Chapter I

Introduction

Backdrop

The common message from the media about new information communication technology is very clear: IT has arrived and it will change our life. The transformative potential of ICT is also accompanied by concerns about the growing disparity between information haves and have-nots. Yet it is argued that the “solution” to bridge the digital divide is to provide more computers, network access and to “carpet bomb” developing countries with more ICTs. It is also argued that ICTs have great potential to alleviate poverty and bring in overall development.

This preoccupation with the potential of ICTs is premature, to say the least. There are many constraints, not all related to technology, that hampers our attempt to harness the potential of ICTs. While it is clear that knowledge and information are critical resources for development (World Bank Report on Knowledge for Development, 1998/99), there are many constraints placed on applying ICTs for poverty alleviation.

In attempting to examine these questions, scholars have paid considerable attention to the constraints that exist for poor to harness the potential benefits of ICTs. Based on the
works of the Richard Heeks and others. Melkote and Steeves (2002) identify following constraints:

- Constraints in Accessing Technology
- Constraints in Accessing Information
- Constraints in Evaluating Information
- Constraints in Applying/Using Information

Given these constraints, the poor, are unlikely to “reap the benefits” of ICTs in the short run. Governments and many developmental institutions are now trying to establish national level as well as local state level strategy to promote ICTs to enable people to participate in ‘knowledge-based development’. Such efforts are yet to address, how and in what ways ICTs can help poor people and those who are socially excluded. How can these strategies be made sensitive to the special needs of the marginalized? What are the areas that are likely to create opportunities for the use of ICTs in sectors where they have the maximum potentials to benefit the poor? What are these opportunities and what barriers exist? How can we develop capabilities to adapt, maintain, and reconfigure existing 'ICT solution' to specific requirements of developing countries? What factors mediate success or failure of such an endeavor?

These questions serve as an impetus for the present study and has guided the choice of background theory, research context, focus theory. Following Heeks (2000) suggestion, the study is premised on the understanding that ICTs have far more enabling power
within the institutional intermediaries that serve the poor than poor themselves. Building the capacities of the intermediary institutions to ‘access, assess and apply’ ICTs for their development goals might be a more realistic approach to link ICT, Poverty and Development. At least in the short run!

Research Problem

The present study focuses on how development intermediaries such as non-governmental organizations seek to adopt and adapt ICTs for their organizational development. Mobilizing tacit knowledge and organizational capabilities to effectively connect experience with skills in the construction of knowledge-based societies is a major challenge for development. The skills and capacities of the intermediary institutions are key to the success of the ICT initiatives for development since ICTs are skill intensive. It seems important to work through and encourage ICT usage within intermediary institutions. But how can we build the capacity of the intermediary organizations to harness the potential of ICTs?

There is a general realization that substantial investment in human or social capabilities and in the underlying infrastructure. The role of ICTs within such intermediary institutions is not well conceptualized in literature. Most existing work has predominantly focused on Northern NGOs. Much research, which especially focuses on barriers to relevant ICT-using capabilities within Southern NGOs, is wanted. We need to understand the barriers to diffusion and adoption of ICTs within the context of the these institutional
intermediaries. The present study could be seen as a small step forward. It focuses on adoption and acceptance of computers within NGOs. The broad question guiding the present study is: **What factors mediate adoption and acceptance of the ICT based systems within NGO context?**

NGOs, however, do not form a coherent sector, defined as they are only in terms of their negation ("not government"). NGO sector of society encompasses a great variety of organizations, including charity, religious entities, health care facilities, educational enterprises, human rights organizations and foundations. As such, their functions, activities, organizational forms, policy and procedures all differ considerably. So it is necessary that we focus on particular segment of the NGO sector. The present study, therefore, focuses on one particular (clearly identifiable) sub-category of NGOs: Micro-finance institutions (MFIs) (more recently referred to as Micro-finance Organizations, MFOs). The study, therefore, explores acceptance and adoption of computers within the context of a NGO involved in micro-finance initiatives. These organizations has come to be called micro-finance institutions (MFIs)

**Research Context**

There are several reasons for choosing micro-finance institutions as the context for the present study. Micro-finance is now widely regarded as a tool for combating poverty and gender inequality in developing nations. This approach was pioneered in Bangladesh by professor Mohammed Yunus and his Grameen Bank. Over time, micro-finance initiatives...
have become a world wide movement, which the advocates claim, has the power to lift millions of people out of poverty and empower women. In India, micro-finance has largely been initiated by non-governmental organizations. Now, many NGOs focus exclusively on providing micro-finance services or at least have it as a major part of their activities. Micro-finance has become a key strategy for poverty alleviation and, in particular as a tool to increase the income of women. Micro-finance initiatives provide very small loans to people to set up themselves as self-employed or to start their own micro-businesses. Micro-finance approach has been replicated over much of the developing countries and are now being used as part of poverty alleviation strategies even in the developed countries. Chapter II provides a detailed discussion of micro-finance initiatives in India and sets the context for the present study.

Information and Communication Technologies: A Working Definition

Wilson and Heeks (2000) define technology as “A purposeful, practical activity that involves the application of knowledge by organization of human beings and their interaction with hardware.” A bewildering variety of technologies, systems, and practices have come to be included under the broad generic term “information and communication technologies”. A cursory examination of the use of term of ICT suggests that the concept has come to represent any of the following: Computer mediated communication, Communication Technologies, Computers, Computer based communication technologies, New Media, Computer media communication, Information
Technology, IT Devices, Information Systems and its variant, any mass media (TV, Community Radio etc.), Information-Communication Technologies (ICTs, I/CT)

Given such diverse usage of the term, it is necessary to clarify what exactly is meant by ICTs. Richard Heeks provides a useful classification of these technologies, distinguishing ICTs in the following way:

- ICTs are based on digital information held as 1s and 0s, and comprise computer hardware, software and networks. These will be the main focus of the paper, but they are not the only technology that deals with information. Others include:

- ‘Intermediate’ technology, still based largely on analogue information held as electromagnetic waves such as radio, television and telephone.

- ‘Literate’ technology based on information held as the written word such as books and newspapers.

- ‘Organic’ technology based solely on the human body such as the brain and sound waves.

In most general sense, an ICT has come to represent a process for collecting, processing and disseminating information in an organization using computers (or broadly information technologies). The term information technology relates to the another term information systems. Carver (1989) defines an information system as “...man, the computer, the task and the interaction between them within an environment which may
include the immediate workspace, the physical environment, the social environment and
the organizational environment.”

This process utilizes staff, policies and procedures and may include varying degree of
automation. An information that makes extensive use of computer hardware is called
computer based information system (O’Brian, 1982). ICTs for the purpose of the study
refers to such systems. At a more epistemological level, the framework adopted by
Jackson (1996) to tease out the meaning of communication technology within
organizational context is used adopted in this study. Jackson locates the dual issue of
materiality of the technological artifact and its point of introduction into a social system
as the theme around which future theorizing on organization and technology should
occur. For her, the idea of functionality, defined as the ability of an artifact to be used to
accomplish a social task, is central to this theme. Technological artifacts are
simultaneously social and material.

Computers and Organization

Computers are being marketed for organization—be it for profit or nonprofit—to provide
agreement and continuous quality improvement programs. Cost control and quality
improvements are the two major premises on which decisions to purchase computer
systems are based. However implementation of computer based information system has
resulted in unforeseen costs, unfulfilled promises and disillusionment. There is also
growing realization that computers affect the structure and functioning of organization,
the quality of work life of employees within them, and ultimately the cost and quality of the goods and services they provide (Kanngo, 1999).

Despite technological advancement and increasing sophistication of computer systems and software, three critical problems have come to be recognized:

**Productivity Paradox:** Research has consistently pointed out that, contradictory to the claim of IT enthusiasts, many computer systems do not directly lead to improvement in productivity and have often been responsible for reduction in productivity (Kling, 1996).

**Risk of Failure:** Computer systems and software have high risk of failure. Failure Studies as a sub-field in the information system research has emerged to address the question of why systems fail (Sauer, Chris, 1999). Three key areas are significant for MFIs: *Correspondence failure*—refers to failure of ICT to meet the specified objectives such as reduction in transaction costs, improved efficiency of resource allocation, greater productivity and the like (ibid.). *Process failure* refers to outcomes of the systems development process such as project abandonment, schedule overruns, budget blowouts (ibid.). *Interaction failure* refers to failure to use the ICT because of user resistance, perceived threat, complexity of the system, poor interface design etc (ibid.).

**Elusive Effectiveness:** How effective is the new system going to be in improving the organizational performance? Computer systems claimed effectiveness on organizational performance has been an elusive issue—both conceptually and methodologically.
Attempts to set benchmark for performance has often led to poor results. The question of whether the promise of technology is fulfilled in terms of what it delivers for employment, productivity and other aspects of social and economic life within an organization remains an open question.

**Organizational Change:** Research has also focused on the impact of organizational change resulting from ICT adoption. It is often argued that ICT adoption does not bring *some* change in the organization, but changes the very way in which organizations perform its functions and, more critically the way it delivers its services.

All these problems have led to the search for factors that contribute or hinder the adoption, adaptation and effectiveness of computer systems within organizational context. Many of these factors go beyond technical and system characteristics. Several mediating contingency factors have been identified.

Ramamurthy et al (1992) has proposed a conceptual model incorporating all the potential influences of the effectiveness of decision support systems (DSS). These includes System Characteristics, Task Characteristics, Organizational Characteristics and Personal Characteristics. The evaluation of the causal relationship between these factors is only possible when all four dimensions (and their interactions) can be captured, controlled and manipulated. Ramamurthy et al (1992) argue, however, that this would be unfeasible for practical reasons. A focus on user characteristics and perceptions, then would be productive way to examine computer systems acceptance in micro-finance institutional
context. Also human factor issues are some of the least understood barriers to acceptance of technology. Studies by Markus (1983), Linder (1991) and others suggests that rejections of technologies may be rooted in user perceptions of how the technology supports or opposes the users values, beliefs, work, etc.

**Scope and Significance of the Study**

The issues raised above, obviously, have serious implications for NGOs focusing on micro-finance initiatives, where the resources for investment in computer based systems are extremely limited. Considering the substantial resources being invested in the development of computer based information systems for MFI's, and the risk of these investments, this topic needs to be addressed. Provision of technological resources (hardware, software, and connectivity) for development workers are not sufficient. If the social capabilities to transform the learning resources into knowledge that is responsive to wide range of development needs are not in place, the disparities are likely to widen.

However, outcomes of computer systems adoption is fraught with uncertainty. Computer system ability to add value to an organization is not merely dictated by technological characteristics alone. Social, psychological, cultural, economic factors working both at macro-level and micro level of the organization mediate adoption. If these factors are not taken into account, computer system ability to enhance the capacity of the micro-finance institutions might be severely limited. Any failure of the proposed system would have far reaching consequences, both for the organization as well as the people they serve. Further
in times of economic recession and financial crisis, ICT experts have been asked to provide a far clearer picture of investment in information technology and demonstrate a clear return on investment. Hence it becomes imperative to examine closely the factors that mediate successful adoption and acceptance of computer systems. An understanding of these factors would help us develop appropriate capacity building strategies. Such effort would assist NGOs in identifying specific areas of capacity building intervention and thus minimize risks of technology failure. The concept of social capabilities points to the need to enhance general education and technical competencies along with capabilities to access, assess and apply ICTs.

Theoretical Framework

Ramamurthy et al justify focusing on the psychological (user) part of the model in view of the importance of user-specific variables. Amongst the many contingency factors impacting effectiveness and impact of computer adoption, users role and perceptions play a central role. Users play a critical role in technological change. Users take a more active role in shaping new ICTs, especially in the design and impact of technological change. In organizational setting, hardware and software are redesigned and reinvented by the users in ways that defy models of system development.

Many computer failures result because of failure to recognize the realities of organizational setting in which systems are built and the human limits governing their use. Users response to innovation in ICTs diverge repeatedly from technical forecasts,
which has been simply on new capabilities of the ICTs. The way in which producers and users choose to design and employ products and services are influenced by the perceived advantages, users personal and demographic characteristics, and existing properties of ICTs. ICTs remain malleable and more open to interpretation than technological determinist perspectives suggest.

Political and economic debate about balance that should be struck between market forces and public-led policies is also important factors in determining the relations between producers and users (Dutton, 1996) ICTs are designed with more or less well founded conception of users in mind. Users—whether workers, consumers, managers, citizens or audiences can also play an active role in shaping the implications of ICTs in ways that would not be expected by simply extrapolating from the perceived potential of the technology (Dutton, 1999). Many innovating technological and market failure can be understood as a consequence of having a weak conception of the users (Woolgar, 1996). Accurate claims of effects must be rooted in valid assumption about just how the technologies are used.

Users work within a specific organizational setting. Users attitudes and behavior in organizations is shaped by these social processes. ICT use has been found to be a function of number of facilitating factors such as media accessibility, availability of communication partners, experience with the medium, personal style in using new media, time and cost advantages and communication task requirement (Fulk, Schmitz and Steinfield, 1990)
Researchers have studied computer systems outcomes and computer systems diffusion processes since the inception of the information systems field with specific focus on user perceptions. Reviews of the IT innovation-diffusion literature (Prescott and Conger 1995; Karahanna 1993), which focus on factors such as relative advantage, complexity, ease of use, and results demonstrability, examine the overall impact of these variables on adoption of technological innovations. Technology Acceptance Model is a recent development that places special emphasis on user perception.

The Technology Acceptance Model (TAM) research (Davis 1986, 1989) is an influential contribution to the enduring line of computer systems implementation and diffusion research. TAM has attracted a growing body of research. Originally dealing with e-mail and graphics (Davis 1986, 1989), TAM has since been extended to voice-mail and word processors (Adams et al, 1992; Chin and Todd 1995), spreadsheets (Mathieson, 1991), DBMS (Szajna 1994), GSS (Chin and Gopal, 1995) etc.

Technology Acceptance Model has been adopted for the study due to its simplicity, parsimony, logical coherence and its ability to predict user behavior. The model is closely related to Diffusion of Innovation Theory and there are many points of similarity and differences between the two perspectives. The basic TAM model posits that both perceived ease of use (PEOU) and perceived usefulness (PU) correlate with system use, a relationship that seems to explain fairly well why people accept or reject new computers.
The causal model hypothesizes that actual system use is affected by behavioral intentions, which are in-turn affected by attitudes toward use, PEOU and PU.

The original conception of TAM does not include the influence of social and control factors on behavior. Such factors have been found to have a significant influence on computer usage behavior (e.g., Mathieson, 1991; Moore and Benbasat, 1991; Taylor and Todd, 1995; Thompson, et al., 1991). These variables are also key determinants of behavior in the Theory of Planned Behavior (Ajzen, 1991), where social influences (subjective norm) and perceived behavioral control are modeled as determinants of attitudes. Because of their predictive utility in computer usage research and because of their widespread application in social psychology, subjective norm (SN) and perceived behavioral control (PBC) are added to TAM.

Further, researchers have also linked TAM with Bandura's Social Learning Theory through the concept of self-efficacy. Bandura (1977) terms self perceptions of ability to perform a given behavior "self efficacy". When people are assured of their capabilities they get the most out of their talents whereas, when they are beset by self-doubts, they tend to behave ineffectually despite well-developed skills. Bandura(1986) argued that there are obvious advantages to having accurate self perception of one's capabilities as over estimation in a lack of achievement.
Conceptual Model for the Study

The conceptual framework adopted for the present study draws from Technology Acceptance Model, the concept of self-efficacy from Social Learning Theory and an understanding of determinants of attitude towards computers based on attitude theories. The concepts derived from these theories are used to provide a more complete test of the important determinants of computer usage.

These psychological factors would enable us to predict acceptance of technology in non-government organizational context. In NGO context, user's degree of acceptance to the innovation is critical. Resistance has been often cited as a significant source of impediment to computer success. The model would enable us to focus on factors other than system characteristics to understand usage. Knowledge about why computers are accepted or rejected leads to better system designs and decisions and better returns on investment in computers. Importantly, it is likely to determine the degree to which computers can be used as a 'pro-development tool within the context of micro-finance initiatives.
Technology Acceptance Model

Research Model

Behavioral Control Over Usage

Subjective Norms of Usage

Perceived Usefulness

Attitude Towards Computer

Behavioral Intention to Use

Actual Usage

Perceived Ease of Use
Research Design and Method

The literature Review examines the key factors influence computer utilization in general and specific to non-government organizations. The search lead to a focus on computer adoption and acceptance process. The broad research questions that emerged is:

- What influence does users perceptions have on computer acceptance within micro-finance institutional context?
- How do users perceive the role of computers in general as a development tool and in particular as a tool to support their activities (i.e in the context of micro-finance initiatives)?

The first question lead to the development of the conceptual model based on Technology Acceptance Model, Social Learning Theory and Attitude Theories. The following objectives have been examined:

- To examine the current usage patterns, extent of use and training needs of micro-finance institutions
- To test the conceptual model of technology acceptance proposed in the literature review
- To explore relationship between the TAM variables in the conceptual model and factors such as gender, age, job category, educational qualifications.
To develop a profile of users and nonusers in terms of a set of exploratory variables of TAM and personal characteristics and demographics.

To examine users perception of computers as a development tool within the specific context of micro-finance institutions.

The study adopts an exploratory-descriptive research design. Survey of actual and potential users and interviews with key informants served as primary data collection techniques. Previous research provided a guide for operationalization of the key variables and also development of the final instrument.

Chapterization

Chapter I provides a detailed background and rational that formed the impetus for the present inquiry. It outlines the nature, scope and significance of the present study along with a brief overview of theoretical framework and research design.

Chapter II examines the research context within which the present study is undertaken. Firstly it focuses on developing a background theory that seeks to link ICTs, Development and Poverty. It then focuses on rational for micro-finance intervention for poverty alleviation and gender sensitive development. It also examines the emergence of micro-finance institutions and challenges facing them in their task.

Chapter III provides a detailed literature review of computer system in organizational context. While identifying several contingency factors that mediate computer acceptance,
adoption and adaptation, it specifically focuses on user perceptions. The chapter then provides a review of literature related to computers in NGO context as these form the basis for examining computers in the context of MFI. Finally the chapter develops a *conceptual framework* for the present study based on Technology Acceptance Model,, Social Learning Theory (SLT) and Attitude Theories.

Chapter IV outlines the *Research Design and Method* adopted for the study. It covers, design issues relating to sampling, operationalization of the variables and strategies for data collection, analysis and interpretation.

Chapter V presents the results of the survey with the summary of key findings.

Chapter VI provides the results of qualitative research. This chapter is primarily concerned with how users perceive computers as a development tool in the context of micro-finance initiatives.

Concluding Chapter VII discusses and explores implications of the findings with particular reference to the capacity building potentials and areas of intervention. It seeks to tie the empirical insights to larger question of ICTs for poverty alleviation and development. The chapter also discusses the limitations of the present study and provides recommendations for future research.