Digital dividend or digital divide?

A world of difference

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Stuart Mathison
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Table of contents

List of acronyms

Executive summary

1. Introduction

2. Malaysia case study
   2.1 Key demographic data
   2.2 ICT sector review
   2.3 Case studies

3. Indonesia case study
   3.1 Key demographic data
   3.2 ICT sector review
   3.3 Case studies

4. Discussion
   4.1 Barriers to equitable sharing of digital technologies
   4.2 Critical success factors in sampled projects
   4.3 A model for designing and evaluating ICT initiatives

5. Conclusion

Useful links

Annotated bibliography
List of acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEC</td>
<td>Asia-Pacific Economic Cooperation</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South East Asian Nations</td>
</tr>
<tr>
<td>AWARI</td>
<td>Indonesian Internet Kiosk Association</td>
</tr>
<tr>
<td>CD</td>
<td>Compact Disc</td>
</tr>
<tr>
<td>CMA</td>
<td>Communications and Multimedia Act of 1998</td>
</tr>
<tr>
<td>CME</td>
<td>Continuing Medical Education</td>
</tr>
<tr>
<td>DA</td>
<td>Demonstrator Application</td>
</tr>
<tr>
<td>DAGS</td>
<td>Demonstrator Application Grant Scheme</td>
</tr>
<tr>
<td>GDLN</td>
<td>Global Development Learning Network</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GDPT</td>
<td>Directorate General of Post and Telecommunications</td>
</tr>
<tr>
<td>GKP</td>
<td>Global Knowledge Partnership (network)</td>
</tr>
<tr>
<td>HDI</td>
<td>Human Development Index</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>ICT4D</td>
<td>ICT for Development</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>ITS</td>
<td>Surabaya Institute of Technology</td>
</tr>
<tr>
<td>IDRC</td>
<td>International development Research Centre</td>
</tr>
<tr>
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<td>International Monetary Fund</td>
</tr>
<tr>
<td>INFID</td>
<td>International NGO Forum on Indonesian Development</td>
</tr>
<tr>
<td>ISP</td>
<td>Internet Service Provider</td>
</tr>
<tr>
<td>JIS</td>
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</tr>
<tr>
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</tr>
<tr>
<td>KEMAS</td>
<td>Community Development Division of Kuala Selangor</td>
</tr>
<tr>
<td>LFA</td>
<td>Local Farmer Association</td>
</tr>
<tr>
<td>LHP</td>
<td>Lifetime Health Plan</td>
</tr>
<tr>
<td>LIPI</td>
<td>Indonesia Institute of Knowledge and Science</td>
</tr>
<tr>
<td>MAMPU</td>
<td>Malaysian Administrative Modernisation and Management Planning Unit</td>
</tr>
<tr>
<td>MCPHIE</td>
<td>Mass Customised / Personalised Health Information and Education</td>
</tr>
<tr>
<td>MDC</td>
<td>Multimedia Development Corporation</td>
</tr>
<tr>
<td>MFD</td>
<td>Malaysian Foundation for the Deaf</td>
</tr>
<tr>
<td>MIMOS</td>
<td>Malaysian Institute of Microelectronic Systems</td>
</tr>
<tr>
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<td>Management Information System</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
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<td>Multimedia Super Corridor</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-government Organisation</td>
</tr>
<tr>
<td>NITC</td>
<td>National Information Technology Council</td>
</tr>
<tr>
<td>PAKTA</td>
<td>Pact Indonesia</td>
</tr>
<tr>
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<td>Pan Asia Networking Telecentre Learning and Evaluation Group</td>
</tr>
<tr>
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<td>The Association of Computer and Multimedia Industry in Malaysia</td>
</tr>
<tr>
<td>PML</td>
<td>Perempuan Mailing List</td>
</tr>
<tr>
<td>PPP</td>
<td>Purchasing Power Parity</td>
</tr>
<tr>
<td>RISTEK</td>
<td>National Department of Research and Technology (Indonesia)</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>SSIS</td>
<td>Smart School Integrated Solutions</td>
</tr>
<tr>
<td>TKTI</td>
<td>Indonesian Telematics Coordination Team</td>
</tr>
<tr>
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<td>United Nations</td>
</tr>
<tr>
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</tr>
<tr>
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<td>University of Malaysia Sarawak</td>
</tr>
<tr>
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<td>Urban Poor Consortium</td>
</tr>
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<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>VCD</td>
<td>Video Compact Disc</td>
</tr>
<tr>
<td>VSAT</td>
<td>Very Small Aperture Terminals</td>
</tr>
<tr>
<td>WALHI</td>
<td>Wahana Lingkungan Hidup Indonesia (Friends of the Earth)</td>
</tr>
<tr>
<td>WAO</td>
<td>Women’s Aid Organisation</td>
</tr>
<tr>
<td>WFM</td>
<td>Worldview Foundation (Malaysia chapter)</td>
</tr>
</tbody>
</table>
Executive summary

Overview of this study
The purpose of this study is to contribute to the understanding of the role and potential of ICTs as contributors to global development strategies. Information was collected from published literature and, in the field, from Malaysia and Indonesia, focusing on key demographic data, the ICT sector and its governance, and selected case studies. The specific objectives were to identify:

- Barriers to equitable sharing of digital technologies;
- Critical success factors for ICT4D projects; and
- A model for designing and evaluating ICT4D projects.

Barriers to equitable sharing of digital technologies

ICT infrastructure – includes the electricity supply, the physical components that constitute a digital network, telecommunication services and Internet services. An associated concern is the performance these services. Ways to overcome ICT infrastructure barriers include:

- Government policy and resources to facilitate ICT infrastructure for all of their citizens.
- The application of (relatively expensive) emerging technologies (e.g. VSAT).
- The application of alternative technologies (e.g. radio).
- As an interim measure, drop the ‘C’ from ICT, by disconnecting the Internet service and, for example, using CD-ROM packages to address information needs.

Affordability – refers to one-off costs (e.g. electricity/telephone connection, computer hardware/software etc) as well as to recurring costs (e.g. telephone line rental, telephone call charges, ISP charges, electricity charges, system maintenance costs, human resource costs, etc). Privatised individual Internet access in most poor communities is generally not affordable at the present time. If Internet access is to be delivered to these communities then the IT Kiosk concept is likely to be the dominant medium. It is important to consider whether recurring costs are sustainable and if there might be low technology alternatives that would offer the same benefits.

Human capacity – refers to ‘IT literacy’ or the ability to operate a computer and its software. There are a number of issues associated with this: functional literacy, the ability to learn a smattering of English-language computer jargon, the ability to type and to use a computer mouse, etc. Some ways to overcome these barriers include the application of multimedia techniques and the use of touch-screen hardware. The importance of IT awareness and IT literacy programs were emphasised by many of the projects.

Content – refers to the information and applications that are available to potential users. The issue for equitable sharing of digital access is whether this content is usable, relevant and applicable. Content needs to be delivered in the local language. To ensure relevance and appropriateness, content should be identified or developed in the context of a local community and with the active participation of that community.

Cultural/social restrictions - Without specific efforts to address discrimination, the users of ICT were found to be men rather than women; the young rather than the aged; the rich rather than the poor; and the urban rather than the rural. It was noted that ICTs could create an anonymous space for women to explore issues that might otherwise be culturally restricted. It was also noted that ICTs offer opportunities for those with disabilities to participate and learn in alternative ways.

Critical success factors in sampled projects
It is a reflection of the newness of the ICT4D field in the designated context that the projects we studied tend to be still experimental in nature and essentially unproven. It was thus inappropriate to equate ‘project success’ with ‘positive impact’. While most of those interviewed had various methods of evaluating success, the evaluation was dependent on aims and inconsistently applied.
In Malaysia, perceived pathways to success included:
- Working within the government policy emphasis and with recognised organisations;
- Implementing and testing a prototype before attempting broad outreach;
- Working with a specific, clearly identifiable community and facilitating the participation of that community in every stage of the project;
- Designing for the ICT infrastructure realities;
- Forming effective partnerships to ensure that the project team has all of the inputs and skills required to meet project objectives;
- Emphasising ICT awareness and training; and
- Developing a sustainability plan.

**A model for designing and evaluating ICT initiatives**

In the course of the study it became clear that a one-off, quantitative evaluation of a time-bound project could only represent an historical snapshot of what is a dynamic process. An evaluation of this nature would be of limited value. This is especially true in the ICT4D field because the scope of ICTs, as well as the available information and application content, is changing so rapidly. Furthermore, peoples ability to use the technology and their understanding of its potential is constantly developing. Therefore, in this context, evaluation should represent a reiterative process of reflection, learning and action, rather than a one-off statement of value (or impact).

The evaluation model is shown below:

There are a number of applications for this model. First, the model is a learning-oriented, analytical tool. Application of the model prompts stakeholders to identify, what their needs are, the digital access barriers that confronted them and response actions that were implemented. Second, as a design tool informed by the learning process described above, the model can be used to anticipate barriers to digital access and to suggest ways to avoid these barriers. Third, as an implementation tool, application of the model encourages immediate evaluation of response actions that can result in identification of additional digital access barriers. Finally, as an evaluation tool, the model can indicate recurring digital access barriers, which will highlight areas for capacity building activities. An indicator of 'success' of the ICT4D project is when the community demonstrates its ability to envision, act and overcome barriers without external intervention. An indicator that barriers to digital access have been overcome is when the community operates on the outer loop of envisioning and acting.
1. Introduction

The rise and rise of ICTs in the north has produced what some have named ‘techno-optimism’. Many have posited that the increasing use of ICTs in development (ICT4D) can contribute significantly to development objectives, including poverty alleviation. From this debate has sprung a new idiom: Community Informatics. As this report concerns the successful adaptation of ICTs to community development, it is worth reiterating the principles of Community Informatics as they lie at the heart of project design:

- ICTs are not merely technical artefacts but should be seen as embracing the aspirations and behaviours of those using them.
- Information systems have the capacity to move beyond formal organisations and into society at large.
- When designing ICT systems we often assume a structured context that may not be there.
- We should not evaluate the success of an ICT project according to what we wanted or the original institutional needs or interests, as the use of ICTs is inevitably moulded and changed by community needs.
- We need to recognise the diversity of interests and see ICTs as meeting a community of needs.
- The ability to liberate and politicise communities is, in some instances, more important than any goals of efficiency or effectiveness.
- The way in which that liberation happens, and the creativity with which communities apply ICTs, has the capacity to embrace or enclose marginalised groups.

If one is to accept that ICTs are now, or possibly will be, integral agents for social change in the future, we need to ask ‘in what way’? In the new globalisation debates, some concern has been expressed about the loss or erosion of local economies and cultures, a process likely to be accelerated by inappropriate use of ICTs.

Some of the energy driving techno-optimism derives from Northern values and the language of change; for example, efficiency, cost cutting/downsizing, facing so-called ‘digital divides’, streamlining, leapfrogging, and most of all the opportunity to communicate and exchange information. Some of these values may not represent adequately the realities of the poor or of nations struggling to gain economic and social stability. Efficiency and cost cutting may not be valid in countries where unemployment levels threaten to cause political instability, where wages are low and thus more amenable to ‘employee dense’ solutions, or where infrastructure costs are so high they swamp any possibility of gain through ICTs. Decision-makers should also be aware that despite the rhetoric of technology increasing jobs, technology tends to stratify work more decisively and can reduce many of the jobs that offer opportunities for social mobility.

The focus on delivery of information may be of little consequence to a community seeking to address basic needs. Thus, finding the right fit between ICT-based projects and community demands and capacity is of prime importance. In some instances, the information flow might occur in reverse - the drive is to get information out rather than in. The human rights and environmental movements in particular have benefited from the instant communications made possible by ICTs. This highlights the fact that communication should be recognised as a fundamental human need.

In many developing countries, the modernist notion of economic development is increasingly giving way to the social development movement that emphasises equity, equality, human rights, education and liberation from oppression and poverty. ICTs, as the techno optimists would say, are ideal vehicles to carry this movement into the future.

However, if we accept that social development is about social justice and the equitable distribution of resources, then ICTs are a problematic means of achieving these goals. While ICTs have the

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potential to bring about social justice through their instantaneous contact within worlds and to contribute to an inclusive society, they are still costly and therefore hardly equitable in their distribution. Rather than contributing to social inclusion, they can just as easily be a mechanism for social division. Overcoming barriers to equitable distribution of ICTs is the problem of ‘bridging the digital divide’.

Research undertaken for this study involved literature review and field trips to Malaysia and Indonesia. In both of these countries, the study included review of key demographic data, the ICT sector, and a number of case studies. The study sought to identify:

- Barriers to equitable sharing of digital technologies;
- Critical success factors for ICT4D projects; and
- A model for designing and evaluating ICT4D projects.

Malaysia and Indonesia present contrasting technological pictures. Malaysia, verging on developed country status, has promoted technology as part of its national persona. Indonesia, on the other hand, is struggling to resurface after years of economic decline, while its huge and geographically dispersed population copes with poverty and a lack of services. Malaysia has well-developed infrastructure, is attracting foreign and local investment, and has resisted IMF interference in domestic fiscal policy, while Indonesia is characterised by aid dependence, poor or corrupt management practices, and a growing and seemingly intractable gap between rich and poor.

However, as diverse as these two economies appear to be, there are some common themes emerging from their experiments in ICT development initiatives.
2. Malaysia Field Study

2.1 Key Demographic Data

Malaysia achieved statehood in 1963 through the merging of West Malaysia (Malaya and British Singapore) and East Malaysia (Sabah and Sarawak in North Borneo). Singapore separated from Malaysia in 1965. Malaysia has a landmass of 330,000 square kilometres, a population of about 23 million and a population density of 70 people per square kilometre. Approximately 57 per cent of the population live in urban areas.

In terms of the UNDP Human Development Index (HDI), Malaysia ranked 56th out of 162 nations in 1999, placing it towards the top of the ‘medium human development’ category. Since 1975, Malaysia’s HDI has risen 26 per cent from 0.61 to the present 0.77. Approximately 15 per cent of the population, or 3.3 million people, live below Malaysia’s national poverty line. The Malaysian government has articulated its ‘Vision 2020’ plan, which aims to establish Malaysia as a ‘fully developed’ country by the year 2020. In comparison to the other ASEAN members, Malaysia leads all of the others in terms of human development, with the exception of Singapore (Table 1).

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<td>77.4</td>
<td>92.1</td>
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<td>53.1</td>
<td>47.3</td>
<td>1,471</td>
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Table 1 Human Development in the ASEAN Countries

Malaysia’s GDP per capita is USD 8209 (PPP). The average annual growth of GDP per capita over the last decade has been about 4.7 per cent. Economic output is derived from agriculture (14%), industry (44%), and services (42%).

Malaysia is a multi-racial society. Its population is made up of 58 per cent ethnic Malays and other indigenous peoples, 26 per cent Chinese, and seven percent Indian. The official language is Bahasa Melayu. Various Chinese dialects, Indian dialects and indigenous languages are also used. English is widely spoken. The adult literacy rate is 87 per cent.

2.2 ICT Sector Review

The Internet in Malaysia has its genesis in a university computer network established in 1988 by the Malaysian Institute of Microelectronic Systems (MIMOS). This network had dial-up lines to Australia, South Korea, Netherlands and the United States and provided basic e-mail facilities. In 1992, the dial-up connections were replaced by satellite links to the US and the network was connected to the Internet.

National Information Technology Council

The Malaysian government’s commitment to ICTs was formalised in 1994 when the National Information Technology Council (NITC) was established. NITC envisions a ‘knowledge’ society in line with policies outlined in Vision 2020. It actively promotes the application and development of ICTs in nation-building efforts. NITC has served as the secretariat of the Global Knowledge Partnership network (GKP) for the last two years and has recently been invited to fill the same post for the next five years.

Communications and Multimedia Act 1998

NITC was responsible for the formulation of legislation relating to the ICT sector in Malaysia. Regulations for the ICT sector are defined in the Communications and Multimedia Act 1998. These regulations are technologically neutral, which means that, in the face of development of digital technologies and the convergence of media forms, there can be reform of the ICT sector without the need to modify legislation. The legislation both defines the acceptable boundaries of behaviour for users and national ICT policy objectives. These policy objectives include:

- To establish Malaysia as a major global centre for communications and multimedia information and content services;
- To promote a civil society where information-based services will provide the basis of continuing enhancements to quality of work and life;
- To nurture local information resources that facilitate the national identity and global diversity;
- To regulate for the long-term benefit of the end user;
- To promote a high level of consumer confidence in service delivery from the industry;
- To ensure an equitable provision of affordable services over ubiquitous national infrastructure;
- To create a robust applications environment for end users;
- To promote the development of capabilities within Malaysia’s convergence industries; and
- To ensure information security and network reliability and integrity.

Regulatory Framework

The regulatory framework for ICT in Malaysia consists of four components:

1. Economic regulation addresses the promotion of competition, the prohibition of anti-competitive behaviour, the development and enforcement of access codes and standards, and the licensing of ICT sector participants and the enforcement of license conditions, and ensuring compliance to rules and performance/service quality.
2. Technical regulation addresses frequency spectrum assignment, the development and enforcement of technical codes and standards, and the administration of numbering and electronic addressing.
3. Consumer protection emphasises the empowerment of consumers while at the same time ensuring adequate protection measures in areas such as dispute resolution, affordability of services and service availability.
4. Social regulation includes both content development and content regulation. Content regulation includes the prohibition of offensive content as well as public education on content-related issues.

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4 http://www.mimos.my/
5 http://www.nitc.org.my/
6 http://www.globalknowledge.org/
7 http://www.cmc.gov.my/legislationframe.htm
Multimedia Development Corporation
In 1996, the Malaysian government established the Multimedia Development Corporation (MDC). One of the major projects of MDC is the Multimedia Super Corridor. The aim of this project is to encourage local and multinational ICT companies, through special privileges and taxation relief, to establish operations in a dedicated compound situated just south of Kuala Lumpur. Parallel to this has been the development of the ‘intelligent’ cities of Putrajaya and Cyberjaya.

Seven special projects known as ‘Multimedia Development Flagship Applications’ have been instigated by MDC. These flagship applications include Electronic Government, Multipurpose Card, Smart Schools, Telehealth, R&D Clusters, E-Business and Technopreneur Development.

The Demonstrator Application Grant Scheme (DAGS)
NITC initiated DAGS in April 1998. The scheme is based on the belief that people will not be motivated to take up ICT applications unless benefits are demonstrated. NITC was RM 100 million under the Eighth Malaysia Plan (2001-2005). There are currently more than 50 DAGS projects.

DAGS provides seed funding for project proposals that:
• Contribute to community development through ICT;
• Involve tri-sector partnerships (i.e. community, private sector and state sector);
• Be clear about their goals and deliverables;
• Have potential for expanding outreach through upscaling or replication;
• Have potential for sustainability, through commercialisation, on-going community support, or some other mechanism; and
• Be quickly realised.

DAGS projects work through the following phases:

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Activities</th>
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<tbody>
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<td>Receipt of proposals</td>
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<tr>
<td>Applications vetted by expert groups</td>
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<tr>
<td>Final review and evaluation</td>
<td>Guidelines provided by DAGS.</td>
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</table>

8 http://www.mdc.com.my/
9 http://www.dagsclub.org.my/
2.3 Case Studies

ICT is central to the Malaysia's national vision and the case studies that follow need to be seen in that context. Six ICT4D projects were visited and analysed. A brief synopsis of each project follows.

E-Bario
Bario is a remote community in the state of Sarawak, East Malaysia. E-Bario is a research project that has sought to determine the extent to which ICTs can support sustainable human development to remote communities like Bario. Computer laboratories have been established in the primary and secondary schools, and a telecentre has been established in the village for general community use. The initial phase of the project did not involve development of specific information content. Rather, the emphasis was on delivering basic ICT infrastructure and also on developing the IT-literacy of the community. The project began in May 1999.

SM@SY
The sm@sy project has been implemented in Kampung Raja Musa, a rural village in Northwest Selangor. The project seeks to develop information databases that are relevant to specific local communities. The content is developed and maintained by the local community. The sm@sy database is local to the village LAN and cannot be accessed by outsiders via the Internet. Internet access for sm@sy users, with community-approved links, is also provided. Part of the project was to establish four telecentres in strategic locations in the village. The project began in August 1999.

TaniNet
TaniNet was created to enable the Malaysian agricultural community to use the Internet as a tool for communication and as a place to share information on agriculture and biotechnology. The TaniNet website disseminates relevant information to farmers and provides access to a panel of experts to whom TaniNet clients can submit questions. TaniNet is a membership-based system. Membership is currently about 5000. The project began in September 1999.

E-pek@k
In Bahasa Melayu, ‘pekak’ means ‘deaf’. The e-pek@k project seeks to provide hearing-impaired persons with a medium through which they can access information, services, job opportunities, and peer support. It is also a medium through which their concerns, needs and abilities can be communicated to the wider community. The project has two emphases. First, a website that offers numerous services to the deaf community has been developed. Second, computer laboratories have been established in six schools for the deaf. The project began in November 2000.

WAO
The Women's Aid Organisation of Malaysia (WAO) is an independent, non-sectarian NGO committed to confronting violence against women. WAO was established in 1982. It provides counselling and support to victims of domestic violence, and is involved in research, advocacy and awareness with respect to women's rights issues. The case study discusses the role and application of both e-mail and Internet in achieving WAO's goals.

AkisNet
The Agriculture Knowledge Integrator System is an integrated, web-enabled management system designed to support Malaysia's national drive towards technology-intensive agricultural practices. AkisNet is a suite of software applications designed to be adapted for specific agricultural sub-sectors. AkisNet's pilot program is called PadiNet and is aimed at the rice growing community. DAGS funding for the project began in September 2001. Conceptualisation and project planning occurred for at least one year prior to this.
Summary of critical success factors identified in the Malaysian case studies

Work within the framework
One of the potential benefits of ICT4D projects is that outreach can be extended relatively easily once the information and application content is tested and proven. If broad outreach is to be achieved, projects need to work, as much as possible and practical, within the policy emphasis of government ministries and in partnership with relevant government and community organisations.

Develop a prototype first
Even though the ultimate goal might be broad, multi-community outreach, an effective strategy is to design a prototype application first. The prototype can then be used to illustrate the application to potential user communities. Indeed, a basic premise of DAGS is that people will not take up ICT applications unless the potential of those applications can be demonstrated to them. The prototype application should be relatively small, focussed, quickly realised, and easily replicated.

Have a specific community and facilitate the participation of that community
For those projects that are aimed at multi-community audiences, there is a danger that applications will be developed without reference to any community. However, the participation of community in development projects is fundamental. A number of projects engaged community development organisations to facilitate community participation. The commitment of community members was secured through awareness-raising initiatives. Some projects formed steering committees that included community representatives. Community representatives were invariably engaged to undertake research activities, awareness-raising initiatives and training programs. Those project implementers that were already part of a specific community had a distinct advantage over other projects that had to identify a community and build working relationships within it.

Design for the ICT infrastructure realities
When designing an ICT4D project, it is important to design for the ICT infrastructure realities. For example, if the project is to be implemented in a community that has inadequate ICT infrastructure, such as poor quality electricity supply and long-distance phone call to the nearest ISP, alternatives to on-line information such as CD-ROM solutions should be considered.

Build effective partnerships
An important element of the success of many of the sampled projects was that they had strong leadership and had developed effective partnerships so that the project team had the broad range of skills necessary to achieve project objectives. ICT4D projects need a broad range of skills ranging from project management, community development, software development, web design, IT training and sectorial expertise.

Emphasise ICT awareness and training
A person’s vision for the potential of ICT applications is limited by that person’s awareness and understanding of it. Consequently, most of the projects offered IT awareness activities to members of the participating community. A number of the sampled projects regarded the improvement of IT literacy as an end in itself. Thus a number of the projects involved the installation of school-based computer laboratories and the introduction of IT literacy to the school curriculum. A number of the projects emphasised the need to provide advanced training for a core group of community members so that they will be able to maintain the ICT installations and to provide technical support.

Sustainability plan
It is a requirement of DAGS that proposals submitted to it include a clear sustainability plan. This means that they need to estimate recurring costs and show how they expect to recover them. Another aspect of sustainability relates to the capacity of the community to maintain ICT hardware, perform basic troubleshooting, and continue IT training, etc.
2.3.1 E-Bario

Background
Bario is located in the Northeast corner of the state of Sarawak on the island of Borneo. In terms of land area, Sarawak is Malaysia’s largest state although only about two million of the country’s 23 million people live there. More than 50 per cent of Sarawak’s population lives in remote areas where infrastructure is considerably underdeveloped. For example, the road system is lacking to the extent that many communities rely on the rivers for overland transportation. Malaysian Airlines operates subsidised air services to the interior regions and there are a number of smaller private air services as well.

Bario is one of Sarawak’s 5,000 ‘longhouse’ communities. Longhouses are long structures that are divided into communal areas and private family units. There are 12 longhouses in Bario. The people of Bario are from the Kelabit ethnic group. There are about 1800 Kelabit living in the Bario area and about twice that number living elsewhere. One of the reasons for the drain of people from Bario is that youth need to leave there to undertake upper secondary and tertiary education.

The e-Bario project
E-Bario is a research project that has sought to determine the extent to which ICTs can support sustainable human development to remote communities like Bario. The University of Malaysia Sarawak (UNIMAS),10 which is located in Kuching, instigated the project in May 1999. Bario was selected as the site for the study after a chance meeting between the vice-chancellor of UNIMAS and a Bario school principal. The principal described the lack of communication services in Bario and the disadvantage this caused. This prompted the vice-chancellor to suggest Bario as the site of UNIMAS’s ICT for Rural Development study. UNIMAS had some prior relationship with the Bario community through (non-ICT related) research activities it had undertaken in the area. The Bario community readily expressed its willingness to participate in the project.

The UNIMAS research team was made up of researchers with backgrounds in Information Technology, Anthropology, Social Science, Education, and other fields. Pan Asia Networking11 provided funding for the first year of operations (May 1999 to April 2000). DAGS provided additional funding in the second year (May 2000 to April 2001).

The project began with community consultations via interviews, base line surveys, discussion groups and workshops. A Participatory Action Research methodology was employed. A survey of awareness of ICTs found that 26 per cent of the community had never seen a computer, 91 per cent had never used a computer and 99 per cent had never heard of the Internet.

The introduction of ICT hardware in Bario began in November 1999. This has been a staged process and is still continuing. The UNIMAS team had other teaching and research responsibilities and consequently, they managed the project on a part-time, sporadic basis. This has not been a real disadvantage as it has taken time for the community to become familiar with the project and to develop basic IT skills. At the present time, Bario has a computer laboratory in the secondary school with 16 computers, a computer laboratory in the primary school with 10 computers, and a telecentre with seven computers, a copier and a fax machine. The telecentre was connected to the Internet in February 2002. Electricity for the installations comes from generator power.

10 http://www.unimas.my/
11 http://www.panasia.org.sg/
Concurrent with the installation of ICT hardware has been a number of IT training initiatives. These programs have been delivered by a Sarawak-based IT training company. The training courses include advanced IT training for teachers and basic IT training for community members.

**Information and communication needs**

The primary information/communication needs expressed by the Bario community were first to improve communications to the outside and, second, to provide IT education for their children so that they would not be so disadvantaged when they left Bario to undertake higher education. Most people felt that the most important output of the project has been the installation of a telephone in the community centre. Prior to the installation of the telephone, communication to and from Bario was via:

- By personal messages delivered by people who were travelling in or out of the community;
- By mail, which had slow turnaround because flights into Bario are only twice weekly; and
- By open radio, which was unsuitable for private conversations and was notoriously unreliable.

It can be anticipated that access to email will enhance communication with the outside world even more. Since the telecentre was only recently connected to the Internet, it will take some time for the use of e-mail to increase.

The Kelabit community has formed ‘The On-line Kelabit Society’, which is a forum group for Kelabit people to remain in touch with each other and with current issues. At the present time, the majority of people who use this forum live outside of Bario. The e-Bario steering committee hopes that Bario people will join this forum and, in doing so, provide greater connection between the Kelabit Diaspora and their traditional home. Furthermore, it is hoped that the Bario website, which is under construction, will allow expatriate Kelabit people to stay connected to their cultural roots.

**IT education and computer-aided learning**

IT is becoming an increasingly important part of the Bario school curriculum. Schoolteachers in Bario have demonstrated an advanced level of IT-literacy and the Bario school pupils are highly motivated to learn IT skills.

Some computerised learning methods such as a computer-aided English language-learning program have been introduced into the school curriculum. The research team did some evaluation of the effectiveness of this program and found that the students who used the computer program had lower learning outcomes than did the students who received their instruction by traditional methods. The study indicated that the additional cogitative effort required to drive the computer software hindered the students’ learning outcomes. While this finding does not invalidate the use of computer-aided learning tools, it does suggest that a higher level of IT-literacy will increase the potential impact of computer-aided learning programs.

**Partnerships**

The e-Bario project developed and drew upon a broad array of partnerships from community, government, academic and private sectors. Stakeholders and partners included:

- A steering committee made up of the e-Bario project coordinator (a Bario community member), Bario village heads, a Bario-based government official, a Bario school principal; and a UNIMAS representative.
- Research partners: UNIMAS and Pan-Asia Networking Telecentre Learning and Evaluation Group (PANTLEG).¹⁴
- Technical partners: Telekom Malaysia SDN BHD (VSAT and telephone installation), Comserv (computer installation and training) and CISCO (wireless technology).

¹² The telephone connections are via Very Small Aperture Terminals (VSAT) linked to the Measat satellite. Bario has four VSATs installed – one in the secondary school, one in the clinic, one at the airstrip and one in the telecentre.
¹⁴ [http://www.bellanet.org/leap/pantleg/](http://www.bellanet.org/leap/pantleg/)
Sustainability
In a managerial sense, Bario’s computer centres appear to be sustainable:

- The village leaders are committed to the continuation of e-Bario.
- The community is motivated to use and develop the facilities. The e-Bario steering committee has articulated a broad vision for Internet applications that could be developed for the benefit of the Bario community. This vision relates to information delivery in support of education, culture, commerce, agriculture, health, community, technology, and human resource development.
- E-Bario is served, on a voluntary basis, by a local project coordinator. The roles of this coordinator are to motivate people to use the ICT installations and to liaise with the UNIMAS team. The project coordinator has received training in community development as well as IT.
- A local person has been trained to provide technical support for the computer centres.

The potential for financial sustainability does not seem as positive. With respect to recurring costs, the e-Bario steering committee is formulating a telecentre membership scheme whereby users will pay an annual subscription fee to use the facility. There will also be hourly fees for computer and Internet use. It is likely that there will be separate membership and usage rates for students, ‘ordinary’ members, corporate members, and casuals. This income will be used to maintain the telecentre and contribute towards the cost of VSAT connections.

The cost of VSAT connections will make e-Bario difficult to sustain financially. The four VSAT connections cost RM 540,000 for five years, which is equivalent to RM 2250 per month for each connection. The highest proportion of this cost is not the VSAT hardware but the satellite channels. If more VSATs were in use around the country the price might be able to be reduced but, at the current rates, few communities could afford the technology. If the Bario community is not able to generate enough income to cover the cost of VSAT connections they will require external subsidies.

Evaluating social impact
The e-Bario project worked in partnership with PANTLEG to progress the development of a methodology for evaluating the social impact of telecentres. The research team utilised and tested a qualitative approach based on obtaining and analysing community stories. It was found that the use of stories could:

- Elaborate process more so than numbers;
- Help actors understand process they are involved in;
- Help reveal intertwining and potency of process;
- Give an idea of downstream progress; and
- Give different perspectives of different parties (through stories or role-playing).

The research team concluded that perhaps the most important benefit of utilising stories as an evaluation methodology was that they could highlight unpredicted outcomes, which sometimes turn out to be more desirable than predicted outcomes. In Bario, this methodology revealed social impact in the following areas: aspirations, learning, capacities, organisation, unity, participation, relationships and sustainability.  

Observations and lessons learned

Community involvement
A strength of this project is the involvement of the community in every stage of the project. The project has the strong support of community leaders, who serve on the project steering committee. The schoolteachers are also enthusiastic about the focus on IT-literacy in the school curriculum. There is a strong core group of people who will ensure that the project continues to have momentum.

The Bario community is a motivated community. They are advocating that the forests around their community be declared national parks to protect them from logging and thereby secure their traditional way of life. They are talking about a community bank and an affordable, culturally appropriate way to deliver better care to the elderly in their community. Their vision is based on connection to, and interaction with, the modern world while maintaining their traditional community values and lifestyle. The e-Bario project has contributed significantly to broadening their vision for the development of their community.

IT Awareness and training
IT awareness and training was an important aspect of the project implementation. This included general training for community members, introduction of IT-literacy to the school curriculum, and more advanced training for specific groups (eg IT support personnel, teachers).

Emphasis on young people
E-Bario placed some emphasis on the young as a special group within the community. This emphasis is for a number of reasons. First, the young seem to accept and learn new technologies easier. Second, IT-literacy is an important skill for Bario children who wish to continue their education.

Basic communications needs
One of the fundamental needs identified by the Bario community was improved communications to outside of the Kelabit highlands. Indeed, in this whole project, one of the most significant outcomes was the installation of a telephone. This might suggest that the provision of basic telephony should take precedence over the implementation of sophisticated Internet applications.

Since the Bario computer centres have been connected to the Internet, the next area of most potential impact is probably e-mail usage, especially since the three languages used by the Kelabit people (i.e. Kelabit, Bahasa Melayu and English) are written in the Romanised script. ICT projects need not have ambitious goals to have significant impact.

However, even the relatively simple goal of introducing e-mail is challenging. Even after ICT hardware is successfully implemented and the community has the capacity to manage and maintain it, potential users still need to be trained in the use of basic computer software, typing skills, literacy, and some English language (eg to drive software applications).

Design for infrastructure realities
The project sought to prove that ICTs could bring about sustainable human development in a remote rural village. While the impact on human development is not yet quantified, there are questions as to whether the project itself is financially sustainable. Given the high cost of VSAT connections, there remains the possibility that the Bario community, having enjoyed the benefits of connectivity over a five-year period, could eventually lose their VSAT connection and their telephone and e-mail with it.

Telecentres
Individual (i.e. privatised) Internet access in the Bario community would not be possible at the present time. The costs – both capital and recurring – are too high. If Internet access is to be delivered to remote communities (and within developing countries), the community-based telecentre concept will be the dominant medium.
2.3.2 SM@SY

Worldview Foundation

The promoter of the sm@sy project is the Malaysia chapter of Worldview Foundation. Founded in 1979, the Worldview Foundation is a not-for-profit international NGO that specialises in media and communications for sustainable development. Its head office is in Colombo, Sri Lanka, and the organisation has consultative status with the UN. The foundation has projects in 32 countries across Asia and Africa that are estimated to impact in excess of 10 million people annually. It clients include, among numerous others, the UN, Asia Development Bank, GrameenPhone and APEC.

The Malaysian chapter of Worldview Foundation (WFM) was established in January 1996. In addition to the sm@sy project, WFM is involved in a number of ICT projects in Malaysia including:

- An e-government initiative called e-PS (Public Services). This has been developed in parallel with the sm@sy project, using the same village as the test bed site. The e-PS website is a directory of public services which aims to simplify the process of obtaining information and application forms;
- IT education for public servants;
- An Internet-based neighbourhood watch initiative that aims to build social capital and improve community governance; and
- Formal and non-formal IT education for students, working adults, housewives and others.

Kampung Raja Musa

The sm@sy prototype has been implemented in Kampung Raja Musa, a village in Northwest Selangor. This region is, relatively speaking, one of the best planned and progressive agricultural areas in Malaysia. It has a well-developed infrastructure system consisting of trunk roads, farm roads, drainage and irrigation systems, electricity supply and telephone lines. Kampung Raja Musa is a small palm oil farming community with a population of about 270 households and about 1200 residents. About 56 percent of the residents are younger that 25 and 75 per cent of the residents have at least a secondary level education.

A preliminary survey found that the Kampung Raja Musa community was receptive to IT development and was keen to learn more about it. A computer club had been started in the village in 1998. At the time the sm@sy project began, the computer club had three personal computers and 35 members.

The project promoters deliberately chose this location so that they might be able to develop, test and demonstrate the potential of the sm@sy application without being hampered by problems relating to inadequate infrastructure. They also felt that the willingness and desire of the community to participate in the project was critically important, as was their prior exposure to IT.

The sm@sy project

The sm@sy project began in August 1999. Sm@sy is an acronym for ‘Smart Masyarakat’, which means ‘Smart Society’. The objectives of sm@sy are:

- To expose the community to IT and make IT an integral part of community life;
- To make relevant information available to the community with multimedia technology; and
- To improve the community’s well being through knowledge enhancement, improvement in communications, increase in confidence, and increase in earning capacity.

The project has five distinct elements:

1. Community development: The overriding goal of the project is to facilitate and encourage interaction and cooperation between members of the community so that they can work together to achieve their collective goals.

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16 http://www.wview.com.my/
17 http://eps.mampu.gov.my
2. ICT hardware installation: The first phase of the project involved the installation of touch screen computer systems that are networked and installed in four strategic locations in the village. These locations were at the primary school (for students), at the mosque (for the elderly), at the women’s activity centre (for women), and at the community hall. The second phase of the project involved setting up an additional computer centre in the community hall with 10 networked personal computers, a printer, a scanner, and Internet access.

3. Sm@sy database development: Local content was identified through community research and loaded into the sm@sy database. The sm@sy database is not Internet-based but is installed onto the hard drive of the local server. Local technicians have been trained to maintain and develop this database according to the community’s needs and desires. At the present time, the sm@sy database holds information relating to health, agriculture, tourism, environment, social development, income generation and village profile, all of which is presented to the user via various multimedia such as text, voice, graphics, video, and audio. WFM envisages that, when sm@sy is to be installed at other villages, new community research will be undertaken at each site to provide local content for that site.

4. Internet access: The local sm@sy database has links to various Internet-based applications, such as the e-PS system described above. Users can also access e-mail. While use of the local sm@sy database is free, users must pay to access the Internet. This is achieved through the use of smart card technology.

5. IT training: An important aspect of the project is the IT training provided to the community. More than 200 residents have been trained in the use of the sm@sy system and the Internet. In addition, a core group of 10 has been trained more extensively in IT and multimedia so that they can take responsibility for the management and upgrading of the database. This group also provides additional IT support for the community.

Partnerships
This project developed and drew upon a broad array of partnerships from community, NGO and private sectors. Stakeholders, and their specific roles, included:

- **WFM:**
  - Lead and manage the project.
  - Provide expertise for the sm@sy prototype development.
  - Prepare a training curriculum for key personnel and community representatives.

- **Community Development Division of Kuala Selangor (KEMAS):**
  - Provide public relations to convey project information to the community.
  - Act as development and change agents for the community.
  - Gather village information for inclusion in sm@sy.

- **Aincom Computer Centre, Kuala Selangor:**
  - Provide technical assistance to WFM.
  - Carry out Internet courses and awareness programmes in the community.
  - Provide support and maintenance services, as required.

- **The Kampung Raja Musa community:**
  - Village Development Committee (JKKK) participation in the project steering committee.
  - The village leader and a youth leader were both members of the steering committee.

During the development period, the project was managed by a Steering Committee that included three representatives from WFM, two representatives from KEMAS, two representatives from Aincom, and two public representatives.

**Sustainability and replicability**
The community has taken on the management of the sm@sy centres since completion of the project in the second quarter of 2000. It has appointed a full-time employee, selected from the core group of IT-trained people, to manage the centres. The manager’s wages, as well as running costs associated with the centres, are met through income earned by the smart card system.

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18 [http://welcome.to/aincom](http://welcome.to/aincom)
WFM is ready to replicate the project in other villages and is negotiating financial commitment from donor organisations. WFM is also developing sm@sy applications for Chinese and Indian communities. These are more challenging because of the non-Romanised fonts that need to be used. WFM has been invited to present this system in Beijing, China.

Evaluation
An evaluation plan is one of the required elements of a proposal submitted for DAGS funding. Evaluation of sm@sy involved surveys of:
- IT knowledge and usage.
- Relevance of information provided by sm@sy.
- Economic impact: savings and/or income received through use of information services.
- Social impact: analysed through focus group discussions.

Sm@sy was recognised as a ‘Best Practice’ project at the GKP 2000 conference.

Observations and lessons learned
A specific and clearly defined community
Although sm@sy is ultimately meant to be applicable to any rural community, the initial prototype was designed in conjunction with a specific community so that the concept could be tested and demonstrated.

Strong community involvement, Apply community development principles and practices
The sm@sy project was not just aimed at a specific community. Rather, the community was closely involved in each phase of the project. Community leaders, as well as a key community organisation (JIKK), were significantly involved. Two community members participated in the steering committee. The IT kiosks were located in four strategic locations to maximise access by all members of the community. All members of the community had opportunities to receive basic training in the use of the system. The most motivated members of the community received additional training so that the sm@sy centres would be sustainable, at least in a management sense. Finally, because of the community’s enthusiasm for the project, the sm@sy centres earn enough money from the community to support the project financially.

Immediately relevant to the local context
It is doubtful that the project would have been as successful if it had not developed and linked content that was locally and immediately relevant.

IT training for the community
IT training for the community was a key element of the project implementation. It is not enough to install computers into a telecentre, connect them to the Internet and then leave. Potential users need to be enabled to use it. The sm@sy team recognised this and consequently included a comprehensive IT training program that was made available to every member of the community.

The sm@sy team also recognised the particular importance of developing the IT knowledge and ability of young people by installing a sm@sy centre in the primary school, which enables teachers to progress the IT education of their students. The WFM project director commented that IT-literacy is fast becoming the fourth ‘R’ in basic education. An underlying philosophy of ICT4D seems to be the belief that, in the not-too-distant future, IT-literacy (including access to the Internet and the ability to use it) will be as fundamental as the ability to read, write and count.

Sustainability
The project should have a clear strategy to achieve sustainability. Sustainability was achieved by ensuring community ownership, building in training programmes for the next cadre of managers, and by cost covering through the Smart Card system.
Effective partnerships and strong leadership
The sm@sy team had all of the skills necessary to achieve the project objectives. The expertise required for this project included community development, ICT hardware and networking, software and web development, and project management. In particular, the primary implementing organisation had good experience in ICT4D projects and provided the leadership necessary to achieve the objectives.

Telecommunications infrastructure
Sm@sy was implemented in a village with an adequate infrastructure. This would not be the case for many remote communities.

The sm@sy project has, unwittingly perhaps, suggested a way forward for remote communities that have inadequate telecommunications infrastructure and who cannot afford the technologies that are capable of overcoming the challenges of remoteness. As a replacement for real-time, online information, government departments and other organisations could provide basic information, forms, etc to a centralised information broker for inclusion on a CD-ROM. This CD-ROM would be updated periodically and sent to remote communities that have community-based computer centres that are not on-line. Developing the CD-ROM would not be difficult, as it would contain mostly downloaded websites (and background databases) with little modification required.

Non-standard computer hardware
The touch screen computer systems were specifically manufactured for the project and were therefore quite expensive in comparison to the cost of basic personal computer systems. If sm@sy were to be replicated, the project would need to identify a manufacturer to build the touch screen computers in greater numbers. An alternative would be for the replication project to use only off-the-shelf personal computers, which would make IT training somewhat more challenging and might mean that some members of the community (especially the elderly) would be less likely to use the system. There is a trade-off here between usability and cost.

Financial sustainability
Many remote communities would not have the financial resources of this community. Consequently, the same degree of financial sustainability might not be possible if the project were implemented elsewhere. On the other hand, if the system can save users money by reducing the travelling time required to interact with various services and suppliers, poorer communities might be better off with a system like sm@sy. A detailed cost/benefit analysis of sm@sy would be appropriate, and this would need to be communicated effectively to potential recipient communities.
2.3.3 Taninet

Background
The Asian economic crisis of 1998, and the associated fall in value of the Malaysian Ringgit, caused a dramatic increase in the cost of agricultural commodities imported into Malaysia. In part response to this, the Malaysian Ministry of Agriculture (MOA) developed the Third National Agricultural Policy 1998-2010, the goal of which is to guide and enable the development of the local agricultural sector. The policy encourages the use of emerging technologies, including ICTs, to increase the competitiveness of the sector.

There are numerous agricultural websites available on the Internet, published by national, regional and international organisations. However, most of these sites are tailored for countries with different economies, ecologies and levels of development. Furthermore, the language used is usually English, while the majority of Malaysian farmers read Bahasa Melayu.

The Taninet project
Taninet was created to enable the Malaysian agricultural community to use the Internet as a tool for communication and as a place to share information on agriculture and biotechnology. The project started in September 1999. Objectives include:
- To provide on-line information and services on agriculture and biotechnology;
- To increase local understanding of agricultural biotechnology and of local applications of new technology;
- To provide a forum for discussion among farming communities through a managed bulletin board and chat room;
- To provide access to expert advice and troubleshooting related to agricultural problems via the Internet; and
- To educate the farming community with respect to the application of the Internet to access useful information and services.

Community involvement
The target group for the first phase of TaniNet was made up of the members of four Local Farmer Associations (LFAs) in Selangor. It is through these organisations that TaniNet has scheduled and delivered its community surveys, promotional activities, conferences, and IT training programs. While LFAs are NGOs, their supervising bodies - Farmer Organisation Authorities – are part of MOA. It was appropriate for TaniNet to work through these official channels and to locate the project within the policy framework of MOA.

Socio-economic surveys
The first stage of the project was to conduct surveys of farming communities in Selangor to assess their economic status, information needs and access to information especially using computer facilities. The survey had 607 respondents. The study highlighted the following findings:
- Farmers received information from a variety of sources: government agencies, mass media, the private sector, LFAs and individuals. Thirty per cent of respondents felt they did not receive adequate agriculture information.
- Farmers are generally interested in accessing information from computers. About 15 per cent owned a computer and 20 per cent computer literate.

The TaniNet website
The TaniNet website includes the following features:
- **Main Article:** This article focuses on some agriculture-related topic of interest. The editor is responsible for determining the topic and content of the article.
- **Bulletin Board:** An area where messages can be posted and replied to. Messages posted can be in the form of text, image or even voice. The bulletin board has three sub-sections:

\[http://www.taninet.com.my/\]
advertisements, current events and queries. The query component enables farmers to submit questions regarding agriculture. The editor passes the question on to an expert who is chosen from TaniNet’s database of experts (see below).

- **On-line Survey:** Surveys provide information intended to improve the services offered by TaniNet. TaniNet offers gift incentives to encourage users to participate in surveys.
- **Membership Scheme:** A membership scheme has been devised to maintain a core of committed TaniNet users. Members are registered on a yearly basis and need to renew their membership accordingly. Certain services offered by TaniNet are classified ‘members-only’ to attract membership. These include:
  - Free access to the TaniNet database of articles and other agricultural information;
  - Participation in activities such as organised trips, seminars and conferences; and
  - Personal e-mail address and account with the @taninet.com.my domain.
- **Archive System:** In each edition of the TaniNet home page, material such as the main article can be archived for future reference.
- **Expert Database:** One of the objectives of TaniNet is to function as a bank of experts. As one of its services, TaniNet can be consulted to assist in identifying experts who could offer advice or services. This service is provided commercially as a secure on-line service.

TaniNet provides each LFA with one personal computer with a dial-up connection to the Internet. This enables access to the TaniNet system for the majority of farmers that do not have a computer. TaniNet hopes that as the system becomes more accepted and its benefits realised, more farmers will purchase their own computer.

**IT and TaniNet training**
An important component of TaniNet is training for users and potential users. Members of the farming community are given introductory training on the use of personal computers, Internet use and skills to access the information and services offered by TaniNet. Training is not just offered to farmers themselves but also to family members and to officials and office workers of LFAs.

TaniNet also holds conferences and briefings at government agencies and corporations to promote use of the system.

**Performance evaluation**
TaniNet records website hit rates, the number of on-line survey respondents, the number of queries passed on to experts, the number of membership applications, and the number of business transactions to assess its performance and impact. In its first year of operation, the TaniNet website had about 18,000 hits, 350 survey respondents, 400 queries for experts, and approximately 2000 members. At the end of its second year, TaniNet has about 5000 members.

**Partnerships**
The planning and development of TaniNet was started six months before the actual launch of the project itself. It involved six personnel at senior management level with experience in corporate business management, ICT and agriculture.

The key TaniNet partnership was two private sector organisations:
  - TropBio Research SDN BHD (consultants in agriculture and biotechnology) is the main promoter of TaniNet; and
  - Bionergy SDN BHD (consultants specialising in IT solutions, and including IT education).

Secondary partnerships included:
  - Community sector: Four LFAs in Selangor
  - Public sector: Farmer Organisation Authority, MOA
  - Academic sector: National University of Malaysia (ICT consultancy)
TaniNet phase two
Phase two of the project is underway. The system is to be implemented in conjunction with 50 LFAs throughout West Malaysia. Current membership stands at over 5000. In the last year, more than 400 queries have been forwarded to the panel of experts. In terms of web design and services, phase two will have greater emphasis on e-commerce whereby buyers will be able to purchase agricultural commodities directly through LFAs. The system will also place more emphasis on business-to-consumer sales. This includes not only advertising, but also on-line purchasing of farm inputs. For example, farmers will be able to purchase farm inputs through the system rather than travelling to a regional centre to make their purchase. It is hoped that this emphasis on e-commerce will increase income earned through the system so that TaniNet will be on a more secure financial footing.

Observations and lessons learned

Within the framework
The TaniNet project, which aims to be implemented broadly throughout the country, has located itself within the policy framework and emphasis of MOA. TaniNet also works within the organisational structure of MOA, Farmer Organisation Authorities, and LFAs. This was not only appropriate but also the most effective way to ensure the acceptance and outreach of TaniNet.

Financial viability
The initial phase of TaniNet did not generate substantial income. Phase two has a greater focus on e-commerce. The project managers do not envisage TaniNet to be a financially viable operation in the immediate future, primarily because they believe that it will take years for the required technology cultural transformation to occur. They therefore suggest that public financing is necessary for the immediate future. However, they do believe that TaniNet will be able to be financially viable in the future and they are working towards that goal.

Staff capabilities
The TaniNet team had appropriate and sufficient technical capacity to achieve the goals of the project. Development of the TaniNet website required expert IT skills, and the agricultural inputs also required agricultural and biotechnology experts.

IT education
TaniNet’s IT training was offered to all members. In doing so, they generated good will and the support of the older farmers. However, the younger generation was more open to learning the new technology and found it easier to adapt to it. In many cases where farms were a family concern, the younger members of the family were the ones who interacted with TaniNet website.

Promotional events
TaniNet found that an ‘event’ approach was an effective way to promote TaniNet and Internet usage. However, organising and managing such events required a lot of resources in terms of money and manpower.

Local content and local language
TaniNet highlights the importance of relevant local content, presented in the local language. TaniNet found local news, events and farm product advertisements should be tailored to the specific groups within the TaniNet community.
2.3.4 E-peka@k

Background
At the present time, there are about 18,000 hearing-impaired persons in Malaysia who are registered with the Social Welfare Department. The actual number of hearing-impaired persons is significantly higher but, for various reasons, they are not registered with the department.

‘Pekak’ means ‘deaf’. E-peka@k is an ICT project implemented by the Malaysian Federation for the Deaf (MFD). Its director, Mr. Mohamad Sazali Shaari, founded MFD in 1997. MFD is an umbrella organisation for state deaf societies. There are currently 10 state deaf societies registered as members of MFD. Smaller ‘deaf NGOs’ are also part of MFD’s community. The mission of MFD includes:

- To connect and support hearing-impaired persons in Malaysia;
- To advocate for the rights and needs of hearing-impaired persons with the relevant departments of the Malaysian government; and
- To raise awareness among the general public of hearing disabilities and the needs of hearing-impaired persons.

Except for the DAGS grant received for the e-peka@k project, MFD receives no state sector funding. MFD’s financial requirements are met by public donations.

MFD has 11 staff, which includes four women and seven men, eight hearing-impaired persons (including the director / e-peka@k project manager), three sign language translators, two IT specialists, and one administration coordinator. All staff members serve as trainers, educators and promoters, etc. MFD also receives a significant amount of voluntary labour from undergraduate IT students. Some of these have also been hearing-impaired persons. An indication of the IT-literacy of MFD is that the organisation has as many computers as staff.

The e-peka@k project
Being a primarily visual application, the Internet can potentially provide hearing-impaired persons with a medium through which they can access information, services, job opportunities and peer support. It is also a medium through which their concerns, needs and abilities can be communicated to the wider community. MFD recognised this potential and consequently developed an ICT strategy to help achieve its mission. This is the genesis of the e-peka@k project. E-peka@k attempts to improve and extend the services that MFD already had in place.

E-peka@k officially began in November 2000 when MFD received final approval for the application it had submitted to DAGS. Project planning began three months earlier and dialogue / negotiation with DAGS administrators took about one month, including one face-to-face interview.

E-peka@k has two distinct components. The first component, which MFD calls ‘d-administration’, is a website that provides information, services and networking opportunities for the deaf community. The second component, which MFD calls ‘d-schools’, is the establishment of IT centres in a number of deaf schools, along with the provision of IT training and education. Both the e-peka@k website and the school websites are in Bahasa Melayu language.

The first stage of e-peka@k is a pilot program of 12-months duration that seeks to prove the potential of the project concept. The geographic focus of the pilot project is the Klang Valley (Kuala Lumpur and Selangor State). The first stage of the project is now complete, with the exception of some final reporting requirements and a final impact evaluation study.

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20 [http://www.epekak.net.my/](http://www.epekak.net.my/)
An evaluation plan is an important aspect of the funding application submitted to DAGS. For this project, baseline surveys of clients – including NGO representatives, schoolteachers and students – have been taken. The final survey is not yet completed. The survey focuses primarily on IT knowledge and ability as well as Internet usage, rather than socio-economic impact.

Partners for the project include the Special Education Department, the Social Welfare Department, the Ministry of Health, three local NGOs, and six special schools for the deaf.

**D-administration**

Since MFD staff are themselves hearing-impaired persons, and since MFD has strong links with various deaf NGOs and societies, needs analysis was a simple matter of consultation within the community that had already been organised.

The e-pek@k website provides access to the following information and services:

- **E-register**: allows clients to register with local deaf NGOs.
- **E-interpreter**: allows clients to request the services of sign language interpreters.
- **E-job**: a job network that seeks to place hearing-impaired persons in mainstream positions.
- **E-counselling**: allows clients to make appointments for confidential, face-to-face, peer counselling services.
- **E-advertisement**: allows clients to buy and sell personal items within their community.
- **Links**: for example, a link to the Department of Social Welfare, where hearing-impaired clients can register with that department.
- **Forum**: allows clients to discuss general issues faced by hearing-impaired persons.
- **News and events**: advertisement of upcoming events that are particularly relevant to hearing-impaired persons.
- **Learning sign language**: video presentations, rather than the more common pictorial presentations that are more difficult for a learner to comprehend.

As part of the implementation of e-pek@k, MFD staff provided training for representatives of the deaf NGOs. The expectation is that these NGO representatives would be able to provide IT support and training to their own members, as required.

**D-schools**

This initiative is concerned with ensuring that deaf students are IT-educated so that they can participate in Malaysia’s envisioned knowledge society. The project involves the installation of ICT hardware in schools for the deaf, and training / education for deaf teachers and students. As part of the first stage of e-pek@k, ICT centres have been installed in six schools for the deaf.

The first stage of the implementation process is to sell the idea to the school administrators, teachers, students and parents, by presenting awareness-raising sessions and offering hands-on experience. E-pek@k staff then work with the most enthusiastic school staff and students to install the hardware, which is supplied by e-pek@k. E-pek@k staff and NGO representatives provide training in the use of various popular software applications. Students are assisted to develop their own school website, which they subsequently use and maintain. All six of the schools have their own website and these include tutorials, public forums, chat rooms, quizzes, news and events, etc.

Once the IT centres are installed, it is each school’s responsibility to maintain it.

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22. Sekolah untuk Kanak-Kanak Pekak, Selangor; Sekolah Rendah Pendidikan Khas, Kuala Lumpur; Sekolah Rendah Pendidikan Khas, Kampung Baru; Sekolah Rendah Pendidikan Khas, Selangor; Sekolah Kebangsaan Sultan Alam Shah, Petaling Jaya; and Sekolah Menengah Vokasional Khas, Shah Alam.
23. Including MS-Word, MS-Excel, MS-Explorer, MS-Outlook, etc.
Observations and lessons learned

Community processes
MFD operates within a strong community of organisations and people, and MFD staff are themselves part of this community. This has meant that, when it comes to activities such as needs analysis, program design, project implementation, and training activities, etc, MFD has been able to secure the active participation of its client group. Furthermore, MFD’s place within the deaf community means that there are both formal and informal mechanisms to receive critical feedback.

Project staffing
The e-pek@k project staff are confident, competent and motivated. Their motivation comes from the fact that they are serving their own community and feel that the project itself is having a positive impact. The project also has strong, dynamic leadership. MFD acquired sufficient in-house (and volunteer) IT expertise to manage the web development requirements of the e-pek@k project.

Project accountability
The funding application process with DAGS is quite demanding and searching. E-pek@k staff indicated that this certainly contributed to the ultimate success of the project. Similarly, the accountability measures required by DAGS (eg quarterly review of progress including outputs and finances) meant that the project team was constantly focused on achieving the next set of milestones, and this ensured that the project stayed on track over the duration of the project period. Furthermore, the fact that grant funds are released as quarterly reimbursements rather than as advances intensified the urgency to meet milestones. This externally imposed discipline essentially ensured the quality of project management, which is sometimes lacking in projects run by small NGOs.

IT training
The provision of IT training to intended clients was an essential part of the project. Installing hardware and developing applications is not enough to ensure that clients will make use of the system. Furthermore, the evaluation of the project focuses primarily on IT-literacy and usage patterns. This reflects an underlying assumption that the social impact of increased ICT usage will be positive in the long-term and, by improving access to ICT applications through IT training, the project will assist clients to maximise the social impact now and in the future.

Internet and computer access
The d-administration initiative will be available only to those clients that have access to an Internet-connected computer. Unless clients have access to public Internet centres and are motivated to use them, the system is restricted to those who can afford a computer at home and have access to a telephone line. The initiative has been implemented on the assumption that access to the Internet (by whatever means) will increase over time. This is a priority of the Malaysian government, and time will reveal the extent to which the assumption is correct.

Financial sustainability
E-pek@k does not generate income directly. MFD’s minimum financial requirements are met by public donations. Therefore, if the project is to be developed further, more funding is required. Similarly, while the program design is replicable, more funding is required to modify it for, and establish it in, other areas.

There are no financial provisions for maintenance and upgrade of hardware items that have been installed in schools. It remains to be seen whether the school communities commit to this inevitable expenditure in the future.
2.3.5 Women’s Aid Organisation of Malaysia

Background
The Women's Aid Organisation of Malaysia (WAO) is an independent, non-sectarian NGO committed to confronting violence against women. WAO was established in 1982 when it opened Malaysia's first Women's Refuge that provides counselling and child support to victims of domestic violence. Objectives of WAO include:

- To provide temporary refuge services to women (and their children) who are suffering from mental, physical and sexual abuse;
- To offer emotional and social support to any woman who requests it;
- To undertake and encourage research into factors that contribute to the inequality and subordination of women;
- To advocate for reform of policies and legislation that contribute to the inequality and subordination of women; and
- To create awareness and better understanding among individuals, public and relevant agencies on the issues of violence against women and the underlying inequalities.

E-Mail
The organisation has two main physical locations – the crisis centre and a child care facility. E-mail has now replaced phone calls among staff. The advent of e-mail access has allowed the organisation to keep in contact with international peers and networks. It has facilitated the realisation of a number of advocacy goals and strategies and has enabled the organisation to link to a wide variety of global social movements. Of particular significance has been the Coalition to End Domestic and Sexual Violence, which is proving its value at a time when Malaysian women are resisting the introduction of Islamic rape laws into some provincial legislatures. In the last few days they have received calls of support and advice regarding advocacy strategies from women’s groups in Pakistan, Mongolia and Nepal.

WAO has increased the involvement of volunteers through the introduction of a volunteer management system, which is based on an e-mail group. Most of the volunteers are ex-residents of the Women’s refuge

WAO Website
WAO established its website in November 2000. WAO relied on the goodwill of friends and supporters to achieve this. Staff and volunteers were approached to design the site and identify relevant content. The website is aimed at the general public. It is also used to recruit volunteers and to attract public donations for a child sponsorship program.

After receiving funding from MIMOS, WAO staff were able to participate in web creation and maintenance training sessions. However, this training was not well targeted and consequently did not prove to be particularly effective. WAO realised that they would need to employ a full-time communications officer to support the website and its development, rather than expect a general administration officer to do this on a part-time, ad hoc basis. Since then the WAO communications officer has attended MIMOS-sponsored training that has been out-sourced to a private sector ICT organisation (Fujitsu). This training was found to be much more effective.

24 http://www.wao.org.my/
Due to the nature of WAO’s business, the organisation’s office address is not provided on the website. Increasingly, the website URL serves as WAO’s only public address. Any person that is seeking information is referred directly to the website. Women not yet ready to acknowledge their problem can ease themselves into the services of WAO via the website.

*Internationalisation of WAO*

WAO has a number of interesting anecdotes surrounding their website and its effectiveness. One incident in particular gained international exposure when a worried son in London could not contact his Malaysia-based mother whose phone was engaged. The son surfed the Internet, found the WAO website, and then contacted them by phone for assistance. After checking the status of the woman’s telephone line with Telkom, a volunteer was sent to the women’s house, where she was found laying unconscious.

Other anecdotal evidence regarding the impact of the website is in relation to an increasing number of fund-raising opportunities. WAO has twice been approached by the charitable foundations of multi-national organisations offering the opportunity for funding.

The establishment of the website also introduced a number of challenges. Keeping the site relevant and appropriate requires constant updating in line with current affairs and emerging issues. WAO staff also feel pressure with respect to maintaining a professional-looking presentation.

*ICT training*

In 2001, WAO was approached by The Association of Computer and Multimedia Industry (PIKOM) and was encouraged to submit a proposal for funds for ICT hardware and training. WAO now has three computers for the use of clients at the shelter. The women have open access and have found that the opportunity to increase their skills has lead to an increase in self-esteem.

PIKOM provides two hours per week of training. This, however, is often disrupted by the unavailability of PIKOM trainers. It was also found that the training sessions were dependent on the group dynamics of the class. As the residents are temporary, it proved challenging to develop the skills of an ever-changing target group. WAO has now initiated moves for one of their clients to become a trainer through a PIKOM programme, a step that will provide benefits all round.

Many of the women are now writing their own letters to lawyers and government agencies, rather than being dependent on others for this. The computers also provide an opportunity for women who are not yet comfortable with verbal counselling to write out their experiences and initiate the healing process. The ICTs also facilitate communications between victims whether locally, regionally or internationally. Ex-residents provide peer support via e-mail. Some clients wish to continue their counselling via e-mail but this is not encouraged due to liability issues.

*Observations and lessons learned*

*Anonymity and Safety*

The WAO experience is that women can find a degree of anonymity in the Internet, which provides a layer of safety that allows them to more freely discuss and explore issues.
2.3.6 AkisNet

The Agriculture Knowledge Integrator System (AKIS)\(^{25}\) is an integrated, web-enabled management system designed to support Malaysia’s national drive towards technology-intensive agricultural practices. Its core objective is to design and implement ICT applications to help farmers achieve higher productivity & profitability.

The mission of AKIS is to create a collaborative environment that will close the digital divide for the agriculture community. Emphasis is placed on the following:
- Establishing a sustainable technology infrastructure;
- Creating productivity and enhancement programs;
- Developing IT-literacy within farming communities; and
- Creating new commercial opportunities for these communities.

**Approach to replication**

AkisNet is a suite of software applications designed to be adapted for specific agricultural sub-sectors. This process of customisation is undertaken in conjunction with a community-based approach to content development. The AkisNet software applications include member management, production management, business management and estate management modules, as well as communication tools such as forum, bulletin, farm activity log, weather reports, news, links, etc.

The first pilot project is called PadiNet, which targets a community of rice growers in Pulau Pinang (see below). The PadiNet project will be used to prove the concept and serve as the model from which other applications will be built. The ultimate aim of AKIS is to develop portals for a number of agricultural sub-sectors and to expand these systems through the country.

**Partnerships**

This project draws upon an array of partnerships and consultancies to achieve its goals:

- Promoter: TMM-Biotech SDN BHD
- Community sector: 4 LFAs in Pulau Pinang
- Public sector: Farmer Organisation Authority, MOA
- Agriculture knowledge: Marditech Corporation SDN BHD
- Technology: Industrial & Financial Systems AB

AKIS intends to establish an Advisory Board that will direct the project towards realising its mission. The Board will advise the AKIS community on areas such as economic issues, government policies and legal issues, and strategic direction. It will be made up of senior members of the collaborating partners, key industry leaders and directors of public agencies.

DAGS funding for the project began in September 2001. Conceptualisation and project planning had occurred for at least one year prior to this.

**Approach to sustainability**

AkisNet (and its ‘subsidiary systems’) aim to be commercially viable. The initial pilot project does not address cost recovery but subsequent versions of the system will. It is envisaged that income sources will include advertisements, some e-commerce through an on-line marketplace, and perhaps membership fees. Since the system accumulates and consolidates agricultural data, AkisNet might be able to serve as an information broker, selling this information to interested users such as government, business or research organisations.

In Malaysia, rice growing is mainly carried out by small landholders. There is limited data available in this sector, which hinders logistics planning and results in inefficiencies that adversely impact the productivity and profitability of the farmers.

PadiNet is the first application to be developed from the AKIS platform. The aim of PadiNet is to collect and consolidate information from rice growers, and to make this information available to various levels of management to enhance the effectiveness of the industry as a whole. The target group of farmers is located in the rice-growing region of the state of Pulau Pinang. This includes four farming communities, coordinated and managed by LFAs, in Pokok Sena, Kampung Pelet, Penaga and Lahar Bubu. Up to 2,000 farmers will be involved.

Farmers can record field activities, gain access to critical information and provide feedback to their LFAs. Whilst the system benefits individual farmers, its output cannot be maximised unless all the stakeholders are engaged. This is why the project works in close cooperation with LFAs, and why the design and implementation of the application emphasises community mobilisation, as well as training for local stakeholders. The project will fail if the target community, as a whole, is not committed to adopting the application.

During the pilot stage, emphasis is placed on community development, content development, ICT awareness and training-for-trainers in the PadiNet system. Two resource centres, each with 10 computers and a dial-up Internet connection, have been established in the offices of LFAs. Forty facilitators and promoters have been trained. Facilitators are typically drawn from staff of LFAs. Promoters are employed on a voluntary basis and it is common that village leaders serve as promoters.

**Observations and lessons learned**

**Comprehensive applications**
The AkisNet system is a comprehensive set of applications that will demand an advanced level of IT skill by its users. This means that intensive IT training will be required if the project is to be sustained. It remains to be seen whether this level of IT-literacy will be able to be achieved.

**Intensive community involvement**
The design of the system requires that whole communities are committed to using the system, otherwise consolidated information is incomplete. This is one reason why the project places strong emphasis on motivating and training the community to use the system.

**ICT awareness and training**
ICT awareness and training is an important part of the project implementation. To ensure that IT-literacy levels are maintained, AkisNet provides training-for-trainers. These trainers are based in the offices of LFAs. Half of the trainers are women and training is offered to all members of the community.

**Within the framework**
The AkisNet project has located itself within the policy framework and emphasis of MOA. It also works within the organisational structure of MOA, Farmer Organisation Authorities, and LFAs. The MOA website has links to the AkisNet and PadiNet websites.

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3. Indonesia Field Study

3.1 Key Demographic and Poverty Data

Indonesia is the world’s largest archipelago with around 17,000 islands, of which 6,000 are inhabited. Its landmass is just over 1.9 million square kilometres. With a population of 209 million people, Indonesia is the world’s fourth most populous nation. Approximately 40 per cent of the population live in urban areas. The population growth rate has slowed considerably in recent years, from 1.8 per cent in the period 1975-1999 to the present projected rate of 1.1 per cent in the period 1999-2015. While the overall population density is a modest 110 persons per square kilometre, this figure disguises the fact that around 60 per cent of the population live on the islands of Java, Bali and Madura, which represent only seven per cent of the nation’s land mass.

Figure 2  Map of Indonesia

In terms of the UNDP Human Development Index (HDI), Indonesia ranked 102nd out of 162 nations in 1999. Since 1975, Indonesia’s HDI has risen 45 per cent, from 0.47 to the present 0.68. However, despite this improvement, 27 per cent of the population, or 56 million people, still live below the national poverty line.

Indonesia’s GDP per capita is USD 2,857 (PPP). By comparison, the GDP per capita recorded by most of the top 20 countries (by HDI rank) exceeds USD 20,000. The average annual growth of GDP over the last decade has been 4.7 per cent. Economic output is derived from agriculture (21 per cent), industry (35 per cent), and services (44 per cent). Indonesia faces severe economic problems, stemming from the impact of the 1997 Asian financial crisis, strained relations with the IMF, weaknesses in the banking system, corruption, secessionist movements and the low level of security in the regions. Investor confidence will remain low and few new jobs will be created under these circumstances. This uncertain investment climate has a direct impact on the implementation of ICT infrastructure and the development of Internet applications.

On average, an Indonesian person will live to age 66. About 13 per cent of the population will not live to age 40. Approximately six per cent of the population is under-nourished and 34 per cent of children are under-weight. A startling statistic that might have serious implications for the future health of the population is that cigarette consumption stands at nearly 1400 per adult per annum. Indonesia’s adult literacy rate stands at a reasonably healthy 86 per cent and the youth literacy rate is 98 per cent. In tertiary education, 28 per cent of students major in science, mathematics, and/or engineering.

The official language is Bahasa Indonesia. Other languages include local dialects (of which Javanese is the most widely spoken), and English. A high (Bahasa) literacy rate is a prerequisite for the development and use of ICT applications with specifically Indonesian content.

3.2 ICT Sector Review

Recent policy directions taken by the Indonesian government reflect its acceptance of the potential of ICTs for national development. For example, beginning in 1988, the government has moved to liberalise the telecommunications environment by allowing some limited involvement of private sector entities. However, the laws that have been enacted provide only a minimal framework, leaving too many gaps for interpretation. This has resulted in significant tensions and unresolved issues between the state telecommunications body (PT Telekom) and its private joint venture partners (KSOs). This tension, along with the impact of the 1997 financial crisis on the viability of KSOs, has severely hindered the expansion of basic telecommunications infrastructure.

In 2000, the government established the ‘Indonesia Telematics Coordination Team’ (TKTI). TKTI is a high-level inter-Ministerial coordinating team, headed by the Vice President and consisting of members from the public and private sector. Its role is to coordinate state, private and community sector partnership in policy development and capacity building with respect to ICT and mass media. In 2001, TKTI produced a five-year action plan for the development and implementation of ICTs in Indonesia. This plan addresses four primary areas: policy and legal framework (including telecommunications, IT, and e-commerce); human capacity building; infrastructure; and applications (especially e-government and e-commerce). Unfortunately, TKTI has no power to implement policy. For those policies that require legislative reform, TKTI must achieve consensus among the relevant government ministries if its proposals are to see the light of day. Regional autonomy means that each provincial government now has to give its approval. Beyond that, the TKTI can only hope that private sector and community organisations take up opportunities from their side.

There are currently about 170 licensed Internet Service Providers (ISPs) in Indonesia, of which no more than 70 are operational. There are no regulatory limitations on the allowable number of ISPs. The number of ‘id’ domains has grown from 87 in 1995 to more than 9000 at the end of 2000. The Indonesian Network Information Centre administers the registration of domain names.

The Directorate General of Post and Telecommunications (GDPT) has estimated that Indonesia currently has over 500,000 dial-up Internet subscribers and more than 7000 leased-line subscribers. They extrapolate these figures to suggest that there may be up to four million Internet users in the country (these figures are in the upper range of estimates. For example, a USAID study conducted in February 2001 reported 200,000 subscribers and one million users). GDPT also estimates that access to the Internet is via the following channels: Internet cafes (43 per cent); offices (41 per cent); residential (12 per cent); campuses (three per cent); and (private) schools (one per cent). Again, there is some variability in the data, with another survey suggesting that just over 60 per cent of users connect via Internet cafes. In either case, based on these figures, it would seem that Internet cafes - Warnets as they are known in Indonesia – are the main access points for public Internet users. In early 2001, there were around 2500 Warnets in Indonesia. Warnets are an evolution of the successful Wartel model, whereby private entrepreneurs established community call centres to deliver telephone services. While they currently predominate in urban areas, the establishment of Warnets in rural centres is key to the extension of Internet services to those areas. A license is not required to operate a Warnet.

30 http://www.idnic.net.id/
The Indonesian Internet Kiosk Association (AWARI) is working to bring more than physical infrastructure to the Internet access equation. AWARI is working with the Ministry of Education to establish Warnets in vocational schools and to develop on-line distance learning courses through the Open University. It is also working with small businesses to encourage retail trading by email.

Computer use is, on the whole, limited to larger urban centres on the major islands. Many of the remote islands have no Internet communications and the national server (wasantara.net) was recently withdrawn from several of the populated eastern islands. To make an Internet connection now requires dialling into Kupang, Bali or Mataram. It was reported that Mataram is operating above capacity and is almost impossible to access.

Telecommunications costs are high relative to income. The daily minimum wage is Rp 17,000 per day or less, especially in rural areas. A call to any location outside of a 30-kilometre radius from the initiating phone connection attracts inter-local fees, which are charged at internationally rates. The daily minimum wage, which varies between provinces, is barely enough to cover daily subsistence needs. So while a visitor may think that Rp 6000 per hour is a cheap rate to connect to the Internet at a local Warnet, it prohibits all but the better off from access. Connection fees and ISP fees are also relatively high. However, there is no doubt that ICT can act as a bridge between the rich and poor. The Urban Poor Consortium, for example, can seek international network support and publicity because it has access to the Internet and an organiser fluent in English.

While the IMF has insisted on the privatisation of telecommunications to reduce the domination of state-owned and monopoly capital, the feeling of those interviewed is that inherent inertia would delay any change in status for some years. The national electricity grid is failing to provide reliable power. Even in Jakarta, power outages are a regular occurrence and it was reported that, in the rural areas, power is not at all dependable, sometimes going down for several days at a time.

Indonesia is characterised by an oral culture and many of those interviewed indicated that people are therefore uncomfortable with computers. Multimedia software would perhaps be more appropriate but it is, in light of poor download times, too expensive.

The major social downside to technology is the rise in computer crime. According to interview respondents, Warnets are the centres of such activities. Hate politics, particularly conducted by radicalised groups with religious fronts, are also seen as socially dangerous as they present misleading evidence to easily influenced youth. ICT Watch indicated that pornography is a source of anxiety for parents, although it ranked low as an issue amongst feminists using the Perempuan mailing list.

While women are involved in ICT usage, they still comprise the minority of users and innovators. Most programmers are men and, although PAKTA teaches programming as part of their ICT Camp activities, they concede that for every woman student they have three to four men.

On the positive side, there is some innovation and exploration of alternative means occurring in Indonesia. For instance, it may be possible to by pass conventional Internet systems with radio-assisted or intermediate systems. Radios are seen as a good measure in conflict-affected areas to enable reporting of human rights violations, which the NGOs say are not reported due to geographic distance and lack of means. Radio communication has overcome the constraints of distance and geographical isolation when the need to broadcast reports of human rights have arisen.

Initiatives such as that facilitated by PAKTA in Sumba (see below) have been effective in facilitating the participation of local communities in governance. Other individual and group initiatives provide hope that a transition is underway but donors will have to exercise caution. The time taken to influence cultural change may be well beyond that of the average project cycle. Costs are so far prohibitive and donors will have to exercise prudence in estimating whether some of the high costs involved in satellite connections warrant the outcomes, particularly when other basic needs are of such urgency in Indonesia.
3.3 Case Studies

Ten projects were visited and analysed. A brief synopsis of each project follows.

WAHLI
WAHLI is a collection of civil society organisations gathered under the umbrella of environmental conservation and protection. The collection includes organisations from outer provinces and regions that utilise ICTs for communications domestically and internationally. They also utilise satellite technology to map environmental damage caused by fires and logging.

Perempuan Mailing List
PML was established to provide a forum for women and gender activists to come together to share knowledge and experiences in the fight for women’s rights in Indonesia.

BoNET
Bogor Net was established to meet the ICT needs of the Bogor region, which is just south of Jakarta. In an attempt to provide the opportunity of access to as many residents as possible, they are currently examining web-based radio.

The World Bank – Global Development Learning Network
As part of an international digital divide program, the World Bank is linking Indonesia to the Global Development Learning Program through selected universities.

INFID
A review of the International NGO Forum on Indonesian Development discusses the use of ICTs for Indonesian civil society organisations in network communication, campaigns and international lobbying efforts.

The Kampung Improvement Program:
The ITS are using community mapping for community organising, decision making and prioritising to assist urban poor communities to address their needs.

PAKTA
PAKTA is a unique NGO providing ICT training and support for other NGOs as part of their institutional strengthening and capacity building program area.

Urban Poor Consortium
UPC is a collection of civil society organisations working with the poor of Jakarta. In particular, they advocate on the behalf of pedicab (becak) drivers and slum dwellers. In addition to utilising the Internet for communications, UPC has turned to other technologies with the establishment of community radio stations and the publication of CD-ROMs.

Jaringan Informasi Sekolah (JIS) and Sekolah 2000
The JIS project was established by a small group of disillusioned city teachers and has now spread around the country, with branches connecting all major provinces and DIY regions. The network provides a number of services to teachers wanting to learn more about the application and promotion of ICT in their schools. The program has been so successful that the National Education Department are now requesting training for their staff also.

WARINTEK
WARINTEK and the Appropriate Technologies CD-ROM project are initiatives of the government research and technology agency. They are aimed at promoting regional capacities in the wake of regional autonomy legislation.
3.3.1 Wahana Lingkungan Hidup Indonesia – WALHI

Background
Indonesia faces serious environmental devastation. Its forests are diminishing at an astonishing rate, mining residue is threatening marine and human life and associated criminal activity adds to the particular challenges faced by the Indonesian environmental network. Haze from Indonesian forest fires has threatened the health of the peoples in nearby nations, resulting in some tension at regional meetings. Enforcement is weak and the pro-private sector policies of governments and export credit agencies have seen them lending money to firms whose practices are unsustainable.

WALHI
WALHI is an umbrella organisation representing some 456 NGOs in 26 provinces of Indonesia. It receives funding from a variety of sources, including AusAID. It has a long and involved history in the Indonesian environmental story, and its activists, such as Emmy Hafield, have achieved international recognition for campaigns and activities. WALHI is committed to preserving Indonesia’s natural environment and the well being of its population through concerted and informed community action. The Internet is a valuable part of that system but accessibility, costs, download times, security concerns and power failures limit its use.

WALHI have expressed a wish to communicate externally, particularly about specific campaigns, but language limitations, including an inability to write clear Bahasa Indonesia and the linguistic limitations of Bahasa itself, are a problem.

Organisational structure
WALHI is the peak body representing regional environmental groups. Its national secretariat is located in Jakarta and within that is the Communications and Education Section. The national secretariat is responsible for international and national alerts and campaigning, and relies on information from the regions. To gather this information they use Internet services where possible. They are also trying to establish an environmental database but this is yet to be digitised. The WALHI magazine is yet to go on-line and they are limited in their Web communications by the lack of English speakers able to translate materials with the clarity that international linkages require.

Of the 465 NGOs with which they work, only about 70 per cent regularly use computers in their daily operations. Those that are computerised send approximately 20 e-mail messages each day. The cost effectiveness of that usage rate would have to be compared to computer unit costs and connection fees, which can amount to Rp 450,000 – Rp 4 million per month, depending on whether it is a dial-up or cable modem.

WALHI are trying to develop a model of working in communities through ‘SIMPUL’ groups. These are farmers, workers, students and computer-literate locals, who can organise local movements to counter contentious issues such as inappropriate or illegal forest management. ICT is important because SIMPULs communicate by e-mail to the central office. The central office, in turn, ensures organisational strength by linking horizontally to other SIMPULs and vertically with regional and national NGOs for support and strategic advice.

The WALHI staff interviewed said that if their computers were stolen tomorrow, only the upper echelons of the group would be affected. As the community is generally not on-line, it is not yet dependent on information technology and thus there is no risk of program failure if the technology itself fails. This is an important thing to remember in project planning as the unreliability of electricity and phone connections in the rural areas and smaller provincial centres must be taken into account. WALHI have also taken advantage of the support given by the government to local radio.

http://www.walhi.or.id/
E Problems as seen by WALHI

WALHI would like to develop a local constituency, which would allow immediate input from villages close to major environmental hazard areas such as mining operations, forest clearing and toxic sites. However, they have discovered that the major impediments to village level activities are:

- High connectivity costs.
- Unreliable connections for both electricity and telephone. Also, power surges place hardware at risk.
- An oral culture that prefers radio and television as methods of communication and thus may be more favourably disposed towards these media forms.
- Technical language and Internet/e-mail jargon that may be incomprehensible to villagers.
- The people are pragmatic and their expressed needs are mostly concerned with local issues. That is, communities tend to organise around local needs which are shared locally through traditional patterns of communications and which may not be of interest to others.
- Regional autonomy has realised numerous local regulations that benefit the local elite and constitute disincentives to the rural poor to use computer technology.
- The sheer size of the population means that any computer-based solutions would be too expensive and may generate community envy amongst those not involved. There are other systems, in particular community radio, which are as effective and lend themselves to mass community participation.
- In parts of Indonesia, for example East Java, the media is privately owned so the news is controlled. Thus community radio is a better option for radical activism in the light of the lack of alternative media.
- In the rural areas there are not the resources to teach rural communities to use computers. Most of those who learn have to travel to urban centres and are provided for by groups such as PAKTA (see below).
- The system is infested with viruses so even if computer technology could be used at the village level, the amount of time spent cleaning systems would make it uneconomical.
- Donors do not tend to integrate their new programs with those that went before so there is low continuity or levels of integration. This is thought to be especially the case with ICT-based programs. It is left to the Indonesians to do the integration or software development. This situation is unproblematic so long as costs do not continue to rise. The problem with ICT use is that NGOs are saddled with burgeoning recurrent costs.

Sustainability

For the major NGOs, and their relationships with external partners, the system is about as sustainable as it needs to be. The Media and Communications team have varying types of expertise and visions about ICT use, so the organisation is not dependent on one person’s skills, and they are realistic about what they, and ICTs, can achieve.
3.3.2 Perempuan Mailing List

Nani Buntarian began using computers in 1984. She is self-taught and has a love of technology. In the Post-Soeharto days, Nani became involved with the feminist movement and offered to set up a mailing list to disseminate information about current feminist issues, activities and alerts. She first used Makelist and then Yahoo. Some of the most important issues to feature on the mailing list were activities, which went with the 1998 National Women’s Congress, the only national Indonesian women’s congress to be held since the first in 1928. While slow to take off, by the year 2000 women were clamouring to join her mailing list and the current membership is about 470 subscribers.

Nani quickly realised the potential of the Internet when it arrived in Indonesia in 1995. She was also one of the first to integrate SMS messaging with Internet and both learned from, and contributed to, Netaction, the on-line handbook for activists. She is now integrating video and voice into IMS at the centre where she works. The centre is dedicated to documenting and preserving cultural artefacts from Eastern Indonesian ethnic groups. Much of the art and practices are disappearing in the face of rapid modernisation and market forces.

The early Post-Soeharto feminist movement needed communications ‘architects’ to design a forum through which women could express their aspirations, ideas and activities with not too much regard for cultural constraints. The mailing list was the first such forum to offer this. However, as Nani herself admits, the mailing list appeals to the already converted. You have to be able to use computers before you can use e-mail and that is largely the domain of the middle class in Indonesia.

The goal of the mailing list is to provide a forum for women to raise issues and to publicise events or activities such as campaign alerts for rape or other forms of violence against women. It is not a discussion forum per se but a bulletin board of issues. Nani intends the mailing list to be completely self-policing and has found that to be an effective form of social control. Women will ignore troublemakers or those who are not fully communicative (eg a woman, who used the Javanese language, was ignored until she began to use Indonesian and/or English). Jokes and banal ‘forwards’ are not welcomed and while she instructs all newcomers in ‘netiquette’, the mailing list remains largely self-enforcing.

Nani is the founder and principle driver of the mailing list and she works on that alone. She pays the overheads of Rp 350,000 per month for cable access and Rp 385,000 for the ISP, as well as the hardware costs. She says that her major input is time. It is hard to keep the mailing list in working order, not least because the Internet in Indonesia is infested with viruses. She also serves the Asian Women’s Electronic Network as a trainer.

Individuals, as well as organisations, can join the mailing list. The list represents mainly young women activists from Java and some of the regional centres such as Kupang and Makassar. The languages used are mainly English and Indonesian. According to Nani, the advantage of the Internet is the ability to move around anonymously without the restrictions of social and cultural norms. That anonymity allows women to openly discuss sexuality and reproductive health. While pornography is discussed in sociological terms, it has not emerged amongst these women as an issue of concern.

Nani’s mailing list has become the major forum through which women communicate in Indonesia. During interviews with other informants, Nani’s mailing list was referred to as the font of gender-specific data in regards to computer technology and other gender and IT issues.

Sustainability
At present the system is dependent on Nani’s input and she needs to address the need for an assistant. The mailing list is currently also her financial responsibility, which could become burdensome.
3.3.3 BoNet and the future of radio

Michael Sunggiardi began using computers in 1981 while still an undergraduate student of electrical engineering. He established the first computer-based desktop publishing agency in Indonesia and subsequently a graphic design agency. When he first heard about the Internet in 1991, he connected to the US at a cost of Rp 3 million (USD 2000 at that time) and set up a networked system of computers. In 1994, the first ISP was established in Indonesia and Michael established his computer service shortly afterwards. BoNet (Bogor Net) is a combination of Warnet and a children’s computer-based learning centre (Michael has the Bogor franchise for the US-based Future Kids learning centres).

After a life-long interest in radio, he now looks to radio to solve some of the endemic infrastructure and cost problems in Indonesian IT.

Michael set out to investigate the ICT infrastructure problem after the Indonesian economic crisis sent ICT usage soaring. Businesses used ICTs to attempt to cut costs and he saw a future in their sustained use. He expanded his service to include the children’s computer learning centre but sees that application as only being useful to the middle class who are able and willing to pay. He added further services to his Internet service centre, including: seminars, desk top publishing, and, more recently, ‘ICT Road shows’ which help promulgate ICT use and add impetus to its further development. His audiences are getting larger - up to 260 lately - and they are showing real interest in the new technologies and particularly in learning Linux. He works closely with Mr. Onto Para, a retired lecturer from the Institute of Agricultural Technology in Bandung who is now a writer and lecturer in ICT applications and one of Indonesia’s major ICT advocates.

Michael’s mission has had two components: first, a need to satisfy a personal curiosity and long standing interest in electronics and radio, and second, the commercial need to develop a business that both makes money and also provides public services. His goal is to establish radio-based Internet services as a viable alternative to telephone-linked services, to by-pass problems created by poor infrastructure and maintenance. His abiding interest in the value of communications has led him to develop neighbourhood cable networks. The 100 meters of cable allowed for one service is often enough to wire up 10 houses, which then spreads the Rp 4 million cost of subscription to a point that is more affordable for lower middle class people.

Although Indonesia has cable connections, there is little likelihood that the cable connections will be nationally integrated in the major industrial cities for another 10 years and until now the cost has been prohibitive to people other than wealthy individuals or groups. Radio technology is rapidly changing so any investment in the technology needs to made with an eye to future (cheaper) developments.

The existing satellites whose footprints cover Indonesia are expensive to use. A service costing USD 200 in America costs over USD 100,000 in Indonesia.

Issues and Future Development

According to Michael, the Warnets are a major innovation and, while they are still largely the province of middle class youth for chatting and downloading ‘dubious’ materials, he feels they provide a bridge to general use. Students often move on to browsing the web and using the sources for study, particularly if they have enough English. Warnets have helpers who can guide users through the process, which accelerates learning.

Michael and Onno have discussed the purchase of second hand computers to place in the village meeting places, which are usually centrally located. However the cost is too high for him to bear on his current income. Second-hand computers are easy to come by in Indonesia, comprising over 40 per cent of the national import number of 700,000 per year. It is the day-to-day telecommunications costs which he says are prohibitive and it is these costs that his radio experiments are designed to overcome.
3.3.4 World Bank: Global Development Learning Network

Background
The education sector has been under sustained pressure from the ongoing economic downturn. Children drop out of school to go to work so that maintaining the current number of students is a major challenge. The sector is so needy that the World Bank representative emphasised that he and the Minister were in accord in believing that ICT use would only divert essential resources from more urgent and basic needs.

Universities are also suffering the effects of 30 plus years of New Order education. Standards have slipped and professional/educational ethics have suffered as is evidenced by widespread plagiarism. For Indonesia to progress, it is important that a cohort of scholars be exposed to wider learning experiences, research opportunities and critiques of work.

Global Development Learning Network (GDLN)33
The World Bank supports a global videoconferencing network facility to allow selected universities upgrade their skills and have access to international standards of teaching. However its major objective is to allow policy makers and national leaders to meet, discuss and learn. Mexico, for example, uses this medium to conduct monthly meetings of around 1,000 mayors in over 100 learning centres, to discuss policy, technical issues related to governance such as urban and city management, and local initiatives.

The initiative represents a partnership of public private and NGOs that make up the only interactive multi-channel distance learning network with a development mandate. (Source: WB Fact Sheet, which has the history and details of the global project)

The Indonesian economic crisis reduced the amount of money available for all government services, including education. Universities in Indonesia have had trouble keeping up with international standards and need to prepare scholars for post-graduate overseas studies by promoting international-level discourse. They have few world class institutions, and those that rate are falling behind in standards. The GDLNs are meant to stimulate and enable standards to be regained through interaction with global institutions, to harness and exchange learning between peers.

In addition, policy makers and NGO leaders have little experience of learning from their counterparts in developed or other comparable developing countries. The GDLN grew out of a successful pilot that had been underway since 1997. This pilot linked 80 countries with the Bank and its partners to provide an interactive learning environment for the major stakeholders in the Bank’s in-country programs.

The World Bank experimented with an ICT program in Yogyakarta by handing over a few computers and Internet connections to several schools. ‘Other than checking to see if the electricity and phone bills have been paid and are still connected, the bank has taken a hands-off approach’. In September this year, the program will have been in place for one year and a detailed evaluation will occur. Because there are so few materials available in Indonesian, it is felt that even the use of computers is not enough to sustain an educational program. However, they will await detailed evaluation before making any plans to expand or dissolve the existing program.

The World Bank official commented that most donors run on cable and have up-to-date facilities. They forget that village or urban systems in the South are usually less than adequate and expensive to run. He strongly recommended against ICT-based education systems in Indonesia for anyone but the already wealthy.

Despite sending Indonesian change agents, policy makers and leaders overseas to expose them to alternative methods of problem solving, learning is quickly extinguished in the absence of a

33 http://www.gdln.org/
sustained and challenging intellectual environment. In addition, most problems demand immediate solutions and the GDLN is responsive to that need.

**Sustainability**
The Global Learning Centres are not amenable to large-scale leakage of funds so their adoption is dependent on a desire for the product and not for inadvertent gain. They will be sustainable if the product is useful, accessibility is timely, and recurrent costs do not drown the facilities. Most of the locations have been chosen for their readily available local wealth and motivated local leadership, so time will tell if the Centres prove their worth through sustained use and upkeep. Experience has indicated that courses run by internationally recognised people or on attractive subjects are well subscribed to. Some learning blocks will be free, students only paying connection fees, while others are charged in US dollars. The costs can be defrayed amongst a sizeable group but the Rupiah is still volatile despite its current rise (being mainly due to the drop in value of the US dollar), leading the Bank staff to declare that they really have no idea how successful it will be.

The biggest issue is language. Most of the client group has an inadequate grasp of technical English and Bahasa Indonesia has severe limitations in application to science and technology.
3.3.5 *International NGO Forum on Indonesian Development (INFID)*

**Background**

INFID, which was formed in June 1985 as a pluralistic open network of NGOs from Indonesia, in addition to NGOs representing the various member countries that make up the government sponsored Consultative Group on Indonesia, which is chaired by the World Bank.

INFID maintains two secretariats. The main one in Jakarta enacts the terms of INFID’s mandates and organises INFID’s international conferences and meetings. INFID also maintains a liaison office in Japan, which relates to the Japanese NGO Network on Indonesia.

More than 100 NGOs participate in INFID activities, contributing their experience and direction. Of those, about half are from Indonesia and the rest are from the constituent nations of the CGI. INFID’s agenda is to represent the views and priorities of the people as articulated through their representatives. INFID has a human rights focus that applies to all sectors of its activities: social, economic, cultural and political rights. They consider this to be central to any notion of participatory development.

The central mission of INFID is:

- To ensure that the formulation and implementation of policy on the disbursement of development assistance, investment and trade are in the best interests of the poor and disadvantaged, and are based on the principles of peace and justice; and
- To create conditions that allow for the strengthening of democratic life through the broadening of the people’s participation in, access to and control of, development in Indonesia.

INFID’s priority areas are land use management, labour, civil rights and governance, debt reduction and project monitoring.

**UseNet**

INFID, being linked to domestic and international networks, is absolutely dependent on Internet services. Ms Dete is part of the Asian Women’s Electronic network and is responsible for most of INFID’s electronic services. After trying a number of systems, Dete established the Usenet system in 1995. Usenet links some of Indonesia’s peak NGOs directly to the US and thus escapes some of the security and monopoly issues that are such problems in Indonesia. While Usenet is expensive - approximately USD1000 per month - it is used extensively for international lobbying and coordination.

At the time of INFID’s establishment, modems, computers and their accessories were too expensive for Indonesian NGOs. INFID, which had adequate external funding, could link internationally before most other NGOs. NGOs all need speed, secure connections and reliability. Mainstream systems offer none of these. Just prior to the end of Soeharto’s term in office, virtually all ISPs were electronically closed down or censored by the Indonesian security apparatus. However, as UseNet kept working as an independent system, some NGOs were able to continue communicating with the outside world about the events of the day, even when their phone links were cut by the state authorities.

INFID set up what are known as local houses in all the major trouble spots, including Medan, Sulawesi, Maluku, Kalimantan, Central Java, and West Papua. Each house links with Internet or radio connections to more distant NGOs who channel news and incidents back to the house. This news is, in turn, relayed to Jakarta. This design has cost and security advantages as the regional NGOs do not have to pay dial-up costs at inter-local rates. In some areas the regional NGOs use Warnets in preference to paying the cost of having their own systems.
Dete has proposed that women migrant workers have an urgent need for Internet training skills before they leave Indonesian shores to avoid legal and social isolation. She suggested that when violations occur, the women could be in rapid contact with advocacy-based NGOs. An additional benefit would be access to scanned copies of their documents, often taken from them as part of coercive practice. She also considers the extension of single band radio networks in conflictual areas to be vital for the reporting of human rights violations. These are easy to hide, more transportable than computers and cheaper to replace. Messages given by radio to a regional local house can be sent to an alert centre and broadcast internationally. Similar systems could be used in Kalimantan and Sumatra to monitor illegal logging. The Bandung Institute for Technology, with assistance from INFID, is running courses on radio security and broadcasting for activists.

**Sustainability**

INFID’s system is only sustainable for as long as they continue to be well funded. There is an increasing tendency for donors not to fund what are regarded as ‘gate-keeping’ organisations, such as WALHI and INFID, so they may have to develop alternative systems to direct connections. Radio technology may offer useful alternatives at a reduced cost in the longer term.
3.3.6 Kampung Improvement Program: Kampung Banyu Urip

Background
Kampung Banyu Urip is a low-income, densely inhabited settlement with a population in excess of 40,500 people, which is situated Southwest of Surabaya. It is intermingled with Surabaya’s major red light area (nicknamed ‘Dolly’), which, according to the US Centre for Disease Control, is the largest of its kind in SE Asia.

For the last 20 years, Surabaya Institute of Technology (ITS) has been involved in kampung-based community development, assisting the community to organise themselves to improve living conditions and circumstances. Professor Silas, who is Indonesia’s leading exponent on low cost housing for the poor, has led the program. He and his students have taken on the long-term systematic planning exercise in opposition to the largely unsuccessful rapid urban development and social safety net programs typical of donor driven assistance.

The project has yielded amazing results in improved living conditions, improved livelihoods and health. The community itself has initiated all these, with only a few injections of financial capital. Maximum yearly inputs from the local government administered through ITS for infrastructure and other capital works is Rp 25 million (USD 13,000).

With the guidance of ITS staff, the Kampung established a well functioning committee, which called itself the Kampung Development Board. Within the board is the Kampung cooperative, which controls and disburses the board’s finances. The cooperative is headed by a lawyer or notary who is well versed in local regulations, and is known to all the community. ITS staff work with this group, and they in turn negotiate and discuss the means by which the community can realise its needs and priorities.

E Initiatives
The ITS staff use ICTs mainly for community mapping, digitising locally made maps, so that they can discuss changes to the physical parameters of the Kampung drains, bridges, footpaths, location and construction of village meeting places and home industries. The maps are a means of garnering public opinion and agreement on community needs, boundaries and rectification strategies. For example, after floodwaters rose to chest height in the Kampung earlier this year, flood mitigation assumed a higher position on the list of community needs. Consequently, computer based maps were redrawn to simulate the floods. It then became clear where roads had to be raised, and mitigation dykes constructed to reduce the effects of future floods.

On visiting the site it was clear that the work had the support of all the community who had contributed time, cash and kind for the construction of raised walkways, access roads, and higher drainage containment walls.

Data from the mapping is transferred to Excel files so that Kampung-wide needs and priorities can be shown graphically, with progress compared over time. The people have been keen to learn how to interpret this graphic data as it is of direct consequence to their lives and represents their expressed needs and efforts. However, the community does not regard the use of ICTs as a priority. One or two residents have computers for personal use but while Professor Silas thinks that ICTs could have many applications in this particular settlement, he is happy to accord with the community’s expressed values.

He sees computers being valuable for assisting local traders locate markets for their goods. Multifarious goods are made in the community from locally available waste (paper masks) and wood (elaborate bird cages).
The community has located sufficient exterior markets to satisfy current production levels, but Professor Silas thinks that if they want to expand further, the Internet might offer some opportunities. He also thinks that they could learn commercial English: that is language sufficient to conduct business.

He also thinks that his Kampung Architects Group of young Kampung dwellers who are interested in housing design and improvement, could, with assistance from his own graduates and students, use computer systems for dwelling design and testing at a later stage.

**Sustainability**

The notion of working to a community’s pace and priorities is one that is intrinsic to sustainability. While the use of ICTs is as yet at a low level, the impression is that if they were to be accepted by the community as a vital part of community well being then the community would themselves ensure the lasting use and effectiveness of ICTs.
3.3.7 PAKTA

**Background**
The independent foundation PAKTA was founded in 1996 in response to a burgeoning need for support and capacity building amongst NGOs working for civil society and related issues in Indonesia. Since then they have assisted NGOs in developing and maintaining skills in using ICTs for civil society issues. AusAID has been amongst the funding agencies assisting PAKTA to achieve its goals, particularly in eastern Indonesia.

PAKTA has a wide subject base, assisting with programs to advise on HIV/AIDS, community development, urban support, conflict resolution, clean governance and gender issues. PAKTA’s mission is:

- To work with local partner organisations to develop capacities and abilities necessary to achieve a civil society in Indonesia.
- To develop and strengthen liaisons with international and local partners, for mutual benefit.
- To carry out research, in particular social research, to underpin development strategies
- To strengthen advocacy abilities and deepen networks between Indonesian NGOs.

PAKTA has a central office based in Jakarta where it hosts the IT camps for which it has become so well known. It has also established cabangs (branch offices) in various areas. Syaril for instance, is responsible for the program on Sumba Island. This office is self-sustaining, bringing in enough money to support itself through its management training and associated activities. The management seems quite democratic: Rama and Syaril joking that they are all ‘directors’. Certainly the office atmosphere was charged with energy and enjoyment.

PAKTA’s staff of 10 is well skilled in development, management and ICT use. Most have a background in project management.

They provide two major activity streams:
1. Management training including organisational self-assessment methodology, finance education, accounting, principles of sustainable development and income generation and funds mobilisation.
2. Training in issues related to Corporate Social Responsibility for private companies, including community assessment, social funds management, program management monitoring and evaluation. PAKTA also provides liaison between communities and private organisations wishing to make contributions to community well being. Coca-Cola is one of their major clients.

Threaded through both these streams are activities aimed at building competence and capacity in ICT usage.

**E Initiatives**
PAKTA recognises that the 5000-odd Indonesian NGOs are to varying degrees, already skilled at organisation and data collection. They are not so good at handling or analysing that data, or being able to use it to develop action strategies or priorities. So PAKTA aims to assist NGOs in learning to use filing and MISs to optimise data analysis and use. PAKTA also realises that competency in ICTs is one of the bases for effective organising, advocacy and international networking.

The USAID funded Civil Society and Support Project gave them money to assess NGO IT capacity and to develop an operational plan. To conduct that survey PAKTA went to Sumatra, Aceh, East Java, North Sulawesi, West Papua, Kalimantan and West Java. Many of these areas have deep-seated conflicts, some politically based, others centred on land reform or religion. NGOs in these areas are often isolated and themselves under a lot of pressure.

35 [http://www.pakta.or.id/](http://www.pakta.or.id/)
From their findings, PAKTA developed the concept of an IT camp, where NGO representatives are brought to Jakarta for three months to learn three major facets of computer use, including:

1. Programming
2. Management Information Systems and Data management systems
3. Computer Networking

These courses are funded by PAKTA, with participants only paying Rp 2.5 million for food and accommodation for the period. Privately funded participants have to pay more. Students take home free software for data base and program management. Some of this software is derived from pirated software. PAKTA agrees that commercial software is too expensive and they have to be pragmatic about piracy. In this way PAKTA has been systematically assisting both large and small NGOs to develop high-level computer competency and independence. In addition PAKTA has developed training courses in:

- Institutional Information and Communications technology assessment (NGO self assessment methodology);
- Regional ICT assessment methodologies;
- ICT training specific to the needs of Civil Society movements;
- ICT training to interact with parallel technologies: radio, satellite, LAN/WAN, database programming and website construction and applications;
- The development of free web spaces and Internet addresses for NGOs;
- Communications infrastructure management in remote locations; and
- Digital office management, library and financial management systems.

Their program in Sumba has centred on the establishment of a weekly community newspaper. Twenty per cent of the copy is downloaded from national daily newspapers, via connection to Kupang, and the rest comes from local sources. The newspaper has been effective in exposing corruption and collusion amongst local administrators and consequently has resulted in high levels of community interest in political processes.

PAKTA, in collaboration with a consortium of NGOs, is currently developing an on-line capacity building program available in a downloadable set of modules. This program will be interactive so member NGOs can modify, add or restructure the course to suit their specific training needs. A synopsis of their current ICT activities is as follows:

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing Internet and website training for HIV/AIDS NGO</td>
<td>• Strengthening HIV/AIDS NGO networks through Internet</td>
</tr>
<tr>
<td>Funded by: UNAIDS-APICT 1997-1999</td>
<td>• Increase capability of HR development as it relates to communications and ICT use</td>
</tr>
<tr>
<td>Developing and maintaining Indonesian NGO website</td>
<td>• Provide free web-hosting and e-mail</td>
</tr>
<tr>
<td><a href="http://www.ngo.or.id">http://www.ngo.or.id</a></td>
<td>• Strengthen NGO networking by sharing information and data</td>
</tr>
<tr>
<td>Funded by: Cabot Foundation</td>
<td></td>
</tr>
<tr>
<td>Develop and provide training in MIS for PKBI youth centres in 6 Provinces</td>
<td>• Increase the skills and abilities to manage internal communications systems</td>
</tr>
<tr>
<td>Funded by: IPPA/UNFPA</td>
<td>• Increase the understanding of ICT potential</td>
</tr>
<tr>
<td></td>
<td>• Develop project management and information systems for internal management purposes</td>
</tr>
<tr>
<td>MIS Workshop with WALHI Aceh and partners</td>
<td>• Develop understanding of ICT and its potential amongst WALHI staff</td>
</tr>
<tr>
<td>Funded by: WALHI Aceh</td>
<td>• Enable WALHI and partners to carry out organisational self assessment to better understand their ICT needs</td>
</tr>
</tbody>
</table>
Develop LAN and Operational training for PKBI Central office.
Funded by: PKBI-IPPA
- Increase operational skills and knowledge
- Develop ICTs as useful tools with which to support organisational goals.
- Develop communications and project management between central and branch offices.

Conducting NGO ICT assessment
Funded by: CSSP-USAID
- To assess the capacity and hardware needs of Indonesian NGOs.
- Assess the capacity and skills available to each organisation
- Assess the capacity to use internal data management
- Evaluate the need for technical assistance
- Evaluate the degree of ICT sustainability amongst Indonesian NGOs and what needs to be done to achieve that.

Develop modules on ICT based project management for CSSP-USAID partners
Funded by: CSSP-USAID
- Assist the organisations involved to conduct their own project monitoring

Workshop for NGO CSSP/USAID partners
Funded by: CSSP-USAID
- To build a common perception of ICTs and their usage amongst partner organisations
- To develop a broad-based ICT based strategy amongst involved NGOs.

Develop LAN/MIS and digital library for PDS/HB jassin
Funded by: CCFI Foundation.
- Develop digital assistance for library services
- Increase the knowledge and skills of librarians about the use of ICTs.
- Using ICTs as integral to community support activities.

Despite their highly developed program, PAKTA believes that ICT is not a development issue at this stage of Indonesia’s progress towards becoming a democratically functioning nation. They predict that perhaps 10 years into the future it may become so but systematic poverty and inadequate levels of basic needs still prevail. The cost of ICTs, in hardware and recurrent cost terms, make ICTs unsustainable in the broader context.

Sustainability
PAKTA places high value on sustainability and model it themselves by marketing services to support their own activities. Their emphasis on sustainability is an overarching part of their activities. To that end they understand that to take ICT use any further down the social class scale into the community itself is to make ICT use unsustainable and with them, the activities and programs they are meant to support.
3.3.8 Urban Poor Consortium

Background
The complexity of urban poverty compelled an alliance of like-minded organisations and individuals to found The Urban Poor Consortium (UPC). UPC is an NGO that works with marginal groups in a participatory approach.

UPC believes that the marginal urban groups suffer from ‘poverties’, not poverty. In Indonesia, urban poverties are best illustrated by the condition of the marginal groups living in poor communities in Jakarta:
- poverty of subsistence due to insufficient income, food, shelter, and other basic needs;
- poverty of protection due to violence and inadequate health systems;
- poverty of affection due to oppression and exploitative relations with the natural environment;
- poverty of understanding due to poor quality of education and participation due to marginalisation and discrimination; and
- poverty of identity due to the imposition of alien values upon local and regional cultures, and forced migration.

UPC’s mission is to work with marginalised groups to develop strong community organisations and networks. UPC bases its work on the development of critical awareness of people through dissemination of information using multimedia. This information relates to improvement of the community’s economic, education, health, and settlement conditions.

Communication infrastructure
UPC’s Becak (pedicab) Campaign has been successfully developed over the last two years through utilisation of Internet and e-mail facilities. The Becak campaign now includes over 500 international supporters. The e-mail and Internet have proved invaluable in raising awareness and disseminating information to and from the ‘outside’ world.

The mailing list and discussion forums have resulted in a national network that is mobilised during times of local crisis and can be linked to international supporters. These facilities provide relevant timing and access, particularly to national media.

UPC uses the Internet to gather information and to mobilise human resources, including volunteers and experts. For example, UPC identified expertise in garbage recycling, including materials and expert assistance.

UPC Website
UPC felt that they were perceived by in a negative light by urban constituents, primarily because of their high profile in the mass media. For example, they have been referred to as ‘demo-crazy’. In response to this, UPC has developed their website to present a more diverse perspective of the organisation. The website illustrates to the community that UPC is more than just what they hear in the mass media. As a tool for public relations for the consortium the website highlights issues faced by the cities residents.

The website also provides a central access point for the wider public - local, national and international - to contact UPC to volunteer their skills and knowledge.

Due to the sensitivity of UPC’s work, the website also provides a ‘front door’ for an organisation that does not want to reveal their physical location for fear of retribution from local thugs and authorities.

36 [http://www.urbanpoor.or.id/](http://www.urbanpoor.or.id/)
ICT capacity building

Indonesian culture is a culture of oral traditions. For centuries wayang puppet and operas have gathered the community in public spaces and mobilised the community for social change, this was particularly evident during the independence struggle. In more contemporary times, radio and TV have dominated the community’s conscience.

Previously, UPC and other NGOs have relied upon campaigning through posters, pamphlets and leaflets. However, UPC now recognises the power of appropriate technology and media and have begun establishing community radio stations. Social change advocates are now expanding their outreach beyond readers to listeners.

With funding from George Soros’ Open Society, the UPC, in collaboration with local communities, have recently launched three radio stations - one for workers and two for the urban slum communities. Another had also been planned specifically for becak drivers but this was not feasible, as the men needed to earn a living. The stations have a broadcast range of approximately 10-kilometres. Community members voluntarily attend training with a local development radio station, which has been established by a consortium of media professionals.

While the stations have been established without government approval, the communities are not concerned. They feel that they are already ignored by authorities who don’t really care what they do, provided it is non-violent. The communities are somewhat proud of their underground radio, feeling that they are ‘showing the government’.

The community centres are used as the station bases, and are usually managed by young people and the unemployed of the community. Men tend to dominate the Saturday all-night broadcasts, while the young people dominate the afternoon sessions. The involvement of local women in the project is yet to be demonstrated. Those that are involved are already active in the community as facilitators and microfinance outreach workers. The active women blame the husbands of the community for not letting their wives participate. However, community members added that they hoped to address this issue through more active recruitment of kampung women.

To address human resource needs, UPC has scheduled train the trainer courses and subsequent peer training in radio hosting.

Programs developed include religion, health, political (land rights and updates on the community’s on-going court battles), education and entertainment. It is hoped that these will provide a foundation within the community for future programs to address substance abuse and domestic violence.

CD-ROM and VCD

Since ICT access is financially unviable for the many Indonesians, particularly since the ‘Krismon’ and ‘reformasi’, CD-ROMs are being utilised to disseminate information and advocate on issues such as state violence and the politics of inner-city floods. The CDs have been produced with funds from the radio programs and are sold with the condition that they must be copied and disseminated by the purchaser.

UPC is also considering further development of their multimedia expertise, for example, through the production of developmental soap opera’s (Pakistani Style) that address issues such as unemployment, AIDS and children’s rights. These could be produced and disseminated on Video Compact Disks (VCDs), which are another popular form of media in Indonesia and flow from the country’s obsession with TV. This provides a cheap and more socially acceptable alternative to TV advertising and campaigning on chat shows.
Observations and lessons learned

Appropriate media
UPC and their participating partner communities have recognised the power of oral-based communication technologies and their appropriateness for Indonesian communities and culture. Furthermore, UPC has attempted to address the four C’s of appropriateness - cost, content, capacity and culture.

Safety and security issues
State, ethnic and domestic violence are challenges faced by the majority of partner communities. In Indonesia, community organisations and their partner communities are addressing this physical issue by utilising ICTs that provide them with a ‘safe space’ in the public arena. The virtuality of ICTs provide protection for communities in an often unsafe environment.

Young people
The Urban Poor Consortium have strategically involved young people in this program in an attempt to foster and nurture community capacity. They have chosen to invest in the next generation of community leaders, as part of a general feeling in post-reformasi Indonesia that only the next generation can provide any relief from the ingrained and embedded culture of corruption and violence in the current generation.

Space, Base and Place
The website has provided the diverse members of the UPC to come together as a stronger body in the protection of the virtual world. It has provided this group of unheard voices space to gather in safety, to build their relationships and networks and provide a base for them to launch their initiatives and more importantly has provided them a world to which they can belong, to which they feel they can belong – the global civil society.
3.3.9 Jaringan Informasi Sekolah (School Information Network)

Background
In 1999, a group of teachers from both private and public schools who could see the potential for ICTs came together to establish the Sekolah 2000 project. The aim of the project was to link 2000 Indonesian schools to the web. Initially, the plan was to involve secondary schools but, due to increasing popularity, it now includes technical schools, primary schools and kindergartens. The ISPs association – APJII – has provided technical assistance.

The project was initially linked to the national department of education through local government agencies working with technical schools. However, the project has since evolved to become a NGO, the head of which is the secretary-general of APJII.

The premises of the Sekolah 2000 project are that:
- Education is the right of all children;
- The national economy cannot guarantee every child’s education; and
- Aside from providing access to the world, information technology can reduce the knowledge gap between students in the larger cities and those in regional areas.

The Sekolah 2000 Foundation was founded in October 2001. Some of its major aims include:
- To promote the creation of a children’s Internet community in Indonesia;
- To gather and distribute funds and computers to the education community; and
- To provide insight into Internet technology for all levels of education.

The Jaringan Informasi Sekolah (JIS) is an offshoot of Sekolah 2000. JIS is a web of network hubs with branches in all provinces and major cities throughout Indonesia and currently accommodates over 2000 schools. The Jakarta branch alone supports 200 educational institutions.

Communications infrastructure
Teachers who become representatives for their school use free services, such as hotmail, to communicate through discussions groups, forums and chat-rooms. The education department is yet to establish a departmental Intranet and consequently, JIS serves as a communication channel not just for ICT issues but also for the compilation and filing of student records.

Website
Hewlett-Packard supports the Sekolah 2000 and JIS websites. The websites provide facilities for teachers to engage in forum discussions, to download shareware, and to use e-mail services. The site also provides a central point of interaction for educationalists in Indonesia and thus breaks down geographical barriers faced by teachers in regional areas.

The site also provides a space for a virtual office for the JIS, which, based on its structure of networks, has no physical location. This also supports the equitable structure of the network in that no branch or regional office dominates the others.

Interestingly, the organisers avoid media exposure of the program, afraid that exposure will lead to politicisation, manipulation and exploitation. They are also hesitant in approaching donor organisations for funding assistance, fearing that the availability of funds will destroy the ‘volunteer ethic’ of the network and may even lead to corruption.

37 [http://www.sekolah2000.or.id/]
38 [http://www.jis.or.id/]
ICT capacity building

The network has been developed between state and private schools, and between schools and the education department. To maintain and expand the network, training is provided at regional and branch levels by peers from other regions. This keeps costs down but also continues to build human capacity within the education system.

Furthermore, an indication of the success of the project is its recognition by the National Education department and the subsequent move to provide training for departmental staff. The JIS organising committee provides free training to departmental staff at a nearby school. Training is provided in the basics of Internet communications such as e-mail and Indonesian search engines. Upon completion of this basic training, the focus moves to the department’s student database system that teachers can access via the web.

The primary goal of the project is to promote proliferation of ICTs in school environments, so that students can gain ICT skills. The process begins with key teachers being identified, who then approach their school Principal to request permission for such a facility. This is often a major hurdle as many Principals are unfamiliar with ICTs. Furthermore, Principals are wary of spending the school’s budget on IT equipment, and they are hesitant due to the web’s notorious reputation in Indonesia. To overcome the funding issue, some participating schools have established their own Internet cafes, charging students and community members approximately Rp 2000 per 40 minutes (average class time) to access the café.

Once the labs have been approved and established, students are assessed on their current skill level. This forms the basis of the curriculum of the class. Skill levels are dependent on economic background / class. Students are also taught the basics of computer maintenance and management. Most of the software utilised in the laboratories is shareware and Linux applications, which are available in Bahasa Indonesian. Once students have gained the basic skills they then move onto the more technical applications, designing and building their own website.

Evaluation of the program is based on the curriculum of the class and assessment of students.

Observations and lessons learned

Commitment and motivation of volunteers

JIS is dependent on the services of its volunteers and survives on the social capital developed through its network structures and solidarity against the common enemy - the lack of resources. Without the unpaid commitment of the teachers this project would never have been realised. Sourcing, recruiting, managing and maintaining these resources is vital to the sustainability of the organisation. Maintaining trust between volunteers and the program is also essential in sustaining volunteer motivation and availability.

Shared resources

In the typical fashion of those without resources, the network actively pursues a philosophy of pooling physical and intellectual resources. This pooling of resources further contributes to the development of the program’s social capital and in turn promotes trust in the program. This trust, as mentioned above, fuels volunteer commitment and subsequently increases the capacity of the program.
3.3.10 WARINTEK

Background
In Indonesia, community perceptions of the Internet are generally negative. Many people think of the web as a source of pornography and inappropriate material to which they do not want to be exposed. Furthermore, there seems to be a general feeling that the Internet is complicated and only for the elite urbanites.

The National Department of Research and Technology (RISTEK) was established to assist the President of Indonesia in matters relating to research, science and technology. Its aim is to establish a prosperous Indonesian Society based on an ability to utilise and develop human science and technology. The national science and technology development strategic policy has to make the best use of science and technological potentials.

The WARINTEK project
The WARINTEK project is an activity of RISTEK. WARINTEK is an acronym for Warung Informasi Technology. A ‘warung’ is a roadside stall where community members gather and socialise. A WARINTEK, in this context, refers to an Internet café where it is hoped that people will gather to utilise ICT services. The goal of the program is to build regional capacity in ICT, education and research. The focus of the project is regional capacity building. WARINTEKs have been established in regional areas such as Irian Jaya, North Sumatra, West Nusatenggara, West Kalimantan, West Sumatra, South Sumatra, Lampung, West Java, Central Java, Yogyakarta, East Java and Central Sulawesi.

The project was initiated in February 2001. There are currently 90 WARINTEKs with about 1000 PCs. Over 2000 applications to join the project have been lodged, an indication of enthusiasm for Internet access and the breaking-down of previously negative attitudes.

Partnerships
The WARINTEK project involves three partners:
- RISTEK: Promotes awareness of the technology.
- MYOHDOTCOM: ISP and development of business model.
- Hewlett-Packard: Provision of hardware and equipment.

Costs and sustainability
WARINTEK is essentially a franchise system, where local persons or groups purchase computer hardware, broadband Internet access and WARINTEK expertise to establish and support an ICT skill centre. A choice of hardware packages is offered (through Hewlett-Packard) at competitive rates:

<table>
<thead>
<tr>
<th>Hardware Package</th>
<th>Price Rp</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 PCs, a server and a workstation</td>
<td>32 million</td>
</tr>
<tr>
<td>10 PCs, a server and a workstation</td>
<td>58 million</td>
</tr>
<tr>
<td>15 PCs, a server and a workstation</td>
<td>83 million</td>
</tr>
<tr>
<td>20 PCs, a server and a workstation</td>
<td>104 million</td>
</tr>
</tbody>
</table>

The franchisee provides office space, furniture, equipment and running costs. The franchisee also pays a monthly fee of Rp 2.8 million for broadband Internet access. Income is generated by charging hourly rates for Internet access and by providing training courses. For example, a WARINTEK centre that has 10 computers, 40 per cent average usage, open for 12 hours per day, and charging Rp 3000 per hour equates to Rp 4.3 million per month. This is enough to cover expenses and generate some profit. Franchisees might be private business people, educational

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39 http://www.ristek.go.id/
40 http://www.warintek.net/
institutions, local government authorities, etc. So far the project has successfully promoted the development of SMEs and Cooperatives.

**CD-ROM database project**

Another major activity undertaken by RISTEK is the development of their ‘Appropriate Technology Database’, which is produced on CD-ROM. Free copies of the CD are distributed to communities via the WARINTEK network and through education, government and community groups.

The initial CD included a wide range of information on agricultural, livestock and fisheries issues. Ten thousand of the CDs have been produced for dissemination on a ‘not for sale’ basis. Subsequent issues of the CD will address topics such as health, education, etc. The project is a joint initiative of RISTEK, the Indonesian Institute of Knowledge and Science (LIPI) and several private sponsors.

RISTEK and LIPI, in conjunction with local WARINTEK operators, undertake community information needs analysis. This analysis is used to develop local information content for inclusion on the CD-ROM. This process of consultation and has also assisted in the identification and documentation of local indigenous knowledge.

**Observations and lessons learnt**

**Building demand**

RISTEK, aware of the general public’s negative perception of ICTs in Indonesia, particularly in regional areas where lack of exposure has lead to ignorance, are attempting to reverse this trend through providing free access and exposure to ICTs. The RISTEK initiatives are aimed at breaking through the physical and intellectual distance – or digital divide - and providing Indonesians with the opportunity to see and judge for themselves the potential of ICTs.

**Appropriate technology**

Once again the choice of cost efficient, light and hardy CD-ROMs has highlighted the need for appropriate technologies in ICT for Indonesia. The content of the CDs developed as a result of community consultations and baseline studies also illustrates the need for appropriate information and content. The CD-ROM also incorporates the use of video for the illiterate and thus incorporates an understanding of the importance of the oral culture.

**Regional capacity building**

The emphasis on the regions, to support the transition to regional autonomy, is also critical in promoting trust in the initiative and thus trust in the technology. It is these trust issues that are the first to be addressed, rather than physical infrastructure to ensure the sustainable uptake of technology. This invitational approach to a government initiative is an illustration of the changes in policy and service implementation brought about as a result of reformasi.

In conclusion to the Indonesian case study section it becomes apparent that Indonesia is adapting a more cautious approach to ICT4D, maybe not out of choice, but all the same a more measured approach. While Malaysia identifies the physical infrastructure as the main barrier, Indonesia must deal with the psychological barriers. While this may seem an indication of ‘backwardness’ it will be interesting to observe the long-term impact of this approach. In that what effect(s) will it have on the national psychology in the future? Will it lead to a more reflective society willing to independently and objectively evaluate their choices and will Malaysians remain psychologically dependent on their leaders? The cultural logic or cultural based rationale behind the different approaches – the physical over the psychological - should prove interesting comparatives in the future.
4. Discussion

4.1 Barriers to equitable sharing of digital technologies

Barriers to the equitable sharing of digital technologies can be represented by the following questions:

- Is all of the technology available in the location?
- Is the technology affordable in the short and long term?
- Does the participating community have the desire and ability to use the technology?
- Is the technology relevant and desirable? and
- Are there cultural or social factors that limit access for particular groups?

To put it another way, barriers to digital access are related to:

- ICT infrastructure;
- Affordability;
- Human capacity;
- Content; and
- Cultural/social restrictions.

**ICT infrastructure**

ICT infrastructure includes the physical components that constitute a digital network, as well as the provision of telecommunication and Internet services. A community can have no share in digital access if it lacks any of the necessary physical components or services, or if the existing services are unreliable or unaffordable.

To overcome this barrier, governments need to be committed to facilitating the delivery of ICT infrastructure to all of their citizens and to pricing and maintenance policies that can support equitable distribution. Malaysia has a clearly articulated vision of a digital future and has invested money and its reputation in providing far-reaching services. Indonesia, on the other hand, has no such integrated policy. Its degraded telecommunications and electricity grid requires huge investment and reform to be able to effectively function in the far-flung regions as well as in the cities. For example, Indonesia has actually reduced its national Internet services by removing most of the eastern islands from its Post Office-managed wasantara.net system. Furthermore, against the background of privatisation of telecommunication systems, it cannot be assumed that the private-sector will deliver ICT infrastructure to remote areas because it is expensive to do so and the returns will always be greater in the more densely populated urban areas.

In some cases, the barrier presented by inadequate ICT infrastructure might be overcome through the application of (relatively expensive) emerging technologies. For example, the Kelabit community in Sarawak had no ICT infrastructure at all before the e-Barlo project was implemented. The project overcame this barrier by installing VSAT technology. The most significant outcome of this was that the community now has a telephone connection to the outside world and this has had significant positive impact for the community.

As a practical interim measure, some remote communities may need to drop the ‘C’ from ICT, by disconnecting the Internet service and, for example, using CD-ROM packages to address information, education and problem-solving needs. An example of this is the Indonesian government’s Warintek database series. A variation of this approach is the sm@sy project that developed information content designed for storage on a local database rather than on an Internet-based server.

Another infrastructure-related barrier that confronts remote communities in particular is the lack of an electricity supply. For example, the Bario community provides its own electricity through the use of generators. The installation of computer systems has increased their electricity consumption and adds significantly to their generation costs. Other power-related ‘frustration’ factors include unreliable power supply and inadequate earthing. Blackouts, brownouts and power surges cause havoc with computer installations and while these can be partly overcome with protective
hardware, it does add significantly to set-up costs. Similarly, inadequate earthing results in the build-up of static that can be damaging to sensitive electronic circuits. This can be overcome with earthing equipment but again, it adds to installation costs.

The poor performance of networks and Internet services as a result of inadequate bandwidth is another barrier to digital access. This is manifested in poor transmission rates that can render some applications unusable or unaffordable. One way to address this barrier is to simplify the presentation of information but that can work against the usability of the application.

A number of the Malaysian projects (TaniNet, AkisNet, and sm@sy) deliberately chose locations that had adequate ICT infrastructure for their pilot programs. This was so that they could test their application development and IT literacy training programs without the results being clouded by infrastructure issues.

**Affordability**

Affordability refers to one-off costs (eg electricity/telephone connection, computer hardware/software etc) as well as to recurring costs (eg telephone line rental, telephone call charges, ISP charges, electricity charges, system maintenance costs, human resource costs, etc). It is clear that privatised individual Internet access in most poor and remote communities is generally not affordable at the present time. If Internet access is to be delivered to these communities then the IT Kiosk concept is likely to be the dominant medium.

Unlike Malaysia, Indonesia does not have a vibrant computer hardware manufacturing industry. For this reason, the import of second-hand computers into Indonesia could benefit poorer groups. Furthermore, most of the groups consulted in Indonesia indicated that their ICT-based programs were only viable because of pirated software. Most of the basic software is proprietary and comes at costs too high for many small or even large NGOs to afford.

For remote communities, the technology used to deliver telephone links can be prohibitively expensive. In the remote areas of Indonesia, telephone dialups to ISPs outside a radius of 30kms involve inter-local costs, which are charged at rates comparable to Australian STD rates. These costs are so high that Warnets typically connect many computers to the one communication line. This results in glacial download times, increasing costs and reducing the efficiency that ICTs are supposed to enhance. In Bario, where there were no telephone lines at all, the VSAT connections cost RM 2250 per month per unit. Bario has four VSAT connections, each on a 5-year lease. This cost has been met by external funding provided to the project. It remains to be seen, however, whether the cost of this can be sustained without external subsidy.

Another aspect of affordability is the cost of maintaining an IT Kiosk, which includes provision for future hardware upgrades as well as regular system maintenance such as backups, virus protection, etc. These costs are not insignificant and need to be considered when the project is being designed. When budgeting for ICT4D projects, one-off installation costs must be separated from projected running costs including upgrades, spare parts and maintenance. All of the recurring fees relating to ICT infrastructure as well as maintenance of computer systems need to be accounted for. This budget can then be the basis for designing cost recovery measures to ensure the financial sustainability of the project.

Two Malaysian projects (TaniNet and AkisNet) are looking towards commercialisation as the way to becoming financially sustainable. TaniNet is considering e-commerce, advertising and for-fee services as income sources. AkisNet is considering becoming an information supplier to government and academic clients that might have use for the field data that the system accumulates.

When considering the application of ICTs to addressing community needs, it is important to consider whether recurring costs are sustainable and whether there might be low technology alternatives that would offer the same or different benefits.
**Human capacity**

In this context, human capacity refers to ‘IT literacy’ or the ability to operate a computer and its software. IT illiteracy and more specifically training capacity is a significant barrier to digital access and there are a number of issues associated with this.

In some developing countries, low functional literacy rates will be a significant barrier. Functional literacy in the language used to display information is necessary, as most websites and software packages are primarily text-based. Furthermore, if standard software packages are not released in the local language, a smattering of English-language computer jargon will also need to be comprehended by the user. One way of lessening this barrier is for website designers to use multimedia techniques such as audio, graphic, pictorial, and video, provided download times and the associated costs are not prohibitive. The sm@sy project in particular made effective use of these multimedia techniques. E-pek@k also made innovative use of video to present sign language courses.

The inability to type is another barrier. This is especially true in contexts where the local language does not use a Roman script and a standard local-language keyboard has not been developed. Unfortunately, there is no simple solution to this difficulty. In contexts like Malaysia and Indonesia where the national language is written in a Roman script, many literate people will still have difficulty in learning how to type. People who have little experience with computers can also take some time to become comfortable with using a computer mouse. The sm@sy project overcame this by developing touch-screen systems that obviated the need for a mouse. The system also uses ‘virtual’ keyboards for typing tasks.

Every one of the Malaysia projects provided significant amounts of IT training to community members to overcome these barriers. In Indonesia PAKTA is the focus of ICT training for NGOs operating at community level but few organisations take ICTs further into the community itself.

A number of the projects (e-Bario, sm@sy, e-pek@k, JIS, and Warintek) considered IT literacy to be an important end in itself. On a number of occasions IT literacy was referred to as ‘the fourth R’. This philosophy was one of the motivating factors behind the installation of computer laboratories in schools.

Training and education is most effective when the participants are motivated to learn. Furthermore, a person’s understanding and vision for the potential impact of ICT applications is limited by that person’s awareness and exposure to it. In line with this observation, a basic premise of both DAGS and RISTEK is that people and communities will not take up ICT applications unless the potential of those applications can be demonstrated to them. A number of the projects visited (TaniNet, AkisNet, sm@sy and JIS) deliberately chose communities that already had some exposure to and interest in, ICT applications. In doing so, they increased their chances of successfully developing and testing their pilots. However, these projects still included significant efforts to raise the level of ICT awareness in the communities in which they worked. While the studies may not stand up to wider field realities, they do test the notion that those previously having no contact with ICTs can be drawn to usage through exposure.

**Content**

Content refers to the information and applications that are available to potential users. The issue for equitable sharing of digital access is whether this content is useable, relevant and applicable.

The first and most basic requirement relating to content is that it needs to be delivered in the local language. This is more challenging in contexts where the local language is not written in a Roman script and where there are no standard fonts available for that language. Unfortunately, it is the more remote communities that are less likely to be conversant in the dominant language of the nation and this further intensifies their disadvantage with respect to digital access.

To ensure relevance and appropriateness, content should be identified or developed in the context of a local community and with the active participation of that community. This process might be
Digital dividend or digital divide?

A number of projects (TaniNet, AkisNet, sm@sy, e-pek@k, Warintek and JIS) developed considerable amounts of content for their respective websites (or other information resources). Each of these projects worked within established community structures and with relevant community organisations. A number of the sampled projects engaged community development practitioners to facilitate the participation of communities in their work.

Cultural/social restrictions

In Indonesia, strong oral traditions, as well as the existence of local languages that predominate over the *lingua franca* in distant areas, also constitute barriers. Some languages such as Javanese and Balinese reflect social and religious status through the use of stratified specialist languages. The oral tradition maintains high levels of social coherence and tradition and are, in some cases, are already under pressure of extinction. The use of ICTs raises the ethical issue of whether one should (perhaps adversely) effect cultural cohesion for the sake of ‘modernity’.

Gender Analysis Implications

Women are more likely than men to be illiterate or unable to use the *lingua franca*. Amongst the Balinese, for example, more women speak only Balinese than men. Because of this, women at the community level are less likely to feel that ICTs are accessible to them.

At the middle-class level, women use ICTs at a rate approximately equal to men. A visit to a Warnet will reveal a mixture of 60 per cent men and 40 per cent women at the consoles. The women are more likely to be using chat rooms, while men are more likely to be browsing and surfing. Women using ICTs are most likely to be middle class or at least college educated.

Discussions with women routinely working with ICTs in Indonesia suggested that women are less likely to be technology managers or to know how to develop software. For example, while PAKTA teaches women to program and to engineer networks, their own staff are mostly male. Women users also commented that women are more likely to learn from their male partners or children than learn independently.

It was noted that ICTs could create an anonymous space for women to explore issues that might otherwise be culturally restricted. Issues of sexuality and relationships can be discussed and explored in a space free of judgements or sanctions. This is perhaps why, on the feminist network, pornography is an issue to be discussed and not one of alarm. WAO in Malaysia found that the anonymity afforded by the use of e-mail and Internet has assisted women to discuss experiences and issues relating to domestic violence.

There is no doubt that women could directly benefit from ICT usage, particularly in areas where they are particularly vulnerable to human rights violations. The immediacy and anonymity of the medium allows women to seek rapid assistance or to discuss issues like rape without the shame of face-to-face contact. However the design of the interface would have to be such that it contained symbols likely to appeal to women, as many women reportedly complained that some of the interfaces were obscure or unintelligible to them.

Age, Class and Disability

The young and the middle class dominate ICT use. Even the Warnets are lacking in older people and indications from private ‘cybercenters’, such as BoNet, are that the older the user, the higher the social class or income.

ICTs offer good opportunities for those with disabilities such as the blind or deaf to learn in unorthodox ways. However, the limitation is once again cost, as download times for graphics and voice driven systems in some countries, in this case Indonesia, are prohibitive. Malaysia presented a good example of an ICT based project that addresses disability.
Social Justice and Civil Society

The social development movement has highlighted the importance of the above-named factors in securing dignity and well being in the face of totalitarian, corrupt or oppressive regimes. In recent years this language has been tempered somewhat by the use of terms like Civil Society or Governance.

ICTs offer double jeopardy in that while they allow instant connections and contact with the outside world and thus can be used in the struggle for human rights, they are also easily monitored and censored by security forces. Indonesian groups in particular highlighted the need for safety and invulnerability from shut down in case of political crisis.

An AusAID-funded project in Sumba (Eastern Indonesia) has proved successful in securing a high degree of participation of the local population in local government. The project is partially dependent on ICTs to download national news from the larger centres but it is the local news supplied by the community that has had particular impact. The project, run through PAKTA, indicates the degree to which local newspapers and radio backed up with computer-driven ICTs can influence and enable the forces of civil society.

4.2 Critical success factors in sampled projects

In the context of ICT4D, the definition of ‘success’ is problematic. If ‘success’ were to mean, for example, ‘five years continuous operation reaching increasing numbers of clients in a sustainable way and demonstrating unambiguously positive impact on human development’, then none of the sampled projects would pass the test. In fact, such projects might not exist anywhere.

One of the objectives of this study was to contribute to the process of identifying and confirming notions of ‘good practice’. This process will continue in the years to come as the ICT4D field develops. We have chosen the term good practice as opposed to ‘best practice’ as the technology is so dynamic, as is the human interface, and ‘best practice’ might be taken to imply some form of stasis.

‘Project success’ should not be equated with ‘positive impact’. The impact of the sampled projects is yet to be proven, and while most of those interviewed had various methods of evaluating success, the evaluation was dependent on aims and inconsistently applied. In some instances, evaluation was meant to discern degrees of acquired competency. In other projects, evaluation was based on uptake and innovation, and in others still, evaluation was based on the effectiveness and security of alert systems.

If one is to take on board the parameters of social development and community informatics, then indicators of success would relate to issues of control, access, participation, innovation, fit, inclusion and sustainability of technological applications and costs. While replicability is regarded by donors as being important, in the world of ICTs replicability of principles only might apply, as the ideal project is one that a community runs and innovates for itself according to its own discrete needs. Ideas that can be replicated by applications might not be so easily moved and applied from one location to another.

That being said, in Malaysia the critical success factors identified in the sampled projects include:

- Working within the government policy emphasis and with recognised organisations;
- Implementing and testing a prototype before attempting broad outreach;
- Working with a specific, clearly identifiable community and facilitating the participation of that community in every stage of the project;
- Designing for the ICT infrastructure realities;
- Forming effective partnerships to ensure that the project team has all of the inputs and skills required to meet project objectives;
- Emphasising ICT awareness and training; and
- Developing a sustainability plan.
In Indonesia the indicators were not as clear-cut. Amongst NGOs the government is becoming increasingly irrelevant at best, and in view of the lack of services and comprehensive national IT policy, organisations find themselves struggling to make up for the deficits.

The determinants of success were more related to how closely aligned the ICT applications were to community needs and if there was an effective ICT-based service in the region that was reachable on foot, as transport is unreliable and expensive in relation to rural incomes. Thus, effectiveness was more based on pragmatic issues. For instance in the kampung improvement project in Surabaya, despite community members owning computers and encouragement from the ITS staff, the community regarded basic needs as taking precedence.

In this case, the community did not see that it was capable of receiving or giving information, that the information it needed was not best rendered by ICTs, or that the costs required could be best spent elsewhere. That is, in the language of Canada’s IDRC, the community’s aspirations do not include an ICT mediated path to an improved life. It appears as though most Indonesian communities are content with NGOs being intermediaries rather than having there own economic and operational responsibilities.

Not all of the sampled projects could be considered ‘sustainable’, and a couple of them appear to be decidedly unsustainable. For some, it is too soon to judge. In Malaysia, TaniNet, for example, is only now embarking on a second phase of development, which will focus much more on cost recovery. Perhaps the most notable success is the sm@sy implementation in Kampung Raja Musa, which is fully sustainable, both in a financial and managerial sense. In fact, the IT Kiosk has generated enough income to employ a full-time manager.

4.3 A model for designing and evaluating ICT initiatives

The growing concern for demonstrating the impact, assumedly positive, of ICTs, the Internet, Information, etc seems to be primarily driven by the need to justify urgent and massive investments in these areas. This approach might be short-sighted and not so much productive ... It is further useless, since it is the **process of change** by which stakeholders moved from one to the other situation that one needs to understand to learn from this endeavour and to **take more action in the future** ... Impact studies need to be based on continuous observations. This, in turn, requires that members of the community, or intermediaries within it, be **trained to carry out effective observations**.

**Introduction**

A goal of this research project has been to identify a framework or model that could be used to design and evaluate ICT4D projects. In the course of the study, it became clear that a one-off, quantitative evaluation of a time-bound project could only ever represent an historical snapshot of what is a dynamic process. An evaluation of this nature would be of limited value. In many ways this is true for any development process but especially so in the ICT4D field because the scope of ICTs (and the Internet), as well as the available information and application content, is changing so rapidly. Furthermore, people’s own ability to use the technology and their understanding of its potential is constantly developing. Even as a community’s information and communication needs are being met, more opportunities are encountered and recognised, resulting in more action. The complexity of issues uncovered during the field study underlined the need to understand the relationships and processes between communities and ICT use in a non-linear, multi-factorial way. Therefore, in this context, evaluation should represent an reiterative process of reflection, learning and action, rather than a one-off statement of value (or impact). Furthermore, the community in question needs to be enabled to carry on this process.

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**Evaluation in the sampled projects**

None of the sampled projects has undergone formal external evaluation. Those projects that were part of DAGS performed some formal internal evaluation. A requirement of DAGS is that projects submit an evaluation report as one of the final outputs. However, these evaluation reports have tended to focus on achievement of outputs, financial acquittal, and lessons learned during project implementation, rather than evaluation of socio-economic impact. A general impression was that the projects struggled to perform formal evaluation activities.

Some projects did attempt to evaluate the economic impact of their initiatives but a common conclusion was that it was ‘too early’ to measure such an impact. One commentator has suggested that ‘data about impact will not be obtained before several years, and probably 10 years or more will be required before reliable findings could be reached’.42

In some cases, economic impact is particularly difficult to measure. For example, it would be difficult for a local farmer to quantify the economic impact of advice received from the TaniNet panel of experts. In light of this difficulty, some of the projects (eg TaniNet and AkisNet) used quantitative indicators such as website hits, membership growth, and number of responses to online questionnaires as proxies for impact evaluation. In the case of e-Bario, it is non-sensical to talk about economic impact, at least at this early stage. The most significant impact – the ability to telephone children studying outside of Bario – is a social impact and is impossible to quantify.

A number of the sampled projects focused at least some of their evaluation efforts on ICT awareness and IT literacy as key educational outcomes. This generally involved baseline survey analysis (sm@sy and Warintek) or curriculum assessment (e-pek@k, e-Bario and JIS). This is reasonable in as much as ‘to raise ICT awareness and literacy’ was a stated goal of these projects.

The e-Bario research team utilised and tested a qualitative approach to evaluation based on analysing community stories. It was found that the use of stories can:
- Elaborate process more so than numbers;
- Help actors understand processes they are involved in;
- Help reveal intertwining aspects and potency of process;
- Give an idea of downstream progress; and
- Present the different perspectives of different parties (through stories or role playing).

This methodology revealed social impact in the following areas: aspirations, learning, capacities, organisation, unity, participation, relationships and sustainability.

**Evaluation model**

The term ‘model’ rather than ‘framework’ has been chosen because it suggests greater flexibility and dynamism. The term ‘initiative’ rather than ‘project’ has been chosen because it better reflects the idea of on-going actions rather than a set of pre-determined activities that have been duly completed. Finally, the model is applied to both ‘designing’ and ‘evaluating’ ICT initiatives to promote the idea of an action-reflection spiral. The model needs to be able to engage this process at any point.

The evaluation model needs to allow for the participation of multiple stakeholders, who each have their own knowledge, expertise, interests and perspectives to contribute to the process. The role of secondary stakeholders is to raise awareness, make suggestions, demonstrate possibilities, offer technical knowledge and expertise, provide funding where appropriate, etc. The role of the primary stakeholders - the social group that has received the technology – is to make value judgements about the ‘goodness’ or ‘effectiveness’ of initiatives and to determine subsequent initiatives.

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42 Menou. p213.
The proposed model has a number of components, namely:

- Information and communication needs analysis;
- Barriers to satisfying IC needs; and
- Response actions.

The diagram below demonstrates how the model is applied.

A key feature of the model is that it reverses the relationship between technology and the community. That is, the model causes people to ask ‘what impact is the community having on the design and use of ICTs?’ rather than the more traditional ‘what impact does ICT have on the community?’. The latter reflects a sense of passivity - perhaps a lack of community partnership and ownership - that has been a root cause of failure of many development initiatives. The former question, however, reflects a more active community that is using ICTs in a dynamic way.

The feedback loop ‘evaluation – informal and formal’ represents those processes whereby the community makes value judgements about particular activities and outcomes. This could be either formal or informal evaluation, and this is where traditional impact evaluation techniques might be applied. For example, the e-Bario project conducted a formal evaluation of the educational value of English-language tutor software. This is not an evaluation of e-Bario as such, but an evaluation of one specific and identifiable part of it. The nature of these formal evaluation activities depends on the nature and construct of the ICT initiative. For example, TaniNet could evaluate the effectiveness of its expert referral system, of its discussion forum, of its educational components (the article and archive), and of its discussion groups. Each of these components would require a different approach to evaluation. Another evaluation technique that could be usefully applied at this level could be the story approach identified by e-Bario.

There are a number of applications for this model. First, the model is a learning-oriented, analytical tool. Application of the model prompts stakeholders to identify digital access barriers that confronted them and response actions that were implemented. The model reduces what were likely to have been ad hoc decisions and actions into a logical description. As the model is applied to more and more case studies, a comprehensive list of digital access barriers and effective response actions will be accumulated.

Second, as a design tool informed by the learning process described above, the model can be used to anticipate barriers to digital access and to suggest effective ways to avoid these barriers.

Third, as an implementation tool, application of the model encourages immediate evaluation of response actions that can result in identification of additional digital access barriers and design modifications. Recollection of this process will highlight critical success factors and design nuances.

Finally, as an evaluation tool, the model can indicate recurring digital access barriers, which will highlight areas for capacity building activities. For example, if ‘lack of IT literacy’ is repeatedly
confronted as a barrier to digital access, then it might be assumed that the response(s) employed to overcome that barrier – eg IT training – might have been ineffective. Where weaknesses are identified, more traditional, targeted evaluation techniques can then be employed to determine how the effectiveness of responses might be improved.

An indicator of ‘success’ of the ICT4D project is when the community demonstrates its ability to envision, act and overcome barriers without external intervention. An indicator that barriers to digital access have been overcome is when the community operates on the outer loop of envisioning and acting.

**Example: Jaringan Informasi Sekolah (JIS)**

<table>
<thead>
<tr>
<th>Information and Communication Needs Analysis</th>
<th>Barriers to satisfying IC needs</th>
<th>Response actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Envisioning</strong></td>
<td>Evaluation – informal and formal</td>
<td></td>
</tr>
</tbody>
</table>

**IT skills for students.**

- Principals don’t want to pay for school labs (IT awareness).
- Staff afraid of undesirable content, eg pornography.
- Teachers lack IT skills.
- No resources for teaching training.
- No computer equipment.
- Lack capacity to maintain computer systems and networks.

**Regional teachers want to learn more.**

- No forum to share learning.

**Response actions**

- Persuade principals of the potential of ICTs.
- Partner with ICT Watch ‘Healthy Internet’ program to block undesirable sites.
- IT training for teachers.
- Teacher networks leads to peer training.
- Pooling of resources. Private sector contributions.
- Appoint volunteer system manager. Technical training for system manager.
- Establish regional branch networks.
**Example: E-Bario**

<table>
<thead>
<tr>
<th>Information and Communication Needs Analysis</th>
<th>Barriers to satisfying IC needs</th>
<th>Response actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evaluation – informal and formal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Envisioning</td>
<td></td>
</tr>
</tbody>
</table>

| IT skills for students. | No computer equipment. | Install computer labs in school. |
| Teachers lack IT skills. | IT training for teachers. | |
| Lack capacity to maintain computer systems and networks. | Appoint volunteer system manager. | Technical training for system manager. |

<table>
<thead>
<tr>
<th>Computer-based educational opportunities.</th>
<th>Communication with children studying in Miri / Kuching.</th>
<th>No telecommunications infrastructure.</th>
<th>Install VSATs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Opportunities to use Internet applications for benefit of community.</td>
<td>Lack awareness of Internet and applications.</td>
<td>Internet awareness program.</td>
</tr>
</tbody>
</table>

| Inexpensive, convenient means to communicate in writing to people outside of Bario. | Opportunities to use Internet applications for benefit of community. | Lack awareness of Internet and applications. | Internet awareness program. |
| Lack capacity to use e-mail software. | Training in e-mail use. | |

| Communicate with Kelabit people who live all over the world. | Form On-line Kelabit Society via e-Forum group. | Lack capacity to use forum software. | Training in use of forum software. |

| Running cost of VSATs. | Develop cost recovery plan. |

| Diversify income sources – tourism. Need to promote Bario as a eco-tourism / trekking destination. | Lack capacity to develop website. | |

**Digital dividend or digital divide?**
Example: RISTEK

<table>
<thead>
<tr>
<th>Information for farming.</th>
<th>Geographic distance from central libraries.</th>
<th>Disseminate library held information to the regions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heavy postage expensive and unreliable.</td>
<td>Collate and send on CD-ROM.</td>
</tr>
<tr>
<td></td>
<td>Limited space on CD so what specific information is required?</td>
<td>Consult community on appropriate content.</td>
</tr>
<tr>
<td></td>
<td>Potential users lack computer access.</td>
<td>Establish regionally based Warinteks</td>
</tr>
<tr>
<td></td>
<td>Consumers don’t know how to use computers and CD-ROMs.</td>
<td>Provide free training for consumers.</td>
</tr>
<tr>
<td></td>
<td>Need venue and equipment for training.</td>
<td>Coordinate through Warinteks.</td>
</tr>
</tbody>
</table>

| Information for marketing their agricultural goods. | Lack of information on markets including prices, etc. | Warintek provides access to internet and up to date market prices. |
**Information and Communication Needs Analysis**

**Barriers to satisfying IC needs**

**Response actions**

**Evaluation – informal and formal**

**Envisioning**

<table>
<thead>
<tr>
<th>Recognition of numerous needs and services that need to be presented visually.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFD lacks IT skill, including web page design and development.</td>
</tr>
<tr>
<td>Recruit / train staff for IT tasks. Draw on IT student resource (volunteers).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MFD lacks IT hardware.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase hardware for MFD office.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Need for forum to discuss issues facing hearing impaired persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forum format not suitable for some personal issues</td>
</tr>
<tr>
<td>Establish e-counselling service.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deaf persons not aware of news and events that specifically relate to them.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish news page.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>People want to learn sign language to be able to communicate with hearing impaired friend / relative.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign language pictures difficult to interpret.</td>
</tr>
<tr>
<td>Produce video clips for teaching sign language.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inconvenient and difficult to book services of sign language interpreter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish e-interpreter booking service.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hearing impaired community don’t know about website.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness / advertising campaign.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hearing impaired community lack IT skills.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide training-for-trainers to deaf NGOs.</td>
</tr>
</tbody>
</table>
5. Conclusion

The intoxicating blend of development with ICTs has captured the attention of development planners and theorists. ICTs seem set to take an increasingly important role in determining the rate of social and economic progress of nations across the world. We have presented a snapshot of the role of ICT in a wide range of initiatives in two contrasting countries in mid-2002.

This study highlighted some of the barriers to equitable sharing of digital technologies. These barriers cannot be underestimated and they grow ever higher for disadvantaged groups and populations. Infrastructure constraints penalise everyone, but the further away people are from urban centres the less likely are they to have a reliable electricity supply and a viable telephone connection. Also, the more remote communities are less likely to be able to sustain the economic platform needed to support the hardware and the human resources needed to manage it. Therefore, ICTs are likely to remain the province of the urban middle class for some time to come, more so in Indonesia than Malaysia. This highlights the notion that, although ICTs might be used to contribute to social inclusion, they might just as easily be a mechanism for social division.

In the course of this study, it became apparent that there are two distinct paradigms for ICT4D initiatives. The first paradigm is the sharing of information in an interactive, multi-directional way between peers and peer groups. It reflects the human condition and the need to relate to one another. Examples of this paradigm tend to emerge spontaneously, they are inexpensive to establish and maintain, they tend to be more dynamic, and they are sometimes transient in nature. The second paradigm is the downloading of reference information from bureaucratic, official or 'expert' sources to recipients. Although it might indicate a desire to break down barriers to transparent sharing of information, this paradigm nevertheless reflects an imbalance of knowledge ownership and of power. Examples of this paradigm are constructed deliberately, they are expensive to establish, they tend to be less dynamic, and they need to be ‘sold’ to potential users.

We do not consider it necessary to argue that one paradigm is more important or influential than the other. However, we do suggest that the ICT4D field is diverse and needs to be divided into more manageable categories if progress is to be made with respect to the definition of ‘best practices’ for the design, implementation and evaluation of ICT4D initiatives.

In relation to the question of ‘impact evaluation’, it was found that it is more relevant to observe the social influences, often unpredicted and difficult to measure, of ICT4D initiatives, rather than to attempt to quantify economic impacts. The relationships and processes between communities and ICT use need to be understood in a non-linear, multi-factorial way. This caused us to suggest a model for designing and evaluating ICT initiatives that represents an on-going process of reflection, learning and action, rather than a one-off statement of value (or impact).

The plasticity of ICTs allows communities to use them as a vehicle to define their own sense of place (meaning and relevance), space (collective versus individual use) and base (the roots of the applications in terms of religious, cultural or class/occupational needs). To achieve that sophistication of usage, ICTs need to be divorced from Western notions of individuality, of efficiency and of being value neutral. For development planners, the use of ICTs may necessitate the abandonment of structured goals and outputs in favour of allowing a more evolutionary progress by which communities can define and innovate to meet their own perceived needs. In that way, ICTs have the capacity to stimulate revolutions both within poor communities and within communities of donors more used to control models of project management. Historically, the socio-technical interface was smothered by control but thrived when given sufficient self-determining elbow room. Planners and evaluators should keep that principle in mind.
### Useful Links

#### General

<table>
<thead>
<tr>
<th>Organization</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Telecommunication Union</td>
<td><a href="http://www.itu.int/">http://www.itu.int/</a></td>
</tr>
<tr>
<td>Pan Asia Networking Telecentre Learning and Evaluation Group</td>
<td><a href="http://www.bellanet.org/leap/pantleg/">http://www.bellanet.org/leap/pantleg/</a></td>
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#### Malaysia General

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<tr>
<th>Organization</th>
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<tbody>
<tr>
<td>Electronic Public Services</td>
<td><a href="http://eps.mampu.gov.my">http://eps.mampu.gov.my</a></td>
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</table>

#### Malaysia Case Studies

<table>
<thead>
<tr>
<th>Case Study</th>
<th>URL</th>
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<tbody>
<tr>
<td>E-Bario</td>
<td><a href="http://www.unimas.my/">http://www.unimas.my/</a></td>
</tr>
<tr>
<td>Sm@sy</td>
<td><a href="http://www.wview.com.my/">http://www.wview.com.my/</a></td>
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<td></td>
<td><a href="http://welcome.to/aincom">http://welcome.to/aincom</a></td>
</tr>
<tr>
<td>E-pek@k</td>
<td><a href="http://www.epkek.net.my">http://www.epkek.net.my</a></td>
</tr>
<tr>
<td>Women’s Aid Organisation</td>
<td><a href="http://www.wao.org.my">http://www.wao.org.my</a></td>
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#### Indonesia General

<table>
<thead>
<tr>
<th>Organization</th>
<th>URL</th>
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<tbody>
<tr>
<td>ICT Watch</td>
<td><a href="http://www.ictwatch.com/cyberwise">http://www.ictwatch.com/cyberwise</a></td>
</tr>
<tr>
<td>APJII- Indonesian ISP Association</td>
<td><a href="http://www.apjii.or.id">http://www.apjii.or.id</a></td>
</tr>
<tr>
<td>Indonesian Network Information Centre</td>
<td><a href="http://www.idnic.net.id/">http://www.idnic.net.id/</a></td>
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<table>
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<tr>
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<tbody>
<tr>
<td>Walhi</td>
<td><a href="http://www.walhi.or.id/">http://www.walhi.or.id/</a></td>
</tr>
<tr>
<td>International NGO Forum on Indonesian Development</td>
<td><a href="http://www.infid.or.id/">http://www.infid.or.id/</a></td>
</tr>
<tr>
<td>Pakta</td>
<td><a href="http://www.pakta.or.id/">http://www.pakta.or.id/</a></td>
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<tr>
<td>Urban Poor Consortium</td>
<td><a href="http://www.urbanpoor.or.id/">http://www.urbanpoor.or.id/</a></td>
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<tr>
<td>WARINTEK</td>
<td><a href="http://www.warintek.net/">http://www.warintek.net/</a></td>
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<tr>
<td></td>
<td><a href="http://www.ristek.go.id/">http://www.ristek.go.id/</a></td>
</tr>
</tbody>
</table>
Annotated Bibliography

**Association for Progressive Communications - Women’s Networking Support Programme**

**Gender Evaluation Methodology for ICTs**

[http://www.apcwomen.org/gem/](http://www.apcwomen.org/gem/)

GEM is a guide to integrating a gender analysis into evaluations of initiatives that use Information and Communication Technologies (ICTs) for social change. GEM provides a means for determining whether ICTs are really improving women's lives and gender relations as well as promoting positive change at the individual, institutional, community and broader social levels. The guide provides users with an overview of the evaluation process (including links to general evaluation resources) and outlines suggested strategies and methodologies for incorporating a gender analysis throughout the evaluation process.

**Borton J**

**Connecting the poor to education opportunities**

*Asia Times Online (02.03.02)*

World Bank is quietly deliberating on how to make education more accessible to people in developing Asian countries and also determining who will pay for it. After all, education is about access to information and knowledge and ultimately the empowerment of people to take control of their lives. Although technology offers enormous potential to transform people’s lives, unless everyone is connected it will become another tool for excluding the poor from the West’s economic growth and decision-making. World Bank senior management strongly believes that it can leverage its available resources and be able to increase the supply of quality learning opportunities in those countries with the greatest need. So, while the knowledge revolution brings with it the threat of a widening gap between the developed and developing countries, the World Bank is under increasing pressure, both internal and external, to examine what practical steps can be undertaken to close the widening digital divide.

**Communication Initiative**

**Information Village Project – India**


The Information Village Project has connected the villages near Pondicherry, India by a hybrid wired and wireless network — consisting of PCs, telephones, VHF duplex radio devices and e-mail connectivity through dial-up telephone lines — that facilitates both voice and data transfer. This has enabled the villagers to get information that they need and can use. The information provided in the village knowledge centers is local specific and relates to prices of agricultural inputs and outputs, market, entitlement, health care, cattle diseases, transport, weather, etc.

**Ellis V**

**Enterprise or Exploitation: Can global Business be a force for good?**

*New Statesman: London (16.07.01)*

Grameen phone in Bangladesh illustrates the difference that even simple technology can make. As a 12-year-old boy, Iqbal Quadir would walk miles in the country to buy medicines, only to find the medicine shop closed. It taught him how much toil for rural people could be saved by telephone. The Grameen group now operates its own cellular network and loans money to village women to purchase the handsets. Incomes and savings have increased among phone-owners, mainly women. Phone-users, many of them farmers, have increased their productivity through access to market information, weather reports and pest and disease alerts.

In Bangladesh, 90 percent of the country’s 68,000 villages have no phone service of any kind and average annual income is less than USD 200 per person. However, a subsidiary working with the microfinance organisation, The Grameen Bank, provides services in rural areas via local entrepreneurs, usually women. Each local entrepreneur owns and operates a cellular phone that typically serves an entire village. Villagers pay for phone calls in cash per minute.
Gomez R and Hunt. P (eds.)
Telecentre evaluation. A global perspective.
http://www.bellanet.org/gkaims/documents/docs/wrkshp.pdf?ois=no
An anthology of papers presented at an International Meeting on Telecentre Evaluation. The objectives of this meeting were to:

- To explore in depth the challenges and opportunities of telecentre evaluation in Latin America, Asia and Africa;
- To understand and compare emerging evaluation frameworks and methodologies;
- To assess the needs and resources available for telecentre baseline evaluation, monitoring, impact assessment, and to identify salient issues affecting telecentre performance; and
- To provide an opportunity for telecentre operators, project leaders, and researchers to exchange experiences and lessons across regions.

Hammond A L
Digitally Empowered Development
This article identifies the global gap or digital divide between the developed and developing world. Lack of access to digital networks is but one of the challenges that face those who live at the bottom of the economic pyramid. However, the imaginative use of emerging technologies and creation of partnerships or cooperative approaches that combine the skills of major corporations with the growing strength of civil society can accelerate development and can reverse many of the most worrisome trends. Achieving this will require a bottom-up model that makes credit, communications, information, energy sources, and other self-help tools directly available to communities and individuals in poor regions, empowering them to take charge of their own development. Another successful strategy for increasing prosperity world-wide builds on the intensifying competition for customers among banks and other large financial entities, and relies on the power of new digital systems to track millions of customer accounts while steadily lowering transaction costs. In achieving protection, NGOs and community groups have formed global networks, linked through the Internet, and then work together with leading companies or trade associations to establish environmental and social standards.

International Development Research Centre
ICT4D Research Themes
http://www.idrc.ca/pan/panamericas/themedefinitions.htm
The International Development Research Centre (IDRC) is a public corporation created in 1970 to help developing countries find long-term solutions to the social, economic, and environmental problems they face. IDRC's architects believed that the powers of science and technology could be harnessed to promote economic growth and development in the South. They envisioned an organisation that would follow the lead established by Southerners themselves. The result was the first international organisation to focus on knowledge gained through research as a means for empowering the people of the South. Also the Digital Opportunity Task Force (DOT Force) which brings together representatives from G8 and developing country governments, private and not-for-profit sectors, and international organisations was established late in 2000.

International Telecommunication Union
Country Case Studies
http://www.itu.int/home/index.html
The International Telecommunication Union is unique among international organisations in that it was founded on the principle of cooperation between governments and the private sector. With a membership encompassing telecommunication policy-makers and regulators, network operators, equipment manufacturers, hardware and software developers, regional standards-making organisations and financing institutions, ITU's activities, policies and strategic direction are determined and shaped by the industry it serves. While the development of the Internet in developed countries has been widely documented, its diffusion in developing nations has generally not been well researched. The ITU is carrying out a series of case studies on the diffusion of the Internet in countries at different stages of development. The aim of the project will be to seek to
understand the factors, which accelerate or retard the development of the Internet in different environments and, through comparative analysis, to advise policy makers and regulatory agencies on appropriate courses of action. A particular focus will be on the spread of the Internet in different sectors of the economy such as health, education and commerce as well as government

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**Jenson M and Esterhuysen A**  
The Community Telecentre Cookbook for Africa - Recipes for Self-Sustainability  

A manual that details a process for implementing an IT telecentre. Topics addressed include setting up a group responsible for the telecentre, linking the telecentre to the community, developing a business plan, fundraising, management and startup strategies, day-to-day management issues, marketing and promotion, risk management, etc.

**Kasim S**  
Providing tech facilities for Women (03.28.02)  
The Women and Family Development Ministry will be embarking on an initiative to tackle the gender digital divide in Indonesia that will cater to the various segments of the women population. The Ministry will be setting up an information and communications technology facility at its women’s service centres nationwide, which will provide computer access and training in addition to other services such as counselling. Participants of the courses will learn skills relevant to the sector such as computer-aided design and computer-aided manufacturing. With such competency, they will be able to improve their job prospects and move up in their companies.

**Katakam A**  
The Warana Experiment  
Frontline Vol19-Issue 01, Jan.05,-18, 2002  
[www.flonnet.com/fl1901/19019890.htm](http://www.flonnet.com/fl1901/19019890.htm)

Warana Cooperative Sugar Factory together with the Central and State governments in 1998 initiated the ‘Warana wired village project’, which enables sugarcane farmers to interface with a cooperative sugar factory through computers. The computers are linked to a central network that provides farmers access to essential pieces of information such as the ideal time for planting and harvesting sugarcane, the current market rates of their product, and payments made by the factories. The Warana experiment seems to have succeeded as an attempt to bridge the digital divide. However, unless there is people’s participation in the use of information technology on a mass scale, the project cannot be called a success.
In India’s rural areas, users will be able to shop for farming such as seeds and machinery as well as household items such as bicycles or refrigerators, and find buyers for crops and handicrafts without making arduous trips to a city. The Internet, in the form of a start-up known as TARAhaat.com is the first Internet service designed for the needs of rural village users. It can be both a successful business as well as a tool to help those it serves to lift themselves out of poverty. Villagers will access the portal at the village cyber-kiosk, using a computer that displays pictures, diagrams and simple explanations in local languages. It will provide information on such vital matters as land records, health clinics and jobs.

A conference organised by the Asian Development Bank, along with the Ministry of Information Technology of the Government of India; Department of Information Technology of the Government of Karnataka; and Institute for Social and Economic Change, Bangalore, was held in Bangalore, India, in August 2001. The purpose of the conference was to help impoverished people gain access to the information they require to improve their lives through the use of information and communication technology. The resource speakers along with some of the best universities in the world have all implemented complex ICT projects in developing countries, such as telecommunications infrastructure, e-health care, and online learning opportunities.

Pokhale is one of 70 villages in the Warana region participating in an $600 000 information technology project initiated by the federal government. All the villages in the area now have computers linked to a central network, while training centres have been opened in six villages to impart computer education to rural youth and to provide access to the Internet. With computer kiosks in every village, Warana’s ‘Wired Village’ project already provides farmers access to essential information. The network keeps detailed records of all their transactions with the local sugar and milk cooperatives; it lists prices of farm produce in the region’s agricultural markets; and it offers a daily weather forecast.

This web site deals with issues in India on Development of telecommunications infrastructure, Public Private Partnership, Human Resource Development, E-Government, ICT in Poverty Reduction: Bridging the Digital Divide, Cyber laws and Emerging IT opportunities. Chairperson and Managing Director of various organisations discuss these issues in speeches.

ICT infrastructure development varies widely within the East Asian region. Countries in the East Asian region are very different in terms of their income, telecommunications infrastructure and policy, information technology penetration and human development. Figure 1 provides a snapshot of the relative positions of countries within the Asia Pacific region. The diagram outlines key economic variables, namely population density, GDP per capita and the services share of GDP. Other indicators shown are telecommunications and IT indicators and population and education indicators. The size of the shapes in the figure indicates the degree of development of economies in terms of these indicators. The relative strengths and weaknesses of different countries can be visually assessed on the diagram.
Tangkitvanich S
Global E-Commerce Policies Seen from the South
A Framework for Global Electronic Commerce is proposed by developed countries. However, global e-commerce policies proposed by developed countries may not necessarily be appropriate for developing countries. The framework also discusses certain key policies and strategic directions. Among other things, it proposed that the telecommunications market be liberalised, that the Internet be a tariff-free environment for trade in goods and services, that the commercial code be harmonised, and that intellectual property rights be strongly protected. This assessment of the ‘commerce divide’ covers five areas: liberalisation of the telecommunications sector, taxation, trade negotiations under the GATs, harmonisation of e-commerce-related commercial laws, and protection of intellectual property rights. Some data are presented in this article from Thailand and East Asia as part of an attempt to reflect the interests and viewpoints of developing countries.

Turner A
Aid group tosses cyber-lifeline to East Timor
The Australian (3.10.00)
Computer networks and skills are essential for community groups, individuals and non-government organisations. The installation of computer systems is therefore vital. Thus the East Timor Community Computers Project, a volunteer organisation from Melbourne, is using Linux freeware and low-level, community based sustainable technology to install communications for the regions and training for employment. The use of low level technology means that the installation and maintenance will be easy for East Timorous communities and enables them to improve their skills as their finances allow. The ETCCP hopes the system will enable a search for relatives and loved ones lost during the violence following the ballot for independence.

The World Bank Group, E-Government
Gyandoot: Community-Owned Rural Internet Kiosks
The villagers in the Dhar district in central India were concerned with the absence of information about prevailing agriculture produce auction centre rates. Consequently, farmers were unable to get the best price for their agricultural produce. Copies of land records also were difficult to obtain. The goal of the Gyandoot project has been to establish community-owned, technologically innovative and sustainable information kiosks in a poverty-stricken; tribal dominated rural area of Madhya Pradesh. The services offered at the kiosks include: Agriculture Produce Auction Centres Rates, Copies of Land Records, On-line Registration of Applications, On-line Public Grievance Redress, Village auction site and Transparency in government.

Some examples of benefits of the kiosks to the rural population are, access to market rates leads to better deals, 256 milch animals vaccinated in one day upon receiving an e-mail from a kiosk that an epidemic had broken out amongst the milch cattle, and greater computer literacy. Gyandoot is recognised as a breakthrough in e-government, demonstrating a paradigm shift which gives marginalised tribal citizen their first ever chance to access knowledge, with minimum investment.

The next generation of IT users is too poor to use IT right now
Hoover’s Online (04.01.2002)
[www.hoovers.com](http://www.hoovers.com)
As the cost of information technology continues to drop, a majority of tomorrow’s technology consumers will be those who can’t afford it today. Right now the next generation of IT users are too poor to use IT. The Massachusetts Institute of Technology has set up its third media lab worldwide together with the Indian government, to explore the ways technology can be introduced to improve the state of the rural poor. How to build useful ‘rural software’. How to interface with a user and in what language. The focus of Media Lab Asia is on the development of new technologies for emerging economies. ‘These are huge markets that are now opening up to ICTs and offer vast potential for industry growth’ Media Lab Asia will develop India-centric solutions so over time, these solutions could be mapped on to other developing nations. At the moment, Media Lab Asia is also finalising its research agenda around three technical challenges that are barriers to deploying low-cost digital services in rural communities. Their goal is to create a digital ecology.
that maintains traditional values and community, while opening economic and expressive opportunities for all members of society.

**The Hole in the Wall initiative**
[www.niitholeinthewall.com](http://www.niitholeinthewall.com)
Experiments conducted by NIIT, one of the largest computer training and software services company, have shown that semi-literate poor children can quickly teach themselves the rudiments of computers and Internet. Deploying Internet kiosks in economically backward parts of India is not quite simple. Besides the lack of infrastructure, the other challenges include providing a low-cost solution that can withstand harsh conditions like dust and extreme temperature and a kiosk that can be remotely administered.

**The Internet Comes to Rural India**
[www.idrc.ca/reports/prn_report.cfm?article_num=552](http://www.idrc.ca/reports/prn_report.cfm?article_num=552)
A pilot project is bringing the Information Age to rural Indian villagers in the form of communal telephone and Internet access after the realisation that the local people have the capacity to absorb new technology. The aim was to supply information that rural villagers regarded as useful such as daily weather reports, and news that have an impact on their lives. Rural Indians were also interested on information about government programs, information releases, agricultural and fishing information. Over a six month trial period, farmers requested dynamic information on the costs and availability of agricultural inputs, while women primarily used the information ships to obtain information about family income supplements and public welfare schemes, low-cost insurance and health issues.

**Village in the clouds embraces computers**
The mountain village of Nangi, and Himanchal High School is the first in Nepal to have the Internet and a website. To connect Nangi to the Internet, Australia, Singapore and Malaysia donated computers and Manabir Pun installed two small hydro-generators in the stream near his village for power for the school. Some benefits of the Internet are to generate money for the village, to provide quality education, to provide information about their culture, and to invite volunteer to come to the village.

**Wong C**
**CEOs urged to help close digital divide (03.25.02)**
[www.itnetcentral.com](http://www.itnetcentral.com)
Chief executive officers of the world’s top corporations are being urged to set aside a significant portion of their philanthropic budgets to fund projects that bridge the digital divide. The CEO Charter would help private corporations scope out the development market for digital divide efforts. This process is also important for NGOs and can help them decide which companies they can approach. The purpose is to demonstrate the private sector’s commitment to bridging the divides between rich and poor through the application of ICT.

**Wong C**
**E-commerce to fuel growth, global business group says (03.25.02)**
[www.itncentral.com](http://www.itncentral.com)
A private sector group made up of the world’s largest and most dynamic companies says e-commerce will be a major driving force for economic growth in Asia and rest of the world, despite the dot-com fallout two years ago. A key point raised during the meeting is that e-commerce is continuing to play an increasing role in driving economic growth despite losing some of its high-profile glamour following the bursting of the dot-com bubble two year ago. However, the one thing that can slow all this down is the digital divide, between people or nations that have access to technology and those that can’t afford it. Many leaders of developing nations are growing sceptical about whether there is any serious intent on the part of developed nations and multinational corporations to devote resources to addressing the digital divid