REACHING THE LAST MILE: KNOWLEDGE SHARING FOR DEVELOPMENT

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Abstract

The paper characterises the problem of understanding the local context of demand for knowledge by poor people as "reaching the last mile". From a range of practical studies the paper offers some evidence of ways in which the local context contributes to successful knowledge sharing. The paper highlights the objectives, channels and context that distinguish knowledge-based development from knowledge sharing in business. The case of the Intermediate Technology Development Group (ITDG), a UK-based NGO promoting the use of technology to reduce poverty in developing countries, is taken as the basis for our discussion. The implications of ITDG's research into reaching the last mile, including partnership models, business models and the relevance of information communication technologies (ICTs) are outlined and insights that are relevant to other domains of knowledge sharing, with particular regard to the importance of context, are discussed in the conclusion.

Keywords: knowledge sharing, knowledge for development, ICTs, context.

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Suggested track:

D   Knowledge sharing

1   Introduction

This paper explores the challenges and lessons learned from knowledge sharing initiatives in developing countries. Based on a practitioner perspective, the paper has important lessons for all who are motivated to improve the local contextual dynamics of knowledge sharing. It concludes with a discussion of the implications of this work for knowledge sharing in the domain of business and management in developed countries.

In the knowledge economy, new technologies have made it possible for information to be processed and shared with a wide audience more quickly than ever before. Global access to knowledge is unequal and countries in the South suffer from 'information poverty' as their knowledge is not valued and their access to knowledge through information and communication technologies (ICTs) is severely limited.

In 2002, the World Business Council on Sustainable Development reported that more than half the world's citizens have never used a telephone, 7% have access to a personal computer, and only 4% have access to the internet (Doering et al. 2002).

We are presently in a transitional period, as disruptive technologies (Bower and Christensen 1995) compete for markets in developing countries and top-down and bottom-up communications initiatives try to exploit these technologies to bridge the 'digital divide' (Mansell 2002).

Attempts to bridge the digital divide have often failed to take into account the local context. Barriers such as language, literacy, access to and affordability of ICTs and cultural relevance can prevent poor communities from accessing information that could improve their livelihoods (Lloyd Laney 2003b;Marker, McNamara K., & Wallace 2002). In many cases, poor people's access to information is mediated through 'infomediaries' – information intermediaries – and through their social networks (Schilderman 2002).

For people to truly share knowledge they must be able to receive information and have the ability to use that information (Devlin 1999). In the case of people living in poverty a frequently met challenge is the severe constraints on their ability to use the information and thereby turn it into knowledge.

Good practice recognises the local context and builds on local knowledge. Recognised examples of good practice come from community media for peer exchange, one example being miners' radio stations in Bolivia (Gumicio Dagron 2001). Traditional ICTs such as folk music and theatre offer culturally legible ways to reach poor communities (Sundaram 2002).

Success stories about innovative uses of ICTs (for example the Hole in the Wall project where children from the slums in Delhi taught themselves how to use a computer, or the Swaminathan Foundation's Information Village Research Project, where women in a village can access information on market prices and weather to improve their livelihoods) demonstrate that even the most marginalized members of society can benefit from information through electronic ICTs. Development practitioners and donor organisations are investigating ways to incorporate knowledge delivery through

electronic ICTs with the existing knowledge sources and traditional practices of communities (Saywell, Woodfield, & Cotton 2000).

The danger is that initiatives focus on ICTs as the end and not the means and fail to meet demand. Information providers are aware of the need to assess the impact of information for development, but evidence of grassroots demand has been highlighted as a gap in several pieces of literature (Hovland 2003b;Saywell, Woodfield, & Cotton 2000).

2   Issues: knowledge sharing and the importance of context

There are many parallels between sharing knowledge to increase competitive advantage in the domains of business and international development. Tools and practices adopted in the private sector influence the choices of managers in development and the lessons of development communication can be valuable to knowledge managers in the private sector. In the domain of international development, however, knowledge-based development aims to share knowledge to assist people working their way out of poverty. This paper distinguishes between two approaches to knowledge-based development: the 'dominant paradigm' embraced by donor organisations such as the World Bank which promotes a top-down model of knowledge transfer from North to South; and the 'participatory approach' which starts from community needs and engages people in poverty in the process.

Both approaches face what is characterised as the 'last mile' or 'first mile' problem – reaching people in poverty, who are often marginalized from social structures, geographically remote or have poor access to information sources. This particularly applies in the context of using ICTs, which are inaccessible to many low-income communities for reasons of time, infrastructure, cost, literacy or technical literacy. Challenges for reaching the 'last mile' in knowledge-based development include creating sustainable business models for information services and blending ICTs with traditional channels to reach the 'last mile'. This section argues that a further challenge is to adapt the top-down model based on knowledge transfer to take account of the local context and develop two-way knowledge sharing channels.

Knowledge is seen by many organizations as a key competitive advantage and many are therefore investing in systems and processes to support knowledge management and sharing (Jarrar 2002). In communicating with each other and sharing knowledge, human beings carry out complex sense-reading and sense-giving processes (Walsham 2001) and context affects the way that meaning is conferred (Grimshaw, Mott, &

Roberts 1997). Some of the accepted definitions of knowledge draw on Polanyi's (1966) concepts of tacit and explicit knowledge to identify the individual as the locus of tacit knowledge. For example, Nonaka and Takeuchi highlight the importance of context in knowledge creation:

"… 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)

This paper will adopt the definition of knowledge offered by Davenport and Prusak which incorporates the notion of context:

"Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms."

(Davenport & Prusak 1998)

Knowledge sharing is a two-way process and is conditioned by context-specificity i.e. the extent to which knowledge makes sense outside the context it originated in (Fernie et al. 2003). Context, like culture, is a difficult construct to operationalize because it operates at various levels of abstraction – such as the individual, community, organizational, national and international.

The following sections compare knowledge sharing in the business domain and in the international development domain to examine the parallels and differences in their approaches to knowledge sharing, the channels they use and the contexts in which they operate.

2.1 Knowledge sharing in the business domain

Why share knowledge in the business domain?
In the knowledge economy, businesses are increasingly aware of the need to secure knowledge-based competitive advantage and are employing knowledge management strategies to promote processes of knowledge creation, capture and transfer inside the organisation.

Knowledge sharing is a two way process and much literature about knowledge sharing focuses on the dynamics of sharing knowledge for example within a team or organisation (Chai, Gregory, & Shi 2003;Tempest 2003;Thomas-Hunt Melissa, Ogden,

& Neale 2003). Increasingly, though, as Zack (2003) describes, knowledge sharing is changing the boundaries of a knowledge based organisation:

"Companies are increasingly realizing that knowledge is often produced and shared as a byproduct of daily interactions with customers, vendors, alliance partners and even competitors. The knowledge-based organization, then, is a collection of people and supporting resources that create and apply knowledge via continued interaction. Its boundaries are blurred, malleable and dynamic. The organization seeks knowledge wherever it exists and allies with whomever can help it learn what it needs."

(Zack 2003)

Inter-organisational knowledge sharing increases competitive advantage by integrating processes, sharing knowledge, identifying customer value and creating knowledge-intensive products. For example, in supply chain literature there are many examples of organisations involving suppliers in the design of systems or in the creation of new ideas (Kobayashi, Tamaki, & Komoda 2003;Lee & Whang 2000;St.Onge 2001). Organisations are also participating in knowledge networks, which allow them to position themselves strategically and minimise transaction costs while collaborating on knowledge-intensive products (Pena 2002). Inter-organisational knowledge sharing can also provide customer value. For example, Urban (2004), highlights a trend for organisations to provide a service which identifies the best products for customers, even if it is from the competition, in order to build trust and repeat business, which he characterises as 'customer advocacy'.

A primary objective of knowledge sharing in the business domain is therefore increasing competitive advantage by sharing existing knowledge and generating new knowledge to improve processes, learn about customers and deliver customer value.

Channels for knowledge sharing

ICTs have enabled many new channels for knowledge sharing and international businesses can exploit networks and communities of practice (Contractor & Monge 2002), groupware products (Cummings 1994) and shared systems and processes (Kobayashi, Tamaki, & Komoda 2003), as well as meetings, conferences, secondments and other face to face mechanisms for knowledge sharing. In many cases, these channels are put in place to support knowledge sharing and build on existing informal networks with defined domains (Wenger & Snyder 2000).

The local context in a business domain

Context is key to knowledge sharing, often responsible for the success or failure of knowledge sharing initiatives (Koskinen, Pihlanto, & Vanharanta 2003;Nidumolu, Subramani, & Aldrich 2001). For Augier et al. (2001), solving complex unstructured problems requires the emergence and maintenance of contexts with many similarities, as otherwise problem solvers cannot check their understandings.

Knowledge sharing in business is affected by contextual factors such as language or cultural context (Ford & Chan 2003) just as international development is. Arguably though poor communities are more time-poor and less well connected to knowledge sources, particularly ICT-based services, than business employees.

2.2 Knowledge sharing in the domain of international development

Why share knowledge?

As businesses have begun to realise the importance of knowledge to secure competitive advantage, development agencies such as the World Bank have recognised the contribution of knowledge to international development goals and have put knowledge at the center of their organizational strategy. The World Development Report for 1998-9 proposed looking at the problems of development from the perspective of knowledge and defined the concepts of 'knowledge gaps' (the unequal distribution of technical knowledge) and 'information problems' (incomplete knowledge of attributes for decision making).

Ludin (2003) describes the World Bank as ushering in the era of *"knowledge-based development"*, a new paradigm that defines development not only in terms of the transfer of resources between North and South, but also the transfer of knowledge.

In this paradigm, codified knowledge is seen as a global public good, which is undersupplied by the private sector (Barnard 2003;Meyer 1997) as Stiglitz (1999) comments:

"Disembodied knowledge has the characteristics of a public good (non-rivalrous and, once public, non-excludable) while money is the quintessential private good. [...] disembodied knowledge for development is indeed a global public good and, like other public goods, it would be undersupplied if left entirely to private initiative. The internet has in practice brought knowledge access closer to the ideal of a global public good. The communication revolution has made great strides in facilitating communication

within countries and has also enhanced the ability of developing and transitional countries to tap into the global pool of (codified) knowledge." (Stiglitz 1999)

This paper characterises this approach as the 'dominant paradigm', where codified knowledge is seen as a global resource for developing countries to access. This paradigm assumes a one-way model of knowledge transfer and has been criticised for assuming that *"if communication of information and research could be improved, development would follow"* and for overlooking *"the complex political and economic processes that produce situations of poverty"* (Hovland 2003a). Schech describes the World Bank's *"self appointment as the manager in the creation, transfer, and management of knowledge"* as another step in establishing the hegemony of Western knowledge:

"It continues the dominant trend in development studies to construct the West as holding the key to the development of the South - first capital and technology, now ideas and knowledge."

(Schech 2002)

A second approach to knowledge-based development focuses on a more bottom-up, participatory approach, supporting communities to take control of the means of communication and participate in decision making processes. A good example of this approach is the video projects of the Deccan Development Society which enabled women farmers to influence policymakers previously unwilling to hear them. The 'local content' movement advocates for the creation and promotion of more local content (Ballantyne 2002). For example, the Open Knowledge Network run by OneWorld.net aims to create a global database which collects local content , sharing it through local channels. Other initiatives such as the HoneyBee Network focus on the preservation of indigenous knowledge. These initiatives go beyond the model of knowledge transfer that underlies the dominant paradigm put forward by the World Bank.

Hovland summarises this evolution in communication for development from dissemination to a more participatory approach:

"Current communication initiatives in international development are starting to recognize this complex interplay between communication and poverty. While previous communication activities often focused on providing increased and more effective flows of development information 'downwards' to the poor, there is now far more emphasis on discussion, user engagement, and links to decision-making processes in society. It

is no longer always assumed that 'more information equals more development' or that improved communication will necessarily reduce poverty […]" (Hovland 2003a)

Though in knowledge-based development the dominant paradigm is one of knowledge transfer from the North to the South, there is a parallel movement investing in knowledge sharing as a two-way communication, which builds community engagement in political processes.

Channels for knowledge sharing

Knowledge sharing between stakeholders in international development has been facilitated by the advent of ICTs which allow people to overcome geographic distance and share knowledge through online communities, websites, video conferencing, e-conferences and so forth. Hovland (2003a) distinguishes between communication of research to policymakers, to researchers and to end users (referring to people in poverty and the organisations working with them). ICT-enabled knowledge sharing channels in the domain of international development tend to be between researchers or practitioners or at a policy level, such as the Bellanet online community, websites such as the Development Gateway or Eldis and e-conferences like Spreading the Word, run by the Water, Engineering and Development Centre (WEDC) at Loughborough University. Development practitioners have also adopted knowledge networks such as British Overseas NGOs for Development (BOND) to promote inter-organisational knowledge sharing.

For knowledge-based development, different channels have to be adopted, channels that reach people living in poverty, reaching the 'last mile'. In development agencies in Nepal and Kenya for instance, traditional communication channels and strategies are still the most popular means of exchanging all kinds of information (Aley 2003). According to Aley's research, the most favoured means of communication are those based upon oral communication especially face-to-face interaction. The written word is less favoured, and less trusted especially amongst communities with lower literacy rates. Radio is a favoured communication technology, whilst other modern ICTs are hardly considered as part of the community information systems. Although it is generally accepted that face to face communication is preferred (Lloyd Laney 2003b), development organisations are increasingly realising the importance of 'blending' multimedia and interpersonal approaches (Waisbord 2003).

Frameworks and models for engaging with people living in poverty often offer checklists for practitioners to consider their dissemination strategies, funding sources,

channels, appropriate content etc (Fisher, Odhiambo, & Cotton 2003;Lloyd Laney 2003a). In many cases they list available channels for dissemination, such as storytelling, street theatre, posters, radio listening groups and so forth (Aley, Waudo, & Muchiri 2004) or assess the needs of different audiences (Max Lock Centre 1999).

Many of these models seem to be presuppose a model of knowledge transfer from development actors to people living in poverty (one-way communication), rather than knowledge sharing (two-way communication), although exceptions exist such as the model of Communication for Social Change put forward by the Rockefeller Centre, which conceptualises 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).

This approach is seen by Waisbord (2003) as reconciling the historical differences between theories of change which saw individual agency as key to social change (for example social marketing targeting individual smokers) and those that target the social structures to bring about social change (for example government measures targeting tobacco companies). He contrasts one-way knowledge transfer channels such as social marketing and entertainment-education (for example using soap operas to change behaviour) with participatory approaches to knowledge sharing such as social mobilization, which involves building on existing social networks, or community empowerment, which involves supporting poor communities activity in political processes in society.

The funding of knowledge-based development initiatives is criticised for perpetuating the model of knowledge transfer by focusing on the macro-level and producing projects that fail to meet community needs (Gumicio Dagron 2001). This is the criticism of many ICTs projects, which are seen as focusing on the means rather than the end of poverty reduction:

"Many initiatives address specific aspects of the range of issues, but too often they neglect related factors that limit their success. For example, too many telecentres providing computers and connections in rural locations do not become self-sustaining because local people do not use their services -- often they have failed to address the role of the centre in the local economy or the need for locally relevant content." (Bridges.org 2001)

The sustainability of knowledge-based development initiatives is a key concern. Where knowledge is seen as a public good, donor organisations have funded websites and

databases that aim to redress that balance. But the difficulty of assessing demand from poor people, the impact of knowledge on poverty reduction suggests that donors may be spending millions of dollars annually (Hammond 2001) on systems that don't meet users' requirements.

Donors have chosen to prioritise different aspects of knowledge sharing including supporting global public goods development and dissemination, research cooperation, e-learning, North-South and South-South institutional partnerships and meetings. King et al. (2003) contrast the UK Department for International Development (DFID)'s support of knowledge networks and websites such as SciDev, the GDNet and ID21 with their Japanese and Swedish equivalents who focus more on supporting Southern knowledge capacity through cooperation with higher education.

Although the private sector is unlikely to fund the sharing of knowledge as a public good, many of the channels (e.g. mobile telecoms or radio) can be financially viable. Multinationals are beginning to focus on new business models such as the shared access model (which disaggregates access from ownership) in order to target the poor as a new market, who have been shown to have money to spend and technological competence (Prahalad & Hammond 2002). Organisations such as DFID are looking to public-private partnerships, voucher schemes and group ownership to fund channels to reach the last mile, although more research is needed in this area (Winder 2002).

The local context

In order for knowledge to be shared and not just disseminated, there is a need for information to be relevant to the local context: in the right language, to the right level of detail, about the right topic and in an accessible medium (Lloyd Laney 2003a;Saywell, Woodfield, & Cotton 2000). This highlights the key role of information intermediaries (infomediaries) that make content relevant to a local context. This is particularly the case for marginalized communities that cannot read or access technology. Successful knowledge-based development projects such as the Arid Lands Information Network (ALIN) in Kenya build in these infomediaries to ensure that their knowledge is reaching the last mile and that communities are able to influence the flow of information and content.

2.3   Three dimensions of knowledge sharing: objectives, channels, context of use

Table 1. overleaf summarises the key issues highlighted above in knowledge sharing in the business domain and knowledge-based development.

Table 1. Knowledge sharing in business and knowledge-based development

	Knowledge sharing in business	Knowledge-based development
Objectives: **Why share knowledge?**	Impact for the organisation: competitive advantage through generating new knowledge and sharing existing knowledge for improved practices and new product development.	Wider impact: reduced poverty through transfer of existing knowledge (dominant paradigm) and two-way knowledge sharing to building community engagement (participatory approach)
Context of use: **What contextual factors affect how knowledge is used?**	Need for information appropriate to audiences' language needs, technological level, cultural context Institutionally richer – organisations linked through commercial chains	Need for information appropriate to audiences' language needs, literacy levels, technological level, cultural context Time-poor audiences, with less access to knowledge sources
	Motivation for sharing knowledge depends on organisational incentives	Incentives for communities to participate in knowledge sharing need to be promoted (dominant paradigm). The motivation for knowledge sharing starts from community needs (participatory approach).
	Able to assess impact of knowledge sharing on service delivery or product development and therefore on revenue, brand value or market share and feed back into strategy formulation	Difficult to assess the impact of information in terms of direct contribution to poverty reduction and feed back into strategy formulation
Channels: **How is knowledge shared?**	Businesses have adopted ICTs and face to face channels. Formal and informal channels (e.g. communities of practice often build on informal networks)	Building on existing social networks and traditional media (participatory approach) and blending with ICTs.
	There is a business case for knowledge sharing	The business case for knowledge sharing (in the dominant paradigm) depends on donor funding

This analysis suggests that the objective of knowledge sharing in business is primarily to generate new knowledge, whereas in knowledge-based development the dominant paradigm is centered on transferring existing knowledge. This knowledge is theorized as 'global codified knowledge' but this concept does not reflect the contextual difficulties (language, technology access, literacy etc) people living in poverty will face in accessing this information and applying it to their lives.

In the business domain, the business case for knowledge sharing can be made if the new knowledge generates financial benefits whereas in international development, the impact of knowledge sharing on reducing poverty can be hard to measure because information poverty is only one of many factors that contribute to poverty, particularly when it is funded by donors as a public good.

3 Studying the case of the Intermediate Technology Development Group (ITDG)

This paper draws lessons from the case of the Intermediate Technology Development Group (ITDG), a UK-based non-government organization (NGO) with offices in seven developing countries and 500 staff worldwide. ITDG has been involved in the production and dissemination of information about small-scale technologies since it was founded in 1966, through books, multimedia products, websites, technical briefs, newsletters, research reports and a technical enquiry service, all targeting an international audience. ITDG Publishing, a subsidiary company, has an international reputation for publishing and retailing in its field, although there is growing competitive pressure from other publishers.

This paper is an output from a DTI-funded action research project based at ITDG, in collaboration with Cranfield School of Management, researching best use of ICTs for sharing knowledge with external audiences in order to develop a business proposition for ITDG's knowledge sharing activities.

Between June and December 2003 a preliminary market analysis was conducted, based on interviews with information service providers in development, internet-based research and a literature review. In January 2004, an audit was conducted of the systems used by staff to create information products for external audiences. This was based on interviews with staff in each country office and a review of organizational literature on knowledge sharing practices. In addition to this research, this paper also cites examples of good practice from other development agencies innovating in the field of knowledge sharing for development, identified during the literature review.

3.1 Why does ITDG share knowledge?

ITDG's ambition is to become the leading authority on the use of technology to reduce poverty in developing countries. The strategy for 2003-7 focuses on using knowledge more efficiently for greater impact and influence. In an increasingly competitive market, ITDG and ITDG Publishing need to develop content and distribution channels that meet market demands and make knowledge work to reduce poverty.

Market analysis showed that in knowledge-based development, where knowledge is seen as a public good, much information provision is supply-driven and its impact on poverty is difficult to monitor and evaluate (Talyarkhan 2003). The analysis segmented a sample population of 134 organisations identified by ITDG as competitors . These were organisations disseminating information about sustainable development or appropriate technology. They were segmented in terms of their audience (primarily Northern or Southern) and content (primarily theoretical or practical). In the sample of providers analysed, the majority of information was theoretical information, which was of benefit to Northern audiences. This may be attributable to the sample frame or the language of the search (English) but it suggests a gap in provision of more practical information for audiences in the South.

ITDG's historical competences include producing practical information about appropriate technology, offering demand-led enquiry services and resource centres and working in partnership to empower grassroots communities. ITDG aims to build on its experience by becoming a broker of practical information for audiences in the South.

3.2 Channels for sharing ITDG's knowledge

As part of the market analysis a value chain was developed to model how research is communicated for development. The diagram in Fig 1. shows the actors and outputs and how value is added at different stages. For example, at ITDG, the development education department plays the role of content creator, learning from research outputs and creating development education materials (a branded product) which is then aggregated with other development education content and disseminated on ITDG's website. The internet has created new types of aggregators such as search engines and portals but has not yet eliminated the need for infomediaries to take information to rural communities, for example, and adapt it for their context, selecting relevant content and translating language. Unless the information can be understood in that context, it will not become knowledge.

Value chain: Communication of research for development
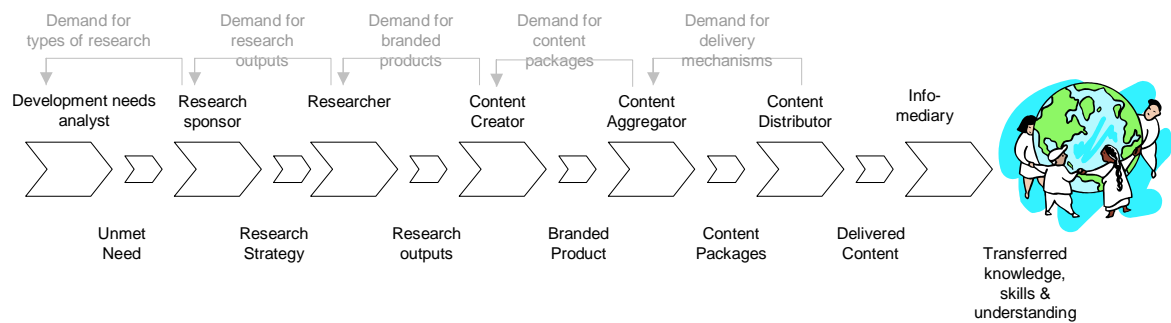
Underlying the construction of a value chain is an assumption that processes can be modelled in a linear fashion, but this is not the case for knowledge-based development, particularly when networks or electronic dissemination mechanisms disintermediate content and actors play multiple roles in the value chain. Nonetheless, the model serves to illustrate the knowledge transfer that is assumed to take place, highlight the gaps in flows where knowledge is not shared and show the types of actor in the marketplace, their business models and partnership strategies.

The value chain illustrates that different skills are required at different times to reach the last mile. Very few organisations will have all the skills in-house to perform optimally at each stage and organisations are therefore required to form partnerships to ensure total quality in the sharing of knowledge with end users. For example, OneWorld functions as a content aggregator, receiving content from its networks in the South, which it then syndicates to Yahoo news, reaching a much broader audience with Southern content. For ITDG, this highlights a need to form new types of partnerships, with actors both in and outside the field of development, to disseminate information more widely. ITDG has experience of working in partnership with Television Trust for the Environment (TVE) on the highly successful multimedia series *Hands On - Earth Report* broadcast by BBC World. The series is produced by TVE and ITDG provides a popular information service to support the programmes.

The value chain helps to identify business models and partnership strategies adopted by different actors. The majority of information providers are funded by institutional donors. Only large-scale content creators and aggregators such as FT.com or Ingenta can charge subscription fees for online journals or news. Other providers such as local news websites charge for advertising space. Organisations are also charging for services: the Institute of Development Studies (IDS) charge for web hosting, OneWorld sell software and charges its network centres for technical support, CAB International charge for use of their taxonomy, Healthlink do consultancy on setting up resource centres and Indian NGOs charges a membership fee.

ITDG realises that it will either need to secure donor funding to sustain its role as an information broker, or charge for other services to fund its work. There is limited evidence that poor people are willing to pay for valuable information. ITDG ran a project assessing the demand for information from informal enterprises such as small businesses (Wakelin 2003), setting up an online information service and training and employing individuals to work part time as infomediaries to sell the information. The project showed that informal enterprises were willing to pay infomediaries for information. For example, one infomediary sold new information about the availability of a peanut butter making machine for Ksh 2,500 (about US$35). This evidence suggests that poor people are willing to pay for information which improves their livelihoods directly, such as market prices. It also supports the findings of another ITDG project on agricultural extension in Peru, that infomediaries, such as the kamayoqs, can charge for their services (Hellin, Rodriguez, & Coello 2003).

Value for end-users in knowledge-based development depends on acquiring knowledge that is useful for them. The large number of links in the chain means that feedback from end-users may not reach the content creators or researchers who generate the materials. Networks could overcome this by offering a forum for mutual knowledge sharing, but in practice, many practitioner networks do not include end-users. The Arid Lands Information Network (ALIN) in Kenya is an exception, which brings together community members, NGOs and research institutions in its network to assess needs and gather information to disseminate through network meetings, newsletters and satellite radio content.

A feasibility study seeking to improve the integration and coordination of information resources considered the role of an international technology and development network (Lloyd Laney 2003b). Its conclusions were that many of the information systems that exist to provide information to the poor are not demand-driven, they overlook local

knowledge, they do not understand or ignore the role of intermediaries, and they do not monitor usage. This research suggested a potential role for ITDG as a broker of technology information brokers, and a catalyst for better communication and co-ordination within networks and between network members. Such an initiative would need to work with infomediaries to unlock and facilitate the transfer of local knowledge and complement it with external information, appropriately packaged and disseminated using innovative and appropriate communications techniques as defined by users.

ITDG needs to create partnerships with other providers of practical information, and develop systems and taxonomies that support content syndication. It needs to invest in strengthening its ability to repurpose its own materials, for example translating technical briefs into various languages or digitising information to make publications available on the web.

Greater reach could be achieved if ITDG promoted its information services for example through networks, partnerships and online links. An African website (www.brain.org.za) has generated traffic to ITDG's website by linking to the technical briefs. Promoting the service to field staff of NGOs, for example in their induction packs, would also generate demand. The combination of broadcasting and technical information has worked powerfully for ITDG, generating thousands of enquiries for the Hands On information service. At a national level, high demand for technical information was generated in Sri Lanka by a recent radio broadcast.

3.3   Context of use: reaching the 'last mile' with ITDG's information

ITDG's research into the knowledge and information systems of the urban poor (Schilderman 2002) was based on fieldwork in low-income settlements Peru, Sri Lanka and Zimbabwe and found that a lack of knowledge and information contributes to the deprivation of the urban poor. The public sector often discriminates against the poor when they seek access to information, or is simply inefficient. The poor tend to have more trust in the private sector, including NGOs, but they cannot cope meet the demand either. So poor people have to rely mostly on their own social networks and key informants within or sometimes outside their communities to access information that is essential for their survival. Some marginalized groups such as women or the homeless are excluded as they are part of different social networks. As yet, the urban poor in the research locations were found to have little access to ICTs.

Interviews with ITDG's communication staff in international offices in January 2004 showed that at present, they prefer to use printed materials to communicate with poor

communities, as these are more accessible and easier to use, particularly posters or materials with pictures and captions. These are distributed through local networks or at ITDG events such as mobile forums in Sudan which aim to take practical information and trainers to the people that need the information. Communication staff see the internet as a way of communicating with a policy and research audience internationally, but few ICTs other than radio are seen as effective in reaching the poorest in society.

ITDG has found evidence of demand for practical information at the grassroots in the South. Brokering appropriate technology information through ICTs would be an unsustainable solution and would not address many of the iniquities faced by communities at grassroots. In order for the information to become knowledge that communities can apply, infomediaries need to be involved, better informed themselves and trained in disseminating relevant information to the local context.

Communities must be supported in sharing their own knowledge and articulating their realities. ITDG's Women's Voices project in Kenya 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. This demonstrates a role for ICTs as a means to a development end. It also suggests that bottom up initiatives, by building peoples' confidence can support the development of social capital, which has been theorised as a key dimension of sustainable development (Spangenberg 2001).

4   Results

4.1   Lessons and challenges for ITDG

In order to 'reach the last mile' with its information, ITDG will have to concentrate on mechanisms of exchange that are inclusive and accessible to poor communities. Partnerships are required with infomediaries who can share knowledge with those communities. In order for knowledge sharing to take place, those infomediaries will need training in the information services, enhancing users' abilities to find information themselves and building community social capital which *"increases the capacity for knowledge sharing"* (Cummings, Heeks, & Huysman 2003). ITDG can build on its

existing networks to identify the infomediaries who share knowledge with poor communities. For example, ITDG's international technical enquiries service and resource centres in each international office allow staff to make direct contact with researchers or infomediaries. Communications staff refer to the service as being key to identifying local demand for information and for interacting with target audiences. New partnerships, for example with radio broadcasters, will help ITDG to promote its information services to a broader audience and transfer knowledge in new formats.

In the future, ICTs have the potential to disintermediate information sharing, so that communities can access information directly, without the need for infomediaries. In Kenya, informal enterprises expressed a desire to learn to access information online themselves and bypass the infomediaries (Wakelin 2003). There is some evidence of poor communities accessing ICTs to get information, for example in Uganda and Kenya commodity and market prices and weather reports are sent by SMS (IDRC 2003). Shared access models such as Grameen Telecom's have been very successful in encouraging adoption of mobile telephony at a rural level (Prahalad & Hammond 2002). ITDG's research suggests that it will be a long time before many marginalized communities get useful information directly from ICTs (Schilderman 2002). The challenge for ITDG is to blend ICTs with interpersonal approaches in order to maximise the reach of the information and the real impact on the lives of people working their way out of poverty.

ITDG is currently running a project in Peru which aims to broker practical information for rural audiences from a variety of content creators including NGOs and government. By repurposing the content for easy access on the Internet and by training a network of telecentres to act as infomediaries, it aims to create a sustainable model for sharing local and global knowledge for development, where information services are subsidised by the charge for ICT services.

ITDG is positioning itself as a broker of practical information for Southern audiences and building the partnerships to support a network of practical information providers and infomediaries to share this information with end users. In this way it hopes to transfer knowledge to poor communities and to support the sharing of local knowledge.

4.2   Implications for knowledge sharing

Knowledge sharing is seen as an investment by business and development organisations alike to improve organisational competitive advantage. The dominant paradigm in knowledge-based development theorises codified knowledge as a public

good and attempts to redress the 'knowledge gaps' and 'information problems' faced by developing countries through a model of knowledge transfer. The focus on sharing existing knowledge in this paradigm can be contrasted with knowledge sharing in business which primarily aims to generate new knowledge.

This paper has argued that context is key to knowledge sharing. It criticises the dominant paradigm in knowledge-based development for ignoring the importance of context in understanding information and therefore assuming that global, codified knowledge can be relevant to all and effectively transferred. Instead it supports the model of communication as dialogue and therefore focuses on the context of the 'last mile' and the need to value local knowledge. This raises important questions about community ownership of knowledge and intellectual property rights, and who benefits from exploiting indigenous knowledge, which brokers such as ITDG will need to address.

In knowledge-based development, because information production is funded by donors as a global public good, end-users will not be charged for information. Therefore information services will only be sustainable if they fulfil two criteria: meeting demand from end-users and cross-subsidies (charging for other services such as advertising, consultancy or ICT-related services such as email hosting or voicemail messages). For private sector organizations, this may create an incentive to partner with NGOs to "connect the last mile", to generate new revenue streams and contribute to sharing valuable knowledge.

The private sector is waking up to 'bottom of the pyramid' as a potential market and multinational corporations are designing new business models and partnership models to exploit these markets (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. Further research being undertaken in 2004 will establish clearer business models for knowledge sharing at the last mile based on empirical work in Peru.

Private sector involvement could improve the information services and infrastructure in developing countries, but at the local level, knowledge sharing will only have an impact on poverty if it brings about social change, either for an individual or a community. Access to information will only bring about social change in combination with other factors and only becomes access to knowledge when that information is appropriate to the local context. This paper argues that in development, a skilled infomediary is

required to contextualise new information if it is to reach the 'last mile' and if knowledge is truly to be shared, a network needs to be supported that connects communities, infomediaries, researchers and content creators to work towards social change with shared objectives and understandings.

This paper has demonstrated the key role of context in knowledge sharing and discussed the different objectives, channels and contexts which apply to the domains of development and business. In the case of ITDG, the research has shown the types of partnerships and channels it will need to adopt if it is to share knowledge rather than simply transfer information. As knowledge sharing in business moves towards customer advocacy and brokering the best service for consumers, the lessons of brokering content for knowledge-based development will provide useful insights into inter-organisational knowledge sharing. Successful knowledge sharing, whether it be for knowledge-based development or in business, has to attend to the context in which the knowledge is shared and create an environment where two-way communication can take place. By linking up the actors in the value chain, feedback can be turned into market intelligence and new products and total quality for customers, whether they be in a shanty town in Nairobi, a telecenter in Peru, or in a supermarket in London.

References

Aley, R. 2003, "MicroMedia: KAR Report to DFID". Unpublished work.

Aley, R., Waudo, A., & Muchiri, L. 2004, *MicroMedia card pack*.

Augier, M., Shariq, S. Z., & Vendelo, M. T. 2001, "Understanding context: Its emergence, transformation

and role in tacit knowledge sharing", *Journal of Knowledge Management*, vol. 5, no. 2, p. 125.

Ballantyne, P. 2002 IICD *Collecting and propagating local development content* [Online].

Available at <http://www.ftpiicd.org/files/research/reports/report7.pdf> [Accessed 20-9-2003]

Barnard, G. 2003 Institute of Development Studies, Brighton *Knowledge Sharing in Development

Agencies: Knowledge Fortress or Knowledge Pool?* [Online].

Available at <http://www.ids.ac.uk/ids/info/eadi/> [Accessed 29-9-2003]

Bridges.org 2001 Bridges.org *Spanning the Digital Divide* [Online].

Available at <http://www.bridges.org/spanning/report.html> [Accessed 22-10-2003]

Chai, K.-H., Gregory, M., & Shi, Y. 2003, "Bridging islands of knowledge: A framework of knowledge sharing mechanisms", *International Journal of Technology Management*, vol. 25, no. 8, p. 703.

Contractor, N. S. & Monge, P. R. 2002, "Managing knowledge networks", *Management Communication Quarterly : McQ*, vol. 16, no. 2, p. 249.

Cummings, J. 1994, "Defining groupware and other impossible tasks", *Business Communications Review*, vol. 24, no. 2, p. 35.

Cummings, S., Heeks, R., & Huysman, M. 2003, *Knowledge and Learning in Online Communities: A Social Capital Perspective*, Institute for Development Policy and Management.

Davenport, T. & Prusak, L. 1998, *Working Knowledge* Harvard Business School Press.

Doering, D. S., Layke, C., Ranganathan, J., Revenga, C., Tunstall, D., & Vanasselt, W. 2002, *Tomorrow's Markets: Global Trends and Their Implications for Business*, UNEP/WBCSD/WRI.

Fernie, S., Green S.D., Weller, S. J., & Newcombe, R. 2003, "Knowledge sharing: Context, confusion and controversy", *International Journal of Project Management*, vol. 21, no. 3, p. 177.

Figueroa, M. E., Kincaid, D. L., Rani, M., & Lewis, G. 2002, *Communication for Social Change: An Integrated Model for Measuring the Process and Its Outcomes* John Hopkins University, 1.

Fisher, J., Odhiambo, F., & Cotton, A. 2003, *Spreading the Word Further* WEDC, Loughborough University.

Ford, D. P. & Chan, Y. E. 2003, "Knowledge sharing in a multi-cultural setting: a case study", *Knowledge Management Research & Practice*, vol. 1, no. 1, p. 11.

Grimshaw, D. J., Mott, P. L., & Roberts, S. A. 1997, "The role of context in decision making: some implications for database design", *European Journal of Information Systems*, vol. 6, pp. 122-128.

Gumicio Dagron, A. 2001 The Rockefeller Foundation *Making Waves: Stories of Participatory Communication for Social Change* [Online].

Available at <http://www.rockfound.org/Documents/421/makingwaves.pdf> [Accessed 17-10-2003]

Hammond, B. 2001 OECD *Digital Opportunities for Poverty Reduction: Addressing the International Digital Divide* [Online].

Available at <http://www1.oecd.org/dac/digitalforum/docs/DO_IssuesConclusions_En.pdf> [Accessed 22-10-2003]

Hellin, Jonathan, Rodriguez, Daniel, and Coello, Javier 2003 ITDG *Measuring the livelihood impact of farmer-to-farmer extension services in the Andes* [Online].

Available at <www.enterprise-impact.org.uk/pdf/Hellin.pdf > [Accessed 20-2-2004]

Hovland, I. 2003a ODI *Communication of research for poverty reduction: a literature review* [Online].

Available at <http://www.odi.org.uk/publications/working_papers/wp227.pdf> [Accessed 20-2-2004a]

Hovland, I. 2003b ODI *Knowledge Management and organisational learning: An international development perspective* [Online].

Available at <http://www.odi.org.uk/RAPID/Bibliographies/KM/KM_Review_00.html> [Accessed 10-9-2003b]

IDRC 2003 IDRC *ICTs in Africa: The Landscape for Growing Telecentres* [Online].

Available at <http://web.idrc.ca/uploads/user-S/105552697401._PAN_AFRICAN_STUDIES_VOL_2_-_TELECENTRES_Chap_2.doc> [Accessed 20-2-2004]

Jarrar, Y. F. 2002, "Knowledge management: Learning for organisational experience", *Managerial Auditing Journal*, vol. 17, no. 6, p. 322.

King, K. and McGrath, S. 26-8-2003 Centre of African Studies, University of Edinburgh *Knowledge sharing in development agencies: Lessons from Four Cases* [Online].

Available at <www.ed.ac.uk/centas/fgpapers.html> [Accessed 28-8-0003]

Kobayashi, T., Tamaki, M., & Komoda, N. 2003, "Business process integration as a solution to the implementation of supply chain management systems", *Information & Management*, vol. 40, no. 8, p. 769.

Koskinen, K. U., Pihlanto, P., & Vanharanta, H. 2003, "Tacit knowledge acquisition and sharing in a project work context", *International Journal of Project Management*, vol. 21, no. 4, p. 281.

Lee, H. L. & Whang, S. 2000, "Information sharing in supply chain", *International Journal of Technology Management*, vol. 20, no. 3,4, p. 373.

Lloyd Laney, M. 24-3-2003a Infrastructure Connect *Making Information User-Driven* [Online].

Available at <http://www.infrastructureconnect.info/pdf/news/Userdriveninfo.pdf> [Accessed 20-4-2003a]

Lloyd Laney, M. 2003b ITDG *Making knowledge networks work for the poor* [Online].

Available at <http://www.itcltd.com/docs/mknwp%20project%20final%20report.pdf> [Accessed 10-7-2003b]

Ludin, J. 2003 BOND *Where are we... with North-South Learning?* [Online].

Available at <http://www.bond.org.uk/networker/2002/dec02/opinion.htm> [Accessed 20-3-2003]

Mansell, R. 2002, "Constructing the knowledge base for knowledge-driven development", *Journal of Knowledge Management*, vol. 6, no. 4, pp. 317-330.

Marker, P., McNamara K., and Wallace, L. 2002 DfID *The significance of information and communication technologies for reducing poverty* [Online].

Available at <http://www.dfid.gov.uk/Pubs/files/ict_poverty.pdf> [Accessed 17-10-2003]

Max Lock Centre 1999 Max Lock Centre *Improving Knowledge Transfer in Urban Development: Guides* [Online].

Available at <http://www.westminster.ac.uk/builtenv/maxlock/KTweb/KTFindex.htm> [Accessed 20-10-2003]

Meyer, C. A. 1997, "The Political Economy of NGOs and Information Sharing", *World Development*, vol. 25, no. 7, pp. 1127-1140.

Nidumolu, S. R., Subramani, M., & Aldrich, A. 2001, "Situated learning and the situated knowledge web: Exploring the ground beneath knowledge management", *Journal of Management Information Systems*, vol. 18, no. 1, p. 115.

Nonaka, I. & Takeuchi, H. 1995, *The Knowledge-Creating Company* Oxford University Press.

Pena, I. 2002, "Knowledge networks as part of an integrated knowledge management approach", *Journal of Knowledge Management*, vol. 6, no. 5, p. 469.

Polanyi, M. 1966, *The Tacit Dimension* Routledge & Kegan Paul Ltd. London.

Prahalad, C. K. & Hammond, A. 2002, "Serving the world's poor, profitably", *Harvard Business Review*, vol. 80, no. 9, p. 48.

Saywell, D., Woodfield, J., and Cotton, A. 2000 WEDC *Dissemination pathways and indicators of impact on development: a review of the literature* [Online].

Available at <http://www.lboro.ac.uk/departments/cv/wedc/projects/stw/lr6.pdf> [Accessed 21-7-2003]

Schech, S. 2002, "Wired for change: the links between ICTs and development discourses", *Journal of International Development*, vol. 14, pp. 13-23.

Schilderman, T. 2002 ITDG *Strengthening the knowledge and information systems of the urban poor* [Online].

Available at <http://www.itdg.org/html/shelter/docs/kis_urban_poor_report_march2002.doc> [Accessed 10-10-2003]

Spangenberg, J. H. 2001, "Investing in sustainable development: the reproduction of manmade, human, natural and social capital", *International Journal of Sustainable Development*, vol. 4, no. 2, p. 184.

St.Onge, A. 2001, "Building a knowledge warehouse", *Modern Materials Handling [H.W.Wilson - AST]*, vol. 56, no. 4, p. 41.

Stiglitz, Joseph 1999 Global Development Network *Scan Globally, Reinvent Locally: Knowledge Infrastructure and the Localisation of Knowledge*25-8-0003]

Sundaram, P. 2002, "Knowledge Transfer in a Democratic Context," in *Communicating for Development: Experience in the Urban Environment*, C. Gandelsonas, ed., ITDG Publishing, pp. 220-234.

Talyarkhan, Surmaya 1-12-2003, "Adding Value: The Market for Knowledge Sharing in Development". Unpublished work.

Tempest, S. 2003, "Intergenerational learning", *Management Learning*, vol. 34, no. 2, p. 181.

Thomas-Hunt Melissa, C., Ogden, T. Y., & Neale, M. A. 2003, "Who's really sharing? Effects of social and expert status on knowledge exchange within groups", *Management Science*, vol. 49, no. 4, p. 464.

Urban, G. L. 2004, "The Emerging Era of Customer Advocacy", *MIT Sloan Management Review*, vol. 45, no. 2, p. 77.

Waisbord, S. 2003 Communications Initiative *Family tree of theories, methodologies and strategies in development communication* [Online].

Available at <http://www.comminit.com/pdf/familytree.pdf> [Accessed 11-11-2003]

Wakelin, O. 2003 ITC *Demand Assessment Exercise for Small Business Information* [Online].

Available at <http://www.itcltd.com/icts/> [Accessed 20-10-2003]

Walsham, G. 2001, "Knowledge Management: The Benefits and Limitations of Computer Systems", *European Management Journal*, vol. 19, no. 6, pp. 599-608.

Wenger, E. C. & Snyder, W. M. 2000, "Communities of practice: The organizational frontier", *Harvard Business Review*, vol. 78, no. 1, p. 139.

Winder, D. 12-12-2002 MANDE *How can we learn more from what we do? Evaluation and evidence-based communications for development* [Online].

Available at <http://www.mande.co.uk/docs/Summary%20record-FINAL.doc> [Accessed 20-10-2003]

Zack, M. H. 2003, "Rethinking the knowledge-based organization", *MIT Sloan Management Review*, vol. 44, no. 4, p. 67.