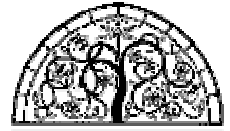


INFORMATION TECHNOLOGY IN DEVELOPING COUNTRIES

Centre
for
Electronic
Governance



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Editorial

Greetings for the festive season! In India we are right in the midst of the festivals and for others the season is just round the corner. We need to keep ourselves in good cheer in these difficult times of deep financial crisis.



I have been teaching a course on Digital Inclusion for Development based on the premise that access to technology in rural areas will lead to social and economic development. Popularity of the concept of fortune at the bottom of the pyramid has created some interest in the corporate sector to scout for opportunities to serve the rural markets. I recently had a chance to listen to Satyan Mishra who founded [Drishtee](#) with three others. Drishtee was able to open up more than a thousand kiosks in the first seven years of its existence and earn a reasonable revenue from the franchisee entrepreneurs to cover its costs. However, over the years it discovered that it is difficult to achieve economic viability through information and government services channeled through the net. The demand is scattered geographically and it is virtually impossible to discover the right basket of service which can earn revenues that provide adequate returns to the entrepreneur. So Drishtee has decided to become a distributor of consumer goods with a deep penetration in rural areas. They use the network of kiosks to collect orders from small rural shops and handle the logistics of supplying the goods. The commissions are adequate to help Drishtee run as a profitable company, even as they have tapped only a small part of the full potential of spend of rural India.

To me it is the fading away of a cherished dream of many development thinkers of using technology for building a Knowledge Society. Perhaps this was a dream of those who were far removed from the reality of rural populations. We need to draw lessons from Drishtee and [e-Choupal](#) the few who have achieved some scale on the composition of the “magic” basket of services. We also need more research on this theme.

(Editorial continued on the [last page](#))

In this Issue...

- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ Pursuing Truly Successful e-Government Projects: Mission Impossible?...2 ▪ E-government in Malaysia: Barriers and Progress...6 ▪ How Web 2.0 is Changing the Basic Character of the Internet...15 ▪ Grassroots Involvement for Real ICT Impact...17 | <ul style="list-style-type: none"> ▪ Biometric Smart Card (BSC)...20 ▪ Common Services Centers (CSC) Scheme...23 ▪ Base of the Pyramid (BoP) Program...25 ▪ Book Review...26 ▪ Conference Announcements...26 |
|--|---|

Pursuing Truly Successful e-Government Projects: Mission Impossible?

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The track record of well-designed e-government projects that have realized benefits is short, complex and difficult to measure. It has already been 5 years since Richard Heeks' classic paper on e-government, "Most e-government-for-Development Projects fail",¹ came out, which claimed that 85% of e-government projects in development countries fail out of which 35% are total failures, 50% are partial failures, and only 15% are successes. Soon thereafter, the World Bank reported in a "Task Managers' ICT Toolkit" that its sectoral based projects with information and communication technology (ICT) components had an "alarmingly high failure rate" with 50% suffering disputes and 80% requiring contract amendments².

With a total ICT component portfolio estimated currently at US\$7.3 billion and less than half of the projects rated "satisfactory" by the Bank's own evaluation system, it would seem that a lot of ICT projects can waste precious resources that could be devoted to competing development needs. Our best guess is that things have not got better for two reasons. First, today's e-government systems are increasingly dependent upon inter-agency cooperation. "Agency-centric", or "silo" approaches to systems reform, and "supply and install" projects seldom work. For example, vehicle licensing systems often require the interoperation and cross-agency cooperation of Transport, Tax, and Finance systems, perhaps with links to private sector financial institutions, insurance, motor agencies and the police.

More complex are trade facilitation systems that involve interoperation between Customs and traders for all government agencies and permit issuing authorities, border control, airports etc. In some countries there may be over 20 agencies involved in permit issuing and over 30 stakeholder systems

involved in implementing an ICT-based "single window" trade facilitation initiative. Increasingly, e-government projects are bumping up against technology policy issues that need to be addressed at the national level. For instance, interoperability policies often need to be addressed in order for proprietary systems at local and national level government units to "talk to each other." Secondly, e-government boils down to people using computer-aided business systems in ways that makes government more accessible, effective and accountable. Every stakeholder eventually asks either "What's in it for me?" or "Why should I be involved in this e-government project?" In this article we present three examples of successful e-government projects that have succeeded because they have addressed policy issues upfront and/or can easily answer the golden "what's in it for me" question. The three cases include: Nangi Village Outreach (Nepal), Nemmadi (Karnataka, India), and MK Connects (Macedonia).

Case 1: The Nangi Case - If You Build it They Will Come

The deployment of ICT services in Nepal is a daunting task, and particularly in the high mountains of western Nepal near the Anapurna range, where the challenges are particularly acute. Nevertheless, in September 2003 the village of Nangi, with 800 inhabitants and a tradition of doing almost all chores without automation, was connected successfully to the worldwide Internet³. This was the culmination of a five-year planning process - a cooperative venture among several villages to set up a group of relay stations, starting with Nangi and extending to Pokhara, the nearest Internet hub. While the villages were primitive, the technology used was modern, rugged and reliable. A dozen access points were connected to the dial-up ISP in Pokhara. Gradually till today dozens of more villages and other regions have been added to this network and a variety of Internet based services have been implemented with considerable success: telemedicine, online classrooms, improved communication and many more. The service has been so robust and continuously successful that a member of a parliament of Scotland complained that the Nangi Project developed by local volunteers was delivering a higher level of service in the mountains of Nepal than that available from British Telecom in the Scotch Highlands.

Since the original implementation five years ago there

¹ Heeks, R. (2003). Most e-Government-for-Development Projects Fail: How Can Risks be Reduced, Institute for Development Policy and Management, Manchester, UK.

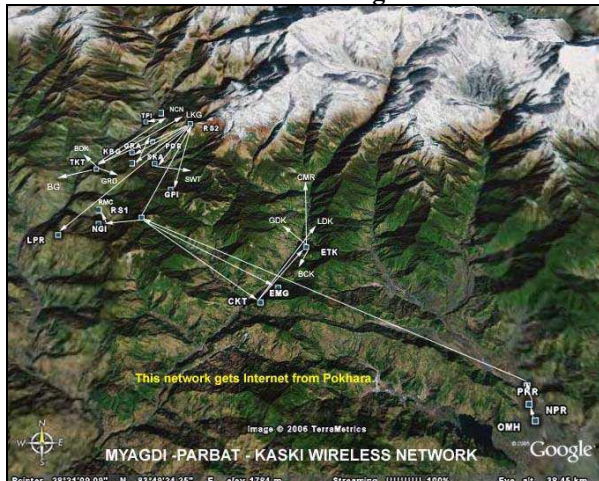
² World Bank, Global ICT Department, Task Managers' ICT Toolkit: Good Practice for Planning, Delivering, and Sustaining ICT Products, June 2003, Report No. 25919-A/B, Washington, D.C.

³ Ruth, S. & Giri, J. (2007, November). Defying the Odds: A Success Story from the Mountains of Nepal. Retrieved from <http://www.iimahd.ernet.in/egov/ifip/nov2007/stephen-ruth.htm>

has been a surprisingly rapid deployment of additional capabilities and applications. From one village, Nangi, in 2003, the number of installations has risen to 22 sites, including ten schools, a library and a hospital. The basic deployment approach has been extended to several other regions within Nepal, and support both from government and external agencies has increased substantially over the years. As the number of sites increases the applications are going up proportionately. A visit to the local homepage of the website "[nepalwireless](http://nepalwireless.com)" describes and helps you to discover the ways in which villagers are using the local network.

For example, Gandaki College of Engineering and Sciences helped develop an e-commerce application using open source software. Villagers can actually use this application to provide information about the products they have for sale. There is now a local bulletin board application which allows the posting of urgent information, news, announcements etc. This bulletin board also has user advertisements, attracting buyers and sellers. Also Kathmandu Engineering College has developed telemedicine applications which have been successfully connected with Dolakha Hospital, located about five hours bus ride away from Kathmandu Model Hospital. At the same time VOIP (Voice over IP) applications using open source software have also been developed for handling voice traffic. As of late 2008, the list of new applications seems endless -- there are special curricula being developed in the local language with the help of Open Learning Exchange – Nepal ([OLE-Nepal](http://OLE-Nepal.com)) using open source software for the "One Laptop per Child program" for second and sixth grade students in science, math, and English. Useful applications for villagers in the local language are also being developed by OLE-Nepal and have been made available through e-library. The application is platform free and can also be used in Microsoft Windows platform. The picture below shows the Network proliferation after the initial installation at Nangi. Nangi is shown as NGI and Pokhara as PKR.

Network Proliferation after Nangi Initial Installation



There are several reasons which make the Nangi case unusual. First of all, it was not initiated through government, NGO or multilateral interventions. Second, it was managed entirely by Nepalese local leaders, with assistance provided through skillful selection of outside helpers, mostly volunteers, from developed nations. There was no role of the USAID, UNDP or World Bank in the project. Third, the hardware used was top-of-the-line, and not a compromise among cheap or aging technologies. Fourth, the cost of the project was relatively modest, because there were no "middle-man" charges and because several equipment suppliers were so impressed with the Nangi concept that they gave large price concessions. Perhaps the most unusual aspect of the case is that the entire effort was not driven by an application, like licensing, taxation or finance. Instead, the idea for Nangi was, "if you build it they will come", the theme from the film "Field of Dreams". The connection was established, and the applications followed. The leader of the original project, Mahabir Pun, received the prestigious Ramon Magsaysay Award, sometimes dubbed the "Asian Nobel Prize", for Community Leadership last year in a ceremony in Manila in August 2007.¹

Case 2: The Nemmadi Case - For-profit Rural Business Centers Diversify into Service-led Employment and Village BPOs

The main aspects of e-government service delivery that can be addressed through technology are: inter-agency collaboration; the strategic use of technology for a *killer application*; security and privacy; data sharing; governance of cross-organizational initiatives; document and data management; and standardization of internal systems.²

The rural business kiosk project, known as "Nemmadi" in Karnataka is worth highlighting as successful for two reasons: (i) it is providing financially viable rural kiosks that are realizing 'development' benefits in terms of delivering government-to-citizen services (G2C) and business-to-citizen services (B2C), and (ii) *Nemmadi* is increasing employability prospects through education and rural Business Process Outsourcing (BPO) services. Introduced in 2004, it is too early for a comprehensive impact analysis of the *Nemmadi* model, yet early indications are that this public private partnership may distinguish itself in bringing network infrastructure, services and job opportunities to "the bottom of the pyramid."

¹ <http://www.rmaf.org.ph/Awardees/Citation/CitationPunMah.htm>

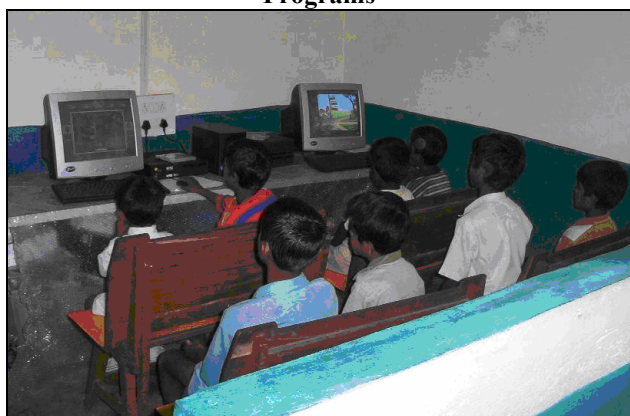
² Microsoft Schools of Government Initiative, in Collaboration with The Global E Team, Overview, July 2008, <http://www.globaleteam.com>

Nemmadi Kiosk Delivering G2C and B2C Services



The Nemmadi services are based on transactions per use, which allows a business based on volume rather than the high up-front costs that other telecenter models have difficulties supporting. The picture below is of the Nemmadi center at Indalawadi in Karnataka, an example of the Rural Business Center servicing local needs through access to e-Literacy programs.

Nemmadi Center Providing Access to e-Literacy Programs



The Karnataka government facilitates the *Nemmadi* project as part of a build-own-operate (BOO) model. “Nemmadi,” meaning “peace of mind,” in Kannada language, was coined by the Government of Karnataka. The role of the public sector is limited to providing data and strictly enforcing a competitively bid, consortium-based service level agreement (SLA) that has been established between the state government and three Indian private sector companies—Comat Technologies, 3i Infotech, and n-Logue Communication Ltd. The SLA specifies daily hours of operation, maximum wait time for services, and other metrics.

The business model for *Nemmadi* is based on a combination of support for scaling up the number of people reached through telecenters—a quantitative scale-up—increasing the scope of activities—a functional scale-up—and improving the organization’s effectiveness and efficiency of its core activities—an

organizational scale-up. One of the lessons of *Nemmadi* is that the one without the others is not sustainable. A company or consortium that has strong values—e.g., to provide universal access or e-literacy and e-governance services for people in rural areas—but is badly run, without proper attention to translating values into profits, will plainly not do well. A combination of a firm commitment to providing multiple services and strong commercial competence gives a good chance of success.

Offering multiple services allows capital and operating expenses to be amortized and spread across different services. The rural business centers are basically a network that delivers G2C services during the day, and B2B and B2C services after-hours in education, and BPO services. This is the functional scaling up. Comat is now also providing convenience services such as travel ticket booking, mobile top up and utility bill payments.

The G2C services include accessing the Record of Rights, Tenancy, and Crop Inspection (RTC, land record) data online and printing out the RTC, food coupons, issuing caste and income certificates, updating crop data, and utility payments. Fees are derived from a complex revenue model in which government has fixed different charges for different services, and these vary depending on the geographical location, season, service and extent of access to the back office databases. Issuing the RTC electronically has eliminated the village accountant who created, modified, and supervised handwritten manual records and the associated bribes.

What makes *Nemmadi* different from most models that currently exist is that its services are based on transactions/per use, which allows Comat to build a business based on volume rather than the high up-front costs that other models have difficulties supporting. To illustrate: 20 million land records divided by 167 *taluka* offices are 120,000 records per office. Priced at Rs 15 (US\$0.37) per RTC certificate, this averages Rs 1,800,000 (US\$44,830) per office in revenues. This is sufficient over time to cover operating costs, provide a modest return to state revenues, ensure good service levels and result in a profit-making proposition for Comat. For other private services, such as ticketing services and topping up pre-paid mobile phones, the revenue model includes origination fees and transaction costs.

From a few experimental pilots, the project is increasing the number of kiosks and numbers of people reached through the RBCs. As a measure of the success of the *Nemmadi* model, Comat, in collaboration with other state governments is rolling out another 5,000 RBCs in 2008 that will serve a population of approximately 1 million people.

Case 3: MKConnects - Macedonia School Internet Connectivity Case

The third example is the MK Connects case, linking hundreds schools and other institutions to stable Internet service in Macedonia. Like many successful IT projects it evolved easily across goals, technologies, and sponsors. The initial impetus came from a visit by the president of Macedonia to the People's Republic of China (PRC) in 2002 and a subsequent offer from PRC of broad-based computer assistance for the school system in Macedonia. With the early help of the PRC and Microsoft, other interested donors became major participants like: Government of Macedonia (GoM), its Ministry of Education and Science (MoES), and the U.S. Agency for International Development (USAID)¹.

What are ways to provide low-cost and sustainable broadband access to elementary and secondary schools dispersed throughout a developing country? How can policy and regulatory changes allow for use of new wireless broadband technology solutions and provide broadband connectivity not only schools but as an initial footprint for connectivity to a larger client base?

Under a telecommunications monopoly, 47% owned by the Macedonian government and 53% by a Hungarian corporation, and laws which inhibited the "legal" growth of the Internet market and Internet Service Providers, the challenge in Macedonia was to develop an Request for proposal (RFP) that would not outright deny the participation of larger providers but would encourage vendors to be innovative in their approach and minimize the participation of MakTel² in the overall scheme of broadband connectivity.

The winning bidder proposed a broadband solution for 430 selected schools. The underlying premise was that the eventual broadband pricing to those schools will be tied to the lowest cost broadband solution commercially available when the project ends. This meant that if a 256K broadband solution is available from another provider for \$75 USD a month (unsubsidized by any government entity) then the schools would pay a similar price. This forced the winning bidder to place an emphasis on commercial, governmental and home users in order to balance out expenses. In other words while the schools may provide 40% of income and utilize 60% of the resources, the other markets may provide 60% of the income and utilize 40% of the resources. The vendor building out the network was also required to add three rural schools for every one urban school location. Based on cost averaging, once the vendor builds the infrastructure to a distant location in Macedonia it

would be no more expensive to deliver a packet from that point than from an urban center

The cost of this project was substantial, and the results excellent. To leverage the computer donations from PRC and Microsoft, USAID spent an additional \$1.3 million in for installing 5,300 computers and 300 printers and another \$400,000 for training 4,000 teachers. This amount does not include administrative time for any of the participating donors. In addition, it became clear that security insurance, and maintenance costs needed to be considered more carefully, leading to a more sophisticated approach to gaining agreement at each school for responsibility and for upkeep and administration of the network.

Leveraging private sector investment, dot-ORG, the contractor selected in 2005 to manage the project for USAID, helped create the world's first national wireless broadband network. The MK Connects project officially ended on December 31, 2007. In November 2007, MK Connects was named a finalist of the third annual W2i Wireless Communities Best Practices Award. Other measures of success were: dramatic increases in overall Internet use (now at 47%), household computers (32%) and household connections to the Internet (17%). Over half of the current Internet users in Macedonia, many of them young people, signed on during the past two years.

A key advantage of this successful deployment of Internet to schools in Macedonia is its scalability. The aim was to empower both urban and rural areas so the resulting numbers of users throughout the country increased the probability of sustaining the initial systems. With hundreds of systems in place it is easier to trouble-shoot and add features. The contractor for the project, On.Net, reduced the unit costs significantly.

Summary: Why These Projects Were Successful

It is regrettable that the percentage of successful E - Government projects worldwide is not higher. Heeks' estimate of only 15 percent may be too severe. But the examples we describe here are in that special group. What characteristics can be found in these three successful projects that distinguish them from the rest? First, as mentioned in the introduction, it is crucial to achieve interoperability - both technical and administrative. The computers have to talk intelligently to each other and so do the affected agencies and stakeholders. Even in the rural Nangi case, it was essential to have interoperability at the hub station as well as the dozens of small villages connected to the wireless network. Second, each of the three cases had a very specific focus with respect to clients, region, and technology use. Third, there was an organized, cooperating cadre of donors which were

¹ <http://http://www.mkconnects.org/index.html>

² MakTel is a national telecom operator providing public telecommunication services in the Republic of Macedonia.

able to coordinate their activities toward the major goal. Fourth, there was good publicity in various international media outlets throughout the life of the projects, not only increasing their credibility, but also ensuring greater donor support. Fifth, there was recognition that equipment donations involve additional costs that must be planned for. In the Macedonia case about \$2 million additional investment was needed to leverage the generous donation of computers and software from PRC and Microsoft. Sixth, in each of these examples it was possible to measure results with reasonable clarity and accuracy. In the Nepal case, arguably the simplest of the three, the number of villages connected and the hours of use was a simple but realistic metric. Finally, as mentioned in the introduction, it is crucial for each stakeholder to appreciate the *cui bono* question. Who benefits? In the three cases we have cited the beneficiaries are citizens who are assisted by the systems, not bureaucrats or faceless agencies.

E-government in Malaysia: Barriers and Progress

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INTRODUCTION

Since the 1990 announcement of the e-Government initiative for Malaysia, tremendous effort has been made to enhance service delivery via electronic means. Most apparent is the construction of facilities and amenities to support the electronic flow of information to the public. Unfortunately, institutional and organizational progress was not equally robust. This deficit has lessened the effectiveness of information delivery to a certain extent. Another factor, which slowed the progress of e-information delivery, was the unequal accessibility and affordability of computers and Internet services. Access to computers is important because not only are computers information devices in their own right, but also because access to computers is the main factor for evaluating access to Internet. Access to Internet is important because it is the electronic linkage to e-services. On the ground, the visibility of e-services at first tier level agencies, that is, ministerial departments, reveals the disparity in access to Internet. The disparity is also apparent when one looks at agencies requiring minimal inter-agency collaboration and integration. In general, there has been only partial achievement of the core objective of e-Government, which is to deliver services to the public effectively and efficiently. To substantiate these observations, this study examined the e-Government

rankings produced by three institutions, the United Nations, Brown University and Waseda University. Interestingly, these institutions gave Malaysia varying rankings. One explanation for the variance was the use of differing definitions and methodologies. Knowing this fact, one should use e-government rankings with reservation.

The current research has two aims: First, to explore the nature of e-Government challenges and achievements from within Malaysia; and second, to review and understand e-Government rankings given to Malaysia by international research institutions.

To address the first aim, web surveys were carried out on 71 agencies within Malaysia's 281 ministries (this occurred after the Brown University Survey). In addition, questionnaires were distributed to probe accessibility, administrative, and management policy matters. Detailed probing was performed on 7 e-Government pilot projects. This exercise adopted some of the Waseda and the United Nations' approaches. Finally, references made to the Information Communication Technology (ICT) national policy, budgeting and strategies, were collected from various sources namely, Malaysia's Five Year Plans, Malaysian Communications and Multimedia Commission (MCMC) reports, United Nations Development Programme (UNDP) and World Bank reports.

To address the second aim, the study explored the e-rankings of Malaysia as determined by the three institutions. The exploration began by outlining the objectives and the criteria used by each of the named institutions in producing e-Government rankings. Malaysia's placement in the rankings as assigned by each of the three institutions was compared at two levels. The first level of investigation involved the comparison of the three institutions' rankings. The second level of investigation looked at the rankings from a human and economic development perspective. Malaysia's Human Development Index (HDI) position was compared to the positions of those countries that were given the same e-Government ranking as Malaysia by the three institutions. However, before discussing Malaysia's e-Government in relation to other e-Government development, a brief account of e-Government development process from various perspectives, is outlined below.

MALAYSIA e-GOVERNMENT

Malaysia's e-Government initiative was launched to improve government internal operations, that is, the speed and quality of policy produced, coordinated, enforced and implemented. Secondly, the initiative aimed to enhance the convenience and accessibility of interactions between government and citizens, and

between government and businesses. In line with this aim, government therefore must improve its internal communications, and this is allied to many elements, some of which are infrastructure, telecommunication lines, human factors such as skill and culture, organisational structure, and institutional factors, such as understanding between agencies.

There is no definitive date as to when the Malaysian e-Government initiative was launched. A possible date is 1996 following the launching of the Multimedia Super Corridor (MSC). This e-Government initiative was one of the seven (Telehealth, Multi-purpose Card, Smart School, R&D Cluster, Technopreneur Development and E-Business) flagship applications introduced to set off the development of MSC.

Broadly speaking, the structure of e-Government consists of two key committees. There is a steering committee with representatives from key policy level agencies. The steering committee's function is to provide policy direction and approval for e-Government programmes and activities and to monitor implementation progress of e-Government projects including pilot projects. The Government IT and Internet Committee's (GITIC) function is to facilitate and coordinate ICT development in the public sector. In addition to the two committees, there was a strategic team established to review/study the setting of Malaysia's e-Government.

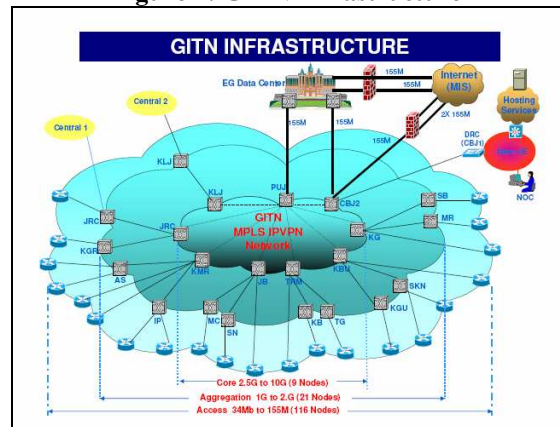
Infrastructure Supporting Malaysian e-Government Applications

While people were starting to learn about Malaysian e-Government in the 1990s, the framework to support the applications had already commenced as early as the 1980s. Advancement of technology enhances the creation and dissemination of information, which in turn improves public knowledge for the betterment of individual livelihoods and national development. Thus, as people in Malaysia became more aware of the potential benefits of e-Government, they increased their demands for integrated government that would promote efficient and effective service and goods delivery. For example, in the case of land data, many user communities have come to realize that the disorganised geo-spatial information is the main cause for ineffective planning and development mishaps. In response to the demands, the government has pushed relentlessly towards system integration and the doing away of stand-alone systems.

One concerted effort towards integration came via the construction of a telecommunication infrastructure. This infrastructure could support inter- and intra-governmental agency communication and introduced the Government Integrated Telecommunications Network (GITN); please see Figure 1. The implementation of GITN set in motion the e-

Government applications. It enables the integration of networking and the channelling of information flow in the public sector and improves the efficiency and effectiveness of inter-departmental and intra-departmental communication.

Figure 1: GITN Infrastructure



Source: Nik Azmin Nik Hussain, 2006.

E-Government Hub

Through the development process, the Malaysian government has learned of fundamental administrative innovations, such as the establishment of one-stop-shops that offer a range of services from agencies to departments to citizen groups. The services can be offered either over the phone, or via the Internet, or via 'front of house' office service. However, these establishments cannot work without the necessary investment in IT. The government has spent approximately US\$9 billion of public funds to develop the country's IT infrastructure and amenities (EPU, 2006).

Among the key expenses was financial support to the Putrajaya Campus Network (PCN). The core technology of PCN is Asynchronous Transfer Mode (ATM), which has the capability of integrating voice, video and data into a single network. The bandwidth available at the core of PCN is OC-3 or 155 Mbps. Shared Services Outfit (SSO) provides the planning and operations arm for PCN. SSO manages the migration of Government agencies and ministries to Putrajaya, ensuring that the new buildings' network designs integrate well with the existing PCN. SSO also performs the daily monitoring and maintenance of PCN to ensure network availability to its present users. Operationally, PCN currently supports approximately 16,000 users for 58 government agencies and ministries.

E-Government Infrastructure: Telecommunication Services

Malaysia telecommunication services started in 1974. Known then as Jabatan Telekom Malaysia (Department of Telecommunications Malaysia) - now TMNet- it was the main service provider. Over the years, few other service providers received licences.

While five operators now have licenses, TMNet still controls the fixed line sector. At the end of 2000, TMNet owned 4574 million of Malaysia's 4628 million fixed lines in service, accounting for 99 percent of the market. TMNet services however lessened during the Asian financial crisis. In the years following the crisis, there was market saturation with mobile phones and the associated changes to consumer behaviour.

The Malaysian mobile phone industry has gone through several up and downs since its introduction in 1985. Like fixed line telephone, the industry stagnated during the financial economic crisis but managed to rebound by 1999. Growth has been such that the number of mobile subscribers surpassed the number of fixed telephone users in 2000. The Wireless Access Protocol (WAP) mobile phone service began in 2000, while General Packet Radio Services (GPRS) commenced in 2001. During the 1980s and 1990s, telecommunication operators competed intensely for mobile services. Competition reached its peak following the launching of five new GSM networks in 1995. By the end of 2000, Malaysia had 8 cellular networks owned by five companies.

After recovering from the economic crisis, cellular phone subscribers increased to 72 per 100 inhabitants. However, the penetration rate for fixed line remained low at 16.1 per 100 inhabitants. The MCMC's survey found more than half of the respondents (57.5%) reported that they do not have a fixed line in their residence. Of those with fixed lines at home, as many as 50.7 percent reported an inclination to use the hand phone over the fixed line phone. MCMC concluded that the reason for not owning a fixed line was cost related (MCMC, 2004). The finding was however not in line with Minges and Gray's (2002) observation. According to them, the cost of owning a telephone was less than two percent of household income. MCMC suggested that the real reason is probably related to the cumbersome requirements for fixed line application and the pull from mobile phone. There is no clear factual evidence to support the findings of either party. But the pull from mobile phone due to its size, flexibility, number of services available - sms, voice etc - and of course its transportability, may well explain the preference for mobile rather than fixed line phone.

E-Government Infrastructure: Internet

The incumbent Telekom Malaysia Berhad has a strong hold over Internet development also. JARING (Joint Advanced Integrated Networking) was Malaysia's sole Internet Service Provider for Malaysia until July 1996 when Telekom Malaysia Berhad, later to be called TMNet, received a license. The market remained a duopoly until the year 2000 when additional licenses were granted. However, while there was a

liberalisation of the ISP market TMNet remained the strongest player. In June 2001, TMNet had 1.05 million subscribers, claiming 70 per cent of the Malaysian market and making it the largest ISP in South East Asia.

Despite having the technology, Internet penetration was low. There were several attributing factors. Malaysia has the second lowest dial-up Internet prices in South East Asia just above Singapore. To some ISPs, the rate is not cost effective, especially since they have to cater for all parts of Malaysia. Another reason is a low level of local broadband access to the Internet. Apart from the business sector, few homes or small businesses had high-speed access at the end of 2000. Several factors contributed to this situation. First, there was limited wireless technology. Secondly, while on the one hand the TMNet Internet service was unreliable, on the other hand alternative ISPs were not willing to invest in infrastructure to support Internet services. Instead, they depended on TMNet infrastructure and this to some extent discouraged TMNet from improving its infrastructural capability. Thirdly, for TMNet to permit its competitor ISPs to use its infrastructure was highly cost ineffective and inconsistent with its development plan. Resultantly, the decision making of the telecommunication regulator MCMC came under question. According to TMNet, MCMC was too lenient towards promotion of independent telecommunication infrastructure for competing ISPs. Fourthly, according to TMNet officers, Streamyx subscribers lacked knowledge of network interface. Often residential/office configuration and network hardware connections were the source of Internet disruption or problems and not the TMNet line.

Therefore, although the number of Internet subscribers more than doubled, penetration was low. For example, in 2004 Internet penetration per 100 inhabitants was 1 percent. In 2005, there was another doubling of subscribers, lifting broadband penetration to just over 2 percent. In 2006, there was an 80 percent expansion, which lifted penetration per 100 inhabitants to just over 3 percent. This represented a household penetration of around 11 percent. Malaysia remained well behind the regional leaders where broadband household penetration was typically running at above 50 percent.

The following section looks into the e-Government profile of Malaysia based on the findings of the Brown University, Waseda University, and the United Nations. The initial date of commencement of the e-Government survey varies among these institutions. The Brown University has data from as far back as 2001 and the United Nations from 2002. The Waseda University Institute of e-Government however commenced its study in 2004. Therefore, for the

purposes of comparison and synchronization this study chose 2004 as the comparative start point for all three institutions.

MALAYSIA e-GOVERNMENT PERFORMANCE

Studies of International Institutions for e-Government

The Centre of Public Policy, Brown University survey (West, various years) studied the features that are available online at national government websites. The study analysed websites' material. This included: contact information that would enable a citizen to find out who to call or write to at an agency to resolve a problem; material on information services and databases; features that would facilitate e-Government access by special populations such as the handicapped and non-native language speakers; interactive features that would facilitate outreach to the public; and visible statements that would reassure citizens about privacy and security over the Internet. The study involved 2,288 national government websites from 196 nations around the world including a wide variety of political and economic systems offices. It included executive offices (such as a president, prime minister, ruler, party leader, or royalty), legislative offices (such as Congress, Parliament, or People's Assemblies), judicial offices (such as major national courts), Cabinet offices, and major agencies that serve crucial functions of government. Functions such as health, human services, taxation, education, interior, economic development, administration, natural resources, foreign affairs, foreign investment, transportation, military, tourism, and business regulation.

The Waseda University Institute of e-Government approach (Waseda, various years) focused on the core of the administrative and financial reform, that is, its effectiveness, productivity, and usefulness to the citizens. The study used six areas and 28 indicators. The first area was network preparedness, which included Internet users, broadband users, mobile users, personal computer users, and security systems. The second area required interface functioning applications including online applications, e-tender system, e-tax system, e-voting system, e-payment system and user-friendly interface. The third area, management optimisation, included EA-ICT investment, system optimisation, integrated network system, administrative and budgetary systems, and public management reform by ICT. The fourth area, homepage indicators, included updating frequency, public disclosure, link navigation system, multi-language correspondence. Finally, the fifth area was, chief information officer (CIO), and its indicators included introduction of CIO, Human Resource Development (HRD) for CIO, supporting body for CIO, role and function of CIO, and promotion of e-

Government, that is, priority of e-Government planning and strategy, promotion activities, legal framework, and evaluation system.

The United Nations survey (United Nations various years) incorporated human capacity, citizens, including young and old, business and commerce, politicians, public administrators, programmers, end-users, infrastructure development and access to information and knowledge. The study looked beyond the availability of online services. It looked at the methods of delivery and the capacity of a country to absorb content and services. It applied components of subjective and normative research asking questions of what is, and what should be? The broad objective of the United Nations e-Government index is to offer insights into e-Government development strategies and themes among regions and across regions. Specifically, their survey aimed to provide a comparative assessment of the willingness and ability of governments in the use of e-Government and ICTs as tools to deliver public services. Secondly, the survey aimed to be a benchmarking tool for monitoring countries' progress towards higher levels of e-Government service delivery.

E-government Ranking for Malaysia

Scores produced by the three institutions carry different meanings. Apart from different emphasis on study objectives, the surveys used different methodologies. This fact notwithstanding, output of each study enhances understanding of a country's e-service performance.

The Brown University survey placed Malaysia at rank 84 in 2004. Ranking dropped to 154 in 2005 moved up remarkably to 39 in 2006 and improved further in 2007. Rankings provided by the United Nations were generally constant, placing Malaysia at rank 42 in 2004 dropping one point in 2005 and 2006 and moving it up 10 points in 2007. Similar to the United Nations, scores given by Waseda University did not oscillate much. Malaysia was at rank 9 for two consecutive years dropping a few points in 2006 and 2007, Table 1.

Table 1: E-government Ranking for Malaysia, 2004-2007

Survey Year	Brown University	Waseda University	United Nations
2004	84	9	42
2005	154	9	43
2006	39	14	43
2007	25	15	34

Brown University Findings

In 2004, Brown University's rating for Malaysia's e-government performance was comparable to The Sudan, Andorra, El Salvador and Afghanistan. In

2005, Malaysia's rating was comparable to Rwanda, Mauritius, Samoa and Kenya. These ratings imply that despite a comfortable income and reasonable HDI, Malaysia was not using its income to improve e-services. Conversely, The Sudan and El Salvador, for instance, despite their low GDP and low HDI rating were allocating attention to e-services. In 2006 and 2007, Brown University's rating indicated that Malaysia's performance improved incrementally placing it at rank 39 and 25 respectively. This improvement places Malaysia's performance as comparable to advanced countries like Finland and the Netherlands.

Subsequently, elements that constitute the ranking were checked. The 2004 survey reported a score of 100 percent on online services; it dropped to 0 percent in 2005, moved-up to 44 percent in 2006 and dropped to 63 percent in 2007. Similar irregular shifts were found in publications and databases. Databases scored 0 percent in 2004 and 2005, increased to 44 percent in 2006 and dropped to 25 percent in 2007. A summary of Brown University's survey pattern for Malaysia is shown in Table 2.

Table 2: Malaysia' Performance for the period 2004-2007 (Based on Brown University E-government Survey)

Survey Year	Online Services	Publications	Databases	Privacy Policy	Security Policy	W3C Disability
2004	100	0	0	0	17	17
2005	0	100	0	0	0	0
2006	44	89	44	11	11	0
2007	63	100	25	38	38	0

Source: West Various Years

Waseda University Institute of E-government Findings

Malaysia's e-service was placed at rank 9 in 2004 and 2005; this grouped Malaysia with Hong Kong, Japan, Australia, Sweden, Finland, Singapore, Canada, and the USA. In 2006 and 2007 ranking dropped to 14 and 15 respectively, but Malaysia remained among the ICT advanced countries. Overall, all four surveys of the Waseda place Malaysia among countries with high GDP Per Capita, that is, among countries with GDP Per Capita of approximately 50 percent more than Malaysia. This finding says that Malaysia has performed relatively well in converting available economic resources towards ICT development, in particular enhancing its e-services to the public. Indeed these results disagree with the Brown University's findings.

United Nations Findings

The United Nations placed Malaysia in rank 42 in 2004, 43 in 2005 and at 34 in 2007. All three surveys place Malaysia among countries with equivalent HDI ranking as well as income level.

Analysis of the Three Rankings

Of the three studies, the Waseda University and United Nations portray the most reasonable view of Malaysia's e-government performance. The Brown University findings on the other hand placed Malaysia's performance extremely low in comparison to its investments and programmes. One would think the cause of such findings was the methodology used, which appears overly simplistic in comparison to that of Waseda and the United Nations. Notwithstanding this technical explanation, the writer has taken the initiative to verify the three institutions' findings based on activities and investments during the survey period – 2004 to 2007.

Based on the Fifth Malaysia Plan Report (2004), ICT investments and implementation were progressing steadily during 2001 to 2005. According to the Plan in those years, 2001-2005, government embarked on efforts to position Malaysia as a regional as well as an ICT and multimedia hub. Among the action taken was the promotion of a competitive environment for ICT and multimedia industries. The effect of the initiatives was the growth of many advanced value added services, including voice, data and text based applications as well as market expansion for electronic based contact and data centres. The spill over extended to companies operating in the multimedia super corridor and pushes for tariff upgrading for leased line communication services. Internet backbone infrastructure was also increased (by JARING) to 2.5 gigabits per second transmission speed.

The Malaysia Plan (2001-2005) also reported completion of ICT infrastructural expansion to rural and remote areas. In terms of basic telephony, such as Internet services, the government allocated the Universal Service Provision (USP) fund. The fund enables a considerable number of districts as well as rural schools access to fixed line. The plan also reported ICT expenditure provided to various economic sectors for ICT systems and processes, as well as the increment improvement of web-based applications.

Usage of ICT also expanded into the government sector. One of the expansion efforts was the introduction of the ICT strategic plan to improve linkages between government agencies, businesses and citizens. Online education and training were also undertaken during the Fifth Plan period. One of the actions was the introduction of the Malaysia Grid for Learning (MyGfL), which served as a repository and directory for sharing of digital content. In addition, the National e-Learning Consultative Committee (NeLCC) was set up to provide direction and monitor initiatives pertaining to formulation and implementation of strategies and programmes.

These efforts improved Malaysia's e-government development. Waseda University in line with its methodology picked up these variables as positive development indicators. The variables were also considered in the United Nations survey. In line with its methodology, the United Nations study also explored beyond counting availability and probed into the effectiveness of service delivery to the public (G2B and G2C), as well as usefulness of the e-service to the public (G2B and G2C). As discussed in the earlier part of this paper, due to various technical and institutional reasons, Internet penetration in Malaysia is still low despite extravagant expenditure on infrastructure. The biggest portion of the budget is aimed at enhancing ICT, which has continuously emphasized closing the digital divide and upgrading accessibility to the citizens in general. Aggressiveness in promoting ICT has not achieved the level of effectiveness in line with e-service requirements.

Even so, this state of development does not imply that performance was static or badly performing as indicated by Brown University findings. The following section examined the status on the ground from the perspectives of users and managers, and through the examination of 28 ministerial websites.

SAMPLE STUDY

The exploration of e-service performance utilised some aspects of the Brown University, the Waseda University and the United Nations' approaches. The objective of this section is to rationalize the three institutions findings from local perspectives of e-government development in Malaysia. This section outlines the approaches that were taken to produce information for this section. Overall, 71 officers participated in a questionnaire survey carried out in the 28 ministries. The questionnaire collected information on structure, means of communication within the organization and with other organizations, administrative issues covering matters on accessibility to computers, Internet and Intranet. Interviews were also carried out on 7 pilot project managers. Finally, web searches were carried out on the 28 ministries' websites.

Status of Accessibility

The basic communication media of e-government is accessibility to a computer and the Internet. According to the survey sample, 80.3 percent of ministries' staff had access to Internet. At department level, 13 percent had no access and 4 percent of departments were still without Internet access. With regard to websites, all 28 ministries have a website. However, the stages of development among the 28 websites vary. 85.9 percent of departments within ministries have an official website. Among departments without a website, 10 percent were planning to have it and less than 2

percent had no plan to develop a website.

Corresponding to the above questions, this study looked into the development level of the ministerial websites. In line with the United Nations definition, a service is an e-service when its entire transaction occurs online. This study found only five ministries offering online services. These were the Ministry of Health, Ministry of Higher Education, Ministry of Youth and Sports, Ministry of Information, Ministry of Home Affairs, as well as Internal Security. Most ministries were offering access to a range of services within their ministries and linkages to other government institutions. They offered specialised databases, downloadable forms and applications, but they do not allow forms to be submitted online. In accordance with the United Nations' categorisation of e-government development, the majority of ministries were in stage 2 of e-government development or having enhanced web presence. There were no ministries at stage 1 the emerging web presence stage, or stage 4 the transactional, or stage 5 the seamless web presence stage.

Level of Effectiveness

All ministries were at either level 2 or 3 implying they all carry the basic features like contact details (telephone, address, email, etc.), links to government sites, office location and a staff directory. This study also found 83 percent of websites email effectively, allowing comments, feedback, and queries to officials. A search feature was also common, allowing web visitors to search for information, such as names of relevant officers, areas of interest, etc. before proceeding with their official communication or transaction. The outreach feature avenue allowing two-way communications between citizens and officials and official to citizens was also common. This study also checked on responsiveness to email. Thirty percent of 28 ministries replied within the same day, 50 percent within a few days and the remainder took more than 30 days.

News on current and up-coming events were considered as essential for creating awareness on the ministries' activities and where necessary draw in participation; all sites offer this approach. Most sites offer specific ministry-related publications and general relevant government policies and guidelines for viewing and downloading. Furthermore, all web pages were bilingual using Malay and English languages, the Ministry of Tourism also offer a greetings message in Mandarin.

All sites have no links to commercial products or services except to government-linked companies. For example, the Ministry of Tourism has linkages to government hotels. However, these links only offer room reservation. In short, things advertised on

government websites were products of ministries and its subsidiaries. For example, the statistics Department of the Prime Minister's Department offers for sale publications on population and business census. The Department of Mapping Malaysia, under the Ministry of Natural Resources and Environment offer digital and analogue maps for sale. To date, online purchase transaction has not materialized, because legislation on Internet security is still in its infancy. Privacy and security signage pasted on all ministries' sites were merely formality.

Having completed the website findings, this study examined staff's general perceptions of Malaysia's e-government prospects; please see Table 3. Except for a few, the majority expressed belief that their offices are committed to e-government development. This view is in line with an initiative taken by the government to move towards fully integrated web presence.

Table 3: Priority of E-government

In your opinion, how high of a priority is your ministry/department's commitment to e-government?		
	No	%
Of a highest priority	13	18.3
Of a high priority	37	52.1
Of a moderate priority	16	22.5
Don't know	5	7.0
Total	71	100.0

Strategies that aimed towards materializing the initiative were already being underlined in the Ninth Malaysia Plan (for year 2006 to 2010). Among these strategies is the strengthening of ICT development in government-linked companies. This initiative was established to effectively promote public agencies' products and services to the wider market via their government-linked companies. For example, small and medium enterprises are given ICT-related financial funds by the Malaysian Technology Development Corporation (of the Ministry of Entrepreneur and Co-operative Development) as well as the Small Medium Industries Development Corporation (of the Ministry of Trade and Industry) to accelerate their production of their services. Furthermore, in the plan period 192 ICT-related R&D projects were approved under the Intensification of Research in Priority Areas (IRPA) programme amounting to USD 15 million. Some of the projects already approved are network monitoring, wireless communications and grid computing infrastructure.

SUMMARY

The United Nations e-government survey looks beyond the availability of online services. It also looks at the methods of delivery and the capacity of a

country to absorb content and services. The study explored the questions of what is and what should be e-government. The index it produced is a composite of three indices: the web measure index, telecommunication infrastructure, and the human capital index. The Waseda University Institute of e-government focused on administrative and financial reform, that is, on effectiveness, productivity, and usefulness of e-services to citizens. Six areas were investigated to produce its e-service index. The Brown University evaluated national government websites for the presence of features dealing with information availability, service delivery and public access. The focus of all three studies was on the performance of e-government in delivering services to the public. However, the depth of each study differs in intensity. Therefore, because of this element, e-government ranking produced by these institutions cannot be straightforwardly compared.

The state of ICT development and e-services of 28 ministries explored in the current study was subsequently used to evaluate the findings of the three institutions. The Waseda University usage of six areas placed Malaysia among countries with high GDP per Capita and simultaneously among countries with high ICT investment. This finding is in line with Malaysia's pattern of development. The Malaysian e-government became public knowledge in the 1990s, but the framework to support the applications commenced as early as the 1980s. From this period on government pushed relentlessly towards supporting inter- and intra- governmental agencies' communications. The government has spent for IT infrastructure and amenities approximately US\$ 10 billion.

The United Nations study places Malaysia in the mid-range level; comparatively aligned with its HDI and telecommunication infrastructure indices. Combinations of these indices reflected the performance of e-services. Generally, only a handful of public offices' websites was offering online services. The majority of websites were still limited to offering one-way information to the public. This finding shows there are communication barriers that need improvement. There were some departments within ministries still without websites. There were also deficits in accessibility to Internet among departments and street-level officers. Communication devices among citizens were only partially sufficient. IT infrastructure and amenities is spreading to rural and remote areas but this has been slow. IT strongholds are still located within the administrative capital of Putrajaya and major urban centres. Besides, Telecommunication industries were not able to balance the corporate interest against the interests of customers. Internet hook-up cost therefore is relatively high for a large sector of the society. Quoting Spears et al (2000) this situation is called the 'triple A' vision of

Internet – affordability, access and anonymity, is not affordable enough, accessible enough or anonymous enough for everyone.

The Brown University surveys painted a different picture for Malaysian e-services. In 2004, online services were rated at the top - 100 points - however, it drastically dropped to zero in 2005. This implies that in 2004 surveyed websites were fully online and in 2005 these sites totally stopped providing online services.

Overall, the United Nations' has given a realistic picture of Malaysia's present e-government standing. Citizens in urban areas are still squabbling over unreliable Internet access. Citizens in remote and rural areas generally are still waiting for access. Rigorous effort is being undertaken by the telecommunication industries and regulatory agency to bring Malaysia's e-government development to a higher path. However, for the present time, the digital divide between those with and without Internet access is still apparent.

According to the people that run the e-government programme, there is cultural resistance to e-government development. The resistance comes from a lack of confidence in new technologies among users. As Spears et al. indicated the government has not been able to show clear benefits in terms of time, money, or an increase in quality from e-service delivery, and the possible transaction costs that may result from such change.

The transaction costs of change, of transition to using an electronic medium, can create a strong initial barrier for citizens to adopt electronic communication with government, as indicated by some studies (Burrows, 2000; Spears et al., 2000; Thomas and Wyatt, 2001). For people to change, an established way of doing something (such as filing a paper income tax form) and instead adopting a new technology or channel of communication (such as sending in an electronic tax form) there is a substantial immediate cost. That is, the cost of finding relevant information, the time and possibly frustration costs of learning a new way of doing things, the cost of putting right any mistakes produced by unfamiliarity and so on.

Institutional barriers relates to organisational mental and legal background. Mental resistance refers to public servants, especially those at street level who are motivated to resist the downgrading of their jobs through information infrastructures, and through a knowledge management approach, which does not allow them any form of discretion. Legal resistance comes from the fact that ICTs lead to blurring of boundaries between organizations. When information is shared between parts of public administration, responsibility for the authenticity, accuracy and

integrity of the information also becomes blurred. In addition, the boundaries of the jurisdictions, that is, the exclusive authority of an actor as a unified entity to determine rights and obligations of citizens in a task domain with a certain degree of discretion for which this actor is legally and politically accountable also become blurred. Therefore as NOA (2002) put it, some organisations cannot 'let go' of the traditional formal delivery approach. This is because people can be unwilling to cooperate, because different rules of thumb and directives govern people in differing organisations. Having made obvious the state of Malaysia's e-government development, it is now incumbent upon the author to ask what could make things better.

CONCLUSION: WHICH PATH TO CHOOSE?

There are many ways to characterize the development of e-government. The United Nations, as an example suggests a few. Among these are the wasteful approach, one that engages resources but does not result in optimisations of government operations. Another is the pointless approach, even if government operations are optimised they may have no (or only minimal) effect on the development objectives preferred by society. Another is the meaningful operation, where a government operation is optimal and supports human development, that is, empowers people/raises human capabilities, and in this framework; equips people for genuine participation in the inclusive political process; and supports values.

The writer sees Malaysia as walking along the third path. This means Malaysia has successfully progressed from path one and two in her early years of ICT activities. Currently, the government has allocated an extravagant sum, about US\$10 billion for ICT, infrastructure, and amenities. The plan is expected to materialise by Malaysia Plan 10 (2010-2015).

However, room for improvements are still very wide. One area is secrecy and accountability. Secrecy and accountability gave power to Internet to deliver and receive fast, efficient and unbounded information, when dealing with the public sector. Unlike the private sector, government departments and agencies are bound to many rules and regulations in handling and liberating the vast information in their holdings. Especially, decisions to liberate information require tedious inter- and intra-departmental agreements and endorsements usually by ministers or elected politicians. This matter must be improved to ensure useful information could be delivered to citizens effectively and efficiently.

Other elements are on regulations and policy environment. The introduction and uptake of e-government services and processes will remain

minimal without a legal equivalence between digital and paper processes. For example, the legal recognition of digital signatures is necessary if they are to be used in e-government for the submission of electronic forms containing sensitive personal or financial information. Additionally, current public governance frameworks based on the assumption that agencies work alone (for example, in terms of performance management, accountability frameworks, data sharing) can act to inhibit collaboration and information sharing between organizations. According to Lau (2003) complexity of regulations and requirements on agencies can be another barrier; if agencies are unable to determine what is required of them, they may be unwilling to invest in a project that may not conform with requirements. In addition, privacy and security concerns need to be addressed through appropriate legislation and regulations (as well as in practice) before e-government initiatives can advance. The web of government requirements around ICT procurement, industry support, contract requirements, compliance with security requirements and other standards can increase costs and drag out implementation timetables.

With regard to policy environment, to realise e-government's initiatives, old laws have to be changed and new laws are needed. This view is in line with Caldwell who sees that implementation could be successful if legislators learned new technologies and unlearned old approaches.

Another area is context, while this is improving incrementally, work is still needed to give it a unique "Malaysian look." In addition to between country heterogeneity, there is also the issue of within country differences. For example, government websites of Taiwan and the Republic of China depict images unique to themselves. This means e-government approaches do not have to be the same, they must be determined by each country according to its own needs.

"It would be a mistake, though, to conceive the interrelation between technology and context as some kind of simple duality.... The context of invention is not the same as the context of design, which is not the same as the context of deployment...these differences are fundamental to the outcome of e-government projects.... e-government technology must therefore be seen not in a uni-dimensional, reductionist manner but in a systemic manner as a group of related dimensions that are drawn from the context within which that technology is designed" (Heeks: 2004, 7-8).

Further Suchman, (1987: viii) emphasised that e-government design is a situated action – an action "taken in the context of particular, concrete circumstances." This action draws elements of that

context into the design because "technologies mirror....societies. They reproduce and embody the complex interplay of professional, technical, economic and political factors." (Bijker and Law, 1992:3).

In accord with Suchman this paper is of the opinion that e-government development in Malaysia is relatively progressive and its ability to excel beyond the present level is clearly assured at least from telecommunication infrastructural support. However more efforts are needed to improve the government machinery that operate and service the system. Finally areas that require attention are integration, security, regulation and context.

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How Web 2.0 is Changing the Basic Character of the Internet

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Technology is a gradual leveler; it gets created by a select, knowledgeable few, while remaining an enigma to others. Only when applications using a particular

technology percolate down to the masses and start helping them do things faster, better, cheaper, etc. does it become an agent of social and economic change. Consider the case of the computer. Fifteen years ago, the most commonly accepted definition of the computer was - "it is a data processing machine". That definition while being technically correct has little practical relevance in today's age, when the computer is a data cruncher, an entertainment hub, a communications device et al.

Similar is the case with the Internet. It started as a means of sharing information for academic and military purposes; soon became the backbone of business communications. Now the Internet is getting social - people have taken center stage and technology has taken a backseat. The Internet is slowly but surely becoming an inseparable part of our lives, as it becomes our primary device for "ICE"- information, communication and entertainment. And a good indicator of this trend is the emergence of the new wave of the Internet, often referred to as Web 2.0. Web 2.0 is like a refurbished version of the Internet. While Web 1.0 (or the erstwhile Internet of the late 1990s, early 2000s) was still focused on technology, Web 2.0 is far more humane - it focuses on people and how they can collectively influence its developing character. Little surprise then, that the international person of 2006 chosen by the Time Magazine³ was "You" - the individual at the center of the current paradigm of the Internet.

The Internet's basic character is changing. And a good way of understanding this change is to delineate how Web 2.0 is different from its earlier incarnation (or Web 1.0). Consider the following shifts (explained in metaphorical terms):

Read v Read/write: Earlier, people could just read the Internet. They were simply the viewers or the audience. Now people can easily write back content into the Internet - through blogs, forums, multimedia content etc and this can be considered a paradigm shift.

User generated content: Vast amounts of content is getting added to the Internet through blogs, images, videos, other kinds of media and the majority amongst them is coming from amateurs and not professionals. The entry barriers for creating content are much lower than before and this is a major shift as well.

Passive consumption v/s Active participation: The earlier version of the Internet was characterized by surfing and browsing, whereas Web 2.0 is pivoted on connecting, collaborating and sharing.

¹ www.slideshare.net

² www.webyantra.net

³ www.time.com/time/magazine/article/0,9171,1569514,00.html

Expert voices v/s Wisdom of the crowds: The participatory nature of the Internet can now be harnessed to precipitate the “wisdom of the crowds”. There is a multiplicity of views and opinions, but it is possible to isolate the most strident amongst them and use that within one’s own context.

80:20 rule v/s the Long Tail: Much of human effort (personal or professional) is oriented towards serving the significant few (or the 20%) at the expense of the insignificant many. But that’s changing with what is known as the “Long Tail”- technology advances are making it possible to isolate and service the teeming insignificant millions at the long tail of the Internet’s normal distribution curve. The message is that “there is room for everyone now”.

The content comes to you: Instead of you having to search and go to the content, the content can be made (through a technology called RSS) to come to you. This has huge implications in the way; the Internet content gets consumed by users, as also the amount of time and effort they have to spend searching for it.

It is important to understand that in the evolution of the Internet as a medium, its different versions (1.0, 2.0 etc) co-exist along the same continuum. They simply correspond to different levels of maturity of the technology and people’s familiarity with that technology at a given point in time.

In India, the Internet is gradually becoming ubiquitous (starting with the urban centers), though Web 2.0 is at an incipient stage. Given its characterizing benefits (mostly free, on demand availability, convenience, unlimited storehouse of information etc), the Internet is being widely used for booking railway and airlines tickets, searching for jobs and matrimonial matches, searching for local facilities etc. But the Web 2.0 dimension of the Indian Internet space is confined to a small subsection of its overall user base. These can be described as the “early adopters” and they typically are technology workers. The Internet consumption behavior of these early adopters can be closely parallel to that of the most advanced users in the West. This group is growing quite fast. While I do not have data to substantiate my thinking, my hunch is that the rate of growth of Web 2.0 in India (vis-à-vis Web 1.0) is faster than the rate of growth of the Internet itself.

Some of the areas where significant Web 2.0 activity has picked up in India are:

Blogging: Blogging has caught the fancy of lots of Indians. Thousands of new blogs are created daily. Most of the blogging is in the English language, though vernacular content is gradually picking up. People are using blogs as a means of personal expression, or a means of chronicling events. Many

self-employed professionals are building their digital identities around blogs. Blogs are playing a huge role in fostering debates about social and political issues.

News and social media: One of the biggest impacts of Web 2.0 can be felt in the way social media is influencing traditional media (print or online). Traditionally, news has always been driven “top down”- by news bureaus and through press releases. Now news (in many cases) is being driven “bottoms up”- by blogs and what can be described as “citizen journalism”. The source of news as well as its broadcast is increasingly getting fragmented.

Social networking: Social networking websites are quite popular especially with the pre teens, the teens and the young adults. The need to connect with other like-minded people is universal and while that need itself has not grown, the use of the Internet in searching for casual acquaintances, friends or even life-partners is exploding. More than a dozen social networking websites that currently exist, are proof of this trend and the biggest of them all, [Orkut](#) frequently comes up in parliamentary debates, though not always for the right reasons. And then there is the trend of cashing in on the popularity of social networking to make inroads into a specific area. There are special social networks for music lovers ([www.saffronconnect.com](#)), for cricket fans ([www.sixer.tv](#)) and for recruiting technical employees ([www.techtribe.com](#)).

Content-centric communities: Many online communities exist for users to share their multimedia content like images and videos. Digital cameras and camera enabled mobile phones have become cheap and ubiquitous. It is easy to take a casual or fleeting snapshot with these cameras and upload it to the Internet, for sharing with friends and relatives. While the most popular communities - [Flickr](#) for images and [YouTube](#) for videos are not India specific, they have very sizable participation (and content) from Indians.

Services leveraging the “Long Tail”: Many niche (or unique) online services are emerging, leveraged on the “Long Tail” characteristic of Web 2.0. Consider [TempoStand](#), a website where you can buy/sell independent Indian music with a Creative Commons¹ attribution. Or [iFood.tv](#), which is a community for food lovers and food making. This trend is likely to explode in the future.

¹ Creative Commons licenses are copyright licenses released by Creative Commons, a U.S. non-profit corporation founded in 2001. All the original licenses, grant certain “baseline rights” such as the right to distribute the copyrighted work without changes, at no charge. Some of the newer licenses do not grant these rights.

Spawning a culture of informal knowledge sharing:

Something that exemplifies the power of Web 2.0 is the spawning a network of knowledge sharing and open learning through the cult of un-conferences ([BarCamps](#)) that have happened in India recently. Un-conferences are informal conferences (or meetings) that are positioned as an anti-thesis of traditional, big budget, formalized conferences. They are a huge rage across Indian technology centers and they have been propagated largely due to the influence of Web 2.0. While this has mostly happened for technology professionals, it is possible to replicate it beyond technology (in just about any domain).

Web 2.0 is not without its own critics. It is often described as “*more hype than substance*” and questions are raised about the commercial viability of many of the websites that have sprung up. That perception, in my opinion, is only partly justified. For it is important to understand that this is the new wave of the Internet. The Internet is being put to new uses and by definition anything which is new is unproven and hence initially not likely to have robust business grounding. Remember when the computer was invented and its critics theorized that there existed a market for 5-10 such machines. The issue of commercial viability of Web 2.0 is similar, though it is quite likely that some of our existing models of commercial feasibility may need rethinking in the process.

Grassroots Involvement for Real ICT Impact

The Experience of a Lone Voice

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As the world innovates governments, communities and management processes at the speed of thought as envisaged by the likes of Bill Gates, as development economists redraw the focus of the wealth of nations from brick and motor possessions to knowledge based specialization, and as we all get confused in our assessment of what constitutes real poverty, one reality comes to mind: that we still have not really identified where actual development and indeed the focus of Information and Communication Technology (ICT) needs to stem from. In my view it needs to stem from the grassroots and not from head offices of national institutions or development thinkers. We need to look at the inverted pyramid without any pretence that management thinkers are known to play. We need to promote the basic definition of wisdom as integrated knowledge - itself an outcome of synthesized information, which we get only when we achieve

effective data processing. This article demonstrates the importance of availing the tools of data processing at the point of data generation, or in other words, the need to think of field data capture at the data source point.

What every digitally thinking initiative must address is to seek a solution to meet the elusive goal of a digitally driven sustainable development. In the context of farming, such a solution lies in our ability to identify a solution that enriches the farmer, who without any of his design, and through his toil, creates the rich, and gets no reward for it other than being used more for the rich to extend their alms. The solution is to be found in wondering whether there would be any moral benefit if technology driven development can create a slant in the distribution of the wealth of nations if farm based wealth was shared with a more proportionate benefit to the person who lives by his sweat, in the farms. This will lead the technology solutions developers and development thinkers to evolve a solution that proportionately rewards the sweating guy, much as the thinking guy also gets a return for his thinking. This can only be addressed and with success if we seriously analyze the agricultural value chain that every farmer lives or interacts with every day of his life and help the farmer tap the opportunities that the value chain presents to him by helping evolve institutional mechanisms that reward all productive activities at their level.

From our assessment that was more heuristic than scientific, we figured that smallholder farmers of tea or milk in East Africa and indeed throughout the world, around the tropics and outside, rely on agriculture as the source of their livelihoods, yet this is the geographical area where poverty is most prevalent, much as it is the most environmentally resource endowed. We also noted that while plantation owners have access to credit to procure the necessary processing lines and to buy the agricultural produce from poor farmers, the poor farmers lack the wherewithal for investment to process their produce; and lack the ability to think of the institutional infrastructure to help them exploit their potential. As you may agree, farmers' earnings are not always proportionate to what is paid to them by the processors to whom they sell their produce. The processor is normally paid more and can at his whim inflate prices to suit his financial appetite, thereby creating inflation that affects those outside the processing arena. To make matters even worse, the poor farmer normally delivers more produce but the records are falsified by middlemen or intermediaries who collect the produce from farmers, and then deliver or sell whatever they have collected from the farmer to the processors. Unfortunately, the farmer is hostage to this system and has nowhere to take his produce besides to the same unscrupulous clerk or middleman who steals from him

with impunity.

When the clerks from procuring intermediaries weigh the produce, they traditionally record a farmer's delivery on a manual delivery ticket. If we take the case of milk which is our latest sector as a company to focus automation on, an illiterate farmer will lose milk:

- At the weighing point where the scale may be deliberately mis-calibrated, and is always rounded downwards, and
- At the produce delivery transcription level.

This inefficiency and resultant loss of effective weights against which payment is made, is repeated at every transcription point where there are clerks, before the actual final record against which payment is made has been captured. When the organization procuring the produce is a farmer cooperative as happens in the cases we have been dealing with, the managers may know that there is a problem of this nature but they too are held hostage by the clerks and their system of operating.

The challenge lies in the fact that most farmers are illiterate and may not be able to tell when clerks cheat on the reading of the scale or if they transcribe the wrong reading from the scale for their records. Indeed, even when they can read or write, the clerk can choose to take the wrong weight against which the literate farmer may have no recourse. Unfortunately, whatever the error, farmers have nowhere to turn to and are forced to develop some blind faith in the representative of the organization that procures their agricultural produce out of which they get their payment. Otherwise they will not be able to sell to anyone at all! Smallholder farmers may not complain, and when they do, they will not let the fraudulent clerk know in order to avert being blacklisted.

Even when the clerk is honest, the common analog scale normally used by the procuring institutions is calibrated to the nearest 0.5 of a kilogram. This means that in the case where the analog scale is used, clerks still have room to either round the readings downwards or upwards depending on their own whim. At times, records are lost by the farmers so that whatever is finally paid to them may not necessarily be what is due to them but rather what the clerks in the purchasing organization may decide is the correct rounded approximation.

Everything therefore relies on a procurement-payment system that is controlled by people other than the resource owner - the farmer. The extra weighed produce deliveries (derived from the aggregation of rounded readings or deliberate transcription errors) is then transferred through records so that payments are made to a rogue collaborating farmer who in the end

oils the chain of thieving clerks, based on whatever may be their agreed formula. Though the farmers and managers in the procuring organization know that this scenario holds, they normally have no way of catching the thieves. Promoting more productivity at the farm level does not help in empowering poor rural communities, where wealth is most needed. And no matter what effort is made, poor rural farmers continue being poor. The process based technology that we evolved addresses this.

Our technology innovation, which is a digital handheld scale, weighs to the closest 0.01 of a kilogram of agricultural produce. Using electronic storage that downloads the data to a centralized database, and linking the scale memory to an electronic load cell, the scale is able to:

- Weigh accurately to the nearest 0.01 of a Kilogram
- Store farmer records in a Read Only Memory
- Get powered through stored-electrical-power to make the scale memory/storage operate away from grid power
- Through the power of a customized firmware designed to mimic the operations of the activities being addressed, automatically capture farmer records and their weightings
- Capture and transfer farmer records on a *farmer smartcard* that can be used in input stores and retail outlets with credit arrangements with the produce buying institution/cooperative

Interfacing this scale with a computer enables the data from the scale to be transferred to an application that then updates records pertaining to payrolls for farmers and the procuring company's internal staff. Farmer records are captured into the scale at the beginning of a field activity so that only real and authentic farmers can weigh their produce using the custom digital scale. This then removes the need for manual records and the control that has hitherto been in the hands of clerks that sell excess milk or tea in their own names or jointly with others.

This is then followed by data encryption so that data is not intelligible to the office clerks within the procuring institution. This forestalls any potential for data manipulation through manual effort. Electronic data capture then ensures that the processing of the farmers' produce deliveries is done and records updated on a daily basis. A portable thermal printer that is strapped on the weighing clerk's belt allows records that a farmer who needs a printed delivery ticket (a receipt of his milk delivery) to be printed. Data so collected and downloaded into a centralized server makes it available for remote querying by other parties such as the farm owner or management so long as such parties have the necessary authentication. Where the futures price is known, a farmer can take credit based on his produce delivery or obtain credit

from a collaborating store using the *farmer smartcard*.

The above model has been under implementation for the last eight years in one of the dairy smallholder cooperatives, Githunguri Dairy, which started in year 2000 when they could only pay their farmers Ksh. 5,000,000 a month. Today they pay their farmers in excess of Ksh. 120,000,000 a month with an average monthly income of Ksh. 8,500 a farmer, an income that is close the basic salary of a teacher. The impact of this effort has been that the chairman of this cooperative was rewarded in the last general election with a vote to represent the constituency where the cooperative is based. The campaign story was the exemplary leadership that he has demonstrated through his strengthening of income generation ability that the smallholder farming community enjoys. They laud the transparent handling of milk records and payment which we know is associated more with the technology than the man. But indeed it is his far sighted thinking and the desire for an impact that he allowed technology to be tried in a rural area.

Another milestone for this community has been that the farmers have allowed their cooperative to invest the extra earnings, arising from the new found milk-wealth, in their own milk processing plant. This plant has captured the market from leading milk processors in the city of Nairobi in a period of less than five years. The employment generation in the locality can only be assessed by a careful analysis of the dairy value chain which has received enormous growth in the country over the last few years. Other cooperatives are following suit with the Kenya Dairy Board having to call for a national programme to automate milk collection and marketing. Our proposal to replicate this system won a 93% mark on the technical and financial aspects. The implementation phase is now underway.

The success of this grassroots technology initiative has been possible due to the following:

- **Partnership:** We defined our role as perfecting the dairy products value chain and therefore decided to create partnerships with institutions that helped us define that perspective.
- **Reliance on the internet to seek like minded institutions:** The electronic scales that we have been partners in reengineering were identified through the Internet. We traded blindly with our Indian manufacturers (Applied Data Logix) for close to eight years before we met in person. All our business was carried out through email with the support of the international financial system, itself a beneficiary of the Internet.
- **Research and development collaboration:** We have collaborated with research and development institutions to promote institutional focus for identifying approaches that create sustainable

community enterprises by using remote data capture solutions.

- **Partnership with policy institutions:** We partner with the government to promote acceptability of our solutions among smallholder community institutions, and in the process support government initiatives that promote what our technology solutions do. We charge the community institutions for our services rather than seek government aid to finance our initiative. Where the government seeks to develop sustainable programmes at the community level, it adopts our grassroots focus with the confidence that our models work. They seek to work with us or the teams that have been nurtured through us due to the institutional focus of our models. Sustainable wealth creation is achieved and the MDGs are met through the processes that we nurture.

We have evolved the same technology to address non-weighting data capture terminals which can be used to:

- Capture records of rural farmers through smart cards that can integrate with the financial sector payment systems
- Promote Internet usage or linkage to wireless telephony through GPRS, and
- Has sufficient memory to carry emails and relevant e-government records.

Our focus now is to create a centralized data center that supports community initiatives through community telecentres that we have been promoting when the communities use the telecentre for market information. This then promotes a technology research 'pull' rather than 'push' to communities. We, along with the government in Kenya, are developing a project so that we can proliferate technology-data-centers in the country through the telecenter model. The telecenters will act as the local information hub to be driven by business incubates of our business so that they can offer technology convergence points at the village level. As a starting point, we have conducted training for business service extension workers through a programme that is funded by the World Bank to promote multidisciplinary research commercialization and extension services. The Ministry of Agriculture in Kenya has agreed to house our program in its extensive network of Agricultural Training Centers (ATCs). The ministry and the government shall be free to subsidize the services offered but the privately driven telecenters will act as the support centers to users of our data capture and data processing outfits. This in essence will be a public private partnership that is geared to promoting the creation of wisdom by synthesizing knowledge from the activities people do to create their livelihoods.

For those that need to process their produce so that they can create cottage industries, we have created an

initiative for agricultural Value Addition and Cottage Industry Development (VACID) through an NGO called VACID Africa. With a business incubation initiative under our first business (www.willpower.co.ke) and a technology business that adapts technology for development (www.octagon.co.ke), and now with an NGO to help the resource-endowed to get their fair share from the market place under VACID Africa (www.vacidafrica.or.ke), we believe we shall have a solution on what can truly take ICT to the grassroots.

I would urge technology promoters to seek avenues to create community institutions that then use the technology for development rather than decide that existing technologies that may have worked in some other place can be brought home and domesticated. Raw data collection and the eventual processing of the same through locally developed data processing solutions have immense potential for sustainable development through knowledge formation and propagation at the point where such knowledge is most relevant. This will eliminate deciding to use foreign technologies just because they are branded 'best bet' technologies in other environments.

Biometric Smart Card (BSC)

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[Life Line to Business (LL2B), an ICT organization based in Chennai was awarded the 2006 Manthan award under the category 'e-Inclusion and Livelihood Creation' for creating India's best e-Content for biometric tracking of payments under the Work for Food Programme and National Rural Employment Guarantee (NREGP) Scheme. Changing the mindset of government officials towards adopting the biometric tracking technology and providing sufficient funds to implement it country-wide were the biggest roadblocks. This article describes the work done by the author and his team in the states of Bihar and Andhra Pradesh in the field of biometrics for unique identification and tracking of benefits extended to poor citizens¹. The work done is an initial drive to empower the voiceless poor and marginalized citizens to obtain their rightful share of benefits and reduce corruption that is omnipresent right

¹ For further reports on Kris Dev and his team's work in the biometric field, see <http://www.indianexpress.com/story/21904.html>, http://www.manthanaward.org/section_full_story.asp?id=507, <http://www.indianexpress.com/story/33365.html>, <http://www.thehindubusinessline.com/ew/2007/03/19/stories/2007031900110300.htm>, http://www.business-standard.com/common/news_article.php?leftnm=10&bKeyFlag=BO&autono=326049

from the village to the national level.]

Background

Today, there are a number of e-governance initiatives like computerization of driving license, PAN card, voter ID card, ration card for PDS distribution, ID card for NREGP, smart card for National Rural Health Mission and passport being undertaken in India. There is no single multipurpose ID card encompassing all cards. This can lead to corruption in delivery of services, as well as fraudulence on the part of citizens/middlemen, such as duplication of documents and forgery of names and addresses. According to estimates, around 10-20% of citizens entitled to various benefits are denied the same as they do not have the necessary ID cards and another 10-20% existing cards are duplicate/bogus cards - by the simple expedient of providing different names, father's names, addresses, etc. Thus on the one hand, genuine beneficiaries are denied the benefits that they are entitled to and on the other hand non-genuine beneficiaries are enjoying benefits that they are not entitled to.

The single motivating factor behind the conceptualization of the biometric tracking initiative was the need to empower the poor and marginalized rural and urban citizens by ensuring that they receive benefits meant for them under various welfare schemes of the Government, and by plugging the leakages in the system to improve targeting of genuine beneficiaries.

Introduction

A biometric smart card (BSC) can act as a single multipurpose card for uniquely identifying every individual. The BSC would contain the citizen's ID number, name, parent's names, date and time of birth, place of birth, blood group, identification marks, height, weight, address, digital photo and complete set of fingerprints. Whenever the card is used, a computer can compare the fingerprints registered with those of the user, thus making the identification fool proof. The card can be updated on a yearly basis to track the changed characteristics (such as height, weight, finger print, photo, physical / mental disabilities) of the card holder, if any. In addition to fingerprints, data related to the iris, facial characteristics, hand geometry and DNA can also be stored in the card for higher order checks.

The BSC can also be used to track the various transactions/benefits received by citizens and as a debit card linked to a bank account. The computers at the village panchayats can be integrated with the

server at the block in a hub-and-spoke model¹; similarly the servers at the blocks can be integrated with the district server; the district servers can be integrated with the state server; and the state servers integrated with the national server. Data would thus be available at all servers and duplicates can be eliminated by running the biometric data in conjunction with a suitable software on a regular basis in all servers starting from the panchayat to the national server. Government agencies responsible for administering various welfare schemes, service providers such as NGOs, banks, citizens and their elected representatives can also be integrated into the same platform for effective multi-way communications.

What is required at each village for the implementation of the biometric smart card is a stand-alone finger print scanner that typically costs about Rs 20,000, a laptop computer, a webcam or digital camera, smart cards each costing about Rs 100 to 200 depending upon the amount of information they need to contain, and local trained people for operating the system. The biometric devices and laptops can run on rechargeable solar batteries. This makes it a feasible option for successful implementation even in remote areas without regular electricity, thus allowing the entire rural population in the country to be targeted. For a nominal service fee, it can also be made sustainable in the long run.

BSCs can be used to create a healthy democracy — they could be used as voter ID cards thereby eliminating unfair voting practices. At the time of voting, a voter can be authenticated by using a finger print verifier to compare any of his/her fingers with the fingerprint data stored in the chip. The record of voting can be stored in the chip and the voting machine, and subsequently downloaded to a computer and transferred to a central server.

The card could also be used to create healthy citizenry - an essential component of a democracy – by tracking citizens' health, hygiene, housing, education and skill training in various life skills; generating suitable employment for citizens based on their education/skills and ensuring appropriate earnings for them; and tracking expenses and payment of insurance, taxes, disability and old age pension, etc. of every citizen. The amount of welfare funding that is required can be estimated and provided for by using a bottom-up approach wherein citizens themselves

exercise their opinion on various schemes. Optimal utilization of funds can also be done by online tracking of the progress of various welfare schemes and measuring benefits accrued to citizens in terms of reduction in poverty and improvement in living standards. Moreover, biometric tracking could help to keep track of movement of people, particularly in sensitive areas, thereby avoiding infiltration, minimizing terrorism, and damage/loss to property and life.

Having a BSC can help a citizen to carry out virtual transactions, any time from any where (for example, a village kiosk) and would help in reducing the personal contact with government officials, thereby reducing corruption and increasing the transparency of the system. Moreover all the transactions can be seen live on the Internet and citizens can track for themselves the progress of various complaints, schemes and payments. To enable this, a suitable e-Administration, e-platform for e-governance can be implemented using open source tools that would integrate the entire vertical and horizontal hierarchy of government / service authorities from the national to the village level and citizens for G2C/G2G/B2B/B2C transactions.

Implementation of Proof of Concept

The actual performance of the idea has been successfully tested on small village populations in Bihar and Andhra Pradesh by the team of Life Line to Business under the National Rural Employment Guarantee Programme (NREGP), a centrally sponsored scheme focused on generating employment opportunities in rural districts, creation of assets for sustainable living, and short term and long term poverty alleviation. A demonstration of biometric tracking was given to officials of the Rural Development Department in Bihar, after which, the team was invited to implement a proof of concept for NREGP beneficiaries in rural Bihar.

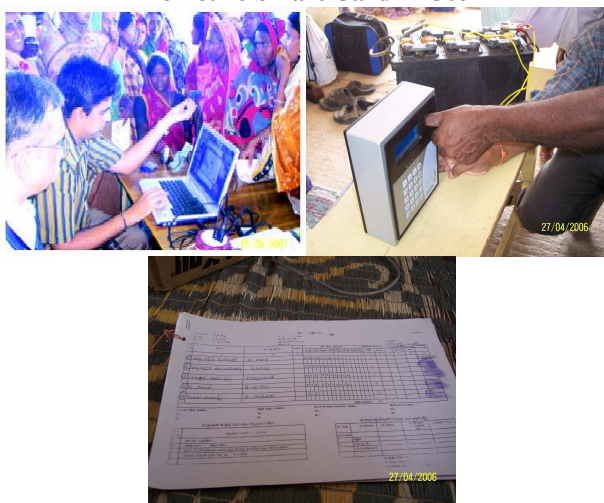
The villages identified for the proof of concept were among one of the most under developed in the state - Kurkuri and Dhuparchak Musahari villages in Phulwarisharif Block of Patna district. The proof of concept was implemented by targeting 170 men and women who were registered beneficiaries under NREGP and had NREGP cards with photographs. Registration and verification was done using different optical biometric devices. A Fingkey Hamster (a computer linked optical finger-size biometric device) was used for registering prints of all the ten fingers, personal data such as the individual's name, name of his/her father/mother/husband, date of birth, address, etc., and a photograph of the beneficiary. This entire

¹ The hub-and-spoke model or network is a system of connections arranged like a chariot wheel, in which all traffic moves along spokes connected to the hub at the center. The model is commonly used in industry, in particular in transport, telecommunications and freight, as well as in distributed computing.

database can be stored in a Java 32kb contact-less smart chip¹ and issued as a Citizen I-Card. The existing NREGP cards with photograph and details were scanned and linked to the details pertaining to the Citizen I-Card in the database.

Attendance tracking was done by placing any of the ten fingers on the biometric device and entering the NREGP ID number, after which a one to one match of the finger print would take place and the photograph of the card holder would pop up on the computer monitor. Simultaneously, the cardholder's attendance was marked as 'in' or 'out' depending on whether it was the first or second entry of the day, and a record was created in the database to track the person's attendance. For field work, it was desired that a mobile optical biometric device with its own battery power backup would be more suitable for daily attendance tracking. A stand alone hand held biometric device that can run with rechargeable batteries and store 1,500 finger prints was used for the registration and verification. The device also had the capability to register the NREGP ID and all the ten fingers (each 3 times for getting the best minutiae count).

Biometric Smart Card in Use



Anup Mukherjee, Principal Secretary and Commissioner in the Department of Rural Development, Government of Bihar, has stated in his "Report on pilot tracking of NREGP beneficiaries using biometrics" dated 8th June 2006 that:

"A pilot project for tracking of NREGP beneficiaries

¹ Contact-less smart chip technology is used in applications that must protect personal information or deliver fast and secure transactions. A contactless smart chip based device includes an embedded secure micro controller or equivalent intelligence, internal memory and a small antenna, and communicates with a reader through a contactless radio frequency (RF) interface. Source: http://www.smartcardalliance.org/resources/pdf/contactless_business_benefits.pdf

in two locations in the Phulwarisherif block of Patna District was conducted by Life Line to Business (LL2B) with the support of NIC and BEST, a Joint venture between BELTRON and ILFS. The biometric registration and verification was 100% successful.

Biometric registration of citizens for unique identification and verification can be used for NREGP work in association with suitable web-based software for creating a central database for access at the Panchayat, Block, District and State level.

Pursuant to the success of this proof of concept, the government of Bihar is planning to implement a comprehensive biometric NREGP solution including registration, smart card, e-Muster roll and bank-linked payment to streamline the implementation of this vital poverty alleviation programme."

It is also possible to integrate finger print registration with a smart card which can store the finger prints and personal data for use any time anywhere. If the smart card is linked to the post office or bank account, payments can automatically be credited into the post office or bank account. The multipurpose smart card can be used as a biometric debit card for making purchases or for drawing money from ATMs. Poor citizens can by themselves track their attendance, work done and payment received. No one would be able to cheat them as the smart card has a permanent record of all transactions. Bihar would have the unique distinction of becoming the first state in India to introduce biometric tracking for NREGP to root out corruption, empower the poor and alleviate stark poverty.

The concept was similarly tested in villages of the state of Andhra Pradesh (AP) wherein middlemen had embezzled the major part of the flood relief released by an NGO using a fraudulent manual muster roll. Agricultural workers were entirely left to the mercy of nature and were being exploited by greedy, corrupt middlemen. The village initiative was possible only after several rounds of counseling and discussions. The implementation was initially seen as yet another bogus scheme to siphon funds, and required some convincing to make villagers see its benefits.

The team had to use a 12 volt car battery and run the device since there was no power available in the entire block. The method adopted was tamper-proof. Even if biometric verification is not possible in a rare case, the Citizen ID retrieved from the smart card with the photo can serve as adequate proof. Biometric tracking using the iris (retina of the eye) has been done in Andhra Pradesh for public distribution system. But since the iris scanner is a costlier device the team came up with a suggestion to use a low-cost finger print scanner that would serve the needs of the common

man. Stand-alone devices can be used in the field to track the daily worker's attendance and the data can then be downloaded to the local computer connected to a telephone line to send it to the block server. The smart card would help to store the entire attendance information. To eliminate any doubt in the mind of the worker, an instant printout of the attendance slip can be given using a palm printer. The pay slip can also be generated automatically and the amount credited into the account for use through the Multipurpose Biometric Smart Card Cum Debit Card.

When a villager arrives for work, he can sign in on the biometric device and sign out when he finishes. Thus, an official record of the man-days he has put in can be maintained. This cannot be tampered with and he can be paid correctly for the number of days and hours he / she has worked. This April 2006 experiment carried out by the author and his team in three villages of Andhra Pradesh - Gurrampeta, Mohammedabad and Jakulla Kootha Palli under the Work for Food, a forerunner of National Rural Development Employment Guarantee Scheme (NREGS) was adjudged as the best entry under the category 'e-Inclusion and Livelihood Creation' for the prestigious Manthan Award in 2006.

Conclusion

The multipurpose biometric smart card, in conjunction with suitable e-tools for validating transactions and introducing total transparency, is certainly an achievable solution that can help to empower every poor and marginalized citizen, irrespective of his / her status in society. The solution can enable citizens to demand and get whatever is rightfully due to them, and prevent middlemen, in collusion with corrupt officials, from siphoning the funds meant for the poor. It can serve as a tool for creating healthy citizenry, ensure poverty alleviation and achievement of the Millennium Development Goals. The central government and various state government departments, NGOs and micro credit organizations in India have shown interest in adopting this technology to help achieve the Millennium Development Goals. India can soon become a role model for the developing world by adopting the Biometric Smart Card – a multipurpose I-Card for the entire lifetime of every citizen.

Common Services Centers (CSC) Scheme – Marching Ahead!

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Believing that the Information and Communication Technology (ICT) intervention can go a long way in meeting the expectations of the people in the villages as well as empower communities by providing them information and knowledge, the Government of India (GOI) has launched the Common Services Centers (CSC) Scheme in 2006 as a part of its initiative for National e-Governance Plan. The CSC Scheme aims to improve the quality of delivery of services to the citizen especially those living in rural areas. Covering 6 lakh villages in the country, over 100,000 (one lakh) internet enabled service centers in rural areas have been envisaged to be established in an equitable distribution - one CSC for every six census villages. The CSC Scheme is not just about rolling out IT infrastructure but to build a network of 100,000+ rural businesses across India. The CSC Scheme with such a geographical spread is a unique scheme, which is being implemented on a Public Private Partnership (PPP) framework and attempted for the first time in the World.

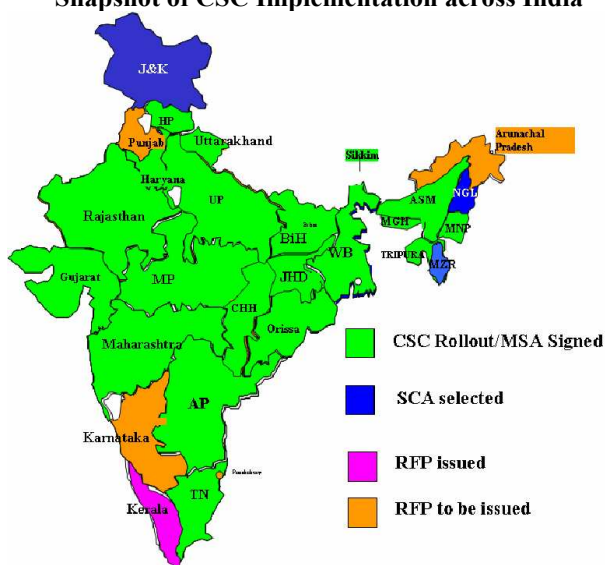
Two years since it was approved by GOI in September 2006, the CSC is a familiar scheme all over the country now and the state governments are geared up to launch the programme matching with their existing initiatives. The beauty of the scheme is that it is open to capturing the diversity and varied features of the states; and these are being factored in, whilst developing the state-wise implementation roadmap.

Although the CSC Scheme started with a mandate to launch 100,000 rural kiosks across the country, it has been observed that after the state governments have finalized the strategies to be adopted, the actual numbers would cross the targeted figure and we would be having around 113,000 CSCs across the country. Out of this, the implementing agencies or the Service Center Agencies (SCAs) - have already been finalized for setting up of more than 103,000 CSCs by mid-2009. Twenty states are in the rollout phase where the state governments have signed contracts with the private parties (SCAs) to set up 101,000 CSCs. Here, it is also worth mentioning that every attempt has been made to reach out to every corner of the country in a uniform manner, no matter how challenging or tough that area may be. For example, upon due consideration of the special features of the state, Jammu & Kashmir (J&K) has selected the J&K Bank as an SCA for establishing 1,100 CSCs in the state, and upon due modifications, seven north-eastern states have completed the SCA selection process and the remaining one state is in the final stage of issuing the Request for Proposal (RFP). They are unique from the perspective of development intervention and there is a strong relationship between the environment and the livelihood of the mountain population. The challenge is to throw up different thoughts and different models and different ideas, which would have the adaptability

and acceptance of both the people and the SCAs.

In terms of actual rollout, over 18,000 CSCs across thirteen states have been rolled out till date. Haryana is the first state in the country to complete 100 percent rollout by three SCAs (3i Infotech, Comat Technologies and SARK Systems). The states of Gujarat and Jharkhand are on the verge of completing the rollout. States like West Bengal, Bihar, Assam, Meghalaya and Uttar Pradesh have geared up with full cooperation from the respective state governments. Understanding the vastness and the complexity of the project at the ground level, it would take more than what was envisaged to achieve the completion of rollout within the defined timeframe. However, the Government along with the private parties is committed to reaching its goal as planned. To understand the implementation issues and the support required by implementing agencies, the [Department of Information Technology \(DIT\)](#), Government of India calls upon the state governments and selected SCAs from time to time, and extends full support and cooperation for timely implementation of the project. A range of private parties has shown interest in implementing the project in various states. Few of them are – SREI Infrastructure Ltd, 3i Infotech, Comat Technologies, AISECT, Zoom Developers, CMS Computers, etc. Few of the SCAs are heading towards meeting the deadline of the rollout as prescribed by the state governments. A snapshot of the CSC implementation across India is given below.

Snapshot of CSC Implementation across India



Meanwhile, as the process of rollout is progressing, attempts have also been made to bring together all CSC stakeholders, including the service providers, to enable drawing up of the CSC roadmap ahead, keeping in view the various implementation challenges faced by the first mover SCAs. Dialogues with various players have been carried out right from the initiation of the CSC scheme with the understanding that a sustainable CSC can only emerge out of continued

partnerships with a range of service providers, technology vendors, academic institutions, community organizations, etc. both from the public and private sectors. A positive response has been received and commitments have come from various stakeholders to make the project a success.

Various government to citizen (G2C) services like delivery of land records, registration, issue of certificates, applications for government schemes, road transport services, pension schemes, issue of ration cards, electoral rolls and utility services are planned to be offered through the CSCs for which the modalities are being worked out. States like West Bengal, Jharkhand and Haryana have already signed Memorandum of Understanding (MOUs) with government departments/ agencies for providing a few identified services through pilot initiatives. Flagship projects like the [National Rural Employment Act \(NREGA\)](#), [Sarva Shiksha Abhiyan](#) and [National Rural Health Mission \(NHRM\)](#) are being linked up with the CSCs to reach out to the beneficiaries. The CSCs have also emerged as the medium for agricultural extension services aimed at reaching out to the farmers, and are also being linked up with the Department of Posts. Similarly, various private services (B2C) like railway ticketing, utility payment, online education, banking services, agriculture services and telemedicine facilities are being offered through the CSCs. The telemedicine project in Tripura is one of the first initiatives in the north-eastern states to have received wide appreciation in the region.

Pragya Kendra – CSC in Jharkhand



Ekal Seva Kendra – CSC in Haryana



The CSC Scheme is the first of its kinds to have been attempted in the world. It is based on the principle of a centralized initiative with decentralized implementation. It captures the diversity and varied

features of different states in the process of implementation. The successful and timely implementation of the scheme is to a large extent dependent on the ownership and initiative displayed by the respective state government. So far, the response and support from the state governments has been quite encouraging. However, a lot needs to be done for delivery of G2C services to the citizens through the CSCs. The scheme once implemented will redefine the process for delivery of government services to the citizens across the country and also empower them by providing the opportunity to avail non-government services at their doorstep.

Base of the Pyramid (BoP) Program

Over the past three years, Manipal University (MU), Karnataka, India and Philips having been working together to acquire a greater understanding of the challenges and opportunities in addressing the needs of the “Emerging Consumer” or the “Base of the Pyramid”. Their ambition is to create an ecosystem built around “Open Innovation” that will ultimately meet the aspirations of the emerging consumers. A Base of the Pyramid (BoP) Chair was therefore setup at MU two and a half years back to promote idea generation, concept development, research, community development, rural linkages and student exchange programs.

The partnership between Manipal University and Philips started with mere funding of projects at MU but has now matured to include ideation, market data collection and prototyping of ideas into proof of concepts. Philips brought to the table the industry perspective on commercialization of ideas, concepts on IP generation, infrastructure and access to the best talent within the company. In turn MU brought the diversity of disciplines that is unique to them. Experts from the fields of technology, management, life sciences and healthcare were brought together to brainstorm on ideas and solutions for the emerging consumers. This experience was shared with other like minded parties from the academia, industry, NGOs and government organizations. This has resulted in other organizations such as M. S. Swaminathan Research Foundation (MSSRF), kTwo Technology Solutions, Intel, Electrocare Systems and Perfint Health Care Solutions joining this program. Participation of these organizations makes the program a sustainable model for the university to build a knowledge network for the benefit of community.

Implementation of the BoP innovation typically involves three steps:

1. Idea Generation

The underlying objective of the BoP innovation is

“development of cost effective solutions and services for the emerging consumer segment”. Over a period of time, the BoP team has developed a platform which helps idea generation, and submission, evaluation and short listing of the ideas. It has also built a cross disciplinary team consisting of students and staff from various disciplines such as health science, engineering and management. So far more than 220 ideas in the areas of healthcare, lifestyle, education, energy, nutrition, community development etc. have been generated under this program.

2. Proof of Concept

Development of “proof of concept” projects involves knowledge integration through “multi-disciplinary customer centric innovation” by student interns sponsored by industry. The tasks center around concept enrichment based on user needs analysis, design, technology development and patent. Nearly 20+ concepts have been developed through multi-disciplinary teams comprising medical, technology and management students. Some of the proof of concept projects that have been implemented are: the rural health data collection and management solution (see the box on e-RMCWH below); a foot pressure monitor to help stroke-affected patients; a bone mineral density scanner for early detection of osteoporosis; a device for relieving deep muscle pains; and a portable water purity tester.

e-RMCWH

e-RMCWH is the electronic version of the Rural Maternity and Child Welfare Home (RMCWH), which is primarily responsible for providing healthcare and medical facilities to expecting mothers and children below five years of age. The RMCWH is the largest private integrated healthcare delivery network in the state of Karnataka. RMCWH centers cover 11 villages and a population of more than fifty thousand rural citizens. Each RMCWH has two ANMs (Auxiliary Nurse Midwife) – the center ANM and the field ANM. The center ANM maintains data on pregnant women and children below 5 years, and general medical details of other patients. This information is collected by the field ANM through visits to the households catered to by the center.

The e-RMCWH application has been designed and developed to be used by field and center ANMs. It has been deployed and field tested in six out of the seven RMCWH centers under the KMC healthcare system. The benefits of this application are that: it makes routine data entry easier by eliminating the need for duplication of work, thereby reducing wastage of time and other resources; and provides an efficient way to maintain, manage and search medical details of patients and rural families. A data mining tool called the “Dynamic Query Tool” is used by doctors, interns and NGOs to extract relevant information from the e-RMCWH database. This information helps to analyze trends in the general health of the population, to evaluate the effectiveness of health services, and to choose or devise appropriate health-insurance policies for the rural citizens.

3. Market Analysis and BoP Knowledge Development

This activity helps to develop an understanding of the pulse of BoP community and providing solutions at the grassroots level. It involves carrying out user research study for designing solutions for the BoP, market analysis to understand the felt needs at the grass root level, modeling of processes for local development of the products, and development of the BoP knowledge base. Activities that have been undertaken include more than eight studies to identify market trends, six user research studies for designing products for BoP consumers, IT-enabling of the Manipal rural healthcare delivery model, publishing a book on the BoP integrated approach, and launching of a knowledge portal on BoP.

Book Review

Change Management in Information Services

Lyndon Pugh

Ashgate, 2007, 230 pp., ISBN: 978-0754646655.

Review by [Elena Maceviciute](#)¹, Vilnius University, Lithuania

The book on change management by Lyndon Pugh reminded me of the workshop on change management conducted by the author in Lithuania more than a decade ago. At that time change was what we were experiencing, but its management was an entirely new concept. All the participants were greatly interested and participated enthusiastically in all the activities. Therefore, I felt an additional curiosity to find out what has changed since then.

This work is mainly an academic text, though practitioners will also find it useful, especially, because of the case studies included. The case studies are well chosen and illustrate a variety of approaches; failed as well as successful change management initiatives. They also provide a good overview of success factors for the implementation of change.

The book reflects the deep knowledge and interest of the author in the topic, as well as his experience. Though written for information service specialists, it deals with general change management issues and covers a variety of aspects: organizational and change theories, change strategies, processes and models, team-work and leadership role in change management,

psychology of change and skills. The work is based on the latest literature, which the author knows well and in most cases uses with competence and creatively. The author uses a number of models that help the reader to get a visual understanding of the processes and phenomena described. The overview of the basic problems of change management and the research into them is exhaustive and could be useful for a wide circle of managers, not only information services leaders. However, one must caution the reader that the reading this text is not easy. Though the style and language of the author is quite accessible, the text in itself requires some prior knowledge of management and organizational concepts. It may be more useful for the lecturers than for students. However, I am going to recommend some chapters and the cases for my Master's students of library management.

However, I am always a little suspicious of any management approaches that claim that only the fundamental involvement and commitment of the whole organization leads to success. And that is one of the main claims of the author. This involvement and commitment is difficult to sustain when we talk of incremental and on-going change as many organizations have experienced. I would have appreciated to find a successful case of this kind, as the successful cases in the book seemed to me to be limited in time (even when they took long time).

On the other hand, *Change Management in Information Services* outlines especially the role of people in implementing the change and in accepting it. They seem to be the main success factor for the whole process. The author emphasizes all the possibilities and methods to enlist support of organization's members and to empower them, to make them responsible for the outcome of the change planning and implementation. After having spent over a decade in constantly changing organizations, I can only confirm how important this is and how difficult.

I would recommend the book for the university libraries, especially if their universities run librarianship and information science and/or management programmes, although it will also be useful to the libraries themselves, as these are constantly undergoing change.

Conference Announcements

eASIA 2008

November 11-13, 2008, Kuala Lumpur, Malaysia

eAsia 2008 provides a platform for Asian countries to discuss opportunities and challenges in promoting growth of Information and Communication Technology for Development (ICT4D) through

¹ Maceviciute, E. (2007). Pugh, Lyndon. *Change management in information services*. 2nd ed. Aldershot: Ashgate, 2007. *Information Research*, 12(4), review no. R279 [Available at: <http://informationr.net/ir/reviews/revs279.html>]

consultative dialoguing, strategic planning, knowledge networking and business partnering. eAsia 2008 will focus on e-Government, ICT in Education, Asian Telecentre Forum, ICT enabled Health services and Mobile application and services for development.

For further details please visit: [eAsia 2008](http://www.easia2008.org).

International Conference on eGovernment and eGovernance (IC-eGov)

March 12-13, 2009, Ankara, Turkey

The first International Conference on eGovernment and eGovernance will be held in Turkey in 2009. The conference aims to provide a platform to leaders, bureaucrats, technocrats, researchers, practitioners and academics across the globe to present and discuss on their research findings, experiences, strategies, policies, technologies, case studies and best practices in the field of eGovernment and eGovernance.

Call for Papers

Submissions are sought from all scientific areas and from people with practical experience in industry or government. All enquiries (on submission of the abstract and paper, registration, etc.) pertaining to the conference should be directed to the following e-mail address: icegov@sobiad.org. For further details on the conference, please visit: <http://www.icegov.info/>.

3rd IEEE/ACM International Conference on Information and Communication Technologies and Development (ICTD2009)

April 17-19, 2009, Doha, Qatar

The goal of the ICTD conference is to provide a forum for academic researchers and scholarly practitioners working with ICT applied to development. The conference will be scientifically rigorous and multi-disciplinary - papers reporting high-quality original research are solicited.

Panel Proposals

In order to spur more reflective dialogue among researchers and between researchers and development practitioners, the organizers of ICTD2009 would like to invite panel proposals that will add to the emerging ICTD discipline by having multiple points-of-view and reflect on issues that affect the practice of ICTD research and its relationship to development practice. All submissions should be emailed to panels@ictd2009.org.

Workshop Proposals

The organizers of ICTD2009 would like to provide a venue for ICTD researchers to disseminate best practice methods and detailed descriptions of solutions

to other researchers and development practitioners. For this, the organizers invite workshop proposals that will further the emerging ICTD discipline by enhancing the skills of ICTD researchers and scholarly practitioners. All submissions should be emailed to workshops@ictd2009.org.

Important Dates

November 2, 2008	Panel and Workshop Proposals due
January 30, 2009	Final decisions sent out to those submitting proposals
February 28, 2009	Position Paper due for panels
April 17-19, 2009	Conference

For details, please see the conference website: <http://www.ictd2009.org>.

IFIP - 10th International Conference on Social Implications of Computers in Developing Countries

May 26-28, 2009, Dubai, United Arab Emirates

The theme of the 10th International Federation for Information Processing (IFIP) Conference is "Assessing the Contribution of ICT to Development Goals". It is widely recognised that ICTs have the potential to contribute to meeting development goals such as basic health care, poverty reduction and education. It is often argued that countries harnessing the potential of ICTs can expect accelerating economic growth, improving human welfare and fostering of good governance practices. The role of development goals in policy making is an important area of academic study and practical application. ICT has been a key element of various economic development and public sector reform agendas around the globe. The three-day conference will explore the contribution of ICTs to the achievement of sustainable development.

1st Call for Papers

The conference invites papers that describe, critique, develop arguments, and draw conclusions from the multitude of development projects on the role of ICTs in achieving development goals and addressing challenges to sustainability. In addition, contributions from other disciplines such as development studies, political science, political economy, social anthropology, sociology, which illuminate themes and identify differences through a willingness to engage in dialogue within and between disciplines, are welcome. This conference hopes to be able to stimulate debate that focuses specially on development in the Middle East and the role of ICTs.

Important Dates

Deadline for submissions: November 3, 2008

Reviews returned: December 1, 2008

Final acceptance and camera ready: Mid-March, 2009

For further information on submission of papers and the conference, please visit the conference website: <http://ifip.dsg.ae/index.htm>

Editorial

(continued from page 1)

Talking about the NeGP, I have often mentioned a large impact assessment study of e-government projects being undertaken across twelve states in India. A [summary report](#) comparing the impact across states and across projects has finally been put out in the public domain by the sponsors – the Department of Information Technology, Government of India. IIMA which provided the overall guidance for the study carried out by eleven market research agencies will hold a workshop at IIMA on November 19-20 to discuss the lessons from the study. We hope to disseminate the findings of the study in various other ways – through a webcast and through *Vikalpa: The Journal for Decision Makers* published by IIMA. Please look out for further announcements on this.

The IFIP WG 9.4 Newsletter Website

The [Information Technology in Developing Countries](#) Newsletter has been published by Prof. Subhash Bhatnagar (Founding Chairman of IFIP WG 9.4) through support of various agencies such as IDRC and COMNET-IT in the past. In recent years, the Newsletter has been published as a joint publication of IFIP WG 9.4 and the [Centre for E-Governance](#) (CEG), Indian Institute of Management, Ahmedabad (IIMA).

A legacy of 10 years of print circulation to its credit, this newsletter is now published on the web.

The next issue of the newsletter will be published in February 2009. For archives, subscription details and guidelines for contributions, please visit the Newsletter website:

<http://www.iimahd.ernet.in/egov/ifip/wg.htm>