Working Paper Series No. 1

'Informational Capabilities'- The Missing Link for the Impact of ICT on development

Björn-Sören Gigler[1]
March, 2011

E-Transform Knowledge Platform
Working Paper
The World Bank

[1] Björn-Sören Gigler is a Senior Governance Specialist, Innovation Practice, World Bank. The author can be reached at: bgigler@worldbank.org

Abstract

Under what conditions can information and communications technologies (ICTs) enhance the well-being of poor communities? The paper designs an alternative evaluation framework (AEF) that applies Sen's capability approach to the study of ICTs in order to place people's well-being, rather than technology at the center of the study. The AEF develops an impact chain that examines the mechanisms by which access to, and meaningful use of, ICTs can enhance peoples "informational capabilities" and can lead to improvements in people's human and social capabilities. This approach thus uses peoples' human capabilities, rather than measures of access or usage, as its principal evaluative space. Based on empirical evidence from rural communities' uses of ICTs in Bolivia, the study concludes that enhancing people's informational capabilities is the most critical factor determining the impact of ICTs on their well-being. The findings indicate that improved informational capabilities, like literacy, do enhance the human capabilities of the poor and marginalized to make strategic life choices to achieve the lifestyle they value. Evaluating the impact of ICTs in terms of capabilities thus reveals that there is no direct relationship between improved access to, and use of, ICTs and enhanced well-being; ICTs lead to improvements in people's lives only when informational capabilities are transformed into expanded human and social capabilities in the economic, political, social, organizational and cultural dimensions of their lives.

1. Introduction

In recent years, the literature has increasingly articulated the links between information and communications technologies (ICTs)[2] and socio-economic development (Avgerou, 2008, 2003 Avgerou and La Rovere, 2003, Madon, 2000; Mansell and When, 1998; Heeks, 1999 and Braga, 1998). Proponents of the "ICT for development agenda" have claimed that these technologies create new opportunities for economic and social development for developing countries and poor communities (Eggleston and al., 2002; Hamelink, 1997; Ngwainmbi, 1995; Pigato 2001; and Pohjola 2002). This literature explicitly or implicitly assumes a direct relationship between ICTs and economic growth, social development, and enhanced democratic participation (Avgerou, 2007: 139 and Bedi, 1999). For instance, Heather Hudson assumes a causal link between ICTs and development when she argues that, "if information is critical to development, then ICTs, as a means of sharing information, are not simply a connection between people, but a link in the chain of the development process itself" (Hudson, 2001).

Its critics on the other hand, take a pessimistic view and claim that ICTs due to existing socio-economic inequalities will favour the privileged segments within society and not reach the economically and socially disadvantaged thus leading to a widening of the socio-economic gap within developing countries (Ciborra, 2002, Castells, 1998, Gumucio, 2001, Panos 1998; Wade 2002). For instance, Castells underscores that ICTs can represent both the cause and effects of social marginalization and warns that computer-mediated communication is culturally, educationally, and economically restrictive and thus could lead to the reinforcement of the cultural dominant social networks, while the poor majority of the development world would become irrelevant in this new knowledge economies and "network society" (Castells, 1996 and 1998).

Finally, a growing number of authors have called for a much deeper and more nuanced understanding about the relationship between ICTs and development (Heeks, 2002:1, Wilson and Heeks, 2000; Madon, 2000; Burkett, 2000; and Loader, 1998). They have pointed out that a key question to determine whether or not ICTs can make a significant impact on socio-economic development and peoples' lives depends on the extent to which these technologies are amenable to the particular local socio-economic, political, and cultural context in which ICTs are being inserted. Such an approach stresses the need for a more holistic approach that fully "integrates ICTs into the overall development objectives of specific programs, rather than being driven solely by technological concerns" (Heeks, 2002:7).

Recent community informatics makes an important contribution to this emerging literature in the sense that it helps us to better understand the conditions under which ICTs can be made more usable and useful to excluded groups. This literature looks beyond mere access to the effects that ICTs have

[2] For the purpose of this research I use Hamelink's definition of ICTs: "Information and Communication Technologies (ICTs) encompass all those technologies that enable the handling of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems" (Hamelink, 1997:3). This functional definition of ICTs includes both the new (i.e. Internet, e-mail) and traditional (i.e. (community-radio) forms of ICT into its definition.

on local communities within the broader context of existing social systems and cultures (Gurstein, 2000, Warschauer, 2004). In particular, this research draws on the concept of "effective use," developed by Michael Gurstein, which emphasizes that people can derive real benefits from ICTs depending on "the way peoples are making use of ICTs in their daily lives and how well they have integrated ICTs into their social, productive and cultural activities" (Gurstein, 2003:10).

The proponents of this more nuanced approach have identified a major gap in the existing literature in terms of research that presents in-depth empirical evidence unpacking the links between ICTs and socio-economic development and peoples' well-being particularly for rural areas in developing countries (Avgerou and Walsham, 2000; Blatman et al. 2003, Nulens, 2003; and Wilson and Heeks, 2000). For instance, DiMaggio emphasizes that "we need to move research away from the ideological debate about the relationships between ICT's and development towards robust survey-based and in-depth qualitative work that begins to unpack the complexity of digital divide" (DiMaggio et al. 2001).

In spite of their significant difference, all three approaches share one key feature in common: the focal point of their investigation represents technology and its societal, economic and political impact. Hereby, these different schools of thoughts distinguish themselves by emphasizing either the positive or negative impacts of ICTs on people's lives, or stress that the impacts will vary depending on the local and social context in which the ICT program is being carried out.

Based on a 'people-centered' approach to development, we will develop in this paper an alternative evaluation framework of ICT interventions. Hereby, we will attempt to operationalize Amartya Sen's capability approach and to directly apply its theoretical framework to the evaluation of the impact of ICT programs (Gigler, 2004). Within this analysis, the paper will address the central question, whether and under which conditions the improved access to information and knowledge facilitated by ICTs can enhance the human capabilities of the poor to better achieve the lifestyle they value. At the outset of the analysis it will be argued that the use of ICTs can act as a catalyst in improving peoples "informational capabilities," ultimately expanding people's human and social capabilities. This approach places the communities' assets and capabilities in the center of the analysis and examines the role of the improved flow of information and knowledge thorough the use of ICTs as a catalyst in expanding the human and social capabilities of the poor. Within this framework we will investigate key factors that have to be met to enable the poor to have 'real and meaningful' access to ICTs and allow them to appropriate these technologies as an instrument for their economic and social development.

The alternative framework significantly differs from the majority of existing ICT evaluations in the sense that it evaluates ICT programs in terms of their development impacts on people's well-being in the multiple dimensions of their lives (i.e., economic, social, and political). It points out that it is necessary to carry out in-depth cases studies to adequately assess the different factors affecting the extent to which ICTs can or cannot result in positive changes in people's lives and enhance the well-being of communities (Harris et al., 2002, Kanungo, 2002, Madon, 1993). The evaluation

literature has stressed that the short time-span on which conventional evaluations usually focus is a major shortcoming of such an approach (Cracknell, 2000: 357; and Fowler, 1997).

The alternative framework does not assume a direct and linear relationship between improved ICT access and enhanced socio-economic development, but instead develops an impact chain that attempts to unpack the various indirect effects of ICTs on people's well-being (Benjamin, 2000; Heeks, 2005). Thus the AEF stands in contrast to most ICT evaluations, which are predominately based on conventional evaluation approaches and thus narrowly focus their assessments on measuring the immediate, short-term, and measurable program outputs in terms of enhanced "access" to and "usage" of ICTs (Whyte, 2000; Daly, 1999; Hudson, 1995, 1999; Wilson III et al., 1998; and Ernberg, 1998a, 1998b)

On the basis of empirical evidence on the use of ICTs by poor communities in rural Bolivia, the paper will provide a series of conclusions, which highlight that it is not possible to identify a direct and causal relationship between ICTs and the empowerment of marginalized groups, but stress the complex and dynamic interdependency between people, social institutions and technology.

2. The multi-dimensional approach of well-being based on the Capability Approach

The paper uses Sen's multi-dimensional approach of well-being developed in the capability approach (CA) (Sen 1984, 1992, 1993), since this approach moves away from an income-based perspective of well-being (utilitarianism) to account for the constitutive plurality of human life and instead emphasizes the non-material aspects of human well-being (i.e., social, cultural, and political aspects). Sen conceives of development as "a process of expanding the real freedoms that people enjoy" and emphasizes the need for the "expansion of 'capabilities' of persons to lead the kinds of lives they value" (Sen, 1999:18).

This view of development places people and human development at its center. What matters, according to Sen, is what people are capable of being or doing with the goods to which they have access. A person's "capability" refers to "the alternative combinations of functionings that are feasible for her to achieve. Capability is thus a kind of freedom: the substantive freedom to achieve alternative functioning combinations (or, less formally put, the freedom to achieve various lifestyles)" (Sen, 1999:75). Capabilities include things that a person actually has done, as well as things he or she can possibly do. In other words, capabilities refer to the extent of one's positive freedoms (Gasper, 2002: 5). The concept of "functioning" "reflects the various things a person may value doing or being" (Sen, 1999: 75). In this sense, a person's functionings represent the "various components or aspects of how a person lives", whereby a person's ability to realize these desired and valued functionings depends on her/his capabilities as well as entitlements or assets (Gasper, 2002:4).

3. Operationalizing Sen's capability approach

In the last couple of years, there has been a lot of debate in the literature on ways to operationalize Sen's capability approach and to apply it in a more practical way to empirical research. On the one

hand, as Comim has suggested the capability framework is well suited for "*evaluating and assessing social arrangements, standard of living, inequality, poverty, justice, quality of life or well-being"* (Comim, 2001: 4).

On the other hand, however several scholars have highlighted the difficulties to operationalizing the approach. Commin points out that these difficulties derive from the capabilities approach's *"theoretical underspecification and inclusive view of operationalization which contest not only the evaluative but also the practical foundations of utilitarianism"* (Comim, 2001: 2). Furthermore, a key challenge has been to define a-priori a set of basic capabilities, in order to have a base-line from which to start specific evaluations (Nussbaum, 2000; Alkire, 2002).

Another difficulty related to operationalizing the capability approach, is that some capabilities are harder to measure than others. For instance, it is much more difficult to assess a person's ability to have self-esteem, than their ability to write and read. This represents particular challenges for gathering data on the non-material aspects of people's wellbeing.

Comim highlights that the capability approach is particularly suited for micro-level studies, since the approach focuses its attention to a large extent on non-income variables (Comim, 2001). Such an approach, he argues will reveal more interesting findings at the micro than at the macro-level, since research at this level can focus on the analysis of peoples' ability to choose what to do or be.

3.1 Capabilities and the sustainable livelihoods approach

One particularly interesting way to operationalizing the capability approach has been suggested by Bebbington (1999), who integrates this method into the sustainable livelihoods framework and then develops his own version based on capitals (assets) and capabilities. The starting point of his analysis is based on the livelihoods approach and underscores the importance of the capitals or assets to which people have access.[3]The main question that the livelihoods approach addresses is what combination of livelihood resources (different types of capital) result in the ability of the poor to follow a combination of livelihood strategies (i.e. livelihood diversification) with what outcomes on their well-being (Scoones, 1998: 3). Bebbington thus develops a powerful framework which highlights the importance of combining capitals with capabilities. He argues that "assets (or capitals) are not simply resources that people use in building livelihoods: they are assets that give them the capability to be and act" (Bebbington, 1999: 5). He refers back to Sen's discussion on the significance of human capital to strengthen the capabilities of the poor. Hereby, Sen stresses that the possession of human capital not only means that people produce more, and more efficiently, it also gives them the capability to engage more fruitfully and meaningfully with the world, ultimately and most importantly, providing them with the capability to change the world (Sen, 1997:1960).

[3] I will use the definition of sustainable livelihoods which was mainly developed by Chambers and Conway (1992) as quoted by Scoones:"A livelihood compromises 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 stress and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Scoones, 1998: 5).

I will turn now to the interlinkages between capitals, agency and capabilities. Kabeer defines agency "*as the ability to define one's own goals and act upon them"* (Kabeer, 1999a: 438). She points out that agency is usually being operationalized as 'decision-making', however in terms of empowerment it is more important to see it within the context of the poor's ability to negotiate or bargain with the formal institutions of the market, civil society and the state. The major significance of this notion of agency and its interlinkages with the poor's capitals for operationalizing the capability approach lies in the *combination* between resources (or capitals) and agency, constituting to what Sen refers to as capabilities. In this sense, improving the access to resources for the poor, for instance providing access to girls' education or access to ICTs only represents a potential for enhancing their capabilities and thus does not automatically have to lead to positive outcomes on empowerment. It is important to stress that there does not exist a direct and automatic causal relationship between improving access to resources (such as for example access to ICTs) and empowerment. Kabeer instead emphasizes the key role of the notion of agency and thus the process it plays in determining whether or not the increase in resources can be transformed into the expansion of the poor's realized functionings.

When designing outcome indicators for empowerment, Kabeer highlights that an advanced knowledge of the development priorities and goals of the marginalized group themselves is needed, otherwise the intervention runs into the danger of prescribing the process of empowerment which would be violating its essence. This last point addresses the issue of who defines the desirable and valued livelihood outcomes which is of particular importance to this paper since I am suggesting to develop an alternative evaluation framework of the empowerment of marginalized groups through ICTs. Robert Chambers argues that within the capability (or wellbeing) approach to poverty and livelihoods, the analysis may allow people themselves to define the criteria that they deem important (Chambers, 1997b). This may result in a range of sustainable livelihoods outcome criteria including diverse factors such as self-esteem, security, happiness, stress, vulnerability, power, exclusion, as well as more conventional material concerns.

3.2 Applying the Capability approach to ICTs

This paper draws on previous studies by Garnham (1997), Madon (2001, 2003), and Mansell (2001), who have stressed the value of using the capability approach to develop an evaluation framework of ICTs. Nicholas Garnham has pointed out that "thinking in terms of functionings and capabilities allows us to get behind the superficial indices of access and usage that we so often use" (Garnham, 1997:32). Based on a capability perspective, Shirin Madon has developed an evaluation framework that emphasizes human agency rather than structural or institutional variables. She uses this framework to evaluate the development impacts of two e-governance programs in India (Madon, 2003). A critical question the use of the capability approach for ICTs raises is "whether new options, such as the ability to hold government accountable, the ability to pay bills, or the ability to generate

income through e-governance applications should be added to the capability set of individuals, communities, organizations and states" (Madon, 2003: 4).

The most important contribution these studies have made is that they have shifted the focus away from evaluating ICT programs solely on criteria related to access, expenditure, and the establishment of infrastructure, and have instead placed the impact of ICTs on human well-being at the center of the discussion. Applying the capability approach to the study of ICTs enables me to evaluate the developmental impact of ICT programs and to focus on the role ICTs can play in improving poor peoples' livelihoods.

Indeed, measuring ICTs in terms of capabilities reveals that there is no linear relationship between access to ICTs and use of them—having Internet access is a necessary, but insufficient, condition for its use. This goes hand in hand with one of the fundamental principles inherent to the conceptual framework of the capability approach, which is that access to a basic good, in this case ICTs, represents an entitlement and key prerequisite for its use; however, differences in people's capabilities determine whether they are indeed able to transform a set of actual opportunities into realized functionings (i.e., improved access to information through the use of ICTs.). In Sen's words (1999) "people have different ways of transforming the same bundle of goods [ICTs, here] into opportunities for achieving their plans in life."

Thus, when assessing the impact of ICTs on well-being, it is essential not only to evaluate the range of information and communication options made available (the potential use of ICTs), but also to consider people's capabilities—i.e., their ability to transform these options into actual or realized functionings (Garnham 1997:32). Such a process entails examining people's motivations, expectations, and reasons for use, as well as the outcomes in relation to their well-being (Mann, 2003).

The paper draws on the contextual approach to ICTs, emphasizing the importance of the socio-economic and cultural milieu, which it considers crucial to understanding the potential effects of ICTs on development (Avgerou, 2001; Kling, 2000; Walsham, 1993 and 1995). This approach stresses that technology only receives meaning once it is "enacted" by users; thus, people can control its use by interpreting and appropriating it to their specific realities (Orlikowski, 2000). In essence, it places human action rather than technology at the center and emphasizes the interdependencies between technology and social context (Orlikowki, 2000; Avgerrou, 2001). It seeks to broaden the evaluative space from the immediate and measurable effects of ICT diffusion and usage to a wider scope encompassing the analysis of the impact of ICTs on the social, economic, political, organizational, and cultural aspects of people's lives.

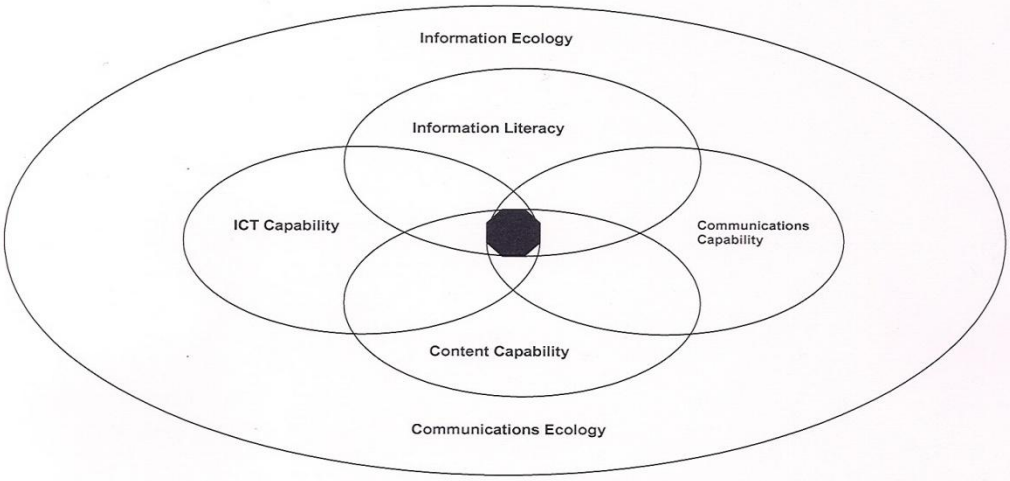
3.3. From information literacy to informational capabilities

Furthermore, the paper draws on the library and information science literature on information literacy in order to conceptualize informational capabilities (Brevik, 1992, Eisenberg and Berkowitz 1990; Horton, Jr. F., 1983; McClure, 1994; Menou, 2002; Ochs et. al; and Zurkowski, 1974). The

term "information literacy" was first used in 1974 by Paul Zurkowski who pointed out that individuals need the ability to find, evaluate, and utilize various sources of information, which should include the following five capabilities: (i) knowing what kind of information is helpful; (ii) knowing where to get that information; (iii) knowing how to inspect the information; (iv) evaluating and organizing the information; and (v) immediately transmitting the information. While a standard definition of information literacy is yet to appear, the paper uses the following commonly quoted definition provided by the American Library Association Presidential Committee on Information Literacy: "Information literacy is a set of abilities enabling individuals to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information" (American Library Association, 1989:2). McClure highlights that information literacy is a concept that stresses people's capability to utilize information to solve problems (McClure, 1994). According to this author information literacy should include the following four components: (i) traditional literacy—the basic capability of reading and writing; (ii) media literacy—the ability to use multimedia (i.e., CDs, microfilms, etc.) to solve information problems; (iii) computer literacy—the capability to operate a computer; and (iv) network literacy—the ability to identify, access, and use electronic information from the network.

Applying the capability perspective to ICTs, the paper introduces the concept of "informational capabilities." The following graphic summarizes the main aspects of this concept and illustrates how the different components are interdependent from each other.

Figure 1: The concept of informational capabilities



Source: The concept of information literacy, McClure (1994)

The graphic visualizes the four components of the "informational capabilities" concept, which refers to a person's capability, or ability (i) to use ICTs in an effective manner (ICT capability); (ii) to

find, process, evaluate, and use information (information literacy); (iii) to effectively communicate with family members, friends, and professional contacts; (communication capability); and (iv) to produce and share local content with others through the network (content capability). In Sen's words, informational capabilities are a person's "capability" to transform his/her existing informational capital, such as people's level of access to ICTs (the entitlement) into human agency and real opportunities in society to achieve the things s/he values doing or being. In other words, informational capabilities refer to a person's positive freedom to use ICTs within the institutional and socio-economic setup of a society.

It is important to emphasize the significant differences between informational capital, ICT capabilities and informational capabilities. The concept of informational capital describes the level of livelihood resources or assets a person has to her or his disposal in term information. Informational capital is defined by the following four components:

(i) The extent to which a person has access to information from the formal institutions of the market stat and civil society;

(ii) The existing level of local knowledge in a person's community and the extent to which this knowledge is being used in his/her daily lives;

(iii) The level of access to information provided by the existing traditional 'information systems' in a person's community;

(iv) The extent to which traditional forms of ICT (i.e. community radio, Amateur radio) are being used within communities.

The concept of ICT capabilities on the other hand encapsulates a person's ability to use computer hardware, software, and ICT tools. The above described definition of informational capabilities is much broader and relates to the role of information itself and one's ability or capability to analyze and place information into one's own socio-cultural context (Horton, Jr. F., 1983; Castells, 1995). The concept, then, is an information-centric approach, deemphasizing the role of technology and people's ability to use these tools. Furthermore, it highlights the combination of a person's human agency and his/her existing informational capital. Furthermore, the concept of 'informational capabilities' refers to the combination between a person's existing livelihood resources in terms of information (informational capital) and his/her agency (ability) to strengthen these assets and to use them in such a way that the use of information can help a person to transform his/her options in life in order to achieve the *'beings'* and '*doings'* a person would like to achieve. Thus at the center of this concept stands the transformative role information can play in a person's life and the options and/or opportunity it can provide a person with in the multiple dimensions of his/her life. Furthermore, a person's capability to use, process and evaluate information is embedded in the broader socio-

economic and institutional local context. Thus, on the one hand the existing endowments of the communities in terms of the existing local knowledge can significantly strengthen a person's ability to use information and thus constitutes an important aspect of a person's overall informational capability. On the other hand, the institutional aspects of the way information is being made accessible at the community level and the existing barriers to the free access to information represent critical impediments for an individual's informational capabilities. For instance, a person's informational capabilities can be significantly restricted by the existence of powerful information brokers within local communities, who impede the free flow of information and instead aim to controlling the access to information.

Based on a capability perspective, it is critical not only to analyze the existing 'status quo' in term of information within communities, however to better understand the dynamic process by which (i) a person's use of ICT can enhance his/her informational capabilities and (ii) how these enhanced informational capabilities are being translated into the expansion of a person's human and social capabilities. Only then can we evaluate the impact of ICT use on people's well-being. Based on the above-described principles of applying the capability approach to ICTs, the following section lays out an alternative evaluation framework that provides an integrated approach to evaluating the development impacts of ICTs on the well-being of marginalized groups.

3.4. Enabling Factors – the role of intermediary organizations

The existing literature claims a critical role for intermediary organizations in the process of introducing ICTs to local communities (Madon, 2000; Heeks, 2002; McConnell, 2000a). For instance, Heeks argues that intermediaries are critical in helping rural communities overcome some of the above-mentioned barriers to political access while providing ICT services (Heeks, 2002). However, the literature does not specify the exact role of intermediaries in the process. Instead, it takes a more institutional perspective and analyzes the effects of ICTs within organizations (Avgerou, 2001; Powell, 1999 and Meyer, 1997).

To address this gap in the literature, my research investigates the different types and levels of intermediation in ICT programs, which I categorize as i) ICT, or technical intermediaries and ii) social intermediaries. An ICT intermediary is defined as a person or organization providing "effective" support to local communities in the use and adaptation of technology. Most commonly, an ICT intermediary is a specialized organization from outside the community—a non-governmental organization, local government, or international donor. A social intermediary is defined as a "local" institution, like a community-based organization. This classification has been used to analyze the two main aspects of the intermediary process: i) the way in which ICTs are introduced and which technical support services (e.g., training, content development) are provided to the community; and ii) the extent to which the ICT program is embedded into existing social and organizational structures (i.e., the relationship between existing information ecology and the ICT intervention). The investigation distinguishes between i) high and ii) low levels of intermediation. A high-level

intermediation is characterized by a high degree and frequency of direct involvement at the local community level; a low-level intermediation is characterized by centralized management and a lower degree of interaction with the local community.

4. Towards an alternative evaluation framework of ICTs programs

Based on the theoretical foundation discussed above and the authors previous work, the article develops an alternative evaluation framework of ICT interventions (Gigler, 2004). The core question that this paper seeks to answer is, whether and under which conditions the improved access to information and knowledge facilitated by ICTs can enhance the individual and collective capabilities of the poor to better achieve the lifestyle they value. Sen's holistic approach to development is very well suited to evaluate the potential effects of ICT interventions, considering that a key characteristic of ICTs is their multi-sectoral dimension, meaning that they can affect people's lives simultaneously in the economic, social and political spheres.

In an earlier analysis Richard Heeks (1999) has argued to place information instead of technologies in the center of the analysis. This approach is in favor of going one step further and placing individual and collective capabilities in the center with information and ICTs occupying the outer circles of the model. Thus, underscoring that ICTs are not a means to an end by themselves and that in fact under certain conditions can act to expand the capabilities of the poor to realize improved economic, social, political and cultural opportunities. Although it is argued that the right to information and knowledge is an important entitlement and its absence can be a contributing factor to poverty, this notion needs to be balanced against the broader context of existing social and economic inequalities, which may reinforce themselves through the technology (Castells, 1997; Hewitt de Alcántara, 2001). Consequently, the sustainable livelihoods framework will be integrated to attempt a more holistic socio-economic analysis of the possible effects of ICTs.

As a starting point, it is being argued that it is important to introduce information as an additional asset or capital into the sustainable livelihoods framework. The analysis of the role that information and knowledge can play for development and the view that the right to information represents an important entitlement of the poor calls for the inclusion of the concept of *'informational capital'* and 'informational capabilities' into the livelihoods approach.

As table 1 shows the 'informational capital' has been added as an additional capital to the set of livelihood resources of the poor. Due to the cross-sectoral nature of information, the framework underscore that the inter-linkages between informational capital and all the other capitals are crucial for evaluating the role of information and ICTs in the livelihoods of the poor. At the same time, it is argued that information on its own right is an important asset for the poor to improve and/or secure their livelihoods and that the combination of the existing informational capital with a person's human agency can lead to a significant expansion of a person's informational capabilities.

This approach underscores that the capability of individuals and social groups to transform valued functionings into realized functionings depends on the combination of a person's existing livelihood

resources or capitals and his/her human agency. The expansion of capabilities is hereby understood as the strengthening of peoples' capitals. What, however is the role that information plays in this context and what justifies broadening the capability approach by the additional dimension of the "informational capabilities"?

The main argument for including this dimension into the framework is that information and ICTs can play an important role not only in their own right, but can act as an 'agent' for the strengthening of the poor's capitals in multiple areas. As the review of the literature (Kabeer, 1999a; Bebbington, 1999) above has demonstrated, only the combination of strengthened resources and agency can lead to enhancing individual and collective capabilities. This approach analyzes the conditions under which the expansion of the informational capability can have a positive 'multiplier effect' on the other capabilities. In other words, does the expansion of the poor's capability to make meaningful use of information strengthen their capabilities to achieve valued functionings in multiple areas?

This notion comes from Sen's concept about the role that human capital plays not only in enhancing a person's ability to generate income, but also in expanding her/his capabilities to lead a freer and more fulfilled life and to reach her/his valued functionings (Sen, 1997:1960). In this sense the focus is on the agency role of human capabilities for bringing about social change.

This paper applies this concept to the field of ICTs. Hereby it is being stressed that the better access to information and enhanced informational capabilities similar to the enhancement of a person's writing and reading skills can enhance peoples' capabilities to make choices in their lives in various areas, including the economic, social and political spheres. As a result of the enhanced informational capabilities, individuals will be able to expand their control over important life choices; in this sense information and ICTs can contribute towards the empowerment of the poor.

The framework highlights the need to assess at the outset of ICT programs, the existing informational capital in communities, in order to assess the existing livelihood resources in terms of information. The existing traditional information systems and the 'information ecology' within communities represent a critical enabling or limiting factor for individual to expand their informational capabilities (Brown, 1991, O' Farrell, 2001). The framework includes an analysis of the local social context, since a common reason for the failure of ICT programs is the perception of key community members that new technologies undermine existing information systems and thus see ICTs as a challenge to the 'knowledge brokerage' role of existing community organizations (Robinson, 1998).

Furthermore, the evaluation framework underscores the importance of understanding the institutional structures and processes that mediate the transformation process from livelihood resources into the expansion of capabilities, thus contributing to the attainment of positive livelihood outcomes. Hereby, it is important to analyze the interrelationship between existing social structures and ICT inter-mediation. The framework emphasizes that a successful mediation process by an effective and local intermediary is required before ICTs can have a positive contribution towards expanding the livelihoods of the poor.

Table 1: Empowerment through ICTs framework

CONTEXT		LIVELIHOOD RESOURCES		INSTITUTIONAL PROCESSES		CAPABILITIES		LIVELIHOOD OUTCOMES
Socio-Economic Conditions		Economic/financial capital		Existing social structures		<u>Individual</u> - Psychological		
					<=>	- Social	=>	Informational Capabilities
Demographics	<=>	Natural capital	<=>			- Economic		strengthened
						- Informational		
Cultural Context		Human capital		Level and degree of		- Political		Human
					<=>	- Cultural	=>	Capabilities
Political Context		Social capital		ICT intermediation				strengthened
						<u>Collective</u> - Social		
ICT diffusion		Informational capital				- Economic	=>	Social
						- Political		Capabilities
ICT policy Framework						- Organizational		strengthened
						- Cultural		
						- Informational		

<u>Stages of ICT project</u>

Existing Information Systems and Environments	Assess Information needs Informational capital	Community ICT Access Local and relevant content Capacity-Building	Local Appropriation and Meaningful Use of ICTs	Ownership Sustainability
INFORMATION NEEDS	ICT USES	ICT CAPABILITIES	INFORMATIONAL CAPABILITIES	HUMAN & SOCIAL CAPABILITIES

In addition, intermediaries play a decisive role in i) identifying and providing access to ICT products and services that suit the local communities' information needs; ii) supporting the generation of local and relevant content; and iii) providing ongoing support in the areas of training and capacity-building.

Within this process the local appropriation of technologies by the communities and the contextualization of information provided through ICTs is required a-priori to poor communities being able to derive real benefits out of its use. Pure access to ICTs by the poor will not allow them to derive real benefits out of its use. In fact, a tool such as the Internet can be described as a medium of the western-elite and needs to be appropriated by non-western and poor communities before they can derive real value. Frequently the content on the Internet does not reflect the realities of local communities (Ballantyn, 2002). In fact, the language of the Internet often represents a prohibitive barrier for communities in their use of information, as most of its content is being written in a rather academic or business style and thus is not directly applicable at the grassroots level. Finally, a continuous program to support the capacity-building of people in using ICTs is necessary to ensure that these technologies can be used in a meaningful way and that in fact they are being used (Delgadillo et. al, 2002).

Within the analysis of the process of individual empowerment, the AEF distinguishes between the following six dimensions: i) informational; ii) psychological; iii) social; iv) economic; v) political; and vi) cultural. (see Table 2 in Annex 1). These different dimensions contribute in different ways to the enhancement of a person's human capabilities. While, the framework develops specific indicators for each of these dimensions, the analysis will stress the interdependencies of the different dimensions of empowerment and investigate whether or not the different dimensions of empowerment reinforce each other.

Due to the fact that the capability-approach stresses the non-material factors of wellbeing, the AEF emphasizes the important role the psychological, social and cultural aspects of a person's life play for her/his empowerment.

In particular, ICTs can play an important and direct role in enhancing through a process of 'self-reflection' and 'critical analysis' the critical consciousness and self-esteem of poor people (Freire, 1972). Specific outcome indicators for the psychological empowerment of poor people through ICTs include i) the improved ability to analyze and solve problems; (ii) to enhance a person's self-esteem; and iii) a sense of participation in the modern world. This dimension of empowerment is very relevant for strengthening a person's human agency or in other words to strengthen a person's ability to influence strategic life choices, a core concept of empowerment (Kabeer, 1999a, 1999b). In this sense it seems that the potential positive impact of ICTs on the

psychological empowerment of the poor has not only a substantive value on its own, however can also be instrumental for the empowerment of a person in different aspects of her/his life. For instance the strengthened self-esteem of a person can be critical to also expand the economic aspects of his/her life by enhancing the person's ability to find new employment.

The framework furthermore considers six key dimensions of social capabilities, identified by rural communities: i) informational; ii) organizational; iii) social development; iv) economic development; v) political participation; and vi) cultural identity (see table 3 in Annex 2). It is important to note that in many of these areas there exist important interdependencies between the individual and collective processes. This separation adds significantly to the analysis, since it provides a clear logical framework for breaking up the different and complex empowerment processes into smaller, more comprehensive and manageable units.

It is however important to emphasize that in the theoretical framework the improved access to information through the use of ICTs has mostly indirect rather than direct effects on the livelihoods of the poor. The framework suggests that a quite complex process needs to take place for ICTs to have an impact on the lives of poor communities. Thus, the framework highlights that there does not exist a direct and causal relationship between ICTs, information, human capabilities and people's well-being, but that the relationship between these variables is much more multi-dimensional and needs to be seen within the broader context of sustainable human development.

Considering that the core of the research aims to assess the impact of ICTs on human well-being, the following section develops a specific 'ICT impact chain' which will analyze in more detail the process and conditions under which the access and uses of ICTs can enhance people's informational capabilities and thus enhance their human and collective well-being.

5. Unpacking the link between ICT and development- The ICT Impact Chain

The following section intents to unpack the link between ICT and economic development and to develop an impact chain that describes both the principal factors as well as the process by which ICTs can significantly enhance people's human well-being across multiple dimensions of their lives. The impact chain unpacks the overall impact of ICTs on peoples' well-being into a five-step process that explains the conditions under which the access and uses of ICTs (i) become meaningful for its users; (ii) it's uses are being translated into enhanced informational capabilities; and (iii) result in improvements in peoples' human and social capabilities.

The first step of the impact chain constitutes an information needs assessment. This initial stage is critical since ICTs are not being introduced into communities in isolation from existing information and communication ecologies however should be embedded into these existing

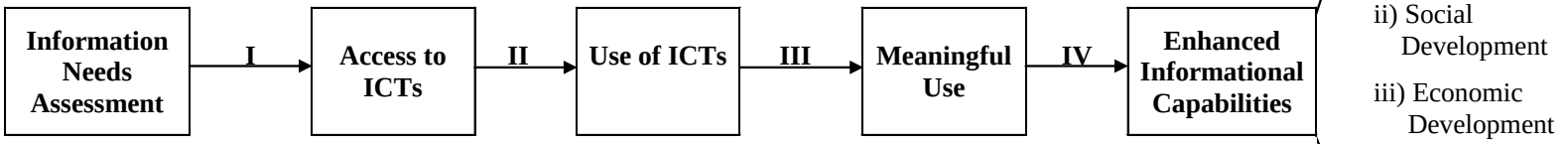
structures, in order to (i) truly strengthen the communities' existing informational capital, (ii) be accepted by the communities' principal stakeholders, and (iii) be sustainable in the long-term. It is thus essential to first analyze the existing 'information ecologies' of communities before providing them with specific ICT services (i.e. access to Internet connectivity). As visualized in the graphic below the assessment should (i) analyze the communities' existing information and communication needs, (ii) identify key local stakeholders, such as elders who frequently are the traditional 'information brokers' in local communities; (iii) assess the existing informational capital; and (iv) identify the existing communication channels. Finally, the information needs assessment should identify critical barriers and bottlenecks that have caused mutual information and communication gaps between local communities and national policy makers and identify mechanisms through which ICTs could promote the improved two-way information and communications flow between these two actors. It is being argued that this first step is essential for ensuring that ICT programs are not supply-driven and 'push' a specific technology on communities, however are responding to real priorities and needs of local communities.

The second step of the impact chain addresses issues related to people's ability to use ICTs. The AEF presented above has demonstrated that in order to assess the impact of ICTs on people's well-being it is critical to move beyond the concept of "ICT access" and to study the multiple factors that enable people's 'uses of ICTs' within their socio-economic, political and cultural context. The impact chain emphasizes that access to ICTs is not sufficient for enhancing people's actual uses of ICTs.

The study emphasizes that the presence of an intermediary organization is the most significant factor explaining poor people's ICT uses. In fact, the intervention of an intermediary organization enables people to acquire the necessary basic capabilities to use ICTs, even if they do not have access to these technologies within their communities. Empirical evidence from rural Bolivia indicates that the majority of the rural poor use the Internet outside of their own communities in intermediary cities or towns and that they combine their weekly visits to regional markets with a visit to a public Internet access point (Gigler, 2009). This finding is intriguing since it highlights that the knowledge on how to use the Internet is more important for poor peoples' Internet uses, than having access to the technology within their communities. Consequently, for people to reach a stage in which they are not only having access to, but are actually using the Internet is essential for ICTs to have an impact on their well-being. The paper highlights that in spite of existing infrastructure constraints, the intermediation through a local and effective ICT program can significantly enhance poor peoples' Internet use, even if communities continue to lack access to Internet connectivity in their communities.

ICT IMPACT CHAIN

A 5-STEP PROCESS



Enhanced Human Capabilities

i) Individual Empowerment

ii) Social Development

iii) Economic Development

iv) Political Participation

Enhanced Social Capabilities

v) Organizational Dimension

vi) Cultural Dimension

Existing Information Ecologies	**ICT Infrastructure**	**Simple ICT Use**	**Level of ICT use**	**Multiplier Effect**
i) information needs	i) access to electricity	i) literacy rates	i) ICT capacity-building	i) ICT Capabilities
ii) communication needs	ii) access to ICT infrastructure	ii) education	ii) local & relevant content	ii) Information Literacy
iii) information brokers	ii) ethnicity	iii) ethnicity	iii) technical local appropriation	iii) Communication Capabilities
iv) informational capital	iii) poverty rates	iv) basic ICT training	iv) sustainability	iv) Content Capabilities
v) communication channels	iv) geographic location	v) poverty rates		v) local technical & social appropriation
vi) information gaps		vi) connectivity costs		

INTERMEDIATION

STRUCTURAL BARRIERS

Source: developed by author

The paper thus identified that there is significant room for reducing the existing digital inequalities through targeted interventions that promote the uses of ICTs among rural communities.

Thus, the second step of the impact chain emphasized that people's actual use, rather than access to ICTs is a critical precondition for ICTs to have an impact on their well-being. The paper however takes the analysis even a step further. It argues that it is essential to investigate people's capabilities to make 'meaningful' uses of ICTs and that it is not sufficient to evaluate the factors influencing whether or not rural communities have the opportunities to use ICTs. The impact chain thus differentiates between "ICT use", and "meaningful use of ICTs"—whereby the notion of "ICT use" encapsulates the simple use of the Internet without specifying proficiency, while "meaningful use" captures the depth, usefulness and level of expertise in Internet use, gauging use in terms of how efficient, informed and beneficial it is.

The third step of the impact chain thus highlights the conditions under which simple ICT-use is converted into meaningful use. Applying this framework allows the study to unpack the different factors that impede people to give their ICT uses meaning and to derive real benefits out of their uses for their individual and collective well-being. As graphic above visualizes, the following four conditions have to be met to enable people to realize meaningful uses of ICTs: (i) enhancement of their ICT capabilities; (ii) availability of local and relevant content; (iii) local appropriation of ICTs: and (iv) financial and social sustainability of ICT programs.

The impact chain furthermore stresses that the local technical appropriation of ICTs by communities is a critical condition in attaining meaningful use. This concept argues for the importance of providing people with the necessary space to explore and interpret technologies on their own terms, to define which tools and applications they consider suitable for their needs, and to adapt these technologies to their own local economic, social and cultural context. Frequently, those programs which are implemented in an overly centralized manner deny people the opportunities to adapt ICTs to their own local circumstances and instead 'impose' preconceived technical solutions on local communities. Such an approach frequently leads to the failure of projects, since in most programs the predefined technical solutions do not correspond with the local priorities of communities. Frequently technical solutions are not being based on real information and communication needs encountered among users, however are being defined in a top-down manner by centralized technocrats or project managers.

The third step of the impact chain emphasizes that ICT programs need to reach financial and social sustainability, in order to provide people with the opportunity to use ICTs in the long-term, enabling them to attain a meaningful level of use. ICT programs often fail briefly after having installed the ICT infrastructure or having carried out their initial phase of training activities due to the lack of community ownership. Programs frequently face both significant challenges of financial and social sustainability, since they fail to base their activities on the priorities of local stakeholders and thus do not succeed in raising any local funds to support the program in the long-term. Many ICT programs

also fail to develop local partnerships with the existing community-based organizations and the different civil society organizations working in their project area.

The fourth step of the impact chain analyzes the conditions which have to be met so that a person's meaningful ICT use also results in the enhancement of her/his informational capabilities. This step is essential, since the impact evaluation framework presented above found that the extent to which ICT programs succeed in enhancing peoples' informational capabilities is the most critical factor determining the impact of ICTs on poor peoples' well-being. The paper has highlighted the significant differences between expanding a person's ICT capabilities versus her/his informational capabilities. The concept of ICT capabilities encapsulates a person's ability to make efficient use of computer hardware, software, and ICT tools; the concept of informational capabilities is an information-centric approach, deemphasizing the role of technology and people's ability to use these tools. It includes the following four components: (i) ICT capability; (ii) information literacy; (iii) communication capabilities and (iv) content capabilities.

The impact chain emphasizes that the conditions under which peoples' meaningful uses can be transformed into enhanced informational capabilities depend on the extent to which (i) they can enhance their capabilities in all four dimensions of informational capabilities; (ii) strengthen their existing informational capital, and (iii) enhance their individual and collective agency in terms the use of information. In this context, a critical success factor in reaching this step is the process of local appropriation of ICTs by communities, as facilitated by an effective and local intermediary.

In fact, a principal finding of the paper is that the intermediary organization (ICT program) is the variable which has the strongest influence on people's informational capabilities. It argues that particularly grassroots-level programs are significantly more successful in enhancing peoples' informational capabilities, in contrast to programs led by government and NGOs which frequently have been relatively unsuccessful in reaching this objective. A critical success factor of this intermediary process constitutes the issue that ICT programs do not only enhance people's ICT capabilities, however that they take a much broader approach and stress the role that information plays for development in generally and thus focus on enhancing people's informational capabilities. In this context, a critical aspect of informational capabilities is the concept of information literacy, which emphasizes a person's ability to collect, process, evaluate, use and share information with others within her/his own socio-cultural context. One of the key lessons from many ICT programs is that most of the difficulties poor people have encountered in using the Internet are related to the analysis and interpretation of information, rather than to using the technology itself. Grassroots ICT programs have demonstrated that it is possible that people with relatively limited formal education can enhance their information literacy skills, if intermediary organizations provide hands-on support, guidance and specific capacity-building activities on issues related to the interpretation of information instead of solely focusing on training participants in the use of technological applications.

On the other hand, government programs frequently overemphasize technology itself in its capacity-building and provided little guidance on issues related to the use, processing and evaluation

of information. These programs frequently fail to place the use of ICTs into the broader local socio-cultural, economic and political context and thus failed to improve peoples' information literacy skills (Gigler, 2009).

A good example of the critical differences between ICT capabilities, meaningful uses and enhanced informational capabilities is the use of ICTs (Internet and community radio) to improve small-scale farmers' access to market prices. While many programs are highly successful in enhancing their participants' 'CT' capabilities to use the Internet to find market price information, they frequently fail to enhance the participants 'I' capacities to interpret, evaluate, process and share the encountered information with others. While this type of use can certainly be considered meaningful, small-scale farmers are often not able to understand the way the different local and regional markets work and to analyze the underlying reasons for significant fluctuations in market prices for their agricultural goods commonly observed in rural markets. Thus improved CT capabilities and enhanced access to the raw market data, without the necessary information literacy skills to interpret the data, fail to enable farmers to directly apply the information to their daily challenge of selling their agricultural products in local and regional markets.

Moreover, the enhancement of people's communication capabilities is an essential aspect of improved informational capabilities. A critical success factor for ICT programs is the issue whether they are successful in significantly enhancing the participant's capabilities to communicate with family members, friends and with their professional contacts. In particular in the context of rural communities, due to their strong social networks—the strengthening of their communication capabilities primarily results in enhancing their horizontal communications with other communities and to a much lesser degree improve the vertical communication between communities and the institutions of the State.

Furthermore, the ICT impact chain stresses the importance of enhancing people's capabilities to not only "consume" but also to produce their own local content and to share it with others. These "content capabilities" are particularly important for rural communities due to: (i) their strong demand for local information; and (ii) the fact, that for most rural communities there is no local Internet content available. To address this issue, ICT programs should support poor communities in the development of their own website in order to provide the poor with a space to create and disseminate their own content and to share some of their experiences with other communities and the public in general.

The ICT impact chain moreover shows that the expansion of people's existing informational capital through the use of ICTs plays a central role in determining whether or not the people have enhanced their informational capabilities. The paper contests that only those ICT intervention that enable communities to locally appropriate ICTs in terms of both their technical and social aspects are successful in enhancing people's informational capital. The technical aspect of the local appropriation process focuses on providing people opportunities to select and adapt communication tools based on their own information needs, while the social aspect of the local appropriation process highlights the

communities' ability to adapt technologies so they are rooted into their own social, economic and cultural processes.

The success of the intermediary process thus depends on the intermediary's ability to simultaneously assuming both roles; the one of a technical and social intermediary. First, in terms of the local technical appropriation, the intermediary should enable poor people to explore, use, and adapt technologies under their own terms and conditions by facilitating an open and secure learning environment among its participants. Moreover, it should provided the necessary technical support (i.e. ICT training, local content) for the technical appropriation of ICTs and thus enabled it participants to make meaningful uses of ICTs.

In relation to the social appropriation of ICTs the intermediary is instrumental in providing the social space to come together and explore the meaning of technologies and their applicability to their individual and collective well-being. A central aspect of this social process is that intermediary assist communities to integrate these technologies into their existing social and organizational community structures. In this sense, ICT programs can play a critical social role in providing its participants with a social space to come together and discuss critical issues relevant for their daily lives. Furthermore, a critical success factor for ICT projects is the issue to what degree the process of introducing ICTs into communities has led to the gradual transfer of "ownership" to the participating communities, in particular whether the participants assume a leading role in the program's management and preparation of specific activities.

Finally the third critical condition in the fourth step of the impact chain emphasizes that ICT interventions need to enhance its participants' individual and collective agency in terms of their uses of information. This concept stresses the political dimension of information and places ICTs into the broader socio-political and economic context. A critical aspect of the expansion of people's individual and collective agency is that the participants gain the necessary knowledge and human capabilities to use, manipulate, and control ICTs. In this sense, the study emphasizes that the users' ownership and control over the use and management of ICTs and the resulting enhancement of their informational capabilities can act as a critical source for their individual and collective empowerment.

In sum, the paper highlights that for ICTs to have a positive impact on people's well-being it is critical that the intermediary organization supports its participants in such a manner that their meaningful uses of ICTs also result in enhancing their informational capabilities. If people are enabled to take this critical step, enhanced informational capabilities similar to literacy can enhance poor peoples' human capabilities to make strategic life choices and to better interact with the formal institutions of the state and the market.

The fifth and final step in the impact chain investigates the extent to which advanced informational capabilities can enhance people's human and social capabilities; and in which dimensions of their lives the meaningful use of ICTs can indeed play a transformative role. The AEF developed above has emphasized that the positive multiplier effect of informational capabilities on people's human and social capabilities depends on the extent to which informational capabilities: (i) enhance people's

individual and collective agency; (ii) strengthen poor people's existing capitals (i.e. human, financial capital); and (iii) have a positive multiplier effect on the other capabilities. Consequently, the impact of ICTs on people's human and social capabilities is the strongest the more robust the effects of enhanced informational capabilities are on these three aspects of people's lives. The last step of the impact chain aims to unpack the indirect effects that the enhanced informational capabilities might have on the multiple dimensions (i.e. economic, social, political) of a person's life and explains the various factors that determine the existence and strength of the ICT multiplier effect on people's individual and collective well-being.

The first dimension in the last step of the impact chain is the personal dimension and the extent to which people's uses of ICTs can result in their individual empowerment. A major finding of the paper is that the individual empowerment is the only dimension in which the use of ICTs can directly enhance people's human well-being. The article argues that the enhanced proficiency to use ICTs can have significant and direct positive impact on people's psychological well-being, particularly for people who belong to the most vulnerable groups, such as women and youth. The analysis clearly indicated that enhanced ICT capabilities can be the source of improved individual agency and has significant positive effects on participants' self-esteem.

The social dimension of people's well-being is the second dimension in which enhanced informational capabilities can play an important role in improving people's human capabilities. Investigating the above mentioned three processes by which enhanced informational capabilities can be converted into enhanced human and social capabilities, it becomes however apparent that the Internet has the biggest potential in enhancing individual rather than collective capabilities in this dimension of peoples' lives. With respect to education, for instance, advanced informational capabilities strengthens peoples' individual agency in terms of raising their awareness of existing educational opportunities and the existing gaps between urban and rural areas. Second, enhanced informational capabilities can significantly strengthen individual's human capital, in particular if the programs focus on issues such as capacity-building in information literacy. Third, enhanced informational capabilities in the area of education have a strong multiplier effect, in the sense that they can significantly enhance people's human capabilities similar to literacy, enabling people to reach higher levels of education. ICT capacity-building programs furthermore can play a critical role in adult education and vocational training programs. As such, ICTs can play an important role in improving peoples' access to non-formal education.

In terms of the economic dimension of people's well-being, the paper ascertains that the use of ICTs has limited positive effects on the economic well-being of rural communities. In fact, empirical evidence frequently indicates that enhanced informational capabilities (i) have often only minor effects on strengthening people's individual and collective economic agency; (ii) do not enhance people's existing economic or financial capital and (iii) have only limited multiplier effects on people's economic well-being.

The main reason for this assertion is that while ICTs can help enhance people's access to market *prices*, they cannot meaningfully alter existing market structures and the lack of competitive and transparent markets in many rural areas of developing countries. Frequently the existing information asymmetry is only one among many factors (e.g., high transportation costs, limited production capacity) that have led to important market distortions and that improving access to market information is not, by itself, sufficient to significantly reduce the mentioned market failures. In fact, the results form ICT program evaluations frequently show that the use of ICTs did not improve the "negotiating power" of small-scale farmers in local and regional markets; often fail to significantly reduce the high "transaction costs" small-scale farmers are facing when bringing their products to the markets; and do not have any significant positive impact on their incomes.

The paper furthermore concludes that ICTs have the lowest impact on the political dimension of poor people's well-being. The study underscored that the multiple barriers for rural communities to participate in the political system at the local and central levels of government are too significant to be overcome by the use of ICTs. In fact, the analysis reveals that while ICTs can help poor people to enhance their individual and collective political agency by for instance exerting their right to information, they frequently only play a limited role in enhancing the transparency of government institutions due to the lack of the required cultural and organizational change within government institutions themselves. While ICTs can act to some degree as a catalyst for enhanced governance, a fundamental change of behaviours and attitudes by politicians and government officials alike is necessary to enhance the accountability and transparency of government institutions. Central to the issue of good governance is the lack of "information accessibility" and not the lack of access to ICTs.

Finally, the impact chain illustrates that the paper has confirmed its principal hypothesis that the presence of an effective and local intermediary organization is the essential factor for enhancing people's well-being through the use of ICTs. They help rural communities to interpret, appropriate and enact ICTs to their local socio- cultural context; to make the uses of ICT meaningful to their every-day lives and to enable people to enhance their informational capabilities that ultimately translate into improvements in their human and social capabilities. The ICT Impact Chain illustrates this critical finding by tracing the path of an ICT program from its initial stage of the information and needs assessment to the enhancement of people's human and social capabilities.

6. Conclusions

The paper has argued that ICTs under certain conditions can significantly enhance poor peoples' human and social capabilities and thus have a positive impact on their well-being. At the core of the process of introducing ICTs into rural communities stands the notion that ICTs can (i) enhance poor peoples' individual and collective agencies; (ii) strengthen their existing individual and/or community assets; and (iii) enhance their "informational capabilities". Similarly to literacy, newly acquired 'informational capabilities' can act as an agent for change for individuals and communities enhancing their abilities to engage with the formal institutions in the economic, political, social and cultural

spheres of their life. It has been ascertained that that the enhancement of peoples' informational capabilities is the most critical factor determining the extent to which ICTs can enhance people's well-being. That is, the expansion of a person's informational capabilities has not only intrinsic value for his/her well-being, but also, and even more important, an essential role as a catalytic agent strengthening his or her capabilities in multiple dimensions of his or her life.

The paper has however also illustrated that there is not a direct and causal relationship between ICT and development. This relationship is much more complex and indirect in nature, whereby the issue of its impact on the livelihoods of the poor depends to a large extent on the dynamic and iterative process between people and technology within a specific local, cultural and socio-political context.

Furthermore, the analysis has demonstrated that there are important differences in terms of the extent to which informational capabilities expand peoples' human and collective capabilities depending on the different dimensions of peoples' lives, such as the political, economic and social dimension. Frequently, the most immediate and direct impact of ICT programs on peoples well-being seems to be the personal empowerment of the most marginalized people, such as women, whereby the newly acquired ICT capabilities provide people with a sense of achievement and pride, thus significantly increasing their self-esteem. The results have furthermore shown that poor people perceive the Internet to play a critical role in enhancing the social capabilities of their communities, while they consider its positive impact on individual human capabilities as less significant. Thus the Internet is being seen to have the strongest impact on the social and organizational dimension of their lives. In terms of both the political and economic dimensions, a major finding is that there exists only a limited relationship between the enhancement in a person's informational capabilities and his or her human capabilities. In both dimensions, the role ICTs can play in enhancing people's well-being is significantly limited by broader socio-economic factors.

A key recommendation of the paper is that the human development of people, rather than technology itself should be the center of the design and evaluation of ICT programs. As has been shown, the important advantage of using the 'capability approach' as the basis for the evaluation of ICT programs is its emphasis on the ability of ICTs to improve the daily livelihoods of poor communities, in contrast to more conventional approaches which overemphasize the significance of technology itself for development.

Bibliography

Action Aid (1999) Fighting Poverty Together. Action Aid's Strategy 1999-2003, London: Action Aid

Agrawal, A. (1995) *Dismantling and divide between indigenous and scientific knowledge*, Development and Change, *26.*

Agrawal, A. and C. Gibson (1999) 'Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation'. *World Development*, Vol.27, No.4, pp.629-649.

Alkire, S. (2002), *Valuing Freedoms: Sen's Capability Approach and Poverty Reduction*. Oxford: Oxford University Press.

Arunachalam, S. (2002) "Reaching the Unreached- an Indian experience in empowering people through information access", MS Swaminathan Research Foundation, Vidura, Press Institute of India

Ashley C. and K. Hussein (2000) "Developing Methodologies for Livelihood Impact Assessment: Experience of the African Wildlife Foundation in East Africa" ODI Working Paper #129

Association of College and Research Libraries (2000), Informaiton Literacy, Competency Standards for Higher Education, American Library Association, Chicago

Avgerou, C. (2001), "The Significance of Context in Information Systems and Organisational Change." Information Systems Journal 11:43-63.

—. (2002), Information Systems and Global Diversity: Oxford University Press.

Avgerou, C. and Walsham, G. (2000) Introduction: IT in developing countries. In *Information Technology in Context: Studies from the perspective of developing countries*, edited by C. Avgerou and G. Walsham, Ashgate Publishing Limited, Hants.

Avgerou, C., and S. Madon. (2003), "Framing IS Studies." LSE: Department of Information Systems: Working Paper Series.

Avgerou, C., and S. Madon. (1993), "Development, Self-determination and Information." in Computers and Society Citizenship in the Information Age, edited by C. Beardon and D. Whitehouse. Oxford: Intellect Ltd.

Ballantyn, P. (June 2002), "Collecting and propagating local development content", in: *INASP Newsletter* No. 20.

Bebbington, A J. (1999) "Capitals and capabilities: a framework for analysing peasant viability, rural livelihoods and poverty in the Andes", in: World Development Vol. 27(12), 2021-2044.

Black, J. (1999), Information rich- information poor, bridging the digital divide. International Institute for Communication and Development. Available at: www.iicd.org

Bhatnagar, S. and Schware, R. Ed. (2000), Information and Communication technology in development: cases form India, New Dehli: Sage

Braga, C. P. (1998). "Inclusion or Exclusion", Information for Development (InfoDev), The World Bank, http://www.unesco.org/courier/1998_12/uk/dossier/txt21.htm

Bridges.org: (2001). Spanning the Digital Divide. Understanding and tackling the issues; available at: http://www.bridges.org/spanning/report.html

Brown, D. (1991) Methodological considerations in the evaluation of social development programmes – An alternative approach, *Community Development Journal*, 26, 4.

Castells, M. (1997) The Information Age: Economy, Society and Culture. Volume 2*: The Power of Identity*, Blackwell, Oxford.

Castells, M. (1998) Information technology, globalisation and social development. Paper prepared for the UNRISD Conference on Information Technologies and Social Development, Geneva, June 1998.

Castells, M. (2001), *The Internet Galaxy*: Oxford University Press.

Chambers, R. (1993) *Challenging the Professions: Frontier for Rural Development*, ITDG, London

—. (1997a) *Whose Reality Counts: Putting the last first,* Intermediate Technology Publications, London.

—. (1997b). "Editorial: Responsible Well-Being -- A Personal Agenda for Development", in: World Development 25 (11) pp. 1743-1754

Chambers, R & Conway G (1991) "Sustainable rural livelihoods: practical concepts for the 21st century", IDS Discussion Paper 296. Brighton: IDS.

Cochrane, G. and Atherton. P.: (1980): "The cultural appraisal of efforts to alleviate information inequality", in: Journal of American Society for Information Services, Vol. 31, No. 2, p. 282-92

Comim, F. (2001). "Operationalizing Sen's Capabilities Approach." Conference Proceedings – Justice and Poverty: examining Sen's Capability Approach. 5-7 June 2001. Von Hugel Institute. St. Edmund's College Cambridge.

Corbridge, S. (2001), "Development As Freedom: the Spaces of Amartya Sen." Progress in Development Studies 2:183-217.

Daly, J. (1999), "Measuring Impacts of the Internet in the Developing World" in: *iMP Magazine*, May 21, 1999

Delgadillo K., Gomez, R. and Stoll K. (2002) Community Telecentres for Developmetn: Lessons from Community Telecentres in Latin America and the Caribbean, IDRC Canada

Denzin, N. K. (1978) *Sociological methods : a sourcebook,* New York : McGraw-Hill,

DFID (2002), "The significance of information and communication technologies for reducing poverty", Department of International Development. London

Digital Opportunity Initiative (2001), "Creating a digital dynamic: Final report of the Digital Opportunity Initiative". http://www.opt-init.org/framework.hstml

Ellis, F: (2000), *Rural Livihoods and diversity in developing countries.* Oxford University Press, Oxford.

Ernberg, J.(1998). "Universal Access for Rural Development: From Action to Strategies", First International Conferenceon Rural Telecommunications,Washington, November 30-December 2

Estrella, M and Gaventa J. (1998), "Who Conts Reality? Participatory Monitoring and Evaluation: A Literature Review", Working Paper 70. Brighton : IDS

Freire, P. (1972). “Pedagogy of the Oppressed”, Penguin Books, London

Friedmann, J. (1992), “Empowerment: The Politics of Alternative Development”, Blackwell Publications, Oxford

Garnham, N. (2000), "Amartya Sen's 'Capabilities' Approach to the Evaluation of Welfare: Its Application To Communications." Pp. 25-36 in Beyond Competition: Broadening the Scope of Telecommunication Policy, edited by Bare Cammaerts, and Burgelman, Jean-Claude. Brussel: VUB Press.

Gasper, D. (1997). "Sen's Capability Approach and Nussbaum's Capability Ethics." *Journal of International Development* 9:281-302.

—. (2000). "Development as Freedom: Taking Economics beyond Commodities--The Cautious Boldness of Amartya Sen." *Journal of International Development* 12:989-1001.

—. (2002). Is Sen’s Capability Approach an Adequate Basis for Considering Human Development? Institute of Social Studies. Working Paper Series No. 360. The Hague. The Netherlands.

Gigler, B. S. (2001). ”Empowerment through the Internet: Opportunities and Challenges for Indigenous Peoples”, in: *Technology for Social Action*, TechKnowLogia, July/August 2001.

—. "Including the excluded: can ICTs empower poor communities?, Towards an alternative evaluation framework based on the capacity approach." 4th International Conference on the Capability Approach, Sept.5-7, 2004 . Pavia, Italy : University of Pavia , 2004.

—. (2008). "Enacting and Interpreting Technology- From Usage to Well-Being." Information Communication Technologies: Concepts, Methodologies, Tools, and Applications. Ed. Van Slyke, C. : Idea Group, 2008.

—. “Decentralization, Clientalism and Popular Participation—Is there a role for ICTs to improve local governance, 3rd International Conference on Information and Communication ICTD 2009 Proceedings, Carnegie Mellon University. Carnegie Mellon University, Education City, Doha, Qatar: Carnegie Mellon University, 2009.

Gomez R., Hunt P., Lamoureux E. (1999), “Enchanted by Telecentres: A Critical look at Universal Access to Information Technologies for International Development.” Paper presented at the New IT and Inequality, University of Maryland.

Gumucio Dagron, A. (2001), “Making Waves: Stories of Participatory Communication for Social Change”, Rockefeller Foundation.

—. (2001) “Prometheus riding a Cadillac? Telecentres as the promised flame of knowledge”: in: *The Journal of Development Communication* — Volume 12, No 2 (December 2001) http://ip.cals.cornell.edu/commdev/jdc-1.cfm

Gurstein, M. (2000) “ Community Informatics: Enabling Communities with Information and Communications Technologies, Idea Group Publishing, Hershey, PA

—. (2003): “Effective use: A community informatics strategy beyond the Digital Divide”, In: First Monday, vol 8, no 12.

Hamelink, C.J.: (1994) Trends in World Communication, on disempowerment and self-empowerment, Southbound, Third World Network, Penang, Malaysia

—. (2002) Social development, Information and Knowledge: Whatever happened to communication? *Development*, Vol. 45, No. 4.

Hartsock, N. (1985), Money, Sex and Power: Towards a Feminist Historical Materialism, Boston, Northeastern University Press

Harvard Institute for International Development: (2001), e-Readiness, http://www.readinessguide.org/forward.html

Hasan, H. and Dista, G.(1999) The Impact of Culture on the Adoption of IT: An Interpretive Study: in: Journal of Global Information Management, 7, no. 1, pp. 5-15

Haywood, T.: (1995) Info-Rich – Info-Poor, access and exchange in the global information society, Bowker-Sauer, East Grinstead, UK

Healy, K. (2001) *Llamas, Weavings, and Organic Chocolate: Multicultural Grassroots Development in the Andes and Amazon of Bolivia*, Notre Dame, IN: Notre Dame University Press.

Heeks, R.: (1999), *Information and Communication Technologies, Poverty and Development*, Development Informatics Working Paper Series, No 5, IDPM Univ. Manchester.

—. (2002) "I-development not E-development: special issue on ICTs and development" in *Journal of International Development* Dev. 14, 1p.1-11

Heeks, R., and C. Kenny. (2002), "ICTs and Development: Convergence or Divergence for Developing Countries?" in 7th International Working Conference of IFIP WG9.4. Bangalore, India.

Hewitt de Alcántara, C. (2001), "The Development Divide in a Digital Age", Technology, Business and Society Programme Issue Paper, No. 4, UNRISD, Geneva.

Hudson, H. (1995) "Economic and Social Benefits of Rural Telecommunications: A Report to the World Bank," University of San Francisco at http://www.usfca.edu/facstaff/hudson/papers/Benefits%20of%20Rural%20Communication.pdf.

IDS Bulletin (1994) *Knowledge is Power? The use and abuse of information in development*, Institute of Development Studies Bulletin, 25, 2, University of Sussex.

ITDG (2001). Enable people to make technologies work for them. ITDG's response to the Human Development Report 2001. http://www.itdg.org/html/advocacy/docs/itdg_response_to_hdr_june2.pdf

International Telecommunication Union-ITU (2003), World Telecommunication Development Report 2003: Access Indicators for the Information Society
http://www.itu.int/ITU-D/ict/publications/wtdr_03/index.html

Introna, L. D., and L. Whittaker. (2002), "The Phenomenology of Information Systems Evaluation: Overcoming the Subject/Object Dualism." in IFIP wg 8.2. Barcelona, Spain.

Kabeer, N. (1994) "Reversed Realities", Verso, London

Kabeer, N. (1999a) 'Resources, Agency, Achievement: Reflections on the Measurement of Women's Empowerment', *Development and Change*, Vol.30, No.3, pp.261-302

Kabeer, N. (1999b) "The Conditions and Consequences of Choice: Reflection on the Measurement of Women's Empowerment", UNRISD Discussion Paper 108, United Nations Research Institute for Social Development, Geneva.

Kenny, C. (2003) "Development's False Divide- Giving Internet access to the world's poorest will cost a lot and accomplish little." *in*: *Foreign Policy (Jan.-Feb. 2003) p. 76-77*

Kiiski, S. and, Pohjola, M. (2001), "Cross-country Diffusion of the Internet", WIDER Studies in Development Economics.

Kling, R. (2000) “Learning about information technologies and social change: the contribution of social informatics”, *The Information Society*, Vol. 16 No.3

Kirkman, G. (1999). "It's More than Just Being Connected" (Working Paper), Information Technologies Group, Center for International Development (CID), Harvard University.

Kirkman, G.S., Cornelius, P.K, Sachs, J.D., Schwab, K. (2002) The Global Information Technology Report 2001-2002: Readiness for the Networked World. Oxford University press, New York.

Korten, D. C., (1990). *Getting to the 21st Century*. Connecticut: Kumarian Press, Inc

KPMG (July 2000), “The Impact of the New Economy on Poor People and Development Countries: Draft Final Report”. London, KPMG report prepared for the Development for International Development.

Madon, S. (1992), "The impact of computer-based information systems on rural development: A case study in India." Journal of Information Technology 7:20-29.

—. (1993), "Introducing administrative reform through the application of computer-based information systems: A case study in India." Public Administration and Development 13:37-48.

—. (2000), "The Internet and socio-economic development: Exploring the interaction." Information Technology and People 13.

—. (2002), "IT Diffusion for Public Service Delivery: Looking for Plausible Theoretical Approaches." in Information Systems and the Economics of Innovation, edited by Chrisanthi Avgerou and R.L. LaRovere

Madon, S. (2003) Evaluating the developmental impact of E-governance initiatives: An exploratory framework. Department of Information Systems Working Paper Series No 124, LSE.

Mansell, R. and When, U. (1998), Knowledge societies: Information Technology for sustainable development, Oxford University Press.

Mansell, R. (1999), "Information and Communication Technologies for Development: Assessing the Potential and the Risks." Telecommunications Policy 23:35-50.

—. (2001), "New Media and The Power of Networks." in First Dixons Publie Lecture and Inaugural Professorial Lecture. LSE.

Maclay, C., et. (November 2001), Al. “Andean Readiness for the Networked World, Introduction and Regional Overview”. The Information Technologies Group, Center for International Development at Harvard University. Andean Competitiveness Project- Working Papers.

Marsden, D., and Oakley, P. (eds), (1990), *Evaluating Social Development Projects*. Oxford: Oxfam.

Mayox, L. (1992), From Idealism to Realism: women, feminism and empowerment in Nicaraguan, Development and Change 23 (2), The Netherlands

McConnell, P. (1995) (ed.). *Making a Difference: Measuring the Impact of Information on Development*. Proceedings of a workshop held in Ottawa, Canada 10-12 July 1995.

—. (2000a) “Connecting with the Unconnected: Proposing an Evaluation of the Impacts of the Internet” In: Richardson, D. and Paisley, L.: *The First Mile of Connectivity: Advancing*

telecommunications for rural development through a participatory communication approach. FAO

—. (2000b) A champion in our midst: Lessons learned from the impacts of NGOs use of the Internet, *EJISDC*, 2, 5, pp. 1-14.

McLuhan, M.: (1964), Understanding Media, the extensions of man, Routledge, London

McNamara, K. S. (2000), "Why be wired? The importance of Access to Information and Communicatioin Technologies" in: *International Journal of Technologies for the Advance of Knowledge and Learning*, March/April 2000.

Melkote S. R. (1991). *Communication for development in the Third World: theory and practice*. London: Sage Publications

Menou, M. (1993), *Measuring the impact of information on development*. International Development Research Centre: Ottawa.

—. (1999), "Impact of the Internet-some conceptual and methodological issues, or how to hit a moving target behind the smoke screen", in Nicholas, D & Ian Rowlands (edit): *The Internet: its impact and evaluation: Proceedings of and international forum* held at Cumberland Lodge, Windsor Park, 16018 (July 1999), London.

—. (2002) "Information Literacy in National Information and Communications Technology (ICT) policies: The Missed Dimension, Information Culture", White Paper prepared for UNESCO, Information Literacy Meeting of Experts, Prague, The Czech Republic.

Meyer, C. (1997) The political economy of NGOs and information sharing, *World Development*, 25, 7.

Miller, D. and Slater, D. (2000) *The Internet, an ethnographic approach*, Berg, Oxford.

Moore, M. (2001) "Empowerment At Last?" Institute of Development Studies, University of Sussex, UK, in Journal of International Development, 13, 321-329

Mosaic Group (1998) The Global Diffusion of the Internet Project: An Initial Inductive Study, Global Diffusion, The Mosaic Group, available at: http://mosaic.unomaha.edu/gdi.html

Narayan, D. (et. al) (2000/2002), *Voices of the Poor*. Vol. 1-3, Oxford University Press.

—. (edit) (2002) *Empowerment and Poverty Reduction*: *A Sourcebook*, The World Bank

Norris, P. (2001), *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*, John F. Kennedy School of Government (KSG), Harvard University

Nussbaum, M. (2000). *Women and Human Development: The Capabilities Approach*. Cambridge: Cambridge University Press.

Oakley, P. (eds.) (2001), Evaluating empowerment. reviewing the concept and practice, INTRAC

Oakley , P. and Clayton A (2000), Monitoring and Evaluation of Empowerment: A resource document, INTRAC

Oakley, P, Pratt, B. and Clayton, A. (1998), Outcomes and impact. evaluating
change in social development, INTRAC NGO management and policy series. no 6

Oliver, R. and Tower, S: (2000) "Benchmarking ICT literacy in tertiary learning settings". In: R. Sims, M. O'Reilly and S. Swakins (eds.) Learning to choose: Choosing to learn.

O' Farrell, C. (2001) **"**Information Flows in Rural and Urban Communities: Access, Processes and People". IRDD, The University of Reading

O'Farrell, C., Norrish, P. and Scott, A (1999). Information and communication technologies (ICTs) for Sustainable Livelihoods: Preliminary study. ITDG, AERDD

Orlikowski, W. J (1992), „The Duality of Technology: Rethinking the Concept of Technology in Organizations." In: Organization Science 3 (3): 398-429.

—. (2000), "Using Technology and Constituting Structures: a Practice lens for Studying Technology in Organizations."in: Organizational Science, 11(4): 404-428.

Panos (1998), " The Internet and Poverty". *Panos Media Briefing*, No. 28, Panos Institute, London.

—. (1999) Information, Knowledge and Development. Panos Media Briefing No. 30, Panos Institue. London

Pohjola, M. (June 2002), The New Economy: Facts, Impacts and Policies, in Information Economics and Policy.

Powell, Mike, (1999). *Information Management for Development Organizations*. Oxfam, Oxford, UK.

Pronenza, J, Buch, R.B., Montero G. (2001) Telecenters for Socio-Economic and Rural Development in Latin America and the Caribbean, 2001, Jointly published by FAO, ITU & IADB. Washington, DC.

Rahman, A. (1993). *People's Self-Development*. London: Zed Books.

Rappaport, J. (1981), In praise of paradox : a social policy of empowerment over prevention, in : American Journal of Community Psychology, 9:1-25

—. (1987), Terms of Empowerment/examplars of prevention: Toward a theory for community psychology, in : American Journal of Community Psychology, Vol. 15, No. 2: 121-148

Robinson , S.: (1998), "Telecenters in Mexico: Learning the Hard Way"**,** Presented at the *Partnerships and Participation in Telecommunications for Rural Development: Exploring What Works and Why*, Conference at the University of Guelph, Guelph, Ontario, Canada, October 26 & 27, 1998

Roche, C., 1999. *Impact Assessment for Development Agencies*. Oxford: Oxfam

Rodriguez, F. and Wilson, E. J. III, (2000), "Are Poor Countries Losing the Information Revolution?" infoDev Working Paper, May 2000.

Roman, R and Colle, R.D. (2002) Themes and issues in telecentre sustainability. Development Informatics Working Paper Series Paper No. 10, IDPM, University of Manchester. Available online from IDPM website.

Rogerson, A. and Itoh, K. (1998), "Knowledge and development: two sides of tomorrow's coin.", Development Research Insights, No. 25, Institute of Development Studies, University of Sussex.

Rowlands, J. (1995) "Empowerment Examined", Development in Practice 5 (2), Oxfam, Oxford

Rowlands, J. (1997) "Questioning Empowerment", Oxford: Oxfam, UK and Ireland

Schech, S. (2002), "Wired for Change: The Links between ICTs and Development Discourses." Journal of International Development 14:13-23.

Schumacher, E. F. (1973), Small is beautiful : economics as if people mattered, Harper & Row, New York

Scoones, I. (1998). "Sustainable Rural Livelihoods: A framework for analysis", IDS Working Paper 72, Brighton: IDS

Sen, A. (1985) "Well-being, Agency and Freedom. The Dewey Lectures 1984", in Journal of Philosophy 82 (4), pp 169-221

—. (1992) *Inequality Reexamined*, Harvard University Press, Cambridge, Mass

—. (1993). "Capability and Well-being." Pp. 30-53 in *The Quality of Life*, edited by Martha Nussbaum and Amartya Sen. Oxford: Clarendon Press.

—. (1997) "Editorial: Human capital and human capability." *World Development* 25:1959-1961

—. (1999), *Development as Freedom*, New York: Knopf Press

—. 2000b. "Social exclusion: concept, application, and scrutiny." Asian Development Bank.

Sen, G. with Grown, C. (1985), DAWN, Development Crises, and Alternative Vision: Thirds World Women's Perspectives, Development Alternatives with Women for a New Era, New Delhi

Silverman, D. (2000), *Doing qualitative research : a practical handboo,* London ; Thousand Oaks, Calif. : Sage Publications

Skuse, A. (2000), Information communications technology, poverty and empowerment http://www.imfundo.org/knowledge/skuse.htm.

Steinmueller, W. E. (2001), "Possibilities of Leapfrogging to Higher Value-Added Production for Developing Countries as a Result of New Information and Communication Technologies", in: International Labor Review Vol. 140. Issue 2. Pp. 193-210.

Tacchi, J.; Slater, D. Lewis, P, (2002) 'Ethnographic Monitoring and Evaluation of Community Multimedia Centres: A Study of Kothmale Community Radio Internet Project, Sri Lanka.' DfID/UNESCO.

UCLA Internt Report (2001. World Internet Project, UCLA Center for Communicatio Policy http://ccp.ucla.edu/pages/internet-report.asp

UNDP (2001), Human Development Report 2001, "Making new technologies work for human development", UNDP, Oxford.

Van der Eyken, W. (1991) The Concept and Process of Empowerment. The Hague: Bernard Vvan Leer Foundation.

Yin, R. K. (1994). *Case Study Research: Design and Methods.* (2nd ed.) Thousand Oaks, CA: Sage.

Young, V., Grant B., and Jens L. (1997). *ICTS and Development: Testing A Framework for Evaluation. Volume 1: Final Report.* Performance Review Division, Canadian International Development Agency: Ottawa, Canada.

Wade, R. (2002) "Bridging the Digital Divide: New Route to Development or New Form of Dependency?" In *Global Governance*, Vol.8, No. 4 Oct. Dec.2002

Walsham, G. (1993) The Emergence of Interpretivism in IS Research." Information Systems Research 6(4): 376-394.

—. (1995), "Interpretative Case Studies in IS Research: Nature and Method." European Journal of Information Systems 4:74-81.

—. (2001), Making a World of Difference. Chichester: John Wiley & Sons, LTD

Wilson, G. and Heeks, R. (2001) Technology, Poverty and Development. In *Poverty and Development: Into the 21st Century*, edited by T. Allen and A. Thomas, Open University & Oxford University Press.

Wilson, E., Daly, J., and Griffiths, J.-M. (1998)," Internet Counts, measuring the impact of the Internet", Office of International Affairs, National Research Council, Washington, DC.

Wieringa, S. (1994) "Women's Interests and Empowerment: gender planning reconsidered", Development and Change 25 (4), The Netherlands

World Bank (1990) World Development Report, 1990 New York, Oxford University Press

—. (1995). *Harnessing Information for Development*, World Bank Group, Vision and Strategy.

—. (1999) *Knowledge for development, World Development Report*, Oxford University Press, New York.

—. (2000), Global Information and Communication Technologies Department, " The Networking Revolution, Opportunities and Challenges for Developing Countries".

World Economic Forum (2002-2003) The *Global Information Technology Report* – Readiness for the Networked World, Oxford University Press.

Annex 1: Table 2: Indicators for Individual Empowerment

Human Capabilities strengthened

Dimension	Objective	Outcome Indicator
Informational	*To improve the access to information and informational capabilities*	➢ improved capacity to use different forms of ICTs ➢ enhanced information literacy ➢ enhanced capacity to produce and publish local content ➢ improved ability to communicate with family members and friends abroad
Psychological	*To support a process of self-reflection (critical conscientization) and problem-solving capacity*	➢ strengthened self-esteem ➢ improved ability to analyze own situation and solve problems ➢ strengthened ability to influence strategic life choices ➢ sense of inclusion in the 'modern' world
Social (Human capital)	*To strengthen people's human capital (skills, knowledge, ability to work and good health)*	➢ enhanced ICT literacy and technology skills (i.e. repair computers) ➢ enhanced leadership skills ➢ improved program management skills
Economic	*To enhance people's capacity to interact with the market*	➢ improved access to markets ➢ enhanced entrepreneurial skills ➢ alternative sources of income ➢ productive assets strengthened ➢ improved employment opportunities ➢ improved income through a) lower transaction costs (less time constraints); b) reduced transport needs; and c) increased timeliness of sales
Political	*To improve people's participation in decision-making processes at the community-level and the political system*	➢ improved access to government information/services (e-government) ➢ improved awareness about political issues ➢ improved capabilities to interact with local governments
Cultural	*To strengthen people's cultural identity*	➢ use of ICTs as a form of cultural expression (i.e. design of computer graphics, websites) ➢ increased awareness of own cultural identity

Annex 2: Table 3: Indicators for Community Empowerment

Social Capabilities strengthened

Dimension	Objective	Outcome Indicator
Informational	*To improve access to information and informational capabilities*	➢ traditional information system strengthened ➢ information flows within community improve ➢ horizontal knowledge exchanges with other communities strengthened vertical knowledge exchanges with the state, donors, NGOs strengthened
Organizational	*To strengthen organizational capabilities*	➢ transparent selection of leaders ➢ increased efficiency ➢ improved information flows ➢ better coordination among different organizations ➢ networks with other local organizations strengthened
Social Development	*To improve access to basic social services*	➢ improved access to formal and non-formal education (i.e. e-learning) ➢ improved access to health services (improved knowledge about health practices and traditional medicine) ➢ improved knowledge and access social programs of the government (e-government services)
Economic Development	*To promote economic opportunities*	➢ improved access to markets and commercialization of products ➢ improve productive activities through enhanced knowledge (i.e. better knowledge about agricultural practices) ➢ enhanced capacity mobilize resources from outside donors ➢ improved access to remittances through improved communication with migrant workers
Political Participation	*To improve participation in the political system* *To enhance transparency within community* *To improve participation in the political system* *To enhance transparency within community*	➢ improved 'voice' and participation in development process ➢ improved transparency of political institutions (e-government) ➢ enhance decision-making power in political process ➢ better coordination of political activities enhanced transparency of information flows within community ➢ direct participation in international policy dialogue (UN permanent forum
Cultural Identity	*To strengthen the communities cultural identity*	➢ Local languages strengthened ➢ indigenous knowledge strengthened ➢ improved dissemination of communities own culture