Connecting the first mile:
a framework for best practice in ICT projects for knowledge sharing in development

Executive Summary

This study aims to develop a framework for best practice in ICT projects for knowledge sharing in development. It begins with a discussion of the role of ICTs in development and a review of literature about connecting the 'first mile'. It suggests that authors are polarised around key debates:

- Top down versus participatory solutions to development problems
- Global versus local solutions
- Technological versus social solutions
- Optimism versus pessimism about the role of ICTs in development

The study situates ITDG's perspective in the context of those debates and identifies the success factors highlighted in the literature. These can be divided into three dimensions: the environment, the project level and the first mile. For each of the success factors, the framework outlines activities that constitute best practice.

Significant factors to address at the environmental level are the policy environment, infrastructure limitations, building a good relationship with donors and communicating project progress. At the project level, success factors are identified as: starting from communities' development priorities; planning projects effectively; learning from monitoring and evaluation; forging strong partnerships; developing a sustainable business model and building capacity among all partners to deliver. At the 'first mile' success factors are: building on existing knowledge systems; creating appropriate materials; using appropriate technologies to reach communities; working with infomediaries; building capacity of infomediaries and target groups; facilitating local content creation; making local knowledge visible; minimising social exclusion and strengthening social capital.

The study concludes suggestions for further research which include testing the framework against a sample of case studies and offers reflections on the application of the framework in the context of research into ICTs for development.

Contents

1 Background

This framework forms part of a piece of research conducted by the Intermediate Technology Development Group (ITDG) in collaboration with Cranfield School of Management, which aims to identify ways that non-government organisations (NGOs) can make better use of information and communications technologies (ICTs) to share their knowledge.

The purpose of this framework is to help NGOs to benchmark their projects against best practice in the field and to understand the factors that have a significant impact on the success of a project.

2 Introduction

The international development sector has become focused in recent years on the need to share knowledge more effectively in support of poverty reduction efforts. Multi and bi-lateral agencies and NGOs are increasingly putting knowledge sharing at the centre of their organizational strategies. And, in the context of a perceived 'knowledge divide', they are increasingly addressing the challenge of how to respond to the knowledge needs of people living in poverty in developing countries.

The challenge for information providers in development is how to share information with people who have little access to ICTs, low levels of literacy, little time or money, and highly contextualised knowledge and language requirements. For many years reaching people living in poverty was characterized as the 'last mile' problem. In recent years this terminology is seen as carrying negative connotations and instead has been refocused as connecting the 'first mile' (Paisley & Richardson 1998).

The question that this piece of research therefore aims to answer is:
"What is best practice for development projects using ICTs to connect the first mile?"

3 Development and ICTs

The concept of 'development' has been evolving since its origins after the second world war. Sachs (1992) dates the 'age of development' as beginning after the Second World War, when President Truman at his inauguration described regions in the South as 'underdeveloped'. International organisations such as the World Bank and the United Nations were established to support international relations and their agendas have influenced the discourse on development ever since.

The priorities of the international development community have shifted over the years. From a focus on economic development and growth, international bodies have begun to focus on poverty as a multidimensional phenomenon and to acknowledge the various contributory factors to poverty such as a lack of access to markets and services or vulnerability to shocks.

Communication has consistently been central to the work of development agencies, but in recent years the recognition of information and knowledge as contributing to growth, as well as the vogue for knowledge management and the massive expansion of ICTs have highlighted the importance of knowledge for development.

Many international initiatives have been established to harness ICTs for development on a global scale, in particular since the publication of the World Development Report on Knowledge for Development (World Bank 1998). These include the Global Knowledge Partnership (founded in 1997), the DOT-Force (created in 2000) and the UN ICT Task Force (created in 2001). The ITU has hosted an international summit on the Information Society in 2003, the second phase of which will take place in 2005. These initiatives try to build

partnerships between civil society, the public and private sectors to harness ICTs for development (Chapman & Slaymaker 2002).

There is a consensus that ICTs can play a huge role in development, by connecting people to more accurate and up to date information, equipping them with new skills, connecting them to an international market and more. However, there is concern that the 'digital divide' is increasing the gap between the 'information haves and have nots' and this is the preoccupation of many of the initiatives established to address ICTs for development.

4 Connecting the first mile: perspectives in the literature

There is a vast amount of literature about ICTs for development and the digital divide. The gaps that exist in the literature about connecting the first mile either represent areas where there has been little convincing evidence collected to date or where authors cannot reconcile their perspectives on the role of ICTs in development.

A review of literature about ICTs and development highlights key concepts around which practitioners are polarised. An understanding of the different positions is essential to illustrate the different meanings of 'best practice' in development discourse and to situate this study against an ontological background.

Commentators have attempted to divide the literature in development into different factions: sceptics and pragmatists, optimists and pessimists, globalists and localists... In this study, it is suggested that authors diverge along several dimensions:

- Top down vs. participatory solutions to development problems
- Global vs. local solutions to development problems
- Technological vs. social solutions to development problems
- Optimism vs. pessimism about the role of ICTs in development

These different perspectives are illustrated for example in the terminological debate over the "*last mile problem*" – a term used to describe the difficulty of improving connectivity in remote rural areas (particularly in telecommunications, but also used to describe the difficulty of reaching those areas with information). This has been reconceptualised in terms of "*connecting the first mile*' which has less negative connotations and privileges the needs of people living in those remote areas (Paisley & Richardson 1998).

Common criticisms of ICT for development projects are that they fail to build on existing systems or work in a participatory way and therefore do not achieve local ownership (Aley 2003b;Gumicio Dagron 2001;Lloyd Laney 2003b). The concept of the "*design-reality gap*" (Duncombe & Heeks 1999) identifies the gap between the context in which an ICT project or application is designed and the context of its use in developing countries.

In many cases projects are driven by the donor agenda, which has a short term horizon and may not recognise or be able to address the multi-dimensional causes of poverty due to a narrow focus on donor objectives (Stoll et al. 2001). Gumicio Dagron is especially critical of the role of donors and their focus on large scale projects:
"The international donor community is still reluctant to acknowledge 30 or 40 years of failures and millions down the drain because of ill-planned macro programmes. The eagerness to go fast, to show short-term results, and to extend coverage to large numbers of people has actually backfired." (Gumicio Dagron 2001)
For him, donors' concern with scale serves to multiply models that clash with culture and tradition and paralyse communication, instead of linking communities and facilitating exchanges.

Several commentators find that ICT for development initiatives are too 'global' in their approach, without acknowledging the importance of local contexts in making information usable as knowledge. Ballantyne (2002) highlights the emphasis on external content 'pushed' at people living in poverty and the struggle faced by efforts to push local content (e.g.

research conducted in the South or Southern arts) onto a global stage. Many initiatives are criticised as offering one-way transfer of information (usually from the global to the local level) but failing to promote genuine two-way knowledge sharing. For example, van der Velden's analysis of the Development Gateway suggests that the project was designed without a concept of knowledge as contextually-defined and therefore does not address the needs of key audiences:
"The critique of the Bank's approach in this case indicates that knowledge needs to be presented in the appropriate context and be meaningful in the local situation in order to be useful and effective." (van der Velden 2002)

There is a distinction between authors who see technology as a solution to development problems and those that seek social solutions. Articles cite particular types of technologies and applications, such as WIFI, open source software, low-cost devices, translation engines, as 'stepping stones' towards 'digital inclusion' (Primo Braga, Daly, & Sareen 2003). This technological determinism recognizes the difficulties of communicating to the local context (such as language or access barriers), but locates the potential to overcome them in new technologies, rather than in social factors. Concerns are raised by other authors that technology is increasingly determining the solutions sought to development problems:
"What I am concerned with is the degree to which complex social development goals become seen as functional or technical problems when ICTs are introduced and how technology becomes particularly determinant in how larger goals are understood and acted upon."
(Boyle 2002)

Some authors writing about the potential of ICTs for development are extremely optimistic, and can be unrealistic about the drawbacks projects may entail for local people. Heeks comments on the "current prevalence of positive and technologically deterministic viewpoints" which is influenced by the climate among international development agencies:
"A number of factors among agency staff may explain the emergence of this viewpoint. They include naivety about ICTs, desire for career advancement, pressure from ICT vendors, a lack of alternatives to the trends/fads of the Northern private sector, and pressure from political masters for quick solutions to development problems. The viewpoint also emanates from those seeking funds or guidance from the development agencies. They tend to mimic the views and messages of those agencies."
(Heeks 2002)

Given these differing perspectives, it is clear that 'best practice' can hold different meanings for different authors. Authors' concepts of best practice will depend on their understanding of what constitutes a 'successful' initiative. Defining, monitoring and evaluating the developmental impact of an ICT for development project is highly contentious because it is in these debates that different perspectives collide. This is firstly because it is hard to define a causal link between development outcomes and ICT projects and secondly because of the power relations involved in evaluating and reporting on development projects.

4.1 Defining best practice: impact, monitoring and evaluation

Practitioners and academics struggle to define a causal link between development outcomes and ICT projects. Although frameworks and targets exist that aim to model how poverty reduction can be achieved and where interventions could be successful, the contribution ICTs can make is not easily defined. Some authors start from frameworks and targets to assess how ICTs contribute. Others look to the sustainability of ICT projects or their ability to 'disintermediate' transactions to demonstrate their success. Other authors adopt a 'rights-based' approach whereby access to information is seen as a human right and the use of ICTs is in itself a developmental outcome.

The Sustainable Livelihoods framework has been used to illustrate some of the contributions of projects, for example their contribution to social capital, human capital or improved livelihoods strategies (Batchelor et al. 2003;Chapman, Slaymaker, & Young 2003). The World Development Report of 2000/1 (2001) identified three priority areas for reducing poverty: increasing opportunity, enhancing empowerment, and improving security. Some studies have taken these as ways of assessing the contribution of ICT projects to poverty reduction

(Cecchini & Scott 2003;Op de Coul 2003). These studies group examples of projects according to the three priority areas, but little evidence is presented that for example increased empowerment has led to poverty reduction. In places these case studies seem to present ICT adoption as increasing opportunity in itself, which becomes a circular argument. The Rockefeller Centre has adopted a 'Communication for Social Change' model which theorises communication as *"dialogue rather than monologue, as a cyclical process of information sharing which leads to mutual understanding, mutual agreement and collective action"* (Figueroa et al. 2002) and develops indicators on that basis although this review has not located cases where these are used.

Many studies refer to sustainability as being key to long term development outcomes for ICT projects. Batchelor et al. (2003) distinguish between economic sustainability (achieved when a given level of expenditure can be maintained over time), social sustainability (achieved when social exclusion is minimised and social equity maximised and institutional sustainability (achieved when prevailing structures and processes have the capacity to perform their functions over the long term).

Economic sustainability is seen by some as a key indicator of the success of a project because it is seen to reflect a genuine demand for that service. At the same time, in many development projects, donors are funding information dissemination as a public good as Tschang et al. comment:
"The nature of telecentre sustainability is complicated by the point that it may initially be a public good, especially in disadvantaged areas, yet must be ultimately self-supporting." (Tschang, Chuladul, & Le 2002)
A great deal of research has been published on economic sustainability, in particular with regard to access initiatives such as telecentres or information kiosks, which have high set-up and maintenance costs and customers with little spare cash. The complicated objectives of providing information services as a public good and making them self-supporting have proved extremely difficult to reconcile and few initiatives have succeeded in covering their costs, even if they have developed viable charging mechanisms (Batchelor, Norrish, Scott, & Webb 2003).

Authors concerned with participation tend to identify it as the locus of social sustainability, arguing that the active involvement of users minimises social exclusion and perpetuates support for the project:
"The concept of establishing a dialogue with beneficiaries all along the process of conceiving, planning, implementing and evaluating a project has been gradually consolidating. At first, implementers understood that beneficiaries should be involved in the activities leading to social and economic development of a community, for the purpose of building up a sense of ownership within the community. This was at last perceived as important especially in terms of the sustainability of the project once the external inputs ended." (Gumicio Dagron 2001)

Institutional sustainability is primarily a question of resources and capacity building, amongst project staff and partners, empowering those institutions to take control in local development issues.

ICTs are also seen as contributing to poverty reduction through 'disintermediation', whereby local producers have direct access to global market and can therefore charge market rates for their goods without having to pay an intermediary. Op de Coul cites an example from Central America:
"Agronegocios in El Salvador helps farmers to become traders as well and to establish direct contacts with buyers, instead of selling to middlemen (called "coyotes"). This is done through bi-weekly markets in the capital but also through a virtual market on the website where offers and demands are published. In Agronegocios centres spread around the country the farmers and their children are taught how to enter their offers and how to find possible buyers. Though the farmers in general prefer personal contacts with their customers, the virtual market has the advantage of offering "business to business" opportunities and bigger quantities can be sold. Furthermore, trade is not restricted to the province or country the farmers live in; deals with foreign traders are an option as well." (Op de Coul 2003)

Batchelor et al. (2003) comment that there is a need for ICT intermediation instead (although the users are less vulnerable to these intermediaries than in traditional transactions).

Practitioners who adopt a rights-based approach to ICTs can perhaps demonstrate impact most easily because for them access to information and ICTs in themselves constitute a developmental impact. Therefore indicators such as the number of people who can access the internet in rural areas will be meaningful indicators of development for them.

The wide spectrum of perspectives on ICT for development projects and the impact they can have on poverty reduction is illustrated in debates around monitoring and evaluation.
Practitioners are highly critical of how development projects, especially communication projects, are monitored and evaluated (Gumicio Dagron 2001;Stoll, Menou, Camacho, & Khellady 2001). Power relations involved in monitoring and evaluating projects problematise the notion of 'best practice': the need for practitioners to demonstrate success to receive further funding, the lack of investment in monitoring activities by donor organisations and the relatively rare input of 'beneficiaries' in the monitoring and evaluation process.

This section has demonstrated that authors approach best practice and monitoring and evaluating projects according to their notions of impact and the frameworks they adopt. The next section situates ITDG in the context of these different perspectives and identifies the research priorities for this study, which have defined the methodology.

5 Methodology

5.1 Defining ITDG's research priorities

The legacy of ITDG predetermines to some extent the organisation's approach to knowledge sharing. In Small is Beautiful (Schumacher 1973), E.F. Schumacher (who founded ITDG) put forward an approach based around finding out what people do and helping them to do it better. Therefore the priority in ITDG's projects is not to identify uses for new technologies in developing countries, but to build local people's capacity to use technologies and information to improve their livelihoods.

In terms of the dimensions highlighted in section 4, ITDG is neither optimistic nor pessimistic about the technologies themselves, but has a vested interest in how they are used. The organisation has embraced participatory methodologies and recognised the disadvantages of top down solutions. ITDG was founded on the premise of making global technology more accessible to people in developing countries, but over the years has focused more on the importance of promoting local knowledge and engaged in the debates on indigenous knowledge and intellectual property. Although the legacy of ITDG is a highly technical one, ITDG sees development problems as complex and multi-dimensional and does not rely on purely technological problems to solve them, but campaigns for technology democracy, whereby individuals have the freedom to make choices about the technologies they use and a voice to protest against the impact on them of the technology choices of others.

This piece of research therefore seeks to prioritise the development needs of people living in poverty, rather than the technologies shaping current discourse. It reviews existing research into ICTs on development and examines best practice in using ICTs to support knowledge sharing at the 'first mile', in order to develop a framework which reflects good practice from the point of view of people living in poverty.

5.2 Search methodology and filtering criteria

In recent years, many studies have been published, particularly by practitioners in the development field, on the use of ICTs for development. This term incorporates a variety of different uses of ICTs, for health, e-governance, agriculture, advocacy and many more. Various projects are finding innovative uses of ICTs for development, or training people in ICT

skills. Studies are published by development agencies, their partners, the organisations implementing the projects and (rarely) the beneficiaries of the projects.

A sample of studies on ICTs for development was collected from the Eldis portal, where researchers in development publish their findings. Searches of academic journal databases (Proquest and EBSCO) found few articles or studies relevant to the first mile, as the majority of this research is conducted by practitioners. Eldis was chosen over other development portals because it is not associated with a particular donor organisation (like the Development Gateway is associated with the World Bank for example) and it was hoped that the sample of practitioners would be more varied.

This study focuses on the use of information at the first mile and the role of ICTs in supporting those processes. Therefore many of the articles of relevance to ICTs in development have been filtered out of the study, although they have informed the literature review. The studies were rated out of five on three criteria which reflect ITDG's research priorities: the relevance of the study to the livelihoods of poor people (the information content of the project), the 'beneficiaries' of the project (whether the project aimed to reach the first mile), the quality of the source (the level of detail and reliability). The studies scoring highly (over 15 out of a possible 25) were reviewed and the elements of best practice were collected.

5.3 Choosing studies

Previous literature reviews in this field have commented on the promotional nature of literature, the paucity of baseline and evaluation studies to date, the recent emergence of frameworks for evaluation and the emphasis on telecentre projects and literature about Africa. (Adeya 2002;O'Farrell, Norrish, & Scott 1999)

From the Eldis search, various studies were identified that have researched success factors in using ICTs and sharing information and knowledge at the first mile. The majority have reviewed a set of cases and identified the factors seen as contributing to the project's success. The sample of studies was selected because in each case the authors had built up a framework based on consideration of ICT projects in practice. This research therefore collates a 'framework of frameworks' and then benchmarks a set of case studies against the elements to develop the framework further.

Although the studies used can help to identify the key elements of a framework, there are several reasons why one cannot rely on them alone as a source of information. Each of the studies has been conducted by an organisation in the North (although the projects cited are in the South). At a recent seminar on ICT for development at OneWorld, the limitations of such an approach were recognised: that 'beneficiaries' perspectives are not well-represented and that the project contexts and objectives are so different that only very general conclusions can be reached.

Also, many case studies are written by the organisations running projects with the aim of persuading audiences (particularly donor agencies) that the projects are a success and are worth continued investment. This can also mean that little evidence is presented or that the project has not been running for long enough to demonstrate significant impact. Few of the case studies are explicit about their definitions of 'success' and how the project has contributed to improving the lives of people living in poverty.

Therefore, in addition to relying on past studies for the elements of a best practice framework, ITDG's own experience (based on documents and also informal interviews with project managers) will be used to test the framework. The section that follows draws out the elements of best practice highlighted by the studies and ITDG's experience.

6 Elements of a best practice framework

This study splits the elements of best practice into three levels of analysis: the first mile, the project level and the environment. One could argue that each level impacts on the others – in terms of power, the environment places pressures on the project which are reflected at the last mile; in terms of impact the first mile conditions how the project should be designed and the environment adapted.

There are instances of good practice, such as capacity building or building on existing systems which apply at all three levels. For example, a best practice ICT project would build on existing information systems at grassroots, existing partnerships at the project level and use the existing infrastructure to make the most of the environment. However, the distinction between the levels helps to identify different types of actors who contribute to best practice and the nature of their contribution.

6.1 The environment

Although the focus of this framework is on the 'first mile', environmental forces such as the regulatory context, infrastructure or the role of donor organisations will play a key role in the success of the project.

For example, Batchelor et al. (2003) demonstrate that the policy environment can affect the day to day working of an ICT initiative, citing the example of ACISAM, an NGO in Honduras that was unable to bid for radio or television space due to policy. An analysis of ICT stories collected by Infodev suggests that dealing with local authorities can be an issue if the project challenges their power:
"*Co-operation from local government is to be taken into account in a lot of projects. Either because project initiators need authorisation from the local government to start their project, or because the local government may even be a partner... they will not co-operate to the fullest if they feel that the empowerment coming from the project will challenge their positions of power."* (ICT Stories (Infodev and IICD) 2004)
Although there are no recommendations for best practice, the studies suggest that best practice is to research the policy environment, recognise the existing power relationships, develop strong relationships where possible with policymakers and devise a project that works within the existing policies. One example of good practice is the Gyandoot initiative in India, which adds value to existing policy structures by giving communities access to government services locally from kiosks.

In ICT projects, the lack of local telecommunications infrastructure can be *"one of the biggest challenges, especially in developing countries"* (ICT Stories (Infodev and IICD) 2004). Best practice in overcoming this challenge includes analysing telecommunications and IT infrastructure deficiencies to plan for realistic measures e.g. in the context of food insecurity (Chapman, Slaymaker, & Young 2003), adopting innovative technologies such as the wireless connectivity technology used by the n-Logue project in India (Badshah, Khan, & Garrido 2004) or developing more accessible devices such as the Simputer (Primo Braga, Daly, & Sareen 2003).

As described in previous sections, the role of donor organisations can also be determinant in the success of a project:
"The initiatives having less financial problems are the ones implementing online activities and the ones whose hosting organisations have good relationships with donors." (Op de Coul 2003)
A case study on the 'stall' of the Aglearn project in Thailand suggests it was partly due to poor donor relations:
"APRTC had only been in existence for a short time and did not have the solid relationships of more established organizations. Also, its approach was unique and relatively unproven even though initial results were promising. That it was an NGO with no connection with any national government or focus on a particular country seems to have put off potential supporters.

Donors seem to prefer working with government agencies or organizations closely aligned with national efforts." (ICT Stories (Infodev and IICD) 2004)
Again, the studies offer little advice about best practice, but ITDG's experience would suggest that forming individual relationships with donors is important, as well as communicating project progress in a timely way. An analysis of the impact of research on policy (Crewe & Young 2002) suggests that establishing credibility and communication, influence and legitimacy contribute to helping an organisation to achieve policy change.

6.2 The project level

ITDG has made powerful arguments for participation by target groups throughout a project, from inception to evaluation and beyond:
"If technologies are to be developed that suit poor end users, then these people must be a part of the design process from the outset. The principles of participatory technology development are as important as ever, whether it be designing a bullock-drawn plough or an electronic information technology. Poor people must be empowered to express their requirements and allowed to play a leading role in technology development. People living in poverty understand their situation better than any 'external expert'. Without end-user involvement, well-intentioned outsiders will make mistakes, which poor people might not even be inclined to point out!"
(Aley 2003b)

Therefore the key to best practice at the project level is to start from communities' development priorities (Stoll, Menou, Camacho, & Khellady 2001) and begin with a needs assessment which could draw on PRA or RRA methodologies (Bridges.org 2004;Cecchini & Scott 2003;Lloyd Laney 2003a). Cecchini et al. point to the failure of an Indian e-governance initiative due to a lack of local understanding
"In Rajasthan, the state-sponsored RajNidhi e-governance program has failed to deliver, despite the fact that the software is easy to use and in Hindi, because of extremely centralized planning that did not take local conditions into consideration. Content, in fact, lacks regular updating because of communications problems between the state and the local government." (Cecchini & Scott 2003)

Like any development project, a successful ICT for development project will adhere to best practice - to have clear objectives, clearly identified target groups and realistic plans for implementation (Batchelor, Norrish, Scott, & Webb 2003;Bridges.org 2004).

Although many initiatives are too new to demonstrate impact (Meera, Khamtani, & Rao 2004), commentators are concerned that monitoring and evaluation indicators relate to use of technology more than to the impact for example on livelihoods (Stoll, Menou, Camacho, & Khellady 2001). There are suggestions for best practice in the literature, which ensure that in addition to data collection, the process supports learning and change. These include linking the project goals, variables and indicators to community priorities (Stoll, Menou, Camacho, & Khellady 2001), critically evaluating efforts, reporting back to clients and supporters and adapting as needed (Bridges.org 2001). Best practice also involves monitoring not only once a project is completed but throughout the life of the project.

The studies mention the importance of partnerships and institutional arrangements.
In order to deliver information services to the poor, information providers need to form strong partnerships with other information providers (Batchelor, Norrish, Scott, & Webb 2003), organisations that promote services and raise awareness (Cecchini & Scott 2003) as well as organisations offering the technological infrastructure and finance to keep the project afloat. So best practice includes selecting partners with complementary strengths. Bridges.org describe the case of the Satelife PDA project, whereby physicians, medical officers, and medical students tested PDA devices in the context of their daily work environments. Partner organisations working on that project in Uganda included the American Red Cross, Makerere University Faculty of Medicine and HealthNet Uganda (who provided technical support and project assistance). Medical texts were obtained from Skyscape (an online information provider).

Incentivising partners to participate in the project is also crucial to success. Donor organisations are looking at public-private partnerships (Carlsson 2002) and there is a case for businesses to partner with businesses, NGOs and community groups already established in developing country markets to minimise risk and maximise infrastructure (Prahalad & Hammond 2002).

Few studies make recommendations for best practice because each project will require a different set of stakeholders to be involved, but the comments from the Max Lock Centre are instructive:
”The key to achieving real partnership in local development is negotiating conflicting interest, discovering overlapping interest and mutually beneficial means of achieving individual interest.“ (Max Lock Centre 1999)
Partnerships with organisations that connect the first mile are also key to the success of a project and will be discussed in detail in the next section.

Many studies relate best practice to how sustainable a project is. Badshah et al. (2004) highlight some initiatives that have developed innovative solutions to financial sustainability:
"Several projects have a self-sustaining commercial focus as the driving factor - Drishtee (India), Cabinas (Peru), Warnet (Indonesia), n-Logue (India), Telecottages (Hungary), are all based on a business model. According to Amin, one way to structure a business driven kiosk model is as a franchise and many of the successful efforts analyzed have adopted this approach." (Badshah, Khan, & Garrido 2004).

Tschang et al (2002) suggest that for telecentres returns are increased through economies of scope and scale, network externalities, vertical integration and agglomeration. They also highlight the importance of partnerships to overcome high initial investment costs:
"The high initial investment costs in equipment and infrastructure make it difficult to base expansion plans on local owner-operators' means. In-kind investment partnerships - e.g. the Indonesian government's vocational school system's partnering with local businesses to sponsor cybercafe, and private sector assistance; or the Indian Andhra Pradesh state government's scheme to involve long distance telephone companies - may be solutions to these problems.” (Tschang, Chuladul, & Le 2002)

The involvement of the private sector in sustainable ICT projects can often reduce costs and improve service quality and efficiency (Badshah, Khan, & Garrido 2004). The private sector is waking up to ‘bottom of the pyramid’ as a potential market and multinational corporations are adopting new business models and partnership models to exploit these markets, such as the shared access model popularised by the Grameen Bank (Prahalad & Hammond 2002). Whereas public initiatives can be slow to recognise services that fail to meet demand, Prahalad and Hammond (2002) suggest that through competition, multinationals are likely to bring a superior level of accountability for performance, which could benefit end users.

Therefore best practice in developing a sustainable business model will include identifying which services are being provided as a public good and where the project could adopt a commercial model and increase returns through partnerships, in particular involving the private sector.

Op de Coul raises the high turn-over of trained technical staff in ICT for development projects as an institutional sustainability issue (Op de Coul 2003). Best practice suggestions are offered by Batchelor et al:
“Institutional sustainability is said to be achieved when prevailing structures and processes have the capacity to continue to perform their functions over the long term. The studies show three mechanisms for gaining capacity: it is possible to buy-in expertise when necessary, to hire specific skilled staff or to train existing staff (or volunteers).” (Batchelor, Norrish, Scott, & Webb 2003)
In knowledge sharing projects there is also a need to extend capacity building to partner staff.

Sharing findings with other development practitioners is important to communicate best practice (Op de Coul 2003) and understand the degree to which a project could be replicated in a different context (Cecchini & Scott 2003).

6.3 The first mile

In the literature relating to the first mile, there is an emphasis on building on existing systems (Chapman, Slaymaker, & Young 2003;Lloyd Laney 2003b) instead of introducing new ones and undermining the ways people currently receive information:
"*the ICTs revolution can undermine traditional, local communications, by supplanting them and by taking attention away from them."* (Lloyd Laney 2003b)
This requires that projects conduct research into existing information systems and design initiatives that build on these. It also involves connecting to traditional knowledge (Ballantyne 2002) and requires that projects promote local participation throughout the project.

Taking account of the local context is crucial when sharing knowledge at the first mile, to make sure that information can be understood and internalised by local people. Knowledge management theory recognises the centrality of context to meaning. For Nonaka and Takeuchi, information and knowledge are context-specific:
"… both information and knowledge are context-specific and relational in that they depend on the situation and are created dynamically in social interactions between people." (Nonaka & Takeuchi 1995). Therefore context is a key factor in whether information systems have an impact at the first mile.

There is a vast amount of literature recommending approaches to designing appropriate information for the local context (Aley 2003a;Aley, Waudo, & Muchiri 2004;Batchelor, Norrish, Scott, & Webb 2003;Lloyd Laney 2003b). These authors highlight the following dimensions to appropriate information: language, cultural context, information delivery channel, information format. For instance, in an assessment of WorldSpace radio, Aley et al. found that:
"A common request is for more information that is appropriate to their specific context, meaning it must be locally relevant and applicable. Many people prefer information to be exchanged orally in their own mother tongue, and appreciate practical face to face demonstrations and follow-up" (Aley 2003a)
Therefore best practice requires that practitioners research the information systems of their target group and understand their information needs, address local language issues and then develop materials in the right format for use.

The studies also highlight the need for appropriate technology to be chosen. In terms of sustainability, Batchelor et al. (2003) highlight the need for local repair and operational skills to maintain the technology. Primo Braga et al. (2003) discuss the use of low cost technologies and free or open source software at the grassroots. Chapman et al. highlight the need for 'realistic technologies' to be used that are appropriate to the local context and suggests the need to blend communications approaches, citing the example of the Kothmale project in Sri Lanka where a community radio station browses the internet at the request of listeners:
"A combination of linking old and new technologies, use of mass media and technology sharing can reach the greatest number of people, over the largest distances and with the least infrastructure investment." (Chapman, Slaymaker, & Young 2003).
Schilderman's (2002) research also shows that successful examples of strengthening the knowledge and information systems of the urban poor are rarely based on a single method of communication and that incorporating traditional media can promote two-way knowledge sharing.

Where there is little access to technology (perhaps due to lack of time or money) an information intermediary can help communities to find the information that they seek. Different studies define information intermediaries in different ways. For Cecchini et al. they are the human intermediary between poor people and ICTs. For Lloyd Laney (Lloyd Laney 2003b), they represent the 'face to face' contact which is essential in turning information into knowledge for poor people. For Raab et al. they are employed to provide information:

"Knowledge intermediaries are the many individuals employed by government extension systems, non-government organizations, academia and the private sector who have the responsibility to provide information and educational opportunities [for farmers]." (Raab, Woods, & Abdon 2003)
For Schilderman they are *"information producers and suppliers, who do so out of duty or desire"* such as the public sector, NGOs or religious organizations.

Cecchini et al. offer examples from rural India of best practice by intermediaries:
"Successful examples of ICT projects for poverty reduction are conducted by intermediaries that have the appropriate incentives and proven track record working with poor people. In Andhra Pradesh, ANMs have been working with poor villagers on a daily basis for years. SKS, the microfinance institution, adheres to a philosophy of reaching out to the poorest women in rural areas. In Gujarat, dairy cooperatives have been the best agent to target small farmers. If these intermediaries are grassroots-based and understand the potential of ICT for social change, they can be tremendously effective in promoting local ownership of ICT projects. In rural India, many telekiosks operators are young, educated, computer-savvy, and very attached to their communities. They are also extremely entrepreneurial. In the case of Gyandoot, successful telekiosk operators –besides offering e-government services– often create and manage database and work on data entry for private clients, offer PC training, provide voice, fax, copy, Internet and many other services." (Cecchini & Scott 2003)

Schilderman recommends best practice for projects with regard to infomediaries, which includes developing appropriate materials, sharing good communications practice and capacity building:
"Development agencies should sensitise state institutions towards more courteous and efficient information provision and, where resources are a real constraint, aim to provide additional resources and capacity building. Where this research has shown that smaller authorities are often better at communicating with their target population, this could be an argument in seeking wider decentralisation. […]
There is furthermore a need to recognise, document and share good practice in communicating with the urban poor. Whereas many infomediaries are obviously not functioning optimally, some do exist that do well or have some exemplary projects or services, but often these are not widely known." (Schilderman 2002)

From the quotations above, it would that best practice in working with infomediaries involves identifying grassroots-based infomediaries with a track record of working with poor people, providing appropriate incentives for partnership and finding entrepreneurial infomediaries who can make a living. In ITDG's experience of running an online service offering information for informal enterprises (e.g. SMEs) in Kenya, the infomediaries were crucial in connecting to the first mile. One infomediary sold new information to a local businessman about the availability of a peanut butter making machine for Ksh 2,500 (about US$35) which illustrates some demand for information services of this kind at the first mile which can currently best be met through infomediaries.

It is clear from Schilderman's research that infomediaries and target groups need training in efficient information seeking and dissemination and need useable materials to share. Recognising, documenting and sharing best practice for infomediaries would also help build their capacity. Infomediaries also need to acquire what Ballantyne (2002) terms *"adaptation skills"* for example translating information materials to suit local conditions.

As the term 'connecting the first mile' shows, development organisations are moving away from one way knowledge transfer models towards the ideal of two-way knowledge sharing:
"Community knowledge partnerships that can develop mechanisms to deal with the problems of connectivity and information literacy, and incorporate local and external knowledge, can directly benefit poor people. This approach could replace the traditional process of a 'one-way' flow of information from a scientific, information rich core to a remote information poor community, with dynamic information sharing partnerships with a two-way flow of information at every level." (Chapman, Slaymaker, & Young 2003)

Ballantyne (2002) comments on the importance of local content in this two-way flow and suggests that best practice in facilitating local content creation includes valuing and motivating local content (through rights and incentives) and building the capacity of the target group in content creation. For him, best practice also involves making local knowledge visible – incorporating local and external knowledge into information materials and connecting the target group to policymakers.

Many of the most inspiring ICTs projects have involved local appropriation of ICTs such as community radio or video, which have empowered communities to make a political impact:
"Content provided through ICT should not be limited to the knowledge that can be accessed from outside sources, but rather extended to ensure that the poor have the means to speak for themselves." (Cecchini & Scott 2003)
One example is the ITDG's Women's Voices project in Kenya, which trained women's groups in the slums of Nairobi in using video so they could communicate directly to policymakers about their situation and development priorities. The videos were shown to an audience of government ministers, housing directors, donors and NGOs. Later the videos were shown on national television and won an international award, the Betinho Award for Technology and Social Justice. The women gained confidence and made contacts regionally and now have plans for setting up a local resource centre with access to information on tenure, health, training and job opportunities.

Best practice in connecting the first mile also requires that the projects be socially sustainable. Minimising social exclusion in project planning can involve developing an understanding of the power dynamics at the local level (Michiels & Van Crowder 2001) and focusing on marginalized groups such as women or the disabled:
"Too often, agencies solely communicate with the more active members in a community, leaving others behind who may remain poorly informed, thus perhaps increasing their exclusion. Agencies should avoid that and may also have to specifically target groups that have difficulties accessing information or have particular information needs, such as female heads of households, the young, the disabled or ill, or the homeless." (Schilderman 2002)
For Schilderman, building community social capital supports improved information sharing through social networks, which is how people living in poverty tend to get information. He distinguishes between bridging social capital, bonding social capital and linking social capital and suggests that best practice includes deliberately stimulating people to undertake a joint activity or action related to particular local needs and providing a space for the community to get together and meet (Schilderman 2002).

The framework overleaf draws together the success factors highlighted by the studies reviewed and the activities that make up best practice at each level.

7 A best practice framework

Dimension of best practice	Success factor	Best practice
Environment	Working within the policy environment	Research the policy environment
		Recognise power relationships
		Develop strong relationships with policymakers
		Work within existing policies
	Understanding and address infrastructure limitations	Analyse telecommunications and infrastructure deficiencies
		Plan for realistic measures
		Adopt innovative technologies
		Develop more accessible devices
	Building a good relationship with donors	Establish credibility, influence and legitimacy
		Communicate project progress in a timely fashion
Project	Starting from communities' development priorities	Work in participation with communities
		Conduct a needs assessment
		Involve target group in project planning and design
	Planning project effectively	Define clear objectives
		Identify the target group
		Plan realistically for implementation
	Learning from monitoring and evaluation	Link project goals to priorities
		Evaluate efforts critically
		Empower target groups to evaluate
		Adapt the project in response to findings
		Monitor regularly
	Forging strong partnerships	Select partners with complementary strengths
		Provide partners with incentives
		Negotiate conflicting interest
	Developing a sustainable business model	Identify which services provided as public good and which can be commercial
		Involve the private sector
	Building capacity among all partners to deliver	Buy in experience
		Hire skilled staff
		Train existing staff/volunteers
	Sharing project lessons	Communicate best practice
First mile	Building on existing knowledge systems	Research into existing systems
		Incorporate existing systems into project
		Connect to traditional knowledge
		Promote local participation in the project
	Creating appropriate materials	Research information systems of target group, literacy levels etc
		Understand information needs of target group
		Address local language issues
		Develop materials in the right format for use

First mile (continued)	Using appropriate technologies to reach communities	Adopt technologies that local people can repair
		Choose technologies that people can afford to use
		Blend communications approaches
	Working with infomediaries	Identify grassroots-based infomediaries with a track record of working with poor people
		Provide appropriate incentives for partnership
		Find entrepreneurial infomediaries
	Building capacity of infomediaries and target group	Provide training in efficient information provision
		Provide usable information resources
		Recognise, document and share good practice in knowledge sharing at grassroots
		Build adaptation skills e.g. translating content to suit local conditions
	Facilitating local content creation and making local knowledge visible	Value and motivate local content through rights and incentives
		Build capacity of target group in content creation
		Incorporate local and external knowledge in information materials
		Connect target group to policymakers through vertical knowledge sharing
	Minimising social exclusion and building social capital	Understand power dynamics at local level
		Focus on marginalized groups
		Build social capital through joint activities and communal space

8 Reflections and further research

This research has identified a set of activities that make up best practice for development projects using ICTs to connect the first mile.

This is a different undertaking to identifying the best uses of ICT in development. Many researchers are looking to identify the 'killer application' that reaches people at the first mile and the business model that makes it an affordable investment. Although it is possible to generalise to some extent about best practice in ICT use – for example there are business models that work for mobile telephony at the first mile, as exemplified by the Grameen Bank, or that radio is a popular communications tool used in Africa – this study has assumed that conditions will be different in any local context and there is no ICT 'best practice' that will encompass them all.

Further research would take a set of case studies and benchmark their contributions according to the framework to test the framework further. From this study however, it is clear that the success of many projects is 'situated success' in the sense that the project has worked due to a particular combination of factors such as a strong local champion, good timing or a conducive political environment. This means that it is difficult to isolate best practice or indeed to generalize much from reported project experience.

There has been so much hype about ICTs and their role in development that ICT projects appear to have taken on a life of their own. There is a danger that they could 'reinvent' the paradigm of development, without learning the lessons of, say, the Green Revolution, or other information sharing initiatives. This framework aims to offer practitioners a way of critically examining their ICT projects to ensure that they are adopting best practice and putting the needs of people living in poverty first.

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