

Framework for evaluating contributions of ICT to capabilities, empowerment and sustainability in disadvantaged communities

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Empowering rural communities through ICT policy and research

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Abstract

Effective impact assessments of ICTs on individuals and communities are required to determine whether ICT for development (ICT4D) projects are successful, scalable and replicable. This paper argues that many ICT4D project assessments often fail to answer key questions about how ICT4D initiatives can contribute to empowerment, capabilities and sustainability.

Using Sen's 'Capability' approach as a conceptual framework, the paper presents an assessment framework aimed at identifying whether and under what circumstances empowerment, capabilities, sustainable development and ICT can reinforce each other in a virtuous spiral. Distinguishing features of the proposed framework include a forward-looking longitudinal perspective and recognition of the importance of institutions at three levels: macro, meso and micro. At the macro-level, the regulatory environment must be conducive to innovative approaches to ICT deployment. At the meso¹-level, there must be a supportive context, including adequate economic, educational, social and physical infrastructures. However, to be successful and sustainable, it is at the micro-level that sustainable ICT infrastructures should have the most pronounced impacts on the lives of individuals, businesses and communities. Hence, the participatory nature of the proposed evaluation method.

In addition to describing the proposed conceptual framework and associated methodology for evaluations, the paper also includes a review of ICT4D evaluations and literature pointing to the lack of adequate knowledge in this field. The paper is of importance to the CPR*south* community, as the outcome of the proposed research is designed to provide input to ICT4D policy-making.

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1 Introduction

The purpose of the proposed research outlined in this paper is to understand how ICT4D initiatives can contribute to fostering conditions that support local, regional and national

¹ In addition to referring to the district and regional level, this term can also refer to intermediaries such as NGOs.

development goals and what such developments mean in terms of capabilities, empowerment and sustainable livelihoods. The research proposal is presented to the CPR*south2* conference in the spirit of open-source research advocated by Samarajiva & Gamage (2007) and with the expectation that feedback from conference participants will improve the proposed evaluation framework.

ICT projects or initiatives² aimed at supporting disadvantaged³ communities range from mobile telephone systems, such as the Grameen Village Phone and small telecentres, with perhaps a single payphone in remote areas, to larger well-equipped community multimedia centres. They also include local radio, which is a widely used ICT4D tool, sometimes in combination with the Internet as well as initiatives such as HealthNet - a satellite based global health network, providing members in developing countries with e-mail access and a library of web-based health information. Another example, PEOPLink, is a website through which artisans in developing nations can market their products directly, bypassing intermediaries and thereby retaining a higher proportion of the retail value of their products. Specialised equipment, such as One Laptop per Child (OLPC), the USD100 laptop, the prototype unveiling of which was one of the highlights of the Tunis phase of World Summit on the Information Society, is another variant in the diverse range of initiatives to be found under the ICT4D umbrella.

Not all uses of ICT in developing nations are in the form of identified or designated 'projects'. For example, a yam wholesaler at a wholesale market in Accra, who uses a cellphone to bypass intermediaries in an extensive chain of marketing information, is acting on her own, rather than being part of a designated project (Overå, 2006).

What is known about the impact of investments in ICT in disadvantaged communities? How does ICT contribute to well-being, empowerment and capabilities? Under what circumstances can the benefits of ICT projects be widely distributed, rather than contribute to inequalities? It is now widely recognised that the potential impact of ICTs rests on many factors, including those that facilitate or impede their accessibility and use, whether they relate to physical infrastructure or human capabilities (e.g. Internet access is of limited use without awareness of what it can be used for) (Alampay, 2006b). Knowledge of these factors is of great importance to policymakers and therefore of significance to the CPR*south* community.

2 Project evaluation categories

Different terms are used for the activity of investigating how well a project has been implemented, how it has delivered in terms of its objectives and what its impacts have been. Terms include verbs such as appraise, assess, evaluate, impact, measure and monitor. In addition to the nouns associated with these terms, other nouns are also used, including result, outcome, cost-benefits, goals achievement, and cost effectiveness. There is no clear definition of the meaning of these terms and they are often used interchangeably. They have in common an attempt to establish a causal relationship between ICT4D and specific outcomes. Ramírez (2007) questions the use of this terminology set, preferring instead to use the terms '*appreciate*' and '*contribute*'. Acknowledging the danger of establishing causal relationships, with so many factors playing a role, the proposed research will nevertheless use the conventional terminology associated with evaluations. Batchelor & Norrish (no date) advocate in favour of the term '*assessment*', rather than '*evaluation*', on the basis that this term "covers the combination of evidence and data gathering of the projects' purpose-oriented M&E system, additional evidence or data required for proof of concept along with the interpretation or judgements made on the data from a forward looking perspective" (p.13). Despite adopting the term '*evaluate*' as the main verb describing activities associated with capturing the many dimensions of ICT4D in this paper, no limit is placed on the issues to be included when considering how a project is contributing to empowerment, capabilities and sustainability.

Evaluations are generally conducted in response to requirements by donors for input on whether and how to continue a project and/or to gain knowledge to be applied in future projects. They vary significantly within a sector and between sectors. The combination of

² Whilst 'projects' normally refer to an initiative of a specified time period and the term 'initiative' has a more on-going connotation, the two terms are used interchangeably in this paper.

³ Disadvantage is defined in terms of lacking the capabilities to lead the lives community members have reason to value, rather than in absolute terms, such as income or education.

different ingredients in evaluation frameworks can be represented as an n-dimensional matrix, where the dimensions relate to many features, including purpose (e.g. formative⁴ vs. summative), methodologies (e.g. participatory vs. top-down), methods (e.g. questionnaires, interviews), timeframes (e.g. snapshot, backwards or forwards longitudinal), unit of study (e.g. individual, community, region, national), focus (e.g. health, education and empowerment) and conceptual frameworks. ICT4D project evaluations have used frameworks originating from different disciplines, including economics and information technology.

The rest of this section presents different approaches to evaluation. This is not an exhaustive or representative summary. It merely serves to illustrate the diversity of approaches used in evaluations.

Mechanistic/organic, narrow/wide evaluations

From the perspective of development and communication studies, Servaes (2000) defined evaluation methods in the context of two types of approaches to development, mechanistic and organic and identified features of each, as shown in Table 1.

Table 1 – Evaluation features of mechanistic and organic approaches to development

	Mechanistic	Organic
Change seen as	Blue-print, project approach	Open-ended process approach
Time perspective	Short term	Long term
Effect of absence of leader	Project activities slow down	Process continues
Initiative for evaluation	Funding agency	Intended beneficiary
Type of solution	Symptom curing	Elimination of root causes

In a study of the impact of micro-credit, Zohir & Matin (2004) distinguished between wider and narrower impact assessments and presented a typology that measures impacts on the cultural, economic, social and political domains.

Conventional evaluations

Ashley & Hussein (2000) differentiated between three approaches to evaluations, conventional, participatory monitoring and evaluation (PM&EA), and the livelihoods approach. External agents are usually responsible for conducting conventional evaluations, often as part of a logical framework analysis (logframe or LFA), assessing whether a project has met its intended objectives. LFA is a tool for planning, managing and evaluating projects. In his critique of this approach in development projects, Chambers (2005) considered it to embody “a linear logic associated with things (such as constructing a bridge) rather than people (such as capacity development...)” (p.67). Conventional approaches also include those that explore the viability of a specific project and identify key drivers for success. In their summary of 17 InfoDev funded projects, Batchelor & Sugden (2003) considered whether each of the projects had the potential to become financially sustainable. They also highlighted the importance of champions for most projects. The role of a champion was also recognised by Paul (2004) as being a key determinant in the viability of n-logue⁵ kiosks.

Participatory monitoring and evaluation (PM&E)

PM&EA, which emerged as an alternative to conventional evaluation, invites intended beneficiaries to contribute to the definition of success in conjunction with other stakeholders. Participatory approaches, designed to overcome dysfunctions associated with the top-down development paradigm are in themselves problematic. There is a body of literature critical of this methodology (Hickey & Mohan (Eds.) 2004), particularly the way it has been captured, popularised and appropriated through donor pressure for purposes other than as a tool for empowerment of disadvantaged communities. Problems include the lack of time and ability of many disadvantaged persons to communicate in a manner that can ensure that the meanings of their perceptions are understood (Tembo, 2004) and cultural differences between the researcher and the researched (Stillman and Craig, 2006). For this and other reasons, the framework has the potential to reinforce, rather than challenge, privilege and power relations (Golooba-Mutebi, 2005), thereby facilitating exploitation and falling short on the empowerment

⁴ Formative evaluations deal with processes, whereas summative evaluations focus on impact and outcome.

⁵ An initiative to bring ICT to villages in India, established by professors at the Indian Institute of Technology Madras.

objective. This occurs when existing power structures are ignored. Participation can also lead to appropriation (Chambers, 2005). Information asymmetry and inequality between participants and sponsors can raise suspicions of the role of the researcher in such a context. There is also some concern that it may undermine representative democracy (Bebbington, 2004b). Sentiments against participation are stronger in academia than in the field, where advocates in favour of this approach are working to address these concerns (McGee, 2002).

Notwithstanding this mixed history of the participatory approach, it is considered essential that the proposed research be conducted through participatory methods, as these are likely to have a role in avoiding the grim future predicted by Castells (1996) that the 'multimediamworld will be inhabited by the interacted and the interacting' (p. 371). There are many potential benefits associated with participatory evaluation, including ownership of the process by the community, direct learning, and community capacity building (McAllister, 1999, Stillman, 2005). Awareness of contended issues should assist with focusing on the positive aspects and avoiding potential traps. This can be done by insisting on representation from groups that may otherwise be excluded from participatory activities and, if required, assisting with building the necessary capacity of participants as an integral part of the evaluation process. Section 6, includes further details on the proposed methodology.

Sustainable livelihoods approach

In the 'sustainable livelihoods approach' (SLA), the focus shifts from a single project to a wider perspective, encompassing capabilities, assets and activities required for sustainability, where sustainability is defined as the ability to maintain a given level of expenditure over time (DFID 1999). Emerging in the 1990s in response to the previous focus on narrower concepts such as employment and income, SLA takes into account the diverse and multi-faceted characteristics of human and environmental systems. Livelihoods are the outcome of choices people make when using their 'capital assets', comprised of any combination of human, social, natural, physical or financial assets (DFID 1999; Khagram, Clark, & Raad, 2003). The SLA is based on the notion that combined capabilities and assets (e.g. access to social capital, entrepreneurial, and innovation skills), can provide a path out of deprivation and enable households and communities to diversify their livelihood sources, thereby mitigating vulnerability. The framework encourages participants to consider substitutability between different types of capital. This is particularly useful where an increase in one capital category, such as social capital can compensate for a decline in the quality or quantity of other forms of capital (e.g. physical assets). ICT4D studies using the SLA were summarised by Chapman, Slaymaker, & Young (2002). Since then Arun, Heeks, & Morgan (2004) have suggested the application of the framework for research on ICT-based enterprises for women, and Duncombe (2006) has applied it to a study on using micro-enterprises in the establishment of ICT4D initiatives.

'Capability' approach

The SLA and the broad body of work dealing with livelihoods in general have been influenced by the so-called 'capability approach' (CA) developed by Amartya Sen (e.g. 2001, 2005) and other authors (e.g. Gasper, 1997; Robeyns, 2001; Alkire, 2005, and Nussbaum, 2006) since the 1980s, particularly by clarifying the importance of human and social capital, linking endowments to capabilities and by defining livelihoods in material and experiential terms (Corbridge, 2002). At the heart of the CA is the importance of the "expansion of freedom ... both as the primary end and as the principal means of development" (Sen, 2001:xii). Development is considered to be an extension of freedoms, which are viewed as the basic building blocks to development, as well as "the expansion of 'capabilities' of persons to lead the kinds of lives they value ---- and have reason to value" (Sen, 2001, p.18). This focus on freedom, which distinguishes the CA from frameworks advocating growth at any price, including doctrines justifying that the end justifies the means, does not mean that economic variables, such as income, are irrelevant. They are, however, inadequate for measuring quality of life and livelihoods. In the CA framework, certain political and social freedoms, such as the freedom to participate in political activities and to receive basic education are considered to be constitutive of development (i.e. they are relevant whether or not they contribute to development and/or growth). Certain capabilities are required to achieve and enjoy freedom. Subject to external constraints, it is then up to each individual and/or community to translate these capabilities into functionings, which describe what a person is actually doing with his or her capabilities. Functionings can also be capabilities that can be used to derive other functionings, that is also a reflection of well-being.

As individuals are responsible for their own well-being, it is up to them to decide what capabilities and functionings are important to them to lead the lives they value. Obtaining and using capabilities are subject to external constraints, including institutional constraints. The CA approach recognises that a person's capabilities not only depend on social arrangements and institutions but also influence others, as described by Sen (1985): "Given the intrinsic importance of well-being, and indeed of agency, it is not credible that a person can morally evaluate his or her actions without taking note of their effects on the well-being and agency aspects or others (including their well-being freedom and agency freedom" (p.216). This means that the CA must account for impacts at a wider community level. There is no defined geographic or other limitation in the definition of a 'community'.

Poverty is multidimensional and 'capabilities' are only one of four dimensions identified by Sen (2001). The others are: opportunity (access to markets and employment), security/vulnerability to economic risk and to all forms of violence, and empowerment, external to as well as within households.

Developed as a critique of the more prevalent utilitarian approach to evaluation and emphasising the importance of 'capabilities' as the basis for evaluations, Comin (2001) described the CA as "a framework for evaluating and assessing social arrangements, standards of living, inequality, poverty, justice, quality of life or well-being" (p. 4). In this framework, access to physical ICT infrastructure would not be a sufficient determinant of how individual preferences, capabilities and choice will influence how this infrastructure is being used and the benefits derived from it. It can be argued that there is a reciprocal relationship between ICT and capabilities in that individuals require certain capabilities to be able to benefit from ICT, which in turn facilitates the free flow of information - vital to democratic freedom. As expressed by Sen (2005): "... access to the web and the freedom of general communication has become a very important capability that is of interest and relevance to all..." (p.160).

'Capability' approach and ICT

A number of studies have referred to the relationship between ICT and the CA (Alampay 2006a, 2006b; Barja & Gigler, 2005; Byrne & Sahay, 2007; Garnham, 1999; Gigler, 2004; Mansell, 2006; Musa, 2006; Warschauer, 2003; Walsham & Sahay, 2006). Alampay's (2006a) investigation of ICT ownership and access in Pureta Princesa City in the Philippines was conducted within a CA framework. Mansell (2006) suggested that "one way of ensuring greater participation of the poor in ICT4D initiatives could be an evaluation of priorities in the light of entitlements as outlined in DAF⁶..." (p.903). However, most of the writers who refer to the CA as a way forward for future research do not include in-depth field studies based on this approach to assess the impact of ICT on capabilities in a systematic, forward looking, longitudinal manner through a participatory approach. Knowledge of the relationship between ICT and capabilities at the empirical level is thus limited.

The proposed research aims at extending such empirical knowledge, using the CA as its conceptual framework. The benefit of this approach is its focus on what is important from a human development perspective. It is unlikely that positive or negative outcomes can be directly linked to ICT within this broad holistic framework, particularly as the study is expected to show a strong relationship between capabilities, empowerment, and sustainability on the one hand, and on the other effective macro-level policy, supportive meso structures, and resources at the micro-level. However, a detailed appreciation of how ICTs have been used to reinforce these relationships can generate knowledge on how ICT can contribute to a range of outcomes. Any search for causal relationships will probably be unsuccessful, as there are always many factors contributing to a specific outcome (Ramirez 2007).

3 Evaluations of ICT4D

The multitude of international, regional, government, and non-government organisations involved in ICT4D projects are the main producers of evaluations of ICT4D initiatives. Books and articles in academic journals have also contributed to knowledge in this field. The literature

⁶ Amartya Sen's seminal work *Development as Freedom* (2001) is frequently abbreviated as DAF.

ranges from being descriptive and prescriptive, to including different degrees of analysis informed by explicit or implicit conceptual frameworks. There is also a stream of research critical of the 'conventional' approaches to evaluation (Mansell, 2006; Ramirez, 2007), finding the focus on the instrumental side of technology to be of limited use in understanding the contribution of ICT to development, at best, and misguided at worst. The lack of assessments about the extent to which technologies can be empowering is of particular concern to Mansell.

Cost-benefit studies

The main focus of evaluation in the telecommunications field prior to the 1990s was on developing cost-benefit analyses and consumer surplus estimates to justify investments in telecommunications. Cost savings from substituting transport with telecommunications were calculated, and benefits were estimated from information on business and social use through questionnaires and surveys (Cronin, et al., 1991; Saunders, Warford, & Wellenius, 1994). These surveys reflected the focus of assistance in the ICT sector on telecommunications infrastructure. Later research is related to the wider, cross-sectoral approach for ICT4D. A more recent example of usage surveys with broader scope can be found in Souter, et al. (2005).

Macro-economic studies

The move towards deregulation of the industry saw the emergence of a wide body of macrolevel literature on telecommunications and development, much of it aimed at demonstrating the benefits of deregulation, privatisation and competition on economic growth and productivity (OECD, 2003), and also addressing issues related to regulatory governance. For example Boyleaud & Nicolette (2001) suggested that countries with stronger actual and prospective competition tend to have higher productivity levels, lower prices, and better quality of service in telecommunications. The relationship between competition and telephone penetration rates is another area of study (e.g. Ros 1999).

The World Dialogue on Regulation for Network Economies (WDR), an InfoDev initiative, publishes many studies in this field (e.g. Mahan & Melody (Eds.), 2005). These studies are important for understanding conditions at the macro-environment level that can facilitate or impede access to physical ICT infrastructure and for highlighting issues at the micro-level that may arise despite relatively promising statistics on the macro-level, such as lack of infrastructure in rural areas despite high growth at the national level (Malik & de Silva, 2005). The Digital Opportunity Index (Sciadas (Ed.), 2005), arising from paragraph 28 of the WSIS (2003) Plan of Action, which combines various statistical indicators with analysis on policies is also focussing at the macro-level.

Project evaluations

Running in parallel with this macroeconomic literature is a project evaluation stream with roots in development studies. At the international level, the FAO and UNESCO have been driving forces for use and evaluations of ICT for development projects, particularly in the fields of agriculture and education, respectively. The work of both organisations also incorporates general development programmes. For FAO, ICT is seen as particularly useful for linkages between research and extensions. UNESCO's communications research goes as far back as the 1960s, covering topics such as rural radio and the use of satellites for education. It is primarily from this tradition that the proposed research will be informed.

Dating back to at least the 1970s, evaluations based on 'informatics' or computer use emerged. As computers in those days were limited to business use, this sector was the early focus of informatics evaluations, which addressed questions related to the impact of computers on organisational behaviour, mostly in a deterministic way (Kling, 2000). This area of research has evolved to embrace more dynamic frameworks and some of these have been applied in the ICT4D area, particularly in explaining technology acceptance (e.g. Musa, 2006). When applied in a community development context, the terminology changes to 'community informatics', a term defined by Gurstein (2000) to cover the area of research and practice associated with enabling and empowering communities through the use of ICT. Social and community informatics both examine the application, design, uses, and impacts of ICT, taking into account their interaction with cultural and institutional contexts.

Within the large body of work on ICT4D project evaluation there is great variation in frameworks, methodologies, methods and focus. The descriptive case study, often at the microlevel, sometimes commissioned by a funding organisation (e.g. Batchelor & Sugden, 2003; Evans & Ninole, 2004; Harris, 2001; Meera, Jhamtani, & Rao 2004; Overå, 2006; Talyarkhan, Grimshaw, & Lowe, 2005) is a common approach. Some case studies make assertions with doubtful, if any substantiation. In contrast to the econometric characteristics of much of the macrolevel literature, the nature of case studies tends to be narrative and anecdotal, containing varying levels of analysis and interpretation and usually includes a summary of 'lessons learned'. Whilst they shed light on important aspects of ICT4D, they do not contribute to knowledge in a systematic way. Case studies published in academic journals tend to be conducted within a theoretical framework (e.g. Falch & Anyimadub, 2003; Rideout & Reddick, 2005). Many of the evaluations are found within the community informatics literature and some use theoretical frameworks and methods that are also used in the evaluation of information systems projects in the business sector. One example is the adaptation of the Technology Acceptance Model (TAM), according to which ICT acceptance is a function of ease of use and usefulness. There are several modified TAM versions for different applications, including Musa (2006), whose modification takes account of limited access to ICT in developing countries and draws on the 'capability' approach. Another useful modification of the TAM in the context of ICT4D is the concept of computer self-efficacy (Gong, Xu, & Yu, 2004), which involves assessing one's own capability to use ICT within the framework of social cognitive theory. The finding that persons with low self-efficacy are more easily discouraged from accepting and using the technology is important when evaluating the impact of ICT initiatives on empowerment.

Heeks (2002) has devoted attention to reasons for successful, total and partial failures of information technology projects in developing countries. In his design-reality gap model, failures arise as a result of the gap between two key stakeholder groups: the technical designers who approach a project from a technology perspective, but not the context, and the relevant organisation, which does not understand the technology.

4 The need for more knowledge

Despite the considerable body of literature dealing with ICT4D project evaluations and other measurement initiatives examining different aspects of the information society related to development (Sciadas (Ed.), 2005), there are still significant knowledge gaps relating to the benefits or impacts of ICT initiatives. The requirement for further multidimensional research has been recognised by many writers, practitioners and funding organisations. In an Infodev report on assessments (Batchelor & Norrish, no date), the following paragraph was included in the foreword:

"In the past few years, Information and Communication Technology (ICT) for development initiatives have proliferated and the resources devoted to ICT in development portfolios have expanded in the hope that ICT can help developing countries reach the Millennium Development Goals. Yet, rigorous field-tested knowledge about "what works and why" in ICT for development, and a deeper understanding of the enabling conditions and success factors in ICT for development initiatives, have been relatively scarce" (Terrab no date, p.3).

Hudson (2006) noted that, apart from a few macro-level studies, case studies provide much of the evidence on the benefits of telecommunications in rural development. Whereas case studies indicate the importance of telecommunications in a range of sectors, such as agriculture and health, and functions such as marketing, they do not in general include any systematic analysis and are not undertaken within a specific theoretical framework. Torero & von Braun (Eds.) (2006) recommended investigations of the conditions required for ICT to contribute positively to sustainable development.

Nielsen & Heffernan (2006), Souter, et al. (2005) and Warschauer (2003) are other authors who have identified an absence of sufficient evidence regarding the impact and uptake of ICT programmes, despite the dramatic increase in the use of ICT4Ds in recent years. Gagliardone (2005) argued that problems arise when localised experiences are scaled, and identified the absence of an innovative culture, capabilities and links between ICT enclaves and the rest of society as factors impeding the use of ICT as a tool for empowering rural communities.

Claiming that an understanding gained from a systematic analysis of how to remove constraints to access could offer a practical and concrete application of the CA, Alampay (2006b) has not found such a study or even a systematic analysis of who has access, where and how people use it, and has identified this as an area for further research.

Focussing on inequalities, van Dijk & Hacker (2003) called for further research relating to different types of digital skills and usage to improve the knowledge of structural inequalities with respect to social classes and people of different age, gender, ethnicity, and geographical location. Several authors have warned that ICT can contribute to an increase in inequalities (Forestier, Grace & Kenny, 2002; Torero & von Braun, 2006; Kumar & Best, 2006). Souter, et al. (2005) found that use of the telephone could actually contribute to greater economic disparity, as the economic value of the telephone was disproportionately favouring better educated and wealthier persons, who are more frequent telephone users. Among the lower income earners some respondents actually considered the telephone to be more of an economic burden, which to some extent may be compensated for by the benefit of having access in emergency situations. Both genders valued the telephone equally for emergency purposes. Emergency use of the telephone was also identified as the key reason for having a telephone in a study reported by Alampay (2006a) in the Philippines. Reporting on the social impact of telecentre use, Kumar & Best (2006) found that men from upper income families frequented the telecentres they studied to a greater extent than other socio-economic groups.

Servaes (2000) noted a pattern where evaluations that focus on project completion lack clear objectives relating to the desired impact, with insufficient consideration given to the content to be used on the new infrastructure or its impact on the social processes supposed to be facilitated by the ICT infrastructure. O'Neil (2002) called for empirical research and assessments set within the context of factors such as culture, political environments and implementation models.

Rice (2005) identified a pattern where research about Internet use has shifted its emphasis to studies of how groups and institutions adapt, structure and shape development and use of communications technologies, away from the previous focus on impacts.

Concluding that the research area of ICT4D has matured in recent years, Walsham & Sahay (2006) nevertheless expressed the view that more should be known about how ICTs can link to the meaning of development. In that context, it was suggested that evaluations could be broadened by 'wider definitions of development such as those proposed by Sen, looking at how freedoms of opportunity and choice can be extended' (p. 15). Mansell (2006) emphasised the importance of public participation in debates associated with such appraisals. In this context, researchers have a role to play in understanding factors influencing decisions at the institutional and local levels.

5 Conceptual framework and distinguishing features of the proposed research approach

The proposed conceptual framework reflects the view of ICT as a tool for empowerment, the building of capabilities and achieving sustainability at individual and community levels. Deployment of ICT should thus aim at 'effective use' (Gurstein, 2003), rather than just access to physical infrastructure. A distinguishing feature of the proposed approach is the combination of a forward-looking longitudinal perspective with linkages between environments and institutions at the micro-, meso- and macro-levels and application of the CA and SLA.

Longitudinal perspective. Most project evaluations are undertaken shortly after the completion of a project. Similarly, papers in academic journals rarely deal with projects at regular intervals, and where they do, the focus tends to be on formative, rather than summative outcomes. Longitudinal studies of ICT4D at both the macro- and micro-levels tend to be backward looking, explaining what has occurred through the eyes of an outsider. Gaved & Anderson (2006) noted there are very few long-term case studies or impact assessments that can shed light on good ICT community practices. The proposed research will incorporate a forward-looking longitudinal perspective as perceived by insiders. The longitudinal perspective is critical, as 'today's IS success may be tomorrow's IS failure' (Heeks, 2002, p. 101). Also, it may take some time of exposure to new forms of technologies before they are

accepted and before any impact can be noticed, particularly as it is likely to be of an indirect nature (Hudson, 2006; Musa, 2006). An unfavourable report a short time after completion may have negative impacts on the future of a project that might otherwise be successful in the longer term. Warschauer's (2003) case study in Egypt, conducted between 1998-2001 is one of a few studies that combines a longitudinal perspective with analysis of the macro and micro levels, but it is not participatory.

Linking micro-, meso, and macro levels. ICT4D research evaluations tend to either focus on the macro-level with macroeconomic studies relating to the relationship between ICT, the regulatory environment and/or economic growth, or on implementation of specific projects at the local community (micro-level). Sometimes reference is made to the impact of the macro environment on the micro-level, particularly with reference to availability of physical infrastructure in rural areas in the context of policies associated with universal service obligations. Despite obligations to deploy infrastructure in rural areas, some carriers prefer to pay penalties for breaching their supply obligations, rather than incur the costs of actually supplying services (Malik & de Silva, 2005; Bhuiyan, 2004). According to Goldman (2000), it is at the meso (district or regional) level where service provision can be more responsive, but the role of institutions at this intermediate level is insufficiently covered in the literature on ICT4D research, despite the importance of understanding institutions and institutional change as a major building block in constructing an understanding of development.

The proposed framework links the three geographic levels. The involvement of the three tiers of government does not always lead to successful results, as is illustrated in the analysis by Jain & Raghuram (2005) of the Community Information Centres (CICs) in Nagaland. However, without involvement of the three tiers, it is unlikely that anything could have been achieved. The n-Logue initiative, with its three-tier business model (Jhunjhunwala, Ramachandran, & Bandyopadhyay, 2004) is another good illustration of the application of the three levels – in the form of a business model involving the private sector in addition to government institutions through funding. The three-tier franchise business model has enabled rapid expansion by management and a delivery model that is close to the end user whilst still benefiting from the economies of scale inherent in co-ordination at the macro- and meso-levels.

The interlinking of all these dimensions can be a determining factor in the development of knowledge societies. The experience of dealing with three levels of government in planning, implementation and evaluation is in itself a learning process that can contribute to social capital (Goldring, 2004).

The meso-level can also be understood at a conceptual level, particularly when considering scalability and replicability. In analysing the social capital agenda, Bebbington (2004a) noted that the search for mesolevel concepts in that agenda is still relevant for analyses that are 'less sweeping than macro concepts without claiming that everything is different' (p. 348). The meso-level, from a conceptual perspective with respect to ICT4D evaluations would require a balance between uniformity of such evaluations and constantly re-inventing a meaningful approach.

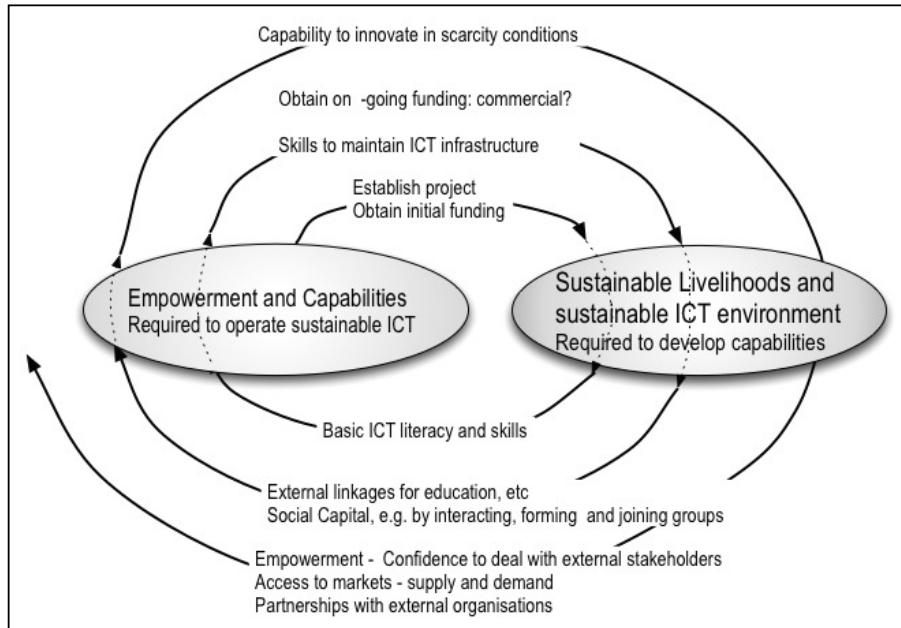
Focus on empowerment, capabilities and sustainable livelihoods. The role of empowerment and capabilities in a sustainable livelihoods framework are the main constructs to be used in the evaluation framework. Consistent with the CA, capabilities to be explored will be defined by the community members, rather than ex ante by the researcher.

As is the case with most participatory research (Anyaeunam, Mefalopulos, and Titus, 1999), perceptions will play a major role in defining needs and problems. Whereas motivations behind choice are not questioned in classical economic theory, these are important in the CA (Robeyns, 2001). Drawing on the perceptions and understanding of their own situations, participants play an important role in assessing if and how ICT is contributing to their capabilities. In addition to basic capabilities, such as literacy and employment, it is envisaged that participants will also include capabilities specific to their respective environments. Notwithstanding the role of the participants in defining capabilities, some capabilities are assumed to be essential for development and likely to be required for, and facilitated by, a sustainable ICT infrastructure. Some of these are illustrated in Fig 1, which depicts a 'virtual

spiral' that is expected to emerge when ICT4D projects are implemented with attention to human capabilities.

Empowerment, a concept associated with the CA, and which here is defined as an increase in the political, social or economic strength of individuals and communities, as well as confidence in ones own capabilities, is an essential ingredient in the framework. UNESCO (2005) has recognised the link between education and empowerment, and considers lifelong education as one of the preconditions for development, which is defined as 'an ability for adaptation and autonomy' (p.77).

Figure 1. Virtuous spiral – Empowerment/Capabilities and Sustainable Livelihoods and ICT



Also, of particular importance is what Arocena & Sutz (2005) refer to as the 'capabilities to innovate in scarcity conditions' (p. 218), i.e. evolutionary learning related to problem solving where key elements of already known solutions are unavailable. Adapting to change and 'learning by doing' are inherent in innovation and are therefore of relevance in this context. Learning by doing is, maybe counterintuitively, facilitated by and becoming more prevalent with ICT, as illustrated by Negroponete (1995) with the examples of learning anatomy via simulations and strategic planning skills through playing games (pp. 199-204). Linkages are also important for innovation, in the 'spiral of knowledge' described by Nonaka (1991), in which bridges are established to convert different types of knowledge - tacit into explicit, explicit into tacit, tacit into tacit, and explicit into explicit knowledge. ICT can be used as an instrument through which these conversions take place. The reason for this emphasis on innovation is that it is likely that this capability is what will eventually empower individuals and communities. This is consistent with the view advocated by Karnani (2006) that the focus on the disadvantaged should be as producers rather than consumers when considering improvements in real income. In questioning the emphasis by donors on support for ICT consumption rather than production, Heeks (2002) also called for a re-balancing of focus in favour of ICT production.

The ability to form and join groups is another essential capability, which in turn can also be a source of empowerment and a manifestation of the meso-level. There are many inspiring case studies of what can be achieved through groups, rather than by individuals acting alone, in terms of building sustainable livelihoods. However, according to Stewart (2005) disadvantaged persons often lack assets such as networks and human capital required to form groups. Once a basic capability in this area has been achieved, ICT and the Internet in particular, is a

medium that can facilitate the geographic extension of groups. It is often at the regional level that groups can have greatest impact. In order for ICT to be useful at this meso-level, the scalability and replicability of ICT4D projects become important, as isolated pilot projects do not provide the externalities required to build and maintain regional groups. The benefits of externalities can only be realised where there is common interests between those connected to the network. Whilst the global population accessible via the Internet may be of considerable use for some purposes, it may not of immediate benefit to a person in a remote village, where connectivity to neighbouring villages is of greater importance and who, for language reasons, have no use for global connectivity. Externalities is reflected in the distinction made by Souter, et al. (2005) between 'connectivity' and 'networking', where 'connectivity' refers to access only and 'networking' means the use of services to facilitate interactions between different users. In recognising the network effect, Lim, Choi, & Park (2003) also identified the need for a critical mass (i.e. a minimum number of adopters is required for the adoption rate to become self-sustaining) and the importance of word of mouth, which travels quickly in groups, to achieve this effect. Jain & Raghuram (2005) identified a similar concept in suggesting a 'cluster' approach to deployment of services. Normal commercial approaches do not seem to enable the establishment of such clusters, as incumbents and new entrants tend to compete for urban markets, while rural areas are still seen as unprofitable with limited demand for the relatively high investment cost per user (Shanmugavelan & Warnock, 2004).

Partnerships are another expression of the role groups can play. The importance of partnerships has been highlighted in many studies, (e.g. Talyarkhan, Grimshaw & Lowe, 2005). On the supply side, partnerships can be established with hardware and software suppliers, financial organisations, information providers and education institutions. Partnerships are also important on the demand side, e.g. demand aggregation, particularly in remote areas can be critical for the viability of an ICT system.

Fig. 1 illustrates assumptions to be tested with respect to the relationships between empowerment, capabilities and a sustainable ICT infrastructure. In summary, it is assumed that a minimum set of capacities and capabilities is required to initiate, operate, maintain and use a basic ICT infrastructure. In Fig. 1 this is shown as 'obtain initial funding', which in reality is likely to be preceded by many other activities. The reference to using ICT in this context has an operational as well as application dimension (e.g. what capabilities are required to use information obtained from the ICT infrastructure). For example, in a study on a community based health system in South Africa, Byrne & Sahay (2007) found that community members considered it essential for them to be part of the data flow in order to have the capacity to act.

Having mastered a minimum level of capabilities, the ICT environment would then contribute to the development of further capabilities, which in turn would strengthen the sustainability of the ICT infrastructure and the community. This virtuous circle, or rather virtuous 'spiral' will continue indefinitely (i.e. there is no equilibrium) and will provide individuals and communities with capabilities required to do and to be what they have '*reason to value*'.

The role ICT can play in different environments is far from uniform. As Alampay (2006a) found, particularly amongst older people, many may not find use of computers important to them. The focus on ICT in the proposed research and the illustration in Fig 1 of all paths to capabilities going via ICT do not imply that ICT is a necessity for all relevant capabilities or that ICT in itself is sufficient for sustainable development. It is well known that 'bits are not edible' (Negroponte, 1995, p. 221). In addition to basic necessities such as food, water, health and shelter, there are many other important elements for development, such as education, health, security, social capital and governance. However, it is posited that once a basic level of these elements has been reached, ICT can play an important role in starting and/or maintaining the virtuous spiral of capabilities and sustainability.

It is envisaged that the new constructs to emerge from the research will include:

- a) A definition of sustainable ICT4D, in the context of the Sustainable Livelihoods Approach (DFID 1999), where the term does not necessarily mean self-funding as there could be an argument for on-going support of ICT facilities because of their externalities and the public good nature of services being provided through this infrastructure.

- b) A basic set of capabilities required to structure and maintain a sustainable ICT infrastructure (i.e. what are the ingredients of a successful ICT4D project from a 'capability' perspective).
- c) Identification of capabilities that ICT can contribute to in different environments (e.g. education, improved health and better innovation capabilities) through access to information on an interactive basis and of ways in which it can contribute to empowerment.
- d) Assessment of the impact of the capabilities developed in (b) on the sustainability of the ICT4D project.
- e) Identification of the key capabilities and attributes required for a project to be replicable and scalable.
- f) A mapping of each orbit of the virtuous spiral.

Whilst these constructs will be specific for each project studied, it is envisaged that there will be some similarities, which could contribute to a theoretical framework. A large number of studies would have to be undertaken to test whether such findings are sufficiently universal to enable such a model to be defined. The extent to which this will be useful would depend on the outcome of the initial field studies.

6 Proposed Methodology

It is proposed that the approach be piloted in field studies in two to three ICT4D projects over a period of a minimum of three years, in different cultural environments, exhibiting a high degree of diversity between them, in order to test the applicability of the approach and conclusions in different social, economic, political, cultural, commercial and technological contexts. This does not mean that it will be possible to claim that the sample is in any way representative. The projects to be studied are likely to be some form of shared facilities, possibly ranging from simple very high frequency (VHF) radio systems currently being trialled in Timor-Leste, to better equipped community multimedia centres, also known under names, such as telecentres and community multimedia centres. Such centres were first introduced in Scandinavia in the mid 1980s, in an endeavour to strengthen the cohesion of local communities in rural areas (Falch & Anyimadub, 2003). Whilst affordability of home equipment and telecommunications was not the driving force for these centres, they are now seen as a way to provide affordable access to ICT facilities in many developing countries (UNESCO, 2005), whether operated on a commercial basis or as a community non-profit enterprise. They are a common ICT4D deployment form in disadvantaged communities where individual ownership of ICT infrastructure is not feasible.

Practical considerations will play an important role in the selection of projects to be studied, including access to project participants and their willingness to participate in the research. In addition to conducting field studies on an annual basis over a period of three years, the background of each project will also be studied to identify the major stakeholders, institutions and infrastructures at the macro- and meso-levels that impact on and are impacted by the project. Detailed planning of the evaluation process will take place following initial negotiations with stakeholders.

Each case study will be set against the macro-institutional framework of the project (i.e. the national policies and strategies related to the provision of ICT services), taking into account the economic assumptions on which these have been based and the meso- and micro- level environments. As far as possible, this will be done through review of official documentation and other literature.

Qualitative interpretivist and hermeneutic inquiry

The methodology will be based on what Chambers (2005) describes as '*participation action reflection*' (PAR) and will include methods that combine action, reflection, participation and research. It is thus a study where practice and theory interact. This approach has been applied in other ICT4D studies, such as Harris (2003), in a study of the e-Bario Project in a remote region of the Malaysian state of Sarawak on Borneo. The reason for the 'action' component in the proposed research is that it would be difficult not to influence the ICT4D projects and communities in some way whilst on site. It would also be perceived as hypocritical not to do so when the proposed methodology seeks to actively involve people in generating knowledge about their own situation and how it can be improved. Moreover, in some communities permission to conduct research can only be obtained where the researcher contributes to the

community. This is the case for Indigenous communities in Australia, where the code of conduct applicable for research requires some form of contribution (AIATSIS, 2000). Whilst the research in itself would constitute such a contribution, it may not be perceived as such by all participants before they see the outcome. The study will thus necessarily include community engagement with participants through an ongoing interactive process as suggested by Ramírez et al. (2002). According to Mohan & Wilson (2005), such engagement can contribute to insight and rigour in the research. Nevertheless, caution will be exercised against contaminating the research results with input from the researcher, by recording all non-research related activities and analysing their potential impacts on the results.

A qualitative methodology is appropriate when studying 'how' questions (Yin, 1994). Qualitative data will be obtained from key informants, through focus group discussions, consultations with individuals and groups, workshops, semi-structured interviews and, possibly, questionnaires. The actual methodology and strategy for data collection used in each study will be negotiated with and guided by community members to ensure they are culturally appropriate. This is likely to result in different methodologies being applied in different environments.

Notwithstanding these considerations, it is intended that the approach will take the character of a hermeneutic inquiry, through which each participant will deal with the constructions of other participants (Guba & Lincoln, 1989). Those participating in the research will also be given the opportunity to verify the results. This practical verification is part of the process of inquiry itself.

It is intended that the fora used for the research will provide participants with mechanisms to define their own development priorities, including capabilities, individually and together, and formulate the extent to which the ICT infrastructure has contributed to these and can further do so in the future. This will include identification of a tentative list of relevant capabilities for individuals and the community through a participatory bottom-up approach. Aspects, such as appropriate factors, functions, metrics and units of measurement, would be developed in conjunction with the participants, who would also be asked to articulate alternative approaches that could have better contributed to meeting their priorities.

The methodology will distinguish between local and external stakeholders and by degree of involvement in the projects. Key stakeholder groups will be defined at the start. As more information is gathered, additional stakeholders may be identified. At a minimum, stakeholders to be approached for the study include service providers, telecommunication regulatory authorities and other authorities with some ICT responsibility, departments at the different government tiers, representatives from different sectors, (e.g. agriculture, industry, health and education), NGOs involved in the projects and end users or user groups with different levels of access to and use of ICT services as well as non-user residents in respective communities. Representation from different age groups and both genders is important. Individuals in all stakeholder groups and sub-categories will be invited to participate in formulating methodologies for obtaining relevant information. Some of the issues addressed may be similar for all stakeholders. There will also be specific issues for each type of stakeholder and the research process will be attentive to possible problems arising from uneven distribution of power in the community, whether arising from economic, gender, age, cultural or political circumstances. This may require the participatory component of the research to begin with examining and/or creating the pre-conditions for participation as it may not be possible to engage directly with all stakeholder groups.

The data gathering will focus on information about impacts and associations that will contribute to summative evaluation with focus on empowerment, capabilities and sustainable livelihoods. Details about processes and other aspects of the implementation that would be useful for a formative evaluation (Hudson, 2006), will also be sought, particularly as they may affect the summative evaluation. If the project has become dysfunctional through the way it has been implemented, it may have detrimental impacts on capabilities.

Question relating to the capabilities considered important in fostering development and described in section 5, dealing with the conceptual framework (i.e. empowerment, abilities to innovate and forming groups) will feature in the research and views on these issues will be encouraged. The field investigations will also address questions related to whether and how

ICT is contributing to health, education, employment, security, governance, and business opportunities. The questioning will be open-ended to enable unexpected capabilities in any dimensions to emerge. If necessary, participants will be prompted with questions related to the important factors noted above. The study will also explore the extent to which the ICT4D project fuelled unrealistic expectations and what impact this may have on the satisfaction. Unrealised hopes can often be more damaging on morale than not having introduced the project in the first place. Any further specification of the research design or detailed questions prior to having at least initial consultations with community members and undertaking background research into the projects and communities would be inconsistent with the proposed methodology and conceptual framework. As argued by Sen (2000) in the context of debating the Human Development Index: "It is important that people evaluate explicitly and critically what they want, and engage in arguing for – or against any set of proposed weights... Central to this exercise is enlightened public discussion" (p.21).

As both qualitative and quantitative indicators are necessary to capture the multiple dimensions of disadvantage (Zeller et al., 2006), the qualitative data from the participatory process will be complemented with quantitative data, where available, relating to relevant indicators, such as education, health, and employment among project participants affected by the project. It may also be appropriate to include official indicators on criminal offences in the area studied, should concern about security and safety issues be raised by any of the stakeholders. Quantitative measures may also be used in some form of cost-benefit analyses that will be incorporated in the study to enable social benefits to be taken into account when considering the sustainability of a project. In doing so, attempts will be made to quantify cost savings arising from any government services that can be provided cheaper over the ICT infrastructure. An extended form of social cost-benefit analysis is useful, particularly where it is unlikely that an initiative can be self-funding from a commercial perspective. Another quantitative benefit of ICT is that it can reduce what Kydd (2002) identified as high transaction costs involved in overcoming information constraints faced by small-scale producers, thereby enabling them to benefit from international trade and globalisation. Cost savings of this nature will also be quantified to the extent possible.

7 Study results

As it is also intended that the preparation of the study results will involve participatory processes, this section is limited to some general considerations about the study results. The evaluation would not create what is normally considered 'facts', but would be what Guba & Lincoln (1989) identify as findings "created through an interactive process that includes the evaluator ... as well as the many stakeholders that are put at some risk by the evaluation", p.8.

It is envisaged that the research would result in a number of distinct, but related outputs. From the community's perspective, the most important would be the results of the actual study, which will indicate impacts on different participant categories, including gender, age, different family members, employment status, local entrepreneurs and decision-makers. It is unlikely that anything more than associations between ICT and the relevant factors can be found, as there will be too many factors that cannot be controlled for any causality to be established, particularly where there is a lag that cannot be identified over a 3-year period (e.g. higher school retention rates may take longer to materialise). The communities will also benefit from a tool that will be useful for those involved in the project to continue self-monitoring, should participants find such evaluations useful. Such a tool could be in the form of a 'sustainability barometer' (IDS, 1998), complemented with a capability barometer, both of which will be useful when approaching funding organisations, which are often looking for impacts of previous investments in community projects. A template for cost-benefit analysis developed would also be useful for the community members to give a quantitative expression to the benefits in future dealings with government authorities and other potential funders.

Another output will be in the form of case studies, which would add a different perspective to the existing ICT4D case study literature. The case studies would then form the basis of the development of an operationalised evaluation framework that could be adapted for use in different environments. It is also expected that the case studies will shed sufficient light on the constructs in the conceptual framework to enable the emergence of a paradigm that can specify the ingredients in the virtuous sustainability/capability spiral. Analysis of data from

case studies can be a way of building theories or frameworks and, as suggested by Benbasat, Goldstein, & Mead (1987), the case study is a suitable approach to a new area of research. Opting for the case study at the expense of a more conventional evaluation design when assessing the impact of road construction in the Philippines, Cariño (1994) noted that the case study methodology necessitates a more comprehensive investigation of the history and contemporary issues associated with projects and encourages more innovation in data collection methods compared to more conventional evaluations. When commenting on the lack of explicit, systematic methods for drawing and testing conclusions from qualitative research, particularly methods that can be used for replication by other researchers, in the same way as correlations and significance tests can be used by quantitative researchers, Miles & Huberman (1994) warned that the analysis component of the case study presents significant challenges. Techniques such as factor analysis, which are commonly used in quantitative research to combine multiple indicators into a single construct, are not easily applicable in qualitative research, particularly as indicators may vary across cases (Eisenhardt, 1989).

In addition to participating in the research as it unfolds, a review by participants of the outcomes of the research is an integral component of construct validation and strengthens this process (Yin, 1994; Miles & Huberman, 1994). Whilst endorsement of the results would be desirable, where it is not possible, divergent views will also be presented. This wider participation will contribute to rigour of the research as will the conversation and dialogue that will take place throughout the evaluation process. Testing of concepts quickly and directly will be assisted through this process (Mohan & Wilson, 2005) and will form one of the multitude of sources of evidence required for validation through triangulation, i. e. increasing the reliability of the results by cross-checking through the use of different methods. Participant 'ownership' of the results is also in the spirit of the type of deliberative freedom advocated by Sen (Kamsler, 2006).

Whilst the proposed 2-3 year timescale is expected to be sufficient to test the framework, sustainability would, by definition need a longer timeframe, and any conclusions drawn during the study period would be conditional on confirmation in studies of the ICT4D initiatives continuing beyond the three-year period. It is hoped that arrangements can be made with project and community stakeholders for the research to be continued and the results incorporated in a study of a longer-term nature than is possible for a 3-year project. The continuation of the studies should preferably be conducted by participants of the ICT4D project as an integral part of the initiative. Ideally, the evaluation process would form part of wider community engagement, which is "*an ongoing interactive process characterised by commitment to ever-changing community needs and interests...*" (Ramírez, et al., 2002). The on-going evaluation would thus in itself contribute to community engagement, moving the ICT initiative a long way away from being just infrastructure deployment.

8 Proposed field studies

It is proposed that pilot studies be conducted in at least two communities, one in a remote Indigenous community on the Cape York Peninsula in Northeastern Australia and the other in a rural area of Timor-Leste (T-L). Discussions are underway for the field studies to be undertaken. In both cases, the importance of ICT has been recognised at several levels of society, ranging from national to local governments and individual members of communities, despite the environments being quite different.

Some 95% of the telecommunications infrastructure of T-L was destroyed following the 1999 referendum on independence (Braga 2005). In 2001, the government of T-L entered into a build-operate-transfer (BOT) contract, giving Timor Telecom a 15-year monopoly over all telecommunications infrastructure, except carriage of broadcasting services. Competitive Internet service providers are also allowed to operate, but the regulatory environment makes it difficult for them to do so, and by early 2007 only one ISP, Inet, had been established. The BOT contract does not include obligations to deploy infrastructure beyond the district capitals. Until this situation is remedied, either by the introduction of competition or obligations to deploy infrastructure in the rural areas, the many NGOs that have expressed interest in assisting with ICT projects are not able to use their resources for this purpose. Apart from a pilot project, Connect East Timor, operated by an Australian NGO in the rural areas of one of the districts, there is currently no infrastructure in rural areas beyond the district capitals. This pilot is based

on a VHF system that does not have connectivity to the rest of the network. It is even difficult for organisations to provide ICT4D projects in Dili and district capitals where services are available. With dial-up Internet access priced at up to USD 4.74/hour (Timor Telecom 2007), the Info Timor project, a shared ICT facility operated by the Dili Institute of Technology, found it difficult to afford Internet access. The situation in T-L is an example of how the macro-environment is not conducive to the deployment of services to rural areas. Micro-environment issues associated with capabilities to operate and use ICT facilities are likely to arise once infrastructure is available. There are, however, institutions at the meso-level, particularly the many NGOs operating in T-L that can assist with addressing these issues.

Although infrastructure is not the key issue in the Australian project, the macro-level is nevertheless problematic, mainly in relation to federal and state government policies associated with funding of projects in indigenous communities, rather than with respect to the telecommunications policy. There is usually insufficient funding for recurring expenses for all projects, a common feature of many development projects, with much time then having to be devoted to preparing grant applications by those who should instead be spending time on developing the centres. At the meso-environment there are a number of indigenous organisations. Of particular interest in Cape York is the Cape York Digital Network (CYDN), a regional indigenous organisation that operates on a commercial basis as a service provider to many communities in Cape York. CYDN's potential market is not limited to indigenous communities. As it is also providing government funded non-commercial services in some of the communities, whilst competing with other service providers in its commercial activities, CYDN must in separate the two sides of its operations. Initial funding for CYDN was provided under the 'Networking the Nation' (NTN) program established by the Australian Federal government in June 1997 in conjunction with the initial privatisation of the incumbent carrier, Telstra. The bulk of the NTN funding was provided to non-indigenous communities.

One of the commercial objectives of CYDN is to operate as a demand aggregator in the region (Balkanu & Cape York Institute, 2006). However state and federal governments, as the major users of telecommunications services on the Cape York peninsula, which could have underwritten CYDN by using its services, are instead using their own IT infrastructures. It is not known whether this is due to issues associated with service levels, other contractual arrangements, or simply a matter of governments not taking a holistic view when considering how they can contribute to indigenous capabilities.

Complicating the matter, there are tensions between the CYDN and some of the 17 communities on Cape York, representing the micro-level, serviced by the organisation. Many of the communities are somewhat dysfunctional and many of them suffer from high unemployment and substance abuse. Personal safety and security are, therefore, likely to feature prominently among the capabilities prioritised by participants.

9 Discussion

The distinguishing features of the proposed approach to evaluating ICT4D projects outlined in this paper are: forward-looking longitudinal, micro-, meso and macro- perspectives, application of the 'capability' approach, and a participatory methodology.

The proposal is a work-in progress and will evolve with comments from this conference and on-going interaction with participants, a key benefit of participation in this conference. Comments are invited on all aspects of the proposed research, including its relevance, the methodology and feasibility. Suggestions on other suitable projects where the framework can be field-tested are also welcomed.

Some tentative themes that could be pursued during the discussion are listed below to facilitate debate. Feedback on these themes would be particularly useful.

- Would the results from the proposed framework be useful for policy-makers and how can it be improved to make it more useful?
- What are the pitfalls in the proposed framework?
- Which difficulties can be anticipated in implementation of the framework?
- Is the 3-year timescale sufficient for the study?

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⁷ There is no publication date on the document and I have not received a response to my enquiry about this.

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⁸ There is no publication date on the document and I have not received a response to my enquiry about this.