

Information Technology in Developing Countries

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Editorial

I wish all the readers a Happy 2002. Last year is best forgotten. Let us hope that the IT industry's *annus horribilis* will not repeat but witness a revival in its fortunes in 2002. And that development and poverty issues will predominate the political agenda of nations.

Developmental issues have remained the same over the last several decades. Be it access to education, health, & clean water; deteriorating conditions of urban slums; rising unemployment; all can be traced to poor governance. The debate amongst the IT and development community do not seem reassuring. As Kenneth Keniston points out in an article in this issue, the IT community continues to claim credit for much that has really not been done. I would like to mention a few exceptions that I came across in recent months.

Bulgaria has implemented an E-Government Portal that has been very successful. It attracts a very large number of visits even though the Internet penetration in Bulgaria is not high. The main use of the portal is to announce procurement tenders and jobs with the primary objective of achieving transparency. Nearly 10,000 tenders have been announced so far, and results of selection processes posted. The intent to bid is done electronically but is followed up in some cases with submission of paper documents. Electronic payments are not processed.

In Jordan, the Income tax department has created a model office where assessment can be filed on-line, and certificates are issued in 45 minutes instead of the 3 to 4 days taken earlier. Work flow has been simplified and powers delegated to field offices with a view to reduce costs for the assessee.

In a recent visit to Karnataka, I came across the following two applications which can also be seen as exceptions.

The first addresses the difficult operational issue of processing the large number of transfer requests from teachers, received by the Education department. Nearly 16,000 requests are received in a year against a vacancy of 6000, making the system prone to corruption. In a new system, the rules for prioritizing requests have been clarified and then coded into a software. A roster of available vacancies is maintained on the computer that can be matched with a database of transfer requests. Employees seeking transfers are called for a counseling session where such matching is done on-line. Employees called in order of priority choose a place of posting from the available alternatives. Transfer orders are generated and the vacancy database is updated. Since the exercise is done in a short window prior to the opening of schools, disruptions in teaching activities are avoided.

The second application I would like to refer to is the computerization of Land records by the Department of Revenue. The Karnataka Government has computerized 20 million records of land ownership for 6.7 million farmers of the state. At 125 taluk offices, a printed copy of Record of Rights, Tenancy and Crops (RTC) is provided on-line for a fee of Rs 15. Earlier the farmers had to seek out the village accountant to get a copy of the RTC-- a document that is needed for obtaining bank loans. RTCs were delivered by about 9000 village accountants, and delays, harassment and bribes were commonplace.

The system allows on-line updating of changes in the ownership. The whole transaction is visible to the farmer on a screen facing the counter. Biometric (fingerprint) identification is being used to authorize departmental operators to access the data. Nearly 200,000 entitlements have been printed during the first six months raising a service fee of Rs. 3 million. In three experimental centers, a touch screen based enquiry system enables a farmer or her agent to access the record and print it. As a result of a complete re-engineering of processes, land record data is in the public domain.

In the next phase it is proposed to connect all the taluks in a network to upload the data to a central server and web enable the access to such a database. This would enable farmers to receive an unsigned copy of the RTC from a village Internet kiosk.

These examples suggest a pragmatic approach to the use of technology - focussed on those elements of a transaction which deliver the maximal value to clearly identified client groups. None of the examples are a completely evolved e-government solution. Elements of the total transaction continue to be handled manually. Perhaps this is the way Governments will change--not wholesale in one go, but a large-step by large-step improvement.

I believe that such e-government applications focusing on greater transparency, lesser corruption and better convenience for citizens can have a significant impact. The need today is the creation of widespread ownership of the proven applications. More than just the effort of a few champions is called for, to make e-government happen on a wide scale.

Most Governments are not taking advantage of the domestic and international talent that is available to build on-line applications. This is largely because the procedures for procuring IT services (as opposed to buying hardware) are not well structured. Often several partners have to bid together as no single vendor can deliver all the components of an application. The procedures do not appear to be open and transparent - leaving room for judgement and maneuver. Civil servants therefore shy away from dealing with the private sector. We need empowered groups of competent professionals in the Government system who can deal with the complex process of procurement of IT services. The current global IT down turn presents an opportunity to leverage domestic and international talent for reforming the way in which Governments deliver services.

Cargo Cults, Knowledge, and IT-for-Decision-Making Strategies in Developing Countries*

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This article considers the possibility that IT and public managers in developing countries may be designing IT-for-decision-making initiatives based on unrealistic assumptions. It argues that the problem with development thinking is that it views IT initiatives as allocation constraints. This creates the expectation that IT strategies can optimize new technologies, human resources processes, and structures within organizations. Consequently, knowledge is treated as an afterthought in IT strategies without consideration for its special characteristics. This article suggests that the challenges facing IT and public managers in developing countries are not allocation constraints but knowledge problems.

In the early 1900s, tribesmen in New Guinea observed that European administrators only had to cable an order or write a letter in order to obtain the goods they needed, which were generally delivered by airplane as cargo. If the tribesmen used the ritual rites, they believed the cargo would also come to them, so they constructed crude airstrips, warehouses and wireless houses, installed office chairs and tables and began passing around pieces of paper to each other. Such behavior became known among anthropologists as "cargo cults".

(Harris 1998:15)

Introduction

Development research on information technology (IT)¹ initiatives in Third World countries indicates that approximately 80% of IT projects either fail² or only partially

¹ This article adopts Heeks' (1999b) definition of information technology, which defines IT as "computing and telecommunication technologies that provide automatic means of handling information."

² IT initiatives that "fail" are initiatives that do not achieve any reform objectives envisioned by public and IT managers.

succeed³ when applied to public sector reform (see: Heeks, 1999a). With access to state-of-the-art technologies and highly-trained technologists in Third World countries increasing, conventional wisdom holds that social and organizational factors may be the primary obstacles to successful IT integration in the public sector (see: Yahya, 1993; Heeks, 1999a; and Mansell and Wehn, 1998). While development studies give considerable attention to technological barriers, human resource constraints, and a myriad of social and organizational factors, they fail to provide a systematic explanation for disparities in IT usage practices.

Research studies on computing in the Middle East and North African (MENA) region illustrate this point. Refocusing the analysis of computing in MENA nation-states on IT usage shows that IT-enabled applications range from basic office practice software, such as word processing, to complex transactional processing⁴ solutions (e.g.: Goodman and Green, 1992; Danowitz, Nassef, and Goodman, 1995). Conversely, the least integrated use of IT in MENA countries, including Israel, is in decision-making practices.⁵

Why do managers and policy makers in MENA countries rarely use IT in decision-making activities?

This article argues that the answer to this question is of vital importance to the field of development public policy and public administration research. Governments and their stakeholders, such as donor agencies and international organizations, have enthusiastically embraced the claim that IT usage can enhance public-sector efficiency⁶ and effectiveness⁷ (e.g.: Heeks, 1999b; Bedi, 1999; Hashim and Allan, 1999; and Mansell and Wehn, 1998). Consequently, IT initiatives have been designed around technical infrastructure investment, education and training projects, and change management initiatives to achieve the efficiency and effectiveness benefits associated with IT deployment and usage in clerical activities, government decision-making and service delivery (see: Mansell and Wehn, 1998; Heeks, 1999b).

Information Technology as a Core Concept

Heeks (1999b: 17) conceptualizes the expected benefits of IT-enabled, public-sector reform around a three-dimensional vision that new technologies can:

³ IT initiatives that “partially succeed” refer to projects that only achieve limited reform objectives envisioned by IT and public managers.

⁴ This article defines IT for transactional processing as the process of using IT to record numerical data to maintain either internal or external relationships between the organization and its environment (see: Lind, 1999; Sacco and Ostrowski, 1990). Transactional software applications are control-oriented solutions based on pre-programmed sequences of events. Payroll and personnel applications are examples of transactional processing solutions.

⁵ Applications for decision-making activities are commonly thought of as technologies that enable analytical reasoning.

⁶ Efficiency gains in information system studies are measured along three dimensions, namely quantity, time and accuracy (see: Heeks, 1999b; Te’eni, 1990; and Dery, 1981).

⁷ Effectiveness gains in information system studies are described as improvements in the way information is filtered, integrated, and presented to decision makers (see: Te’eni, 1990).

1. Automate existing, human-executed processes such as clerical functions which involve accepting, storing, processing, outputting and transmitting information;
2. Assist existing, human-executed processes involving government decision making, communication and implementation; and
3. Create and support new IT- and human-executed processes, such as new methods of public-sector delivery.

According to Bedi (1999: 3-4), these expectations are theoretically made possible by three unique qualities that set IT apart from other technological innovations, namely the ability to:

1. Separate information from its physical repository;
2. Generate content and network externalities; and
3. Be pervasive in nature.⁸

Furthermore, Bedi (1993:3) argues that the most revolutionary aspect of IT is its decoupling property, which facilitates “the immediate transmission of large volumes of information and permits communication independent of the physical movement of individuals.” According to Bedi, the decoupling property enables individuals to use IT and information networks to access information and ideas, thereby generating content and network externalities.

The Knowledge Problem

The problem with development thinking⁹, however, rests with its assumptions regarding IT, human resources, and socio-psychological factors in the design of IT initiatives. Although IT and public managers in developing countries argue that there is no ideal model for IT and decision-making activities, their vision of what needs to be done is based on positivist assumptions that they, along with stakeholders, possess all the relevant information needed to design and implement the most appropriate strategy to improve organizational decision making in public institutions (see: Mansell and Wehn, 1998; and Heeks, 1999b).

Thus, IT initiatives in non-industrial organizations are essentially allocation solutions that revolve around what development thinking views to be the most appropriate means to improve efficiency and effectiveness in organizational activities. Mansell and Wehn (1998:101) summarize the necessary requirements as:

1. A technical infrastructure that provides access to information content;

⁸ This refers to the sector-wide applicability of IT.

⁹ Development literature can be broadly organized into three fields of research, namely socioeconomic, political and administrative (see: Jreisat 1997). Rapid changes in information technology along with the proliferation of the Internet has generated tremendous enthusiasm in each field touting the potential for new economic opportunities, more open, transparent and participatory government, and increased efficiency and effectiveness in public administration.

2. Information content that consists of electronic resources relevant to organizational decision making; and
3. A skill base that includes specialized skills to design, manage and utilize ITs for decision-making practices.

The central thesis of this article is that the obstacles facing IT and public managers in developing countries are not allocation problems, but knowledge questions. More to the point, whereas allocation problems lead IT and public managers to consider how to optimize given resources to improve the decision-making process, knowledge questions explicitly focus attention on how to improve the way the special characteristics of knowledge¹⁰ are used in organizational decision making.

As an example, Figure 1.1 attempts to visualize the development way of thinking using a single-dimension schematic that highlights the tradeoff between the level of access to information and a generic technical infrastructure. Access to information is shown as the primary dimension of decision-making. However, embedded in the tradeoff between IT and the level of access to information are also assumptions that poor quality of information, politicized and inconsistent decision-making processes, values such as kin loyalty and secrecy, lack of awareness regarding IT on the part of management and staff, as well as hierarchical and centralized organizational structures collectively constrain access to and use of information (see: Heeks, 1999a, Harris, 1998; and Yahya, 1993).

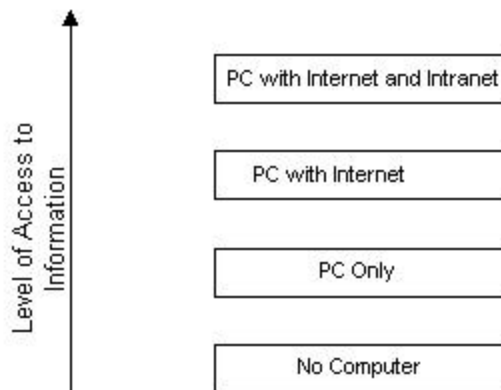


Figure 1.1 Tradeoff between Technical Infrastructure and Information Access

If analysis of IT-application obstacles, is refocused on the kind of knowledge that these obstacles prevent decision-makers from accessing, a knowledge bias in IT initiatives is found. More to the point, IT initiatives only directly address one aspect of knowledge, and the manner in which access to this knowledge using state-of-the-art IT, capable human resources, and IT-friendly socio-organizational factors can improve the decision making, communication and decision implementation in public administration. Table 1 below derives several different spectra along which knowledge can be assessed in an IT-enabled context to illustrate this point (see: Baetjer, 1998).

¹⁰ The phrase “special characteristics” draws attention to the tacit dimension of knowledge.

In other words, Table 1 shows how development thinking ties benefits associated with IT usage to factual and descriptive information or inter-subjective explicit knowledge. Thus, while other forms of knowledge are viewed as either problems or afterthoughts, explicit knowledge is not only conceptualized as a stream of information that travels through IT and information networks, but also as the primary triggering mechanism for decision making.

Table1.1: Different Dimensions of Knowledge

	Explicit Knowledge	Implicit Knowledge
Individual	Verbalized or documented thoughts and strategies	Physical skills, Habits, Rules, Routines
Inter-subjective	Books, Libraries, Manuals, Technology	Language, Social capital

Source: Baetjer (1998: 13-16).

Although such assumptions are necessary conditions for accessing factual and descriptive information, this article argues that they do not directly address how IT, human resources, and socio-organizational factors trigger the use of implicit knowledge on individual and inter-subjective levels. More specifically, IT initiatives do not make allowances for what is known about the decision-making process — once the stream of explicit knowledge that flows through IT and information networks is made available to the organization, it is received by an individual who engages in a kind of discourse with the information. Furthermore, this reflective process is fundamentally a dialogical structure that guides decision-making activities (see: Vickers, 1987; and Lavoie, 1990). The development approach to IT initiatives, however, offers no direction as to how IT can directly improve the use of implicit knowledge on individual and inter-subjective levels, and how that kind interaction can improve the decision-making process in the organization.

To summarize, this article suggests that IT initiatives are designed to stimulate usage of only one aspect of knowledge — inter-subjective explicit knowledge during decision-making activities. Similarly, the fact that IT obstacles are viewed mainly as explicit knowledge constraints implies that IT initiatives reinforce IT usage practices centered around IT applications that collect and process factual and descriptive information, such as data and transactional processing applications. In other words, the belief that maximizing computing power and communication capabilities while minimizing organizational constraints leads to IT usage for decision making in developing countries is, potentially, as much a “cargo cult” expectation as the New Guinea tribesmen’s presumption 100 years ago that mere investment in airstrips, airplanes and wireless houses would deliver “cargo.”

(For list of References, please refer web version of the article)

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Lessons from a Knowledge Management (KM) Initiative

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*The **Electronic Network for Rural Asia Pacific Projects (ENRAP)** was launched to facilitate exchange of information amongst the poverty alleviation projects funded by the International Fund for Agricultural Development (IFAD). ENRAP was to promote documentation and sharing of knowledge, improve dissemination of information from research institutions to projects, strengthen communication with client communities and reduce cost of administrative reporting. ENRAP has lead to some use of email and the web amongst project staff, but there is very little impact on the way the poverty alleviation projects are being implemented. The paper analyses the reasons for the low impact and presents some lessons for other Knowledge Management projects.*

In fulfilling its mandate to eradicate rural poverty and hunger through agricultural development, IFAD is supporting a large portfolio of projects (64 projects in 21 countries) with a commitment of nearly a billion dollars for building the capacity of poor farming communities. Many of the activities supported are new and innovative, involving at every step administrative, methodological, managerial and technical challenges. Building up of human network is seen as an essential feature of the capacity building process so that information and knowledge could be shared amongst a wider group of development stakeholders. Electronic networking, especially open-ended low-cost Internet, was thought to be ideally suited for promoting such an exchange of information between projects and their environments. The ENRAP project was created to fulfill this broad mandate. ENRAP was launched in 1998, as a pilot project to run till May 2001, with a grant of USD 750,000. During the pilot phase, selected IFAD-financed projects in India, Nepal, Pakistan, Philippines and Sri Lanka participated in ENRAP. IDRC, a Canadian development agency with a strong interest in knowledge management, was contracted to implement the initiative.

The objectives of ENRAP focused on developing horizontal communication between implementing partner institutions and their field staff, supporting documentation of local knowledge, improving access to technical research from local environments, and improving communication between projects. In the long run it was also expected to strengthen communication with the client communities.

Scope of Activities: Implementation in a typical project

The Maharashtra Rural Credit Project (MRCP) is a typical IFAD project covering 400 villages in three districts in Western India. India's National Bank of Agriculture and

Rural Development (NABARD) has the responsibility of implementing MRCP. Implementation involved the selection of partnering agencies by the implementers, developing a cadre of field workers, organizing the communities into 750 Self Help Groups (SHGs) and channeling micro credit to the SHGs through partner banks. Besides the usual tasks of monitoring and reporting, project partners organized activities to build capacity of field staff and SHGs. MRCP is seen to be successful as loan utilization rates in the project area have gone up from 40% to 90% and the repayment rate is up from 30% to 75%. Communities are now able to influence the development process. Communication between project officers, partners, field workers and client communities has traditionally been through letters, phone/fax and face to face meetings.

One of the middle level line managers of NABARD was appointed as the coordinator of ENRAP at the MRCP site. The projects were provided a PC to connect to the Internet. Some small equipment (one laptop and a digital camera), software and literature were also provided. Similar resources were provided to all projects.

In its implementation effort across projects in Asia, IDRC concentrated on extending support for achieving basic connectivity, and conducted five workshops and meetings over a 2 year period which brought participants together to learn about Internet and networking and to plan the future networking activities. One of these workshops was conducted at Pune (MRCP head quarters) and the coordinator of ENRAP in MRCP participated in a workshop in Singapore.

A central website was developed by IDRC, which enables dialog amongst participating projects, carries documents posted by IDRC and IFAD projects, and provides links to other sites. Many other projects have created their own web sites hosted on servers of ISPs or other free service providers. Training provided by IDRC has enabled the project staff in developing these sites. Access to these sites is slow and free space is limited.

Assessment of Performance, Outcome and Impact of ENRAP

Measurement of benefits from deploying information and communication technology has always been difficult even in profit oriented enterprises. The nature of usage and its impact is highly contextual, and isolating the impact of a single factor on increased program effectiveness is difficult. If several concomitant conditions are satisfied, of which ICT deployment is just one, programs may become more effective. Well-run organizations are known to extract greater value from their ICT investments.

Given this caveat, it was still necessary for IFAD to evaluate the performance and impact of the KM initiative to decide whether the initiative should be continued, and if so, in what form. It was also necessary to determine if the project staff and implementing agency delivered on their commitments. A team of consultants was hired to carry out the evaluation. The team was advised to maintain a balance between an audit of the achievements of the first phase of the initiative, and understanding the information and knowledge needs of project managers, implementers and client communities that could

be useful in the design of a subsequent phase of the KM initiative. The evaluation mission visited eight project sites in India, Nepal, Sri Lanka and the Philippines (visited by the mission leader). Discussions were held with Project Management Units (PMUs) at the country level, with staff at the field sites, with some of the partners involved in implementing the projects, and with some representatives of the communities where such projects were being implemented.

The evaluation focused on Inputs, Activities, Outputs and Outcomes. Inputs and activities were easier to measure and evaluate against the levels indicated in the proposal documents as these were well defined. The outcomes were not defined in any level of detail. The resources provided by the ENRAP to the various projects (hardware, software, training and participation in workshops); and activities (levels of electronic communication activity like email, web browsing, documentation of best practices, uploading information on ENRAP web site, development of a project web site) were reviewed.

Email was beginning to get used by the PMUs, and in a few cases, by the field units. The use was however sporadic and for ad hoc purposes and special events. For example, the organization of an international workshop in Pune was completely facilitated by email. On the other hand notices for regular meetings were often not conveyed through email even though many of the participating organizations had the facility. ENRAP website was visited once in 2-3 weeks by the project staff.

The content on the ENRAP web site emphasized knowledge management and ENRAP project related issues. Few documents that provide learning for poverty related work were carried. Just a few field experiences have been documented by projects. An analysis of the log of website usage indicated 5-7000 hits per month. 55% of the users were based in the US. Visitors from the ENRAP countries accounted for a mere 17 user sessions during a 3-month period. Developing countries accounted for only 3% of the total sessions.

Major gains of the ENRAP project have been in the area of raising awareness and capacity building. Projects now recognize the need to capture and share local knowledge and best practice. Some key players benefited from technical training and began to share these skills with colleagues and partners. Local capacity was developed for Internet use, design of web sites, and use of tools for managing information. Communications between projects improved marginally.

Many of the IFAD projects had just begun their poverty alleviation work. In places where significant successes were achieved, the role of ENRAP in the success was not evident. Project managers were unable to site instances where ENRAP had helped them in solving problems of design or implementation. Since the actual documentation and sharing of knowledge was at a very limited scale and the use of email and Internet was at a low level, it appears that some of the key pre-conditions mentioned below need to be significantly strengthened for a second phase to be launched.

Analysis of why the impact was marginal

For a project like ENRAP to succeed the following pre-conditions should have been defined at the start of the project:

- A large number of key actors involved in the implementation of IFAD projects have convenient and reliable email and Internet connectivity.
- Those who can access the Internet have the time and necessary computer skills to do so and are aware of the potential benefits of seeking information and knowledge from external sources.
- Budgetary allocations are available to pay for ISP charges and local telephone calls to cover a reasonable amount of Internet usage.
- The information available through the ENRAP web site or in list serve exchanges is useful for their day to day work (e.g. solving operational problems).
- Project staff are keen to share knowledge and information with other projects, have the skills to document knowledge in a form that will make it useful for others and have the resources for documentation work.

Access to Internet was limited to Project Management Units. Many implementing partners had PCs but did not have the operational budgets to get an Internet connection. Even at the PMUs the use of Internet was restricted because of inadequate operational budgets to pay for ISP charges and telephone costs. The data transfer rates were often very low (100 bytes per second) in some areas and the connections were not reliable. A large proportion of the ENRAP budget was spent on the activities of the implementing agency: management and co-ordination (36.6%), needs assessment and training support (39.6%), technical aspects covering development of knowledge networking prototype and a website (14%) and audit and evaluation. A very small amount was allocated to the projects.

Knowledge resources such as web sites would be used if the content were operationally useful and structured to provide easy access. For example the content of ENRAP should have included topics such as: micro credit, self help groups, community mobilization, natural resource management, land use and entitlements, participatory monitoring, among others. The content has to be practical and useful. Electronic interaction needs to be facilitated by a moderator with special skill of e-facilitation.

In many projects the motivation to learn from the experience of others was not strong. Project staff felt that some new ideas may be picked up through sharing but often there was little immediate usability of information/knowledge that was picked up. In some projects the culture of sharing information was weak. Most projects were keen to use the ENRAP platform to project their own achievements but not necessarily to learn from the experience of others.

Many project personnel perceived ENRAP to be a separate entity unrelated to poverty alleviation activities. Knowledge management was seen as an end rather than a means to make the poverty alleviation work more effective.

Key Lessons

The formally stated objectives of the first phase of ENRAP were perhaps ambitious. The project was formulated at a time when there was a great deal of euphoria about knowledge management. Experience seems to indicate that it is easy to systematize documentation of knowledge, indexing, storage and providing access to such databases. Large bandwidths have made it possible to store and transport documents in a variety of forms and formats covering all types of media. However, utilization of this knowledge for making organizational functioning more effective seems to be far more difficult. Few organizations claim to have done it successfully.

There is a hierarchy implicit in the usage pattern of new information technologies. People begin to use computers for simple tasks such as preparing documents and organizing presentations. Some graduate to its use as a tool for analysis and decision support. Email of course is the killer application. Browsing is helpful if a specific need for information is identified. Perhaps the users of ENRAP needed to be supported through the entire cycle of usage before they could become adept at creation and use of knowledge. The process of adoption of new information technologies can be lengthy as an attitudinal and behavioral change is involved.

Access to knowledge can impact effectiveness when individuals feel enriched (with new ideas, solutions to problems) and are able to seek information at the time and place where it is needed. Individuals need to trust the information before the distilled knowledge is applied to a specific action. Projects like ENRAP can at best hope to create large electronic networks which will then support the emergence of human networks keen to consult each other and begin to value and trust the information/knowledge that is pooled and disseminated. Any significant impact is almost likely to happen through serendipity. Knowledge management initiatives should therefore supplement traditional networking through face to face contact, rather than supplant such initiatives.

Exchange of knowledge is more likely to happen in a network when there is commonality of interests and shared problems to solve. It is therefore important to make an appropriate choice for the domain of the network (international, national, sub national). For example in ENRAP the primary focus of knowledge networking could have been at the national and sub-national levels to ensure the usefulness and applicability to local interventions.

KM initiatives need to be integrated with the core work of the organization. High profile KM initiatives tend to become dysfunctional. Knowledge projects like ENRAP should have a strong buy in from the mainline functionaries. Coordinators with experience and responsibility in implementing some aspects of poverty alleviation programs are likely to be more successful in integrating the knowledge activity with the core work of poverty alleviation. Reliable, affordable and convenient access to Internet for a large proportion of the staff that will form a KM network is a pre-condition to any exchange of information and knowledge.

Documentation of indigenous knowledge and sharing it within and across client communities is a potentially powerful idea, but one that is difficult to implement. Bearing in mind the ground reality of short supply of Internet connections and electricity in developing countries, the most practical approach to connect with rural communities is to provide Internet connectivity through multi-function public access points or telecentres. There may already be experimental telecentres established by Government or other agencies with which partnerships can be established to deliver relevant content.

The rural populace in developing countries, to a great extent, lacks the skills required to filter through the vast information available on the Internet and identify information most relevant to them. Capacity of grassroots workers to act as intermediaries would have to be built. They would need to facilitate easy filtering of information, testing of solutions offered to specific problems and their adaptation till the villagers themselves acquire the skills needed to access relevant information.

The documentation of best practice needs to focus on process rather than outcomes so that others can learn how projects could be successfully implemented.

In promoting electronic communication between project staff, field workers, and the client communities the use of local language should be emphasized and supported.

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Understanding e-Governance for Development

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Executive Summary

New information and communication technologies can make a significant contribution to the achievement of good governance goals. This 'e-governance' can make governance more efficient and more effective, and bring other benefits too. This paper outlines the three main contributions of e-governance: improving government processes (e-administration); connecting citizens (e-citizens and e-services); and building external interactions (e-society). Case studies are used to show that e-governance is a current, not just future, reality for developing countries. However, most e-governance initiatives fail. Countries therefore face two challenges. First, the strategic challenge of e-readiness: preparing six identified pre-conditions for e-governance. Second, the tactical challenge of closing design-reality gaps: adopting best practice in e-governance projects in order to avoid failure and to achieve success. A vision for change is therefore outlined of which more details are given in a related paper (Heeks 2001a).

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A. E-Governance for Development: What's New?

Developing country (DC) governments have been using IT for more than 40 years. So what's new about e-governance? What's new is that we are moving on from IT to ICTs and from IT to IS.

New Digital Connections: ICTs

The old model was one of information technology (IT) automating the internal workings of government by processing data. The new model is one of information and communication technologies (ICTs) supporting and transforming the external workings of governance by processing and communicating data.

e-Governance should be seen to encompass all ICTs, but the key innovation is computer networks – from intranets to the Internet – creating a wealth of new digital connections:

- Connections within government – permitting 'joined-up thinking'.
- Connections between government and NGOs/citizens – strengthening accountability.
- Connections between government and business/citizens – transforming service delivery.
- Connections within and between NGOs – supporting learning and concerted action.
- Connections within and between communities – building social and economic development.

As a result, the focus grows from just parts of e-administration to also encompass e-citizens, e-services and e-society.

New Systemic Approaches: IS

The old models held information technology isolated from the mainstream of reform, or held IT as the objective of reform. The new model brings information systems (IS) to the heart of reform.

In practice this means two things:

- A central role for ICTs: as governance becomes – and becomes recognised as – ever more information-intensive, ICTs become an essential part of more and more governance initiatives. ICTs are also recognised as a key lever to change. They are no longer isolated on the sidelines.
- An integrated role for ICTs: e-governance means using ICTs as servants to the master of good governance. ICTs are no longer seen as an end in themselves and they are seen to work only as part of a wider systemic 'package'.

Overall, then, e-governance is the ICT-enabled route to achieving good governance. We might prefer to think of it as 'i-governance' – integrated governance – since it integrates

both the processing and the communication technologies; and since it integrates people, processes, information, and technology in the service of achieving governance objectives.

B. Why e-Governance for Development?

As is true all over the world, government in the developing nations costs too much, delivers too little, and is not sufficiently responsive or accountable.

Good governance reforms aim to address these shortcomings. Yet progress – after many years of effort in implementing such reforms – has been much more limited than expected. e-Governance offers a new way forward, helping improve government processes, connect citizens, and build interactions with and within civil society.

What exactly has e-governance got to offer? At root, it has the power of ICTs, which provide three basic change potentials for good governance for development:

- **Automation:** replacing current human-executed processes which involve accepting, storing, processing, outputting or transmitting information. For example, the automation of existing clerical functions.
- **Informatisation:** supporting current human-executed information processes. For example, supporting current processes of decision making, communication, and decision implementation.
- **Transformation:** creating new ICT-executed information processes or supporting new human-executed information processes. For example, creating new methods of public service delivery.

These change potentials, in turn, can bring – singly or in combination – five main benefits to governance for development:

Efficiency gains:

- **Governance that is cheaper:** producing the same outputs at lower total cost.
- **Governance that does more:** producing more outputs at the same total cost.
- **Governance that is quicker:** producing the same outputs at the same total cost in less time.

Effectiveness gains:

- **Governance that works better:** producing the same outputs at the same total cost in the same time, but to a higher quality standard.
- **Governance that is innovative:** producing new outputs.

These are the direct and objective benefits. ICTs can bring many others. For example, use of ICTs by government can bring benefits both internally and externally:

- Internally, providing benefits such as better staff motivation or greater political control or an improved public image.
- Externally, by delivering cheaper, better services to those who depend on government. Indirectly by demonstrating the benefits of ICTs to the wider

population; by catalysing the local IT industry; and by encouraging foreign investment.

C. What Does e-Governance for Development Cover?

E-Governance does not cover e-commerce and e-business applications that focus solely or mainly on the private sector. As noted above, instead, there are three main domains of e-governance, illustrated in Figure 1 (adapted from Ntiro 2000):

- **Improving government processes: e-Administration**
- **Connecting citizens: e-Citizens and e-Services**
- **Building interactions with and within civil society: e-Society**

Respectively, these particularly address the problems that government is too costly, too inefficient and too ineffective; too self-serving and too inconvenient; and too insular.

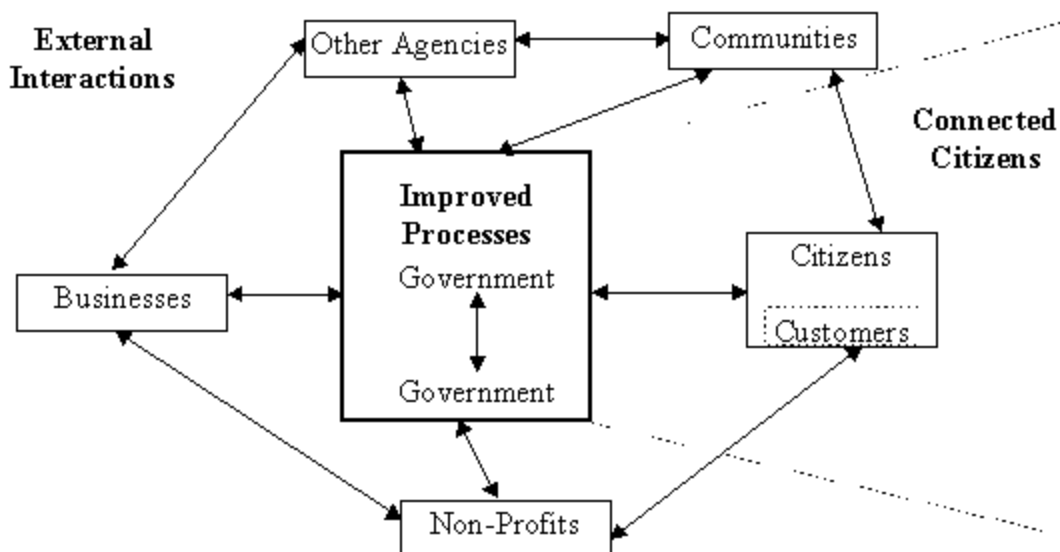


Figure 1: Focal Domains for e-Governance Initiatives

C1. Improving Processes: e-Administration

Such initiatives deal particularly with improving the internal workings of the public sector. They include:

- **Cutting process costs:** improving the input:output ratio by cutting financial costs and/or time costs. Automation can replace higher human costs with lower ICT costs to support efficiency/productivity improvements. Informatisation can

- support decisions and implementation in downsizing or rightsizing exercises. The rationale is to address the large size of public sector expenditure and/or the inefficiency of many of its processes. The Egyptian case below is an example.
- ***Managing process performance***: planning, monitoring and controlling the performance of process resources (human, financial and other). Informatisation supports this by providing information about process performance and performance standards. The rationale is to make more efficient or effective use of process resources. The Tanzanian case below is an example.
 - ***Making strategic connections in government***: connecting arms, agencies, levels and data stores of government to strengthen capacity to investigate, develop and implement the strategy and policy that guides government processes. Examples of such connections are central-to-local, ministry-to-ministry, executive-to-legislature, and decision maker-to-data store. Automation and informatisation support this by digitising existing information channels. Transformation supports this by creating new digital channels. The rationale is to provide clearer direction for public sector and state processes and to provide for a more evidence-based approach to policy and process. The Chinese case below is an example.
 - ***Creating empowerment***: transferring power, authority and resources for processes from their existing locus to new locations. Typically that transfer is to lower, more localised levels of the public sector and may be seen as decentralisation. Transformation supports this by creating new information flows to decision makers and process implementers in new locations. The rationale is to reduce the costs and increase the speed of processes and decision making and/or to create more flexible and responsive processes. The South African case below is an example.

Traditionally, ICTs have been used within government in 'automation' mode, replacing clerical labour processes with their digital equivalent. These are essential building blocks for e-governance. However, their achievement of financial cost-cutting goals is questionable. In the North, replacing costly humans with cheap ICTs may cut costs, though even here evidence of productivity gains is limited. In developing countries, replacing cheap humans with costly ICTs is unlikely to be justified on financial cost grounds. As time replaces money as a more critical global resource, ICTs' ability to increase process speed may provide some justification for automation. More generally, ICTs need to be justified and understood in the context of a broader vision and necessity for e-governance.

From this base of clerical automation, there are three e-administration trends at work in developing countries:

- ICTs are spreading up the organisation, increasingly supporting the work of operational and tactical managers and, most recently, beginning to touch the working lives of politicians and other senior public officials. As the high water mark of ICTs rises higher, their impact on government increases.

- Use is changing from automation to informatisation and transformation. As the change potential of ICTs increases, they deliver ever-greater benefits and enable ever-greater changes in the process of government.
- From a focus on processing (i.e. computers, the I in ICTs), applications are moving to a focus on communications (i.e. networks, the C in ICTs) and, most recently, to a focus on both processing and communications. As the power and reach of ICTs grows, so does the power and reach of change in government.

A final trend is the move of ICTs from inside to outside government. Although lagging some way behind, it is the 'outside' focus that will be discussed in sections C2 and C3.

Developing Country e-Administration Examples

The examples that follow, and those in subsequent sections, are provided as evidence that e-governance is not only the future in developing countries, it is also the present in developing countries.

Why were these initiatives successful? They were successful because they 'kept it simple' and because their design took account of current realities in both their DC host organisation and, where relevant, the external environment.

Cutting Process Costs

Creating a National ID System in Egypt

In Egypt, the Information and Decision Support Center has created a comprehensive national database with 85 million birth records, 34 million death records, 12 million marriage records and 2 million divorce records. This has provided the basis for a national ID number and, hence, a secure and accurate national ID card. Automation of previously-manual processes has saved considerable sums of money. The information base and ID numbers have also been an essential building block in the creation of other public sector planning and service delivery applications. (IDSC 2000)

See also the Tanzania case below.

Managing Process Performance

Delivering Management Control in Tanzania

"The Government of Tanzania has recently launched its integrated HR and Payroll systems covering about 280,000 public servants. While the capital invested was significant at around US\$6.5 million, the savings already accrued in improved management – reduced ghost workers, improved control, and accuracy – mean that the project has already paid for itself. The Government of Tanzania has also implemented an Integrated Financial Management System (IFMS) at all ministries in Dar es Salaam and Dodoma via a wide area network. IFMS has improved control over expenditure management, resulting in more timely and detailed reporting. Internet-enabled versions of both systems will soon be rolled out countrywide." (Ntiro 2000)

Making Strategic Connections in Government

Improving Sustainable Development Strategy in China

There was a recognition in the Chinese government that formulation and implementation of sustainable development strategies were hampered by lack of adequate information, and that much of the data underlying this information lay scattered in many different organisations. Therefore an ICT-enabled national Agenda 21 network was created, particularly linking a set of key national government, local government and public sector research institutions. The project also helped connect leading decision makers with valuable Web-based data resources on sustainable development. In addition to raising the profile of sustainable development with policy makers, the network has also helped bring faster and more information to the process of strategic environmental decision making. (SDNP 2000a)

Creating Empowerment

Breaking the Apartheid Legacy in South Africa

The ANC-led government in South Africa is making extensive use of ICTs in its bid to democratise a public sector run for decades largely by, and for, an Afrikaner minority. Attempting to 'reinvent' itself, Johannesburg Metropolitan Council initiated an intranet project. This was intended to break apartheid-legacy information flows and give all staff access to both formal and informal information sources. Careful design (analysed further in section D2 below) ensured that the project was a success. Council processes have become more inclusive and transparent. The project is now being extended to encompass local community leaders as well. (Benjamin 2001)

C2. Connecting Citizens: e-Citizens and e-Services

Such initiatives deal particularly with the relationship between government and citizens: either as voters/stakeholders from whom the public sector derives its legitimacy, or as customers who consume public services. These initiatives may well incorporate the process improvements identified in section C1. However, they also include a broader remit:

- ***Talking to citizens***: providing citizens with details of public sector activities. This mainly relates to certain types of accountability: making public servants more accountable for their decisions and actions. Informatisation and transformation support this by providing the new information flows from government to citizens on which accountability depends. The rationale is to increase the pressure on staff to perform well and to improve public understanding of government. The South Korean case below is an example.
- ***Listening to citizens***: increasing the input of citizens into public sector decisions and actions. This could be flagged as either democratisation or participation. The main potential is for informatisation and transformation to support this by providing new information flows from citizens to government. The rationale is to make public decisions more responsive to citizens' view or needs. A South

African example is given below, although this relates to the automation of democratic processes, not informatisation/transformation.

- ***Improving public services***: improving the services delivered to members of the public along dimensions such as quality, convenience and cost. This uses all the potentials of ICTs to deliver the informational components of public services to citizens in digital form. The direct rationale is clear from the definition, but there is also an indirect rationale of releasing citizen time and money that would otherwise be captured by inefficient service delivery. The Chilean case below is an example.

Because all these initiatives rely on the new connectivity offered by ICTs, they are all relatively new inclusions within e-governance. They are particularly representative of the significant new possibilities offered by e-governance for development. They also represent something of a further chronology of ICT-enabled governance (in addition to those identified in section C1). The chronology starts with *publishing* (delivering data to citizens), then moves to *interaction* (delivering data to citizens and receiving data from citizens), then moves to *transaction* (undertaking other government processes online).

All of these have so far been rather neglected in developing countries, yet even very basic publishing activities can have significant effects. The information poverty of DC citizens is such that they can often be conned into bribery because they lack the most basic information on the who, where and how of government services. Publishing that information on the Web directly attacks information poverty and its effects. Publishing government forms can also have a strong disintermediating effect – cutting out the public servants and others who may illegally charge citizens for access to such forms.

However, the model for disintermediation in the South will not match that in the North. In the North, the main models for government—citizen interaction have been disintermediated models of direct digital connections to the individual citizen. In other words, these are models involving the replacement of human intermediaries by ICT intermediaries. For the majority of citizens in the North, the ICT intermediary is personally-owned (typically an Internet-linked PC in the home or workplace). For many others, the ICT intermediary is institutionally-owned (typically in a local community centre, library, school, post office, telecentre, etc.).

In the South, the first model – citizen direct ownership and use of ICTs – will apply to only a small fraction of the population for the foreseeable future. A greater number will gain access through the second model – non-ownership but direct use of ICTs – through similar institutions to those listed above. Many will also fall into the grey area between these models that is particularly found in the South – direct use of ICTs owned by family, friends, neighbours or colleagues.

Nevertheless, for the medium-term, the majority of citizens will remain on the wrong side of the digital divide. They create a substantial need for a third model – of those who are neither direct owners nor direct users of ICTs. To benefit from e-governance, these citizens will have to rely on reintermediation models that insert a human intermediary

between the citizen and the growing digital infrastructure of e-governance. Where institutionally based, these can be thought of as 'intelligent intermediaries' that add human skills and knowledge to the presence of ICTs (Heeks 1999).

Realistic e-governance for development projects will therefore have to identify and nurture such intermediaries. They may be existing professionals (e.g. accountants for online tax systems; notaries for online registration systems); or public servants (e.g. in call centres or in one-stop-shop government offices); or NGOs and community-based organisations (e.g. staffed community telecentres); or private sector organisations (e.g. cybercafes); or other public institutions. The Gyandoot case in section C3 provides an example – the entrepreneur running the online kiosk frequently goes online on behalf of his/her clients, helping cross the cognitive gap between cyberspace and life in an Indian village.

Developing Country e-Citizens/e-Services Examples

Talking to Citizens

Greater Openness of Local Government in South Korea

At the highest level in the Municipal Government of Seoul there were concerns about lack of accountability and existence of corruption in the issuing of local government licences and permits. This led to the development of the OPEN system (Online Procedures ENhancement for civil applications): an anti-corruption Web portal that provides citizens with a range of relevant information. This includes the overall goals of the anti-corruption drive and an explanation of the rules and procedures for permit/licence application and processing. However, OPEN goes beyond this. It displays an anti-corruption index that summarises survey results on process performance. It also provides citizens with specific information by allowing them 'real-time monitoring of the progress of an application for a permit or license'. Some of this information can also be found in paper form but, for the increasing number of Seoul citizens or citizen groups with Internet access, this has reduced the barriers to obtaining government information. They are therefore better informed, the process of government is more open, and the rationale for bribery has been largely removed. Feedback from citizens has been very positive, and there has been a dramatic decrease in reported corruption. In large part, these achievements have been due to the integrated approach taken, ensuring that technological change serves public sector reform goals rather than vice versa. (World Bank 2000a)

Listening to Citizens

Supporting Free and Fair Elections in South Africa

Following difficulties in the 1994 elections, South Africa's Independent Electoral Commission "was charged with making sure that the country's second democratic elections in 1999 were 'free and fair'. This election was vitally important for the stability of the South African political climate and for ensuring that democratic processes were solidly in place. Through large scale implementation of unique information technology applications, the IEC was able to ensure that all South African citizens could have their

voices heard. The effort included the creation of a nationwide satellite-based wide-area network and infrastructure; a bar-code system used to register 18.4 million voters in just nine days; a geographic information system used to create voting districts; a national common voters' role; a sophisticated election results centre for managing the process; and the training of 300,000 people. The massive programme was completed in less than two years, in time for the vote." For this, the IEC received the 2000 Computerworld Smithsonian Award for most outstanding programme in the government and non-profit organisations category. (Microsoft 2000)

Improving Public Services

Better Tax Return Filing for Citizens in Chile

Chile's Internal Revenue Service has taken a typical three-step approach to Web-enabled improvements in services to the public. The first step – publishing – involved static presentation of information on taxation rates, procedures and plans. The second step – interaction – allowed citizens to enter a personal ID number, tax return ID number and password. They could then check on the status of their tax return to see if refunds were due or if the return was still being reviewed. Following the introduction of new legislation, the third step – transaction – allows citizens to file tax returns online and to make subsequent online corrections. There have been tens of thousands of online tax returns and hundreds of thousands of online status checks since the system's introduction. The system has reduced costs and increased speed and accuracy of service. It "saves money on printing, distribution and processing time. And online customers find the system easier, faster, and more accurate than traditional paper-based services. Whereas processing a tax return had previously taken 25 working days ... the new online package was delivering online assessments in just 12 hours." These gains mean 'online taxpayers have an extra 10 days in which to declare their taxes' and they also get refunds 'at least a month before paper-based claimants'. (World Bank 2000b)

C3. Building External Interactions: e-Society

Such initiatives deal particularly with the relationship between public agencies and other institutions – other public agencies, private sector service providers, non-profit and community organisations – and with the relationship between civil society institutions. As with citizen connections, these initiatives may well incorporate the process improvements identified in section C1. However, they also include a broader remit:

- ***Working better with business***: improving the interaction between government and business. This includes digitising procurement from and services to business to improve their quality, convenience and cost. This uses all the potentials of ICTs to deliver the informational components of public services to business in digital form. It also includes digital support for opening up government to business through outsourcing and other public—private partnerships. The direct rationale is to drive costs down and quality up within government, but there is also an indirect rationale of improving the efficiency and responsiveness of local business. The Philippine case below is an example.

- ***Developing communities***: building the social and economic capacities and capital of local communities. This uses all the potentials of ICTs to strengthen current information connections and to build new information connections within communities and between communities and other institutions. The rationale is to improve the wealth-creation potential and quality of life of community members. The Indian case below is an example.
- ***Building partnerships***: strengthening institutional relationships. This has two parts. First, building government partnerships: strengthening relations between government and other institutions such as NGOs or international organisations. Second, building civil society partnerships: strengthening relations between the institutions of civil society, such as between NGOs. This uses all the potentials of ICTs to strengthen current information connections and to build new information connections between institutions. The rationale is to create a strong economic, social and political 'fabric' within society. The Honduran case below is an example.

As with e-citizens and e-services, e-society initiatives rely on the new connectivity offered by ICTs. Thus, they are all relatively new inclusions within e-governance. Again, they are particularly representative of the significant new possibilities offered by e-governance for development.

e-Society – at least relating to communities or to other non-governmental institutions – has been a focus for recent donor-funded 'e-development' initiatives. Why? Partly because such initiatives operate at the institutional rather than individual level, and because they operate somewhat independently of the red tape of government. There has also been a strong e-development interest in government-disintermediating service delivery initiatives. These seek to deliver education and health advisory and other information-intensive services direct without state intervention, often on a North-to-South basis.

Other components of e-society – typically those relating to government links – have been rather more neglected. Thus, as with citizen-focus projects, the opportunity has yet to be fully grasped to use the new connectivity to help refocus the state from an internal, self-serving view to an external, nation-serving view.

Developing Country e-Society Examples

Working Better with Business

Reforming Import Procedures in the Philippines

Both business and government in the Philippines were concerned about the delays and corruption associated with customs and importation. An ICT-based system was introduced to address these concerns. Importers create a single electronic declaration which is processed to calculate payments due and to undertake risk analysis which identifies shipments that may require physical inspection. The online system has allowed a move to cashless procedures in which verification of duty/tax payment is sent

electronically from authorised banks to Customs. The verification is automatically reconciled against processed declarations and a release order is then issued. The release order is sent electronically to the Customs warehouses that hold shipments. The result is a much faster service for business. "Cargo is released between four hours to two days, as opposed to eight days in the earlier system." Reconciliation of payments – which used to have a four-month backlog – is now done within the day, and there are fewer errors. Finally, because Customs staff no longer handle cash or physical documentation, the pressures and opportunities for importers to make corrupt payments have been largely removed. (Bhatnagar 2001)

Developing Communities

Developing Rural Communities in India

The Gyandoot project set up 31 Internet-connected kiosks in villages in a district of central India where 60% of the population live below the poverty line (earning less than US\$1 per day). Each kiosk was initially funded by the local government committee. It is run by a local young entrepreneur along business lines: fees are charged for the services provided. Government-related services include online application for government certificates; online filing of complaints; printing of land records (which are held online and which all farmers need every season to obtain bank loans); and access to information on government welfare and related schemes. Other community development services include: access to agricultural produce prices; an auction site for sale/purchase of land, equipment and animals; online discussion forums; and e-mail. In the first year of operation, the kiosks were used on tens of thousands of occasions. Proven benefits include better prices for agricultural produce; easier sales of other items; faster reactions to complaints or problems (e.g. an outbreak of cattle disease); and improved knowledge and skills within the communities served. (Bhatnagar & Vyas 2001)

Building Partnerships

Strengthening Civil Society in Honduras

The Sustainable Development Network is an Internet-linked group of more than 400 institutions that play a leading role in Honduran civil society. It has proven its worth in acute situations. For instance, it was able to act as a clearinghouse for requests for food, medicines, blankets and other supplies in the aftermath of Hurricane Mitch. Sources of supply were identified via the Network, and their delivery was also co-ordinated online. The Network also plays an important longer-term role through topic-based virtual discussion forums, through institution-to-institution information exchange, and through development of online data stores. Given state control of most mass media in Honduras, the Network provides one of the few public spaces for discussion and access to information that is outside state control. This has led to a strengthening of civil society and provided greater opportunities to pressurise government to improve its functioning and transparency. (SDNP 2000b)

C4. Overlapping Initiatives

Although described separately above, the three domains of e-governance should be recognised as overlapping, as shown in Figure 2.

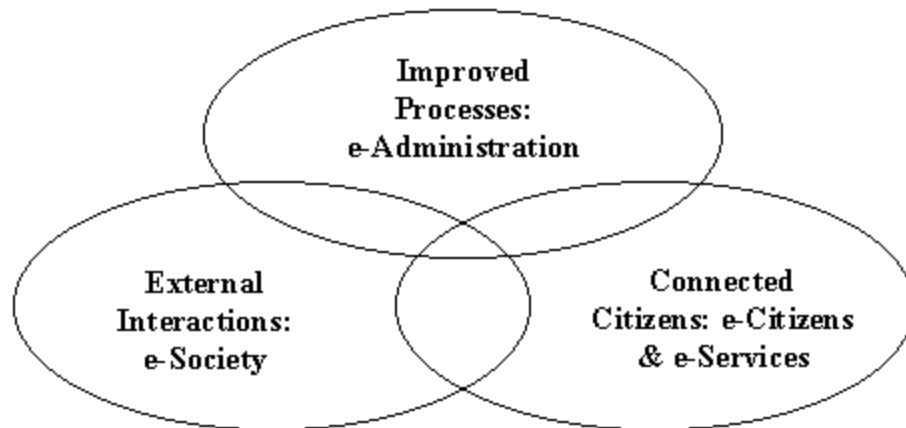


Figure 2: Overlapping Domains of e-Governance

Given growth in the new connectivity, e-governance initiatives may increasingly fall into overlaps. An example is given below.

Strengthening Parliamentary Functions in Uganda

The Uganda Parliamentary Technical Assistance Project has placed a heavy emphasis on improving information flows to, from and within Parliament, particularly through use of ICTs. To date, more than half the MPs and many research staff have undergone ICT training; a Web site has been created; and the information capacities of the Parliamentary Library have been expanded. Draft bills can be viewed, budgets and expenditure tracked, and examples of legislation in other countries accessed. Key Parliamentary information can therefore be accessed not just within government but also outside government by citizens, NGOs, and others. "As a result of this modern technology and training, MPs now make requests for research to be carried out and for background information from the Parliamentary Library and Research staff. The effective use of these resources has resulted in new legislative initiatives, better constituent representation, and improved parliamentary oversight of the Executive Branch." The project therefore strengthens connections within government, between government and citizens, and between government and other civil society institutions. (Ugandan Parliament 2000)

D. The Challenges to e-Governance for Development

The success stories cited above are the exception rather than the rule for two reasons. First, most developing countries have only undertaken a limited number of e-governance initiatives. This mainly relates to a lack of e-readiness, discussed later.

Second, most e-governance initiatives that are begun currently fail. Surveys of e-governance initiatives in DCs are incredibly rare; a shortcoming that needs to be addressed. Even donors, who should be committed to monitoring and evaluation, rarely seem to produce reports. From the material that is available, two main types of e-governance failure can be identified.

In some cases, there is the *total failure* of an initiative never implemented or in which a new system is implemented but immediately abandoned. For example, India's Indira Gandhi Conservation Monitoring Centre was intended to be a national information provider based on a set of core environmental information systems. Despite more than a year of planning, analysis and design work, these ICT-based systems never became operational, and the whole initiative collapsed shortly afterwards (Puri et al 2000).

Alternatively, there is the *partial failure* of an initiative in which major goals are unattained or in which there are significant undesirable outcomes. For example, the Tax Computerisation Project in Thailand's Revenue Department set out seven areas of taxation that were to be computerised. At the end of the project, only two areas had been partly computerised, and five others were not operational (Kitiyadisai 2000).

One type of partial failure that particularly seems to affect e-governance initiatives is the *sustainability failure* of an initiative that succeeds initially but then fails after a year or so. An example is the creation of a set of touch-screen kiosks for remote rural communities in South Africa's North-West Province. These were initially well received. However, the kiosks' lack of updated or local content and lack of interactivity led to disuse, and the kiosks were removed less than one year later (Benjamin 2001). Sustainability question marks also hang over some of the case studies cited above.

As noted, we have only glimpses of evidence about the prevalence of such failure. A few surveys have been conducted, with examples summarised below:

- Use of ICTs for health reform in South Africa's public sector: widespread partial failure of high cost systems with little use of data (Braa & Hedberg 2000).
- Use of ICTs in the Thai public sector: 'failure cases seem to be the norm in Thailand at all governmental levels' (Kitiyadisai 2000).
- Donor-funded public sector ICT projects in China: all were found to be partial failures (Baark & Heeks 1999).
- World Bank-funded public sector ICT projects in Africa: almost all were partial – often sustainability – failures (Moussa & Schwere 1992).

Likewise, independent reports on ICT use in the public sectors of individual developing countries find failure to be the dominant theme (World Bank 1993; Oyomno 1996).

It is important to acknowledge that developing countries are not alone in suffering high levels of failure with e-governance initiatives. However, they do face a particular set of constraints that arise from two related challenges: lack of e-readiness and large design-reality gaps.

D1. The Strategic Challenge: e-Readiness for e-Governance

Lack of e-readiness contributes to both lack of and failure of e-governance initiatives. Six key questions can be asked of developing country governments in order to assess how strategically prepared they are for e-governance.

i. Is the Data Systems Infrastructure Ready?

Are the management systems, records and work processes in place to provide the quantity and quality of data to support the move to e-governance? In many countries, data quality and data security – for example – are very poor, and there are few mechanisms to address these issues.

ii. Is the Legal Infrastructure Ready?

Are the laws and regulations required to permit and to support the move to e-governance in place? In many countries, for example, digital signatures cannot be accepted.

iii. Is the Institutional Infrastructure Ready?

e-Governance can only be progressed if the institutions exist to act as a focus for awareness and to act as a means for facilitation of e-governance. In many countries, there are no institutions to co-ordinate and lead and drive e-governance.

iv. Is the Human Infrastructure Ready?

Are the attitudes, knowledge and skills in place – especially within the public sector – that are required to initiate, implement and sustain e-governance initiatives? In many countries, key skills gaps relate to business analysis and system design, and to project management, contract management and vendor management. There are also 'mindset' gaps: general resistance to change; lack of customer-orientation; resistance to data-sharing; etc.

v. Is the Technological Infrastructure Ready?

Although there have been great strides forward, the fact remains that most developing countries are a long way short of the computing and telecommunications infrastructure on which many Northern e-governance initiatives have been based.

vi. Is the Leadership and Strategic Thinking Ready?

A critical pre-condition in successful e-governance for development is an e-champion or small group of e-champions: leaders with vision who put e-governance onto the agenda and make it happen. Cases like those described above show that such leadership can smash through many operational barriers. Conversely, all the operational e-readiness in the world is of limited value if there is no vision and leadership to give direction to e-governance.

Of all the e-readiness issues, then, this is probably the most critical, and it will be addressed in some detail under five headings:

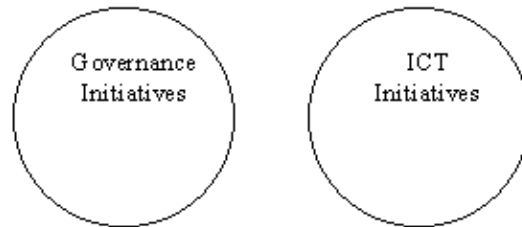
- ***No captains on the bridge***: because of lack of awareness, knowledge, skills and confidence there is a generic lack of e-governance leadership and commitment

amongst senior public officials. Related to this, there is a dearth of any vision or strategy on e-governance from within many developing countries.

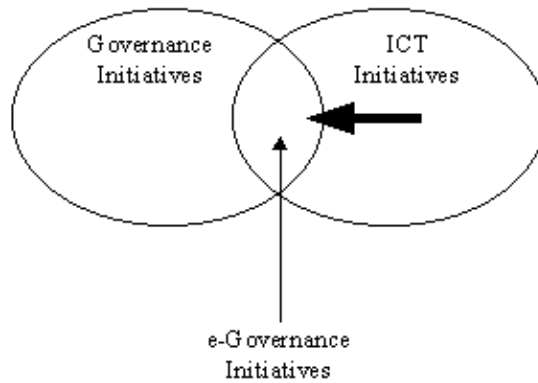
- ***One man's meat is another man's poison***: because of the lack of leadership confidence and capacity within many DCs, e-governance initiatives are frequently driven from outside government by vendors or by donors or by consultants. The locus and focus of strategy is therefore not always right. As a result, inappropriate systems are being forced in; systems from other sectors or countries that do not fit specific DC realities. This is a classic case of square pegs and round holes that will be discussed further in section D2.
- ***Missing the g-spot***: where donors set the e-governance for development agenda, their strategic focus will be critical. But, as noted above, many recent e-development initiatives from bilateral and multilateral donors appear to be deliberately avoiding government. This is partly because of the human capacity and regulatory constraints within government, and partly because of continuing 'government bad, markets/NGOs good' undercurrents within development. Many such initiatives are therefore bypassing the state and going for community telecentres, ICTs in schools, telemedicine, e-commerce and the like: e-business and non-governmental e-society. e-Administration, e-citizen and e-services initiatives, and the government-related components of e-society – altogether representing the 'Networked Government' model for e-governance – have been too greatly ignored, leaving a growing opportunity gap.
- ***Four-Is***: with or without donors, and because of attitude and knowledge gaps, e-governance for development is not being approached properly.
 - In some cases, ICTs are **ignored** – as if they didn't exist; at least some good governance initiatives act as if the last 50 years of ICT development never happened.
 - In other cases, ICTs are **isolated** – separated from the main thrust of the governance project, and so making no effective contribution to it. Ignorance or isolation seems to characterise many identifiable initiatives (see 'current situation' in Figure 3 below). For an example of the latter, one only has to look to the programme structures of major development institutions. Frequently, there will be a structure for governance and a separate structure for ICTs, but no effective communication or synergy between the two.
 - In still other cases, ICTs are **idolised** – put as the centrepiece of governance initiatives, becoming an end rather than a means. This is increasing as public officials find out about ICTs and/or fall for the vendors' hype (see 'emergent situation' in Figure 3 below). It has something to recommend it – ICTs can be a useful lever to change – but governance goals are often mislaid.
 - Only rarely are ICTs properly **integrated** into good governance reforms, with reform objectives in the driving seat, with information requirements well understood, and with ICTs serving those requirements and objectives (see 'required situation' in Figure 3 below).
- ***I'm not listening***: because of attitude and knowledge gaps but also because of cultural and political realities in some developing countries, the strategic approach to key stakeholders (users, clerical operators, citizen beneficiaries, community members) is sometimes ineffective. These stakeholders are sometimes completely

ignored in the planning of e-governance projects. Quite aside from any ethical questions, this leads to the direct practical consequence of e-governance failure.

i. Current Situation: Ignored/Isolated



ii. Emergent Situation: Idolised



iii. Required Situation: Integrated

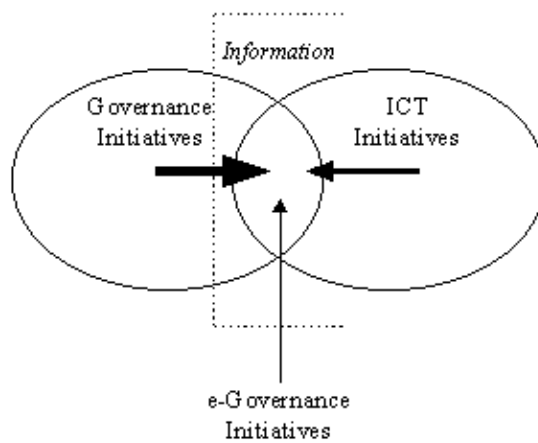


Figure 3: Different Approaches to e-Governance

D2. The Tactical Challenge: e-Governance Design-reality Gaps

The strategic challenge of e-readiness addresses e-governance at the macro-level of the whole nation as a precursor to e-governance. In addition, though, there is a tactical challenge that faces the micro-level of individual e-governance projects during their implementation. This is the challenge of avoiding failure and achieving success.

From a study analysing dozens of e-governance projects, a new model has been developed to explain and predict e-governance success and failure (Heeks 2001b).

The model centres around design-reality gaps: the difference between design ideas and organisational realities. The study showed that, the larger this design-reality gap, the greater the risk of e-governance failure. Conversely, the smaller the gap, the greater the chance of success. We measure these gaps along seven 'ITPOSMO' dimensions, summarised in Figure 4.

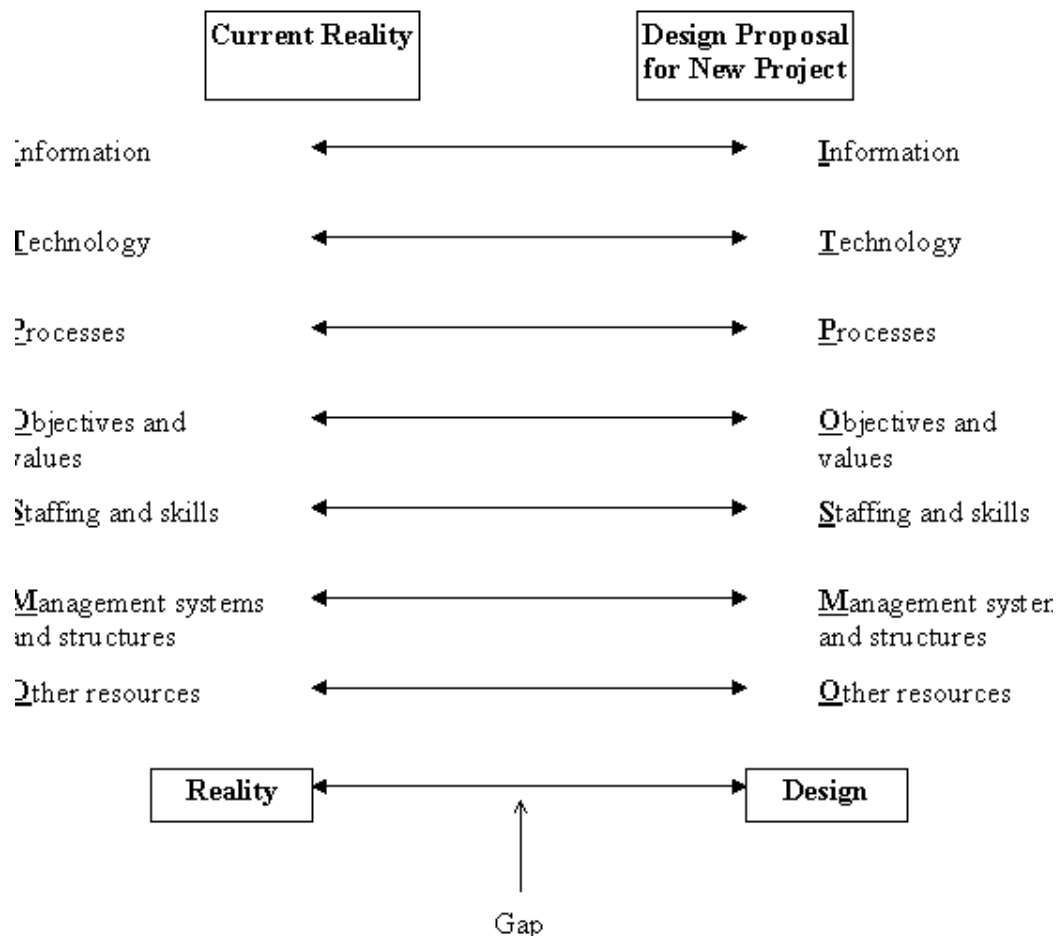


Figure 4: Design-Reality Gaps in e-Governance projects

For example, taking the case above of an intranet in Johannesburg Metropolitan Council, design and reality were often well matched, along dimensions including:

- ***The information dimension***: the intranet was designed to provide just the kind of information that Council users wanted, creating little gap between designed and actual information needs.
- ***The technology dimension***: the project plan relied mainly on existing technology within the Council, creating little gap between designed and actual technology.
- ***The objectives and values dimension***: the project met the real (sometimes personal) political aspirations of senior councillors and officials, and gained their support, creating little gap between designed and actual objectives.
- ***The staffing and skills dimension***: intranet developers had the necessary skills to produce the system that had been designed, creating little gap between designed and actual skill requirements.
- ***The other resources dimension***: the project was set up cheaply and incrementally, without particular time pressures, creating little gap between designed and actual resource requirements.

All of this meant only limited gaps between e-governance project design and Council reality. The result was success (Benjamin 2001).

However, as noted, failure has been more common than success, and archetypes of e-governance failure did emerge from the study: situations when a large design-reality gap – and, hence, failure – was more likely to emerge:

- ***Hard—soft gaps***: ICTs are often conceived in terms of machinery and engineering, rationality and objectivity. Many e-governance systems get designed according to these conceptions. The trouble is that many government and civil society organisations do not adhere to these 'hard' ideas. In reality, they are dominated by 'soft' factors: people, politics, emotions and culture. When a hard IT design meets a soft reality, there is a large gap, and a strong likelihood of failure.
- ***Private—public gaps***: despite the best efforts of 'new public management', the public sector remains fundamentally different from the private sector. This seems to be forgotten by too many ICT vendors, donors and consultants – a particular problem when, as mentioned above, they are often in the e-governance driving seat. They may pick up an information system designed for the private sector. Then they try to shoehorn it into a very different public sector reality. The large design-reality gap generates lots of heat and noise, not much light and, ultimately, plenty of e-governance failure.

- **Country context gaps:** it sometimes seems that only the first half of 'Think Global, Act Local' gets remembered. Designers seeking quick fixes try to pull e-governance solutions off-the-shelf from other countries. But New York is not New Delhi, and Kuala Lumpur is not Kingston. So there is often a large design-reality gap when trying to introduce in country X an e-governance system designed for country Y. The frequent result is failure.

E. Strategy and Tactics for e-Governance

e-Governance lies at the heart of two global shifts: the information revolution and the governance revolution. Both shifts are changing the way society works and the way that society is governed. They bring the opportunity for not just incremental but radical gains in efficiency and effectiveness.

But, at present, any such benefits are accruing to the few, not the many. It is the few who have access to ICTs, to digital information and knowledge, and to the benefits of reform in governance. We can thus talk of an 'e-Governance Divide' that is increasingly separating developed and developing countries, and elites and ordinary citizens within developing countries.

This growing divide must be addressed if the poor in developing countries are not to fall even further behind. We must seize the digital opportunity for governance and seize it now. Delay for the South as the North pushes ahead will only reinforce historical patterns of inequality.

So ... what must be done? In short, there must be both a strategic and a tactical response that attacks the current challenges to e-governance for development hard and head-on.

Figure 5 summarises the package of strategic initiatives that is required. These are described in more detail in a related paper (Heeks 2001a).

At the tactical level of individual e-governance projects, identified best practice on design-reality gap closure must be adopted. Examples of such best practice include (Heeks forthcoming):

- **Legitimising and mapping current reality:** integral to e-governance project success is an understanding of reality. Yet this may be difficult to achieve. e-Governance project leaders can help by 'legitimising reality': by encouraging stakeholders to

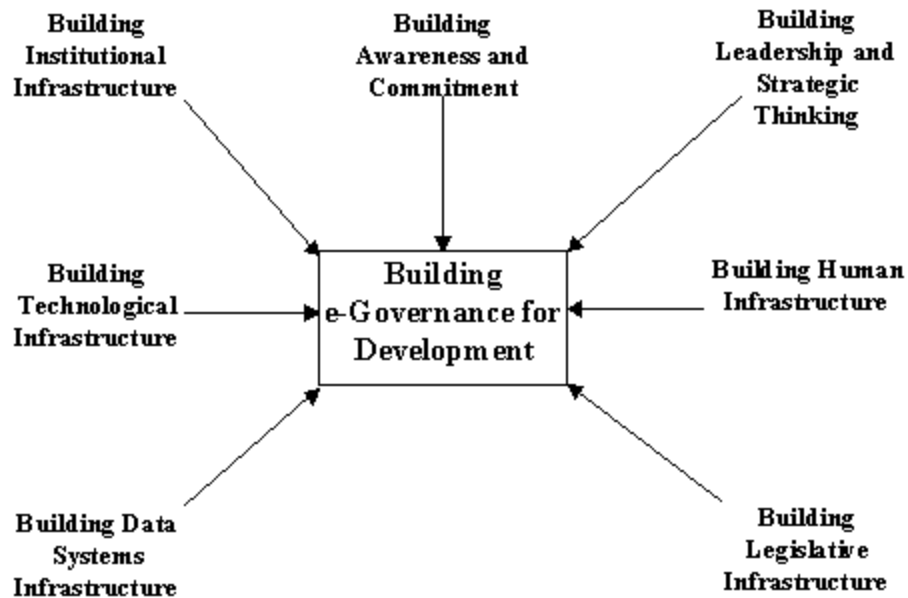


Figure 5: The Strategic Response to the South's e-Governance Divide

articulate the difference between rational, prescriptive models of what they should be doing and real depictions of what they are actually doing. Techniques for exposing and mapping organisational realities play a role here. Self- and third party observation helps expose realities. Use of soft systems tools such as 'rich pictures' helps map realities. Prototyping helps both, particularly helping users to understand their real information needs.

- **Customisation to match realities:** as described above, e-governance solutions designed for one sector or country are being forced directly into a very different reality, creating failure. To combat this, leaders of e-governance projects must be competent enough and confident enough to demand designs that match their situation's unique reality. The keywords for such projects must be 'customised' not 'off-the-shelf'; 'adapt' not just 'adopt'.
- **Modularity and incrementalism:** with the growth in connectivity and as a natural consequence of dealing with millions of entities, e-governance projects are frequently large. With pressures from donors/vendors and pressures to play catch-up with the private sector, e-governance projects are frequently ambitious. But, the bigger and bolder the project, the greater the risk of failure. Designers must reconfigure such projects to limit the extent of change at any given time. Stretching project time horizons is one technique. There is also a growing consensus behind modularity (supporting one business function at a time) and

incrementalism (providing stepped levels of support for business functions) within e-governance projects.

- ***Hybrids and terminology***: design-reality gaps often arise because of a 'two tribes' mentality. IT designers understand technology but not the realities of governance. Officials and politicians understand the realities of governance but not the technology. 'Hybrid managers', who understand both perspectives, are the answer. Yet hybrid training is practically non-existent. Worse, the tribal gap is growing with increasing outsourcing of e-governance work to the private sector. This exacerbates the clash of culture and values between designers and users. Terminology, too, is part of the problem. 'e-Governance' (electronic governance) may be unhelpful by suggesting, wrongly, that delivery of ICTs is an end in itself. As stated above, it may be more appropriate to talk of 'i-Governance' (integrated governance or, perhaps, intelligent governance) that places governance objectives in the driving seat, with ICTs seen as one part of the means to deliver those objectives alongside people, processes and information.
- ***Closing specific gaps***: as well as applying generic best practices such as those just described, it will also be important to address specific design-reality gaps. Early analysis of these gaps in e-governance projects means moving beyond the narrow confines of typical risk assessment models, with their focus on the simple parameters of project resources. It means, instead, converting each of the ITPOSMO dimensions into a set of rating scales. Key project stakeholders then discuss and score these scales. The whole process can be undertaken as a facilitated workshop with an iterative approach. The major design-reality gaps are identified, and the workshop then moves to work out how to close those gaps. This process can become even more iterative if it forms part of a cycle of learning and reflection during the project.

In summary, the cases analysed in this paper show that e-governance has a key role to play in current and future development. It can offer critical improvements to the efficiency and effectiveness of governance; and probably offers critical future legitimacy for government. The issue for developing countries, therefore, is not 'if e-governance' but 'how e-governance'.

In addressing the 'how', this paper has shown that improvements and legitimacy will only be delivered if two things are in place. First, the strategic e-readiness infrastructure, especially the leadership and integrated vision on which e-governance depends. Second, the tactical best practices that are needed to close design-reality gaps and to steer e-governance projects from failure to success.

For Bibliography please refer web version

Grassroots ICT Projects in India*

Preliminary Hypotheses

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Few concepts have spread as rapidly as ‘digital divide’ and with it, the hope of using modern ICTs to promote development. Groups as diverse as the United Nations, the G8 at Okinawa, Foundations, national, state and local governments, and private companies have seized upon the hope that the use of ICT’s could enable even the poorest of developing nations to “leapfrog” traditional problems of development like poverty, illiteracy, disease, unemployment, hunger, corruption, and social inequalities so as to move rapidly into the modern Information Age.

But the hopes so widely expressed are largely built on an empirical vacuum. We know little about the factors that make for effectiveness or ineffectiveness of grassroots ICT projects in developing nations. Thus, critics can point out that the cost of creating a working Internet connection in a developing nation is the same as that of providing immunization against six fatal childhood diseases to thousands of children. Others have argued that the introduction of ICT’s into communities otherwise unchanged will merely heighten existing inequalities. But instead of comparative research to counter or address such claims, we have “stories” – to be sure, largely true stories of successes - from which trustworthy generalizations are impossible.

At least fifty grassroots projects are currently using modern ICT’s for development in India. A few of these projects (e.g. Dhar, Pondicherry) have been publicized; the great majority has not. Surprisingly, these projects have rarely been studied; no comparisons have been made between them; they are not in touch with each other; lessons learned in one project are not transmitted to others; appropriate technologies are rarely evaluated; financial sustainability, scalability and cost recovery are seldom addressed; and the opportunity to learn from the diverse, creative Indian experience is so far almost entirely wasted.

The comments below derive from an ongoing study of grassroots ICT projects in India. They are based on site visits as of early 2001, on the observations and comments of Indian colleagues and friends, and on a careful reading of the descriptions of projects I have not yet visited. They are preliminary hypotheses, which I am currently testing, modifying, or changing on the basis of further research in India. Above all, I hope they will be useful to Indian researchers, who can study these issues more intensively than my own superficial survey.

1. *There is more talk than action.* Plans abound; on the ground realities are much fewer. International, national, state, and local projects and conferences are a dime a dozen. Only a few have substance so far.

2. *Nothing is anywhere nearly as simple as it seems.* Almost every project is late and runs into unexpected difficulties. One example: the officer involved in computerizing land records in one Indian state recently said more than half of them are legally contested, or in the names of dead people, or illegible, etc, - hence not computerizeable. Yet computerizing land records is on the agenda of almost every Indian State. It would be interesting to know how some states, which claim to have done it, have succeeded.

3. *The goal of financial sustainability is rarely achieved.* Granting that initial start up costs have to be borne by someone, very few projects even plan for long-term sustainability, and even fewer achieve it. But there are exceptions: the Dhar-Gyandoot Project in Madhya Pradesh for example. The Pondicherry Project has received a further grant with the goal of attempting to become self-sufficient. E.I.D. Parry, which provides inputs for agri-business, has set up a series of info-kiosks in villages, partly to provide better information to farmers about agricultural inputs, harvesting of sugarcanes, and other matters. And some projects, once the initial public or NGO funding disappears, simply disappear as well. An example is the Apple project for rural health workers in Rajasthan a few years back, which was only recently taken up again by CMC (Hyderabad).

4. *Information technology should not be simply identified with computers and Internet.* Some of the most inventive uses of IT involve radio, television, and embedded chips, potentially useful satellite inventories, etc. The classic example is the use of automated butterfat assessment equipment in Gujarat, which has radically simplified the process of evaluating milk and paying dairy farmers.

5. *Starting by consulting at the grassroots is essential.* Top down projects simply do not work, and end up by providing information that people don't really need or use, or providing it at an incomprehensible level of technical detail and terminology.

6. *The information people initially say they need, may not always be what they end up using.* In the M.S. Swaminathan's Pondicherry Project, for example, male farmers originally said they needed information about agriculture; in fact, their largest single usage of village info-kiosks was to get information about government programs.

7. *Local language content is a prerequisite for any successful project.* I have elsewhere written about the problems of the standardization of code for the major Indian languages. The bottom line is that, despite many brilliant efforts, and despite widespread awareness of this problem on the part of the Government of India and of many state governments, every major Indian language suffers from multiple schemes of coding and fonts, and hence, the absence of inter-operability between programs involving distinct codes. The governments of states like Tamil Nadu and Karnataka are acutely aware of this problem, but lack the ability to enforce the use of common standard. This technical problem dramatically complicates the development of local software and of local IT use throughout India.

8. *The development of locally relevant content is essential, and the nature of that content varies from region to region.* Without accessible local content that addresses the real problems of local people in their own language, and in terms which they can understand, “ICT for the common man” projects are bound to fail. There is some evidence that radio programs, especially designed to appeal to ordinary people, may be more effective than computers in reaching people about topics like best agricultural practices, family planning services, etc. Almost 100% of the Indian population has access to radio; perhaps 30% has access to television occasionally, and well under 1% has access to the Internet and the Web. Whatever the mode of communication, the need to present locally relevant information intelligibly both in terms of language and in terms of the level of explanation is imperative.

9. *E-governance is one of the most promising uses of ICT's.* In practice, e-governance involves two distinguishable activities. First is the computerization of government functions themselves, as discussed especially by Chief Minister Naidu in Andhra Pradesh. This proposes connecting the central state government to district officials, and computerizing registrations, legal proceedings, land records, state offices, etc. for the benefit of the administrators of the state. This type of e-governance also exists at the level of the Centre; some years back, nearly all districts were connected via email to Delhi. (But one study suggests that these connections are rarely used.)

Second, e-governance may mean government-to-people and people-to-government connections whereby citizens obtain direct access to records, rules, and information about entitlements that they need or want in their daily lives. The most successful example of this I know is in the Dhar – Gyandoot Project, where more than a dozen official documents are available, and defined as legally valid if obtained from village cyber-kiosks under the right circumstances. This use serves to make public records immediately available and to eliminate the lengthy trips, long waits, and frequent bribes necessary to obtain vital documents.

Both forms of e-governance are difficult and costly to implement. They also run into strong resistance, since they eliminate middlemen and others whose jobs and incomes depend upon the relative inaccessibility of government documents.

10. *E-commerce, in the sense of customer-to-business on-line buying within India, is probably many years away for a majority of Indians.* But the operational, internal computerization of small and medium businesses has already begun in the larger cities, with notable gains in efficiency. At the Union level, the computerization of the railroad reservation system and the banking system are notable examples of Indian successes. If small business software packages were available in local languages, some observers believe small and medium size merchants in cities, towns, and villages would quickly adopt them.

11. *Commercially funded ICT networks have considerable promise.* For example Warana Project in Maharashtra, though heavily funded initially by the state of Maharashtra and

Delhi, is currently funded by the sugar cane cooperatives in the area, and offers tangible benefits to sugar producers and to sugar cane growers in the area. The E.I.D. Parry project in Nellikuppam, Tamil Nadu is funded by Parry, which expects advantages in terms of improved information to their producers about best agricultural practices. ITC-IBD has set up a series of IT “chaupals” for soya, shrimp and coffee farmers with the goal of reducing the costs of production that currently go to middlemen. In such cases, commercial interests may justify the expense of establishing rural info-kiosks, which can also provide much general information in addition to specific product information.

12. *The market for "indigenous crafts" is a niche market in a few rich countries.* E-commerce from countries like India to Europe, the United States, or Japan has enormous logistic problems. It is not a realistic solution to the use of IT for poverty alleviation for any but a tiny fraction of Indians. For example, the recent claim of one state government that millions of local women are to be involved in the export of local crafts turns out to be a promissory note that is likely never to come due. Furthermore, if it does turn out that there is a big market in wealthy countries for an “indigenous” product, local crafts people are almost always beaten out by industrial producers.

13. *A successful commercial IT sector does not necessarily “trickle down” to ordinary Indians.* Proposals by state governments to develop “information technology for the masses” often place primary emphasis on developing software technology parks, improving education at the higher levels of information technology, etc. These are laudable and necessary goals if India is to continue its astonishing growth rate in information technology.

But there is little evidence that the growth of the software industry is reflected in improved living conditions, more schools, greater justice, better health, more jobs, or other benefits for ordinary Indians. The development of the Bangalore region goes hand in hand with the persistence of Karnataka as one of the poorer states in India. Critics of Chief Minister Naidu in Andhra Pradesh claim that his stress on information technologies has not helped relieve the poverty of the average citizen of the state. One project, however, Nilgiri Networks, has created a software center in Ooty with the goal of spreading the benefits of the IT boom to outlying regions.

14. *Apparently “technical decisions” concerning IT regulation, bandwidth allocation, pricing mechanisms, transmission standards, etc., can have profound effects on whether or not information technologies benefit ordinary Indians.* Professor Jhunjhunwala at IIT – Madras has given many examples in his writings. One case is the requirement that ISP providers guarantee to “cover” an entire state. This effectively precluded local entrepreneurs from providing Internet connectivity in small and medium towns. It thus stood in the way of an Internet service provider phenomenon akin to the local initiatives that have helped spread satellite television rapidly in India. Analysis of the impact of technical, regulatory, and technological decisions on “IT for the common man” is largely absent.

15. *The wheel is constantly reinvented.* I can identify at least four dozen "grassroots projects" in India, some of which I have visited. The people in these projects are not usually in touch with each other, rarely publish or write anything about what they are doing, and - if they are public officials - are constantly transferred here, there, and everywhere. There is little accumulation of knowledge, not even the most preliminary kinds of on-the-site evaluation, little possibility of learning from the successes and failures of other projects.

The kind of expensive, detailed evaluation that the Grameen Bank cell phone project in Bangladesh has undergone is unlikely at this point. (And in any case, the research concludes the project works financially because of the unusual regulatory structure and financing of telecom in Bangladesh.) But we desperately need efforts to learn from comparative studies of existing projects what works, what does not work, how local conditions affect outcomes, etc.

16. *You cannot believe a lot of what you are told.* At one meeting, for example, the audience was told that satellite water temperature data for the Bay of Bengal is being provided to offshore fisherman. A member of the audience asked why this information had only been available for two out of the last 365 days. The speaker replied, "Cloud cover". Other projects that are publicized turn out, on a site visit, to have closed, or not yet to be in operation, or to have deteriorated from the stated original goals.

17. *Until the costs of the "last mile", of basic IT devices, and of local language software are brought down, the goal of "wiring India" will remain unachieved.* My heroes in this area are Ashok Jhunjhunwala at IIT-Madras, Vijay Chandru and his colleagues at the Indian Institute of Science, and Rajeev Sangal of the IIIT-Hyderabad. They are doing world class work on lowering the cost of the "last mile", on producing a low cost (\$200) "Simputer", and on sophisticated machine translation of India's languages. The India-Linux movement is also lively and enthusiastic; projects like the Simputer project use Linux because it is simple and free. But they run into obstacles, not least of all with GOI regulations, with multinationals, and with companies that have a financial interest in having India import European, Japanese, or American technologies.

Low-cost technological solutions alone are of course not solutions to the problems of development, but they are prerequisites for IT in India.

18. *The "IT for the masses", "bridging the digital divide" movement has an inordinate amount of exaggeration and wishful thinking.* But there are in fact real cases of IT projects that actually help poor people in India to meet their basic needs and assert their fundamental rights. We need to define the characteristics of those projects and try to spread the word about what works and what does not.

I trust it is clear that I am not convinced that ICTs are invariably, or even usually, the best answer to poverty, injustice, illness, inequality, discrimination, exploitation, hunger, etc. But at the same time, I think that Bill Gates overstates his point when he says poor people

need medicine and not computers. The challenge is to learn if, when, and how information technologies (of all kinds) can be the most cost-effective means to help people, especially poor people, meet their basic needs and assert their fundamental rights.

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Co-financing ICT partnerships between Europe and Asia

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The Asia IT&C Programme has been launched by the European Commission to intensify co-operation between Europe and Asia in the Information Technology and Communications (IT&C) sector. The Programme aims to support mutually beneficial IT&C partnerships between the two continents in the areas of Agriculture, E-commerce, Education, Health, I-manufacturing, Society, Tourism, and Transport.

With an initial budget of 19 million EUR for 5 years, the Programme will strive towards establishing and promoting Europe-Asia co-operation, and join both regions in identifying innovative IT&C solutions. Co-financed projects would include those which seek compatible IT&C solutions between Asian and European IT&C environments, improve the transfer of IT&C know-how, and strengthen the mutual understanding of IT&C regulatory and/or legislative structures. Projects must be carried out under one of the six components: Get-in-Touch and Keep-in-Touch, Short Courses (University Level), Information Society Interconnectivity, Liaise with European IT&C Initiatives and Programmes, Understanding European & Asian Regulatory and Legislative Organisation Structures and Practical Demonstration Projects.

The Calls for Proposals are published annually in the Official Journal of the European Communities and on the Asia IT&C website. All additional information needed to complete project proposals, including Guidelines for Applications, are accessible on Asia IT&C web site: www.asia-itc.org.

Consortia interested in submitting a proposal are invited to register with the Programme at the Asia IT&C web site or with one of the Programme Management Offices (PMOs) referred below:

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Tel: +66-2-962 70 50; Fax: +66-2-962 70 52;
E-mail: pmo-asia@asia-itc.org

To submit a proposal an Applicant must have a minimum of 2 Partners, forming a consortium of 2 organizations from the EU and one other from a participant Asian country. Eligible organizations are those dealing with at least one of the areas of activity, such as: National & regional organizations, Non-Governmental Organisations, Research Institutes, Universities, Professional Associations and Chambers of Commerce.

The Eligible European Countries are the 15 EU Member States, and the Eligible Asian Countries/Territories include Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, India, Indonesia, Laos, Malaysia, Maldives, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.

The 20th International Conference on Technology and Education ICTE AFRICA 2002

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April 2 - 5, 2002, Potchefstroom, South Africa**

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Basic technology skills of learners and faculty members.
- 2. Courseware Design Especially In E-Learning**
Limitations of programmes presented.
Team approach in materials development.

- Accommodating non-traditional distance learners.
3. **Maintaining Quality In The Introduction Of Appropriate Technology**
Network development and maintenance.
Quality control in courseware design.
The importance of subject matter vs. applied technology.
 4. **Learner Support Systems In The North And South**
Management Systems.
Academic and peer groups.
Administrative.
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Library.
Teacher, tutor and facilitator training.
 5. **Digital Conversion Of Tertiary Educational Structures**
Development of an electronic learning environment.
Administrative systems re-engineering for growing learner needs.
Digital conversion for faculty.
Criteria for scientific use of the internet.
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Issues related to quality control, accreditation and certification.
Collaborative learning across networks.
Dilemmas in outcome-based education, e.g. Assessment.
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