group*.