

Global Digital Opportunities

National Strategies of
“ICT for Development”

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SUMMARY

- Forging a national strategy of “ICT for development” offers less-developed countries a major opportunity to concentrate limited resources and attract outside collaborators.
- Yet most national strategies overemphasize specific technologies or applications and underemphasize local conditions, thereby falling short of a comprehensive approach that combines realistic priorities and effective execution.
- “*Digital Divides*” are not just the result of economic differences in access to technologies (“*Have’s v. Have-Not’s*”), but also in cultural capacity and political will to *apply* these technologies for development impact (“*Do’s v. Do- Not’s*”).
- Strategies must include initiatives for major *local and international* (regional & global) change, not just programs mandated at the national level; the realities of globalization require that outside actors become collaborators in facilitating major impacts.
- Strategies should aim to achieve not just specific sector-by-sector increases in *productivity*, but also broad *cultural changes* in the way information and communications are used in general.
- In developing a national ICT strategy, the *process* by which key sectors and regions are engaged in collaboration and tied to implementation is as important as the *plans* they produce.
- Strategies must make clearer allowance for local differences in culture, “social capital” and institutional capacity, and recognize the need for “*real access*” to infrastructure and locally useful content.
- To avoid fixation on specific technologies or applications, strategies should focus on how ICTs can increase *human capacity* to make actual *enterprises and entrepreneurs* more productive.
- The other dimensions of ICT strategy—*infrastructure, applications, and policy*—should be viewed in light of their impact on institutional and individual capacity.
- *ICTs* should be thought of as “*Integration & Collaboration Technologies*” that facilitate processes of “*networking*” public and private enterprises and individual entrepreneurs to facilitate the *relationships* that make technologies productive.

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1. Introduction: National Strategies of ICT for Development

A powerful array of networking and computing technologies has been rapidly changing the fundamental dynamics of our world. Encompassing a broad range of hardware and applications, from traditional radio and TV to broadband Internet and various wireless applications, they are increasingly produced in digital format, which significantly increases their potential interoperability, mobility and efficiency. Even as we debate the shape and direction of the resulting “information revolution,” we all sense that the speed, scope, and intensity of the changes it generates are transforming our underlying expectations—not only about economic productivity, but also about values of social solidarity, political identity, and even personal privacy and security.¹ In an effort to realize the enormous potential of these technologies, national leaders in a wide range of countries have sought to devise and implement national strategies for systematically applying information and communications technologies (“ICTs”) to development challenges—what has come to be called “ICT for development.”

This Report seeks to capture in broad overview the experience from recent national initiatives on ICT for development. It is offered as a way of “taking stock” of the efforts made to date in a wide range of developing countries with the hope that it will be of use to national governments, international organizations, commercial companies and non-governmental organizations who seek to harness technology in the cause of development. The observations and conclusions are based on a number of initiatives and research projects in which the Markle Foundation participated during the last three years, but they also draw on the experience of a wide range of other organizations and individuals. The Report seeks to highlight some of the major opportunities to use these powerful technologies to promote development objectives, as well as to call attention to some of the principal challenges and pitfalls that confront national leaders in their efforts to organize effective nation-wide initiatives for change.

The *Markle Foundation* seeks to impact the use of information and communication technologies to serve the public interest and improve people’s lives. On issues of ICT for development, Markle became involved through the participation of its President and several staff members in the development of the Digital Opportunity Task Force (the “DOT Force”) established at the Summit of G-8 leaders in 2000, and in its work over the following two years. The Foundation joined with the United Nations Development Programme (UNDP) and the global consultancy, Accenture, in reviewing the record and potential of ICTs to promote development in the poorer parts of the world. Our conclusions were presented in a Report to the G-8 leaders at the 2001 Summit in Genoa, entitled “*Digital Opportunity Initiative: Creating a Development Dynamic.*”² (The highlights of that Report are summarized at page 10 below.) The findings and framework of that “DOI Report” provided the basis for a series of Markle Foundation initiatives exploring opportunities to achieve the kind of comprehensive, integrated impact (“development dynamic”) its authors envisioned. Early in 2002, Markle joined with UNDP and other partners to assist specific countries in the formulation of their national ICT strategies. The Foundation also supported a series of organizations and individual experts focused on various dimensions emphasized in the DOI approach. *These initiatives will also be highlighted throughout this Report and are summarized on the previous page.* At the same time, Markle staff sought to learn from the experience of governments, development organizations, NGOs and other foundations regarding their explorations and applications of ICT programs and projects—much of it made available in on-line form. All of this work reinforced the critical importance of the kind of comprehensive approach to ICT issues outlined in the DOI Report.³

Our basic conclusion is that despite major opportunities to take advantage of the development potential of ICTs, the results of most national strategy efforts to date have been disappointing. National strategies frequently flounder and even fail by becoming focused on particular technologies or applications in isolation from the broader policy, resource and training initiatives necessary to exploit their capabilities in specific settings. Abstract discussions of “the information society” and generic references to one or another “best practice” too often obscure or postpone fundamental policy and budgetary choices and

¹ See Paua, “Global Diffusion of ICT: A Progress Report,” Chapter 2 in *Global Information Technology Report, 2003-2004* (World Economic Forum, Dec. 2003), summarized at http://www.weforum.org/pdf/Gcr/GITR_2003_2004/Progress_Chapter.pdf

² “Digital Opportunity Initiative Report: Creating a Development Dynamic”, July 2001 at <http://www.opt-init.org/framework.html>

distract attention from local realities. The “global development community” often compounds these problems by emphasizing process, logistics and diplomatic positions, resulting in efforts that do not significantly improve understanding or attracting new resources to developing countries.⁴ The World Summit on the Information Society (WSIS), the first phase of which convenes in Geneva on December 10, and the second in Tunis in November 2005, crystallizes both the high expectations and the operational frustrations of building greater understanding and political momentum behind serious implementation of these opportunities.

Given the multiple challenges of globalized markets, digital divides and national politics, it is all the more remarkable that countries like Singapore and Korea, Ireland and Estonia, Brazil and Costa Rica, Mauritius and Mozambique have managed to forge strategies that cut across government ministries and private interests in the name of larger national objectives. Others, such as Pakistan, Azerbaijan and Bhutan have made great progress in a short time by learning from the experience of others. To do so, the leaders in these countries must cut through the fog of donor, vendor and consultant advice (often-contradictory) to identify and manage multiple layers of technology opportunity. In most cases, that effort is only possible if leadership comes from the highest levels of government and the private sector. This Report seeks to highlight both the issues and the opportunities that confront national leaders in an effort to bring them into better focus for all those interested in the enormous potential of ICT for development.

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⁴ For a similar set of conclusions regarding ICT for development, see the *E-Commerce and Development Report 2003*, released on November 20, 2003 by the United Nations Conference on Trade and Development (UNCTAD) available at <http://www.unctad.org/Templates/webflyer.asp?docid=4228&intItemID=2644&lang=1&mode=downloads>. See also the remarks of Fred Tipson on “Networking Development,” at www.markle.org/news/Fred_Tipson_Networking%20Development.pdf.

⁵ This document represents the personal opinions and experience of its two authors, who accept full responsibility for the views expressed. At the same time, we wish to thank Julia Moffett, Karen Lynch and Noa Meyer of the Markle staff for their contributions to the work of the foundation in these areas, Stefaan Verhulst, Markle’s chief of research, for his enormous expertise and tireless advice, Paulette Layton for her skilled administrative support, and Markle President Zoe Baird for her overall leadership.

2. Global Context: *Digital Development Dilemmas*

The days are long past when national leaders could direct the fate of their countries with little reference—or deference—to the world outside. National leaders seeking ICT for development strategies confront several fundamental realities from the outset.

- ***Globalization Multiplies “Digital Divides”***

The *first* reality is that ICTs, as the principal agents and infrastructure of “globalization,” are often a cause of significant disparities in wealth and welfare, not just between rich and poor, but also among culture, gender and age groups. Like a series of waves, each major innovation—telephones, computers, faxes, spreadsheets, mobile phones, World-Wide Web, search engines—radiates unevenly throughout the globe.⁶ The varying ability of people to adopt and adapt these technologies seems to be one of the principal determinants of their prospects for economic, social and political development in general. The resulting differences give rise to what is commonly referred to as a “digital divide”, but which is in fact a series of divides, disruptions and dynamics, presenting a complex mosaic of technology penetration.⁷ In promoting the use of ICTs for development, national leaders are in effect introducing or enhancing the very catalysts of the information explosion that propel globalization itself

“Have’s” & “Have Not’s”. National leaders who seek to overcome the resulting inequalities are not always clear about which types of “digital divide” deserve political priority. On the one hand, developing countries are warned of the divide *between rich and poor countries*, and urged to improve rapidly their aggregate national performance in order to close the gap with wealthier nations and become more globally competitive. On the other hand, leaders are admonished about the difference in technology penetration *between rich and poor within their own countries*, and the political instability that often results from these disparities. Giving priority to this second sort of divide suggests a focus on technology initiatives to reduce unequal distributions of income and public services, thereby giving priority to the improvement in living standards of the poorest citizens within their own borders.⁸

In practice, efforts to address both divides through ICT investments—while not inherently incompatible—often raise difficult choices about national priorities. If increasing aggregate national performance is the imperative, it may be necessary to favor the most productive sectors of the economy with special incentives and subsidies at the expense of attention to the poorest parts of the population. Conversely, if reducing national inequalities is paramount and pursued, overall national performance may not be maximized. In other words, efforts to address the *inter-national divide* may actually exacerbate the *intra-national divide*, and vice versa. National leaders will no doubt seek to balance growth and distribution to achieve both objectives, but the tension between them in the short run can be the source of intense disagreement.

- ***Culture Complicates Technology Solutions***

“Do’s” & “Do Not’s”. The second key reality is that there is a different kind of divide that may be even more pivotal to the issues addressed in this Report. That is the divide, not between technology *have’s* and *have not’s*, but between technology *do’s* and *do not’s*—between those who effectively deploy and apply the technologies available to them for development purposes and those who are unable to do so. Reducing technology divides may not necessarily close economic and social divides, unless development objectives are central and technology options are exploited to achieve them. As emphasized in the Digital Opportunity Initiative (DOI) Report, the challenge of applying ICTs to the development purposes of poorer

⁶ See, e.g., David C. Moschella, *Waves of Power: The Dynamics of Global Technology Leadership, 1964 – 2010* (1997); Frances Cairncross, *The Death of Distance: How the Communications Revolution Will Change Our Lives* (1997).

⁷ For a detailed analysis of the differing kinds of “digital divide” in the thirteen “candidate countries” for European Union membership, see Bogdanowicz, Burgelman et al, “Factors of Regional/National Success in Information Society Developments: Information Society Strategies for Candidate Countries,” at www.firstmonday.org/issues/issue8_10/bogdanowicz/index.html

⁸ See also the remarks of Fred Tipson on the “Global Digital Divide”: <http://www.markle.org/news/061902INET.pdf>

societies is not simply a matter of having the *resources* to acquire the technology, it is also a matter of having the *resourcefulness* to apply specific technologies to achieve preferred ends. Simply increasing connectivity or distributing computers and software will not lead to development impacts unless the range of other factors—*enterprise, applications, human capacity, policy*—converge to make that possible. This point was echoed in a recent OECD study:

Having the equipment or networks is not enough to derive economic benefits. Other factors, such as the regulatory environment, the availability of appropriate skills, the ability to change organizational set-ups, as well as the strength of accompanying innovations in ICT applications, affect the ability of firms to seize the benefits of ICT. Consequently, countries with equal ICT diffusion will not always have similar impacts of ICT on economic performance.⁹

Thus, the successive waves of technological innovation will not necessarily take a society—rich or poor—where its leaders and citizens want to go. It comes down to whether a given society and its component enterprises can identify and take advantage of the opportunities presented—in effect, to harness and steer the tides of change, not simply to watch the waves of technology crash over them.¹⁰ The opportunities must be seized to be realized. Left to their own devices, so to speak, the diffusion of ICTs is likely to generate and magnify current disparities. In short, if the problem of the “digital divide” is defined as a problem of technology or infrastructure scarcity in the developing countries, it is all too easy to slip into the erroneous assumption that simply introducing these technologies—without addressing other major elements of the development equation—will produce development consequences. Fixation on technology deficits not only tends to drive unfortunate policy priorities—such as wiring schools that cannot use them, building databases that do not affect decisions, or creating expensive government Web portals that citizens ignore. It can also result in the neglect of more appropriate technologies—such as community radio for weather reports and crop prices rather than satellite networks; CD ROM distribution of new curriculum instead of high-speed Internet platforms; use of cell phones to report the incidence of disease in place of expensive laptop computers or specialized PDA’s. Rather than see available, but “lower tech,” infrastructure as an opportunity to be exploited, some policy-makers ignore what is at hand in preference for what seems more advanced or more exciting. Donors, vendors and consultants frequently press politicians in this direction, taking advantage of their sensitivity to criticism that they are otherwise missing the “state-of-the-art.” Yet, enormous opportunities are being lost in the developing world from failure to capitalize on what is available in anticipation of what is (realistically) not. Nor can economic and social divides be closed with technologies unsuited to local circumstances and wasteful of scarce resources. Without sensitivity to cultural and economic differences, the well-meaning impulse to use new technologies to “leap-frog” old problems may actually end up leaving development programs “flat-footed.”

National leadership is needed to make the difference. In principal, the opportunities to exploit these technologies are often widely available to individuals and organizations even in remote locations, and do not necessarily depend upon the skill and dedication of national political leaders to take responsibility

⁹ Although these conclusions are drawn from a survey of developed countries, the same point would apply equally to less developed countries as well. See “ICT and Economic Growth: Evidence from OECD Countries, Industries and Firms,” OECD Directorate for Science, Technology and Industry, 2003. ISBN 92-64-10128-4. For example, the World Bank ICT strategy overview, makes a similar argument:

[T]he complex nature of IT procurement as well as the design and implementation of strategic information systems increases the risk of suboptimal decisions and delayed implementation. Successful systems require not just appropriate technology but that all other elements—policies, people, processes, incentives, institutions, and infrastructure—are present and work well.

“Information and Communications Technologies: A World Bank Strategy” (April 2002).

See also Warschauer, “Demystifying the Digital Divide,” *Scientific American* (August 2003), and Mark Warschauer, *Technology and Social Inclusion: Rethinking the Digital Divide* (2003).

¹⁰Or, as one commentator has expressed it, the rapid adoption of globalized consumption patterns Of ICT outputs far outstrips the rate of adoption of globalized production values and attitudes to work and entrepreneurship. Ann Bernstein, “Globalization, Culture and Development: Can South Africa be more than an Offshoot of the West?” in *Many Globalizations: Cultural Diversity in the Contemporary World* (Berger & Huntington eds., 2002) at 185, 213.

for realizing them. And yet, especially in the poorer countries of the world, these leaders have particular opportunities, and therefore a special responsibility, to lead and facilitate these efforts in ways that best promote national development that is compatible with their own values and cultures.

“Open” v. “Managed” Information & Communications. Culture differences create still another sort of divide. The productive application of information depends in large part on the “open-ness” of communications—the ability of people in far-flung locations and diverse functions to find and apply useful, reliable information. Much as free markets promote the efficient allocation of assets by providing accurate information about their relative value to other consumers, an open “marketplace of ideas” promotes the availability of useful information that better informs decisions, reduces corruption and empowers a wider range of actors. However, many cultures do not treat information as an asset to be shared and disseminated. Rather than transparency and access, information is treated more like a precious commodity to be hoarded and protected. Such cultures are not in a position to realize the productivity gains promised by ICTs even when the technologies themselves are available.

This distinction in cultural attitudes toward information is not a bright line distinguishing one group of countries from another. The demise of the Soviet bloc released a large number of countries from the grip of a rigid ideology that represented some of the worst attributes of societies with cultures of “managed information.” Their transition to more open societies has been marked by widely different paces of change in adapting to the wider availability and application of information for decision-making. China offers an example of a country whose economic success appears in part to be the result of the government’s ability to compartmentalize the types of information that receive wider currency—increasingly promoting more open access to economic information while keeping tight control on what is deemed “political”. In other settings, the protection of intellectual property can be drawn so tightly that innovation and access can actually be curtailed rather than promoted. In short, there is no simple balance to be struck regarding information “openness”. But the difference in values on these issues has become evident in the inability of delegates to the preparatory meetings of the World Summit to agree on a set of principles to guide this aspect of the future “Information Society.”¹¹

- ***Strategies Need Local, National & Regional/Global Dimensions***

The third key reality for national leaders is that ICT for development cannot be successful as a matter of national-level action alone. While this Report focuses on the opportunities for strategic choice at the national level, such initiatives must take account of the kinds of changes that need to occur locally, regionally and globally as well to make overall impacts feasible. Any national strategy must therefore find ways to engage, influence and accommodate these different layers of actors.

Local. In critical respects, all development is local. The historical record of large, nationally designed projects, such as regional dam systems or massive urban renewal, is decidedly mixed.¹² Conditions, capabilities, even cultures, differ markedly within countries and frequently alter, or even foil, the best-laid plans for national reform. Particularly where information technology is concerned, the capacity of local organizations to apply it to development objectives varies notably. Globalization acts not only from the outside into a country, but also from the “inside out.” Globalization transforms the culture and values of local citizens in ways that change the political dynamics of every society in the world, notwithstanding the preferences or directives of central authorities. Widespread access to television, for example, has brought images of different lifestyles even to many rural areas, generating powerful new aspirations and expectations. While this can be liberating and empowering for those involved—particularly those of a younger generation eager to participate in change and reform—it can also dilute and even undermine institutions and cultures that were previously the main adhesive of traditional societies.

Local culture is, in effect, the operating “software” of any society and the source of the “social capital” that keeps a community together and makes it function. Development requires the rewriting of this

¹¹ See Static Interference at WSIS Preparatory Meeting,” Gustavo Capdevila, Sept. 26, 2003, Inter Press Service News Agency, <http://ipsnews.net/interna.asp?idnews=20344>. See also discussion at page 59 below.

¹² James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (1998).

cultural software to make it more receptive to economic and technological opportunities (and more accommodating to global imperatives). Societies will therefore readily adopt some practices from outside cultures and influences, while strongly resisting others. In short, there is nothing “neutral” about the adjustments required to apply ICTs to development agendas. National leaders must advance a vision of change that can steer a political course that somehow balances rapid development with social cohesion and cultural integrity.¹³

Regional. For many countries, particularly in Africa and Latin America, options are influenced by regional organizations, requiring them to frame their ICT strategies in relation to regional experiences and initiatives. In some cases, regional collaboration is less reflective of common culture than geographical proximity and geo-political necessity. The coalitions forged among African, Asian, Arab and Latin American countries are sometimes simply political expedients, resulting from the bureaucratic politics of international organizations or donor convenience rather than from a genuinely shared culture. In fact, regional political solidarity must often overcome widely different cultural, ethnic and economic disparities that do not always lend themselves to policy consensus. Yet most governments repeatedly see the value in cultivating such compatibility as a means of achieving leadership and influence in global settings and promoting wider collaboration among neighboring governments.

Global. Finally, all national leaders must cope with the powerful pressures and firm demands exerted by global markets, international financial institutions, multinational media and national donors. For the poorest, most deeply indebted of governments, the International Monetary Fund and the World Bank, the institutional pillars of the “Bretton Woods” system, promote and help to enforce basic standards of economic performance. Because the donor dollars come from their key developed country members, and the G-8 governments above all, these organizations often reflect the views of those governments. The pressures of the global economy are also reinforced by a range of other, lower-profile institutions. Debt-rating agencies, investment analysts, insurance companies, media networks and human rights monitors—each in its own way judges a country’s performance and generates its own financial penalties or rewards.¹⁴ These judgments impact the value of currencies, the size and composition of national budgets, and the rate and direction of foreign investments. In fact, as countries become more integrated with the global economy through the adoption of ICT networks, their vulnerability to the systemic shocks and critical assessments of external actors increases accordingly. National strategies must therefore be keyed to influencing actors at the global level as well at these other political layers.

¹³We should acknowledge here, without trying to address them adequately, the large issues surrounding globalization and culture change that are fundamental to any consideration of technology adoption. See, e.g., *Culture Matters: How Values Shape Human Progress* (Harrison & Huntington eds., 2000; *Many Globalizations: Cultural Diversity in the Contemporary World* (Berger & Huntington eds., 2002).

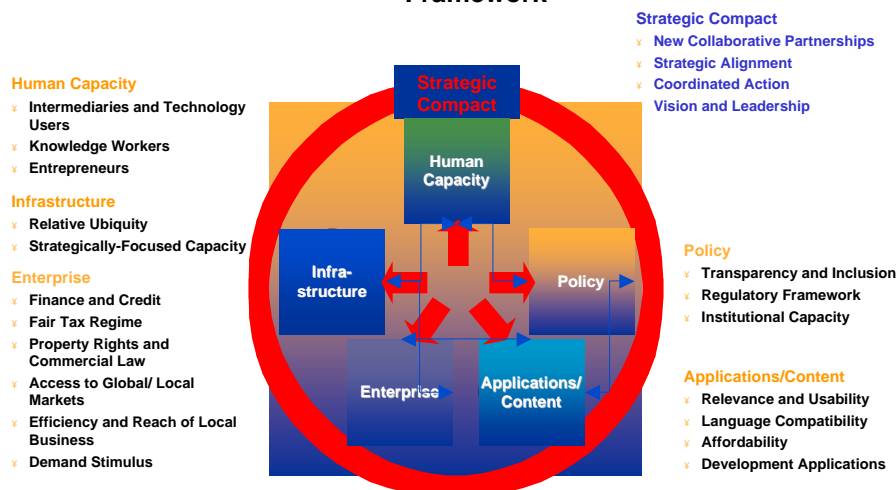
¹⁴Thomas Friedman refers to this myriad of institutions as ‘the electronic herd.’ See Friedman, *The Lexus and the Olive Tree* (1999) at 93-119.

HIGHLIGHT: UNDP, Accenture, Markle
The Digital Opportunity Initiative (DOI) Report: “Creating a Development Dynamic” (July 2001)

The DOI Report, entitled “Creating a Development Dynamic”,¹⁵ proposed a strategic framework for the development of national strategies to help drive an ICT for development agenda. As the title indicates, the emphasis of that Report was on devising integrated approaches to achieve maximum impact through catalytic changes. The Report drew a key distinction between ICT as a *sector* of domestic growth and export opportunity in its own right, and ICTs as *enablers* of productivity and transformation in a range of sectors and institutions. It placed central importance on the need to cultivate a “strategic compact” among public and private entities to foster closer collaboration. These partner organizations were meant to include not only local institutions, such as government ministries, university departments and labor unions, but also governments in other countries, international organizations, multinational corporations and non-profit institutions.

The Report draws on case studies from a range of developing countries to demonstrate the valuable role ICT can play in addressing development needs. It recommended the adoption of national strategies that effectively integrate the inter-related elements of *infrastructure & access, content & applications, enterprise & entrepreneurship, policy & governance* and *human capacity* development. While emphasizing that there is no single, correct strategy of ICT for development, the Report identified a number of the most promising kinds of initiatives in healthcare, education, economic development and political empowerment. It suggested that the experience of successful developing countries pointed to the need to avoid overly hierarchical, command-and-control approaches and to stress the advantages of local demand and multi-stakeholder involvement in defining priorities and designing programs. Finally, a key emphasis of the DOI Report—what might be more rightly characterized as its working hypothesis—is that, when designed and phased in with attention to each aspect of the strategic framework, ICTs should be able to trigger a form of “development dynamic”—a multiplier or “network effect” that generates an overall impact greater than the sum of the separate inputs. *The following diagram from the DOI Report summarizes these perspectives.*

**Digital Opportunity Initiative (DOI)
Framework**



¹⁵ Digital Opportunity Initiative (DOI) Report: Creating a Development Dynamic. <http://www.opt-init.org/framework.html>

3. Goals for Development: Combining Sector Targets & Societal Change

That so many countries around the world will fall short of the Millennium Development Goals in the 12 years to 2015 points to an urgent need to change course....First are countries that combine low human development and poor performance towards the Goals—the top priority and high priority countries. Second are countries progressing well towards the Goals but with deep pockets of poor people being left behind....To achieve sustainable growth, countries must attain basic thresholds in several key areas: governance health, education, infrastructure and access to markets. If a country falls below the threshold in any of these areas, it can fall into a “poverty trap.” Human Development Report 2003 (UNDP)¹⁶

“Development” itself is a word loaded with ambiguity and controversy. The United Nations Development Programme, pursuing a course influenced strongly by the Nobel Prize-winning economist Amartya Sen, promotes a concept of “human development” that emphasizes “a process of enlarging people’s choices.” The most critical of these are deemed to be “to lead a long and healthy life, to be educated and to enjoy a decent standard of living,” as well as “political freedom, guaranteed human rights and self-respect.”¹⁷ The translation of these principles into concrete development targets, however, is a recurrent challenge.

Shortly after the launch of the Digital Opportunity Task Force (DOT Force) at the July 2000 G-8 Summit, a “Millennium Summit” of world leaders—some 189 heads of state in all—convened in New York to set an ambitious agenda for global development. The most tangible output of this remarkable gathering was a statement of objectives known as “The Millennium Declaration” that contained a series of concrete development targets for achievement by the year 2015. These were immediately dubbed the “Millennium Development Goals”.¹⁸ They set forth a series of aggressive targets: cutting the level of world poverty in half, achieving universal primary education, reducing child mortality by two-thirds, and five others. The last goal, which outlined the dimensions of a proposed “global partnership for development” referred to the need to “make available” the benefits of new technologies, “especially information and communications technologies.” Signed by all the leaders in attendance, the Declaration and its MDGs soon became the basic development manifesto for all organizations in the United Nations System.

The potential contribution of ICTs to achieving the Millennium Development Goals should be understood in at least two dimensions. On the one hand, ICTs can be viewed as a set of “tools” for application to particular development programs in healthcare, education, government services, and other sectors. From this perspective, they are specialized instruments for the accomplishment of specific, measurable objectives—number of infant inoculations, students completing the primary school, downloads from a government website, and so forth. The remaining sections of this Report will highlight a number of these sector-specific objectives and the kinds of opportunities presented for ICT contributions.

On the other hand, ICTs must also be seen in broader terms as the agents of a more fundamental transformation of societies in order to make them more effective users of information and communications—the new “currency” of modern societies. As fundamental as this transformation may be, the underlying targets for this purpose are more difficult to specify and measure. For some purposes, indices of technology penetration, such as numbers of phone lines or Internet servers, can serve as surrogate measurements of such transformation. However, because of the cultural and economic differences among societies, these measures can also give false readings of relative progress. National development strategies must recognize and address both dimensions of the development agenda because the ambitious goals of the Millennium Declaration, while fundamental, are simply not achievable without such broader social transformations. Likewise, as noted above, the dissemination of technology without deliberate attention to growth and welfare impacts, will not be widespread and sustainable.

¹⁶Human Development Report 2003: Millennium Development Goals: A compact among nations to end human poverty (UNDP, 2003) (hereinafter cited as *HDR 2003*). “Millennium Development Goals: A compact among nations to end human poverty” pp 2-3. www.undp.org/hdr2003/

¹⁷See UNDP, “Defining and measuring human development,” Chapter 1 in *HDR 2003*. See also Amartya Sen, *Development as Freedom* (1999). Sen will be one of the principal authors of the Human Development Report in 2004, focusing on culture issues.

¹⁸ For a list and discussion of the Millennium Development Goals, see <http://www.undp.org/mdg/>

- ***Addressing the Big Development Targets: "ICTs for MDGs"***

The Millennium Development Goals are a useful starting point for national development strategies because they have the formal, nearly universal, endorsement of national governments, as well as the institutional support of all U.N. organizations. The MDGs offer a basic map of major growth and welfare objectives that should underlie all development plans, and thus a common reference point and a set of consensus targets against which the capabilities of ICTs can be compared and focused. The U.N. ICT Task Force has taken the lead in outlining for national governments with respect to each of the MDGs a basic set of ICT initiatives that could advance their attainment. Under the leadership of the Canadian Government, the Task Force is preparing a detailed matrix that will reference major programs of ICT applications.¹⁹ Other organizations will undoubtedly produce similar lists over time.

These formulations of the relationships between ICT and major development objectives can give countries an enormous start in thinking about ICT for Development strategies. However, In applying this approach for the development of a national ICT strategy, several key considerations should be emphasized. First, strategies must account for how to scale a given ICT application or initiative that is intended to advance a particular MDG—or that may have done so in a particular trial. Unfortunately, ICT for development proposals are often advanced simply on the basis of the assertion that they will make a contribution to development without sufficient regard as to whether that contribution is likely to be cost-effective, or even minimally viable in a particular local context. For example, elaborate infrastructure or software systems can be offered as a "solution" to a development problem even though the supporting dimensions necessary to effectuate them—human skills, policy prerequisites, sustainable funding—are unavailable and unobtainable. In short, ICTs clearly have major contributions to make in education, healthcare, gender equality, environmental sustainability and the other MDGs, but to be successful, that contribution should always be viewed as dependent on a range of other factors and subject to comparisons with other, less technology dependent approaches.

- ***Promoting Broader Social Transformation: "Networked Readiness"***

The second major qualification concerns the scope and degree of social transformation necessary to realize the MDGs as a whole. The scale of change necessary to achieve these ambitious objectives cannot be attained merely through a sector-by-sector application of technologies to improve performance. Cutting poverty in half and making comparable impacts in education, healthcare and gender equality will require fundamental changes in the culture and institutions of the countries concerned. Reaching these goals will require that societies revise their traditional modes of operation in order to make useful, accurate information more widely available and more effectively applied in all aspects of economic and political life. Although often vaguely described as "the information society," this state of advanced information capability is what will be required to realize the full potential of these technologies. Efforts to gauge and compare the progress countries are making in achieving this kind of general transformation are often characterized as assessments of national "networked readiness".²⁰

General skeptics and anti-globalization campaigners may see in these notions of readiness just a stalking horse for the broad agenda of market access and trade principles they so fiercely resist. Indeed, the varying assumptions behind these concepts can and do result in widely differing conclusions about imperatives and priorities in ICT for development. On the one hand, in societies where ICTs convey and

¹⁹ U.N. ICT Task Force is preparing an input to the World Summit on the Information Society that outlines in more detail the relationship between ICT capabilities and the Millennium Development Goals—"ICTs for MDGs". See <http://www.unicttaskforce.org/wsis/books.asp>

²⁰ Readiness" assessments are in fact a great improvement over earlier uses of telephone penetration or "tele-density" measurements to compare national progress. See the useful discussion and comparison of "readiness" indices in Dutta & Jain, "The Networked Readiness of Nations," in *The Global Information Technology Report: Readiness for a Networked World: 2002-2003* (Dutta, Lanvin & Paua eds., 2003), hereinafter referred to as *GITR: 2003*. For an overview of e-readiness in 54 African countries, see World Economic Forum-NEPAD e-Africa Commission, "Building Capacity to Narrow the Digital Divide in Africa from Within," (Davos, 2003). See also Bridges.org, "Comparison of E-Readiness Assessment Models", 14 March 2001, both available at www.bridges.org.

aura of modernity and progress, the mere introduction of the technologies (computers, cell phones, Internet cafes) can seem like progress, even if their impact on major development priorities, including that of economic growth, is comparatively minor. On the other hand, in societies where ICTs are associated with the “negatives” of globalization (gambling, pornography, erosion of privacy, time-wasting distractions), the value of these technologies can be dismissed or resisted. Anti-globalization advocates could easily wallow in such criticism to make their case for resistance to all technology-enabled change.²¹

Yet, responsible national leaders have no choice but to integrate both their preferred development targets and the broader social transformation necessary to realize them. Certainly to cut world poverty in half within another decade will require changes in developing countries on a scale unseen in human history. Even China--whose recent development is becoming one of humanity’s greatest success stories by bringing some 150 million people out of dire poverty within a generation--remains plagued with backward regions and deep structural problems. If there is a broader development lesson from the Chinese experience, it is a story of focused targeting combined with the general transformation of economic and social systems that made these separate targets achievable.²² In short, an ICT for development strategy must somehow accommodate both the broader *transformation* of a society and its culture to make it capable of capitalizing on the opportunities presented by the wider world, and the achievement of concrete *targets* in healthcare, education and government service delivery that bring the more vague versions of this vision “down to earth”.

The various components measured by assessments of “networked readiness” also represent elements in the broader objective of ICT for development strategies—indeed, of all development strategies --namely, to create an impact greater than the mere sum of the separate initiatives or inputs. Such breakthrough change is what is variously referred to as a multiplier effect, a set of synergies, or a “development dynamic.” As highlighted in the DOI Report, the strategic ICT objective is to identify and cultivate the various factor inputs that can contribute to major qualitative as well as quantitative change, looking for those “catalytic” combinations that might “kick-start” growth or take economic performance to “the next level”. For example, the latest UNDP *Human Development Report*, argues that the poorest countries will not escape their current “poverty traps,” unless they “reach certain critical thresholds—for health, education, infrastructure and governance—in order to achieve a takeoff to sustained economic growth and development.”²³

Of course, development dynamics may operate not only at the “macro-dynamic” level. Indeed, it may be politically beyond the capability of a given government to affect the multiple components needed to generate major national growth initiatives on the order suggested above; yet it may still be possible to achieve such integrated dynamics on a smaller scale in the design and implementation of particular programs. Applying ICT effectively to a system of national inoculations, primary school teacher training, or the implementation of a new voter registration program, all involve attention to each of the components emphasized in the DOI Report, from infrastructure through human capacity. In short, we might distinguish in this regard the “Big D” or “macro-dynamic” effects of development strategy on an entire national economy and the “little d” or “micro-dynamic” effects to be generated within a more delimited program, such as educational reform or small business support.

- ***Pressing Political Reform: U.S. “Millennium Challenge Account”***

The third caveat to the ICT for MDGs formulation concerns the dimension of political reform. Political development is largely downplayed in the formulation of the MDGs. In the interest of achieving the widest possible consensus, the Millennium Summit did not give prominence to the objective of democratic elections, rule of law and transparent governance—even though many development specialists

²¹This public ambivalence about the value of the Internet is reminiscent of the debates a generation ago about the cultural potential (and disappointment) surrounding broadcast television--what Newton Minow dubbed a “cultural wasteland.” See Baird, “Promoting Innovation to Prevent the Internet from Becoming a Wasteland”, 55 *Federal Communications Law Journal* 441 (May 2003).

²²But see the concerns expressed in a recent World Bank study that the Chinese government does not have a sufficiently broad understanding of the changes needed to create a “knowledge economy.” Dahlman & Aubert, “China and the Knowledge Economy: Seizing the 21st Century,” *WBI Development Studies* (2001).

²³*HDR 2003* at page 25.

would place these goals high on the list of key components for sustainable change. For this reason, the MDGs cannot be considered a complete set of development objectives—and, indeed, are not considered comprehensive even by the United Nations itself. As UNDP Administrator Mark Malloch Brown emphasizes in his Introduction to the 2003 *Human Development Report*, governance and human rights priorities must also be understood as key components of any national development strategy. He reminds us that these objectives were part of the broader “Millennium Declaration” at the 2000 U.N. Summit,²⁴ and should therefore be assumed to be part of any basic development agenda even though they are not prominent in the MDGs themselves. UNDP in fact places major emphasis in its development work on the broadening of political participation and democratic institutions. Its programs in support of government decentralization, bureaucratic transparency and electoral process rely heavily on the wider use and dissemination of information through effective application of ICTs.

Other development initiatives place even greater emphasis on the political prerequisites for effective development strategies. For example, a major test of the role of ICTs in larger development strategies could come through the implementation of a new U.S. foreign assistance program, the “Millennium Challenge Account” (MCA). In March 2002, at the U.N. a follow-up conference to the Millennium Summit in Monterrey, Mexico on “Financing for Development”, the United States was asked to make concrete commitments to funding the Millennium Development agenda. The American government’s response came in the form of a pledge by President George W. Bush to provide, starting in FY2004, an additional \$5 billion in development assistance—over and above the existing levels of U.S. foreign and security assistance. Over the following year, the Administration unveiled a program intended to make good on this pledge. In addition to the enlarged levels of assistance promised, the “Millennium Challenge Account” (MCA) involves a new set of criteria for determining the eligibility of countries to qualify for these funds. Based on arguments that development assistance is most productive where countries have properly set the stage for it, the MCA would condition eligibility for grants from this new fund on the performance of each country against three general standards: “ruling justly, investing in people and promoting economic freedom.” Specific indicators of country performance against these standards, many of them compiled annually by the World Bank, combined with formulas for determining the cut-off points for satisfactory performance, were developed.²⁵

The MCA is not explicitly related to technology initiatives. Yet, each of the central criteria suggests opportunities for ICTs to make significant contributions to development performance. As economist Dan Rosen put it in a policy brief sponsored by the Markle Foundation:

ICT is not a sector looking for an earmark; it is a force increasingly woven into all aspects of development, at low levels of income as well as high. People do not fund electronic sensors, but the clean water programs they support; they do not buy computer programs, but the accounting platforms they provide. Leaders envision the solutions and functions needed, not the ICT that runs them.

In short, given the heavy emphasis in U.S. government and industry on productivity, transparency, and political participation, the MCA will likely demonstrate *how* those technologies can best be built in from the beginning.

²⁴ Meanwhile, the Johannesburg Summit of 2002 added two additional targets to the list MDG regarding access to clean water and sanitation—a version that came to be called “MDG+”.

²⁵ For a valuable primer on the use of indicators, see Stefaan Verhulst’s paper “ICT Indicators: Mapping Resources and Issues,” May 1, 2003, available from Research@markle.org.

HIGHLIGHT: Daniel H. Rosen

“New Directions in US Foreign Assistance & the Role of Information and Communication Technology”

Daniel H. Rosen is a Visiting Fellow at the Institute for International Economics. As a consultant to Markle in 2002, he prepared a policy brief on “New Directions in U.S. Foreign Assistance and the Role of Information and Communication Technology” that provided the basis for a series of meetings with key U.S. government officials on the value of ICT for the U.S. Millennium Challenge initiative. Rosen’s paper addressed the issue of the ICT “value proposition” head on. He developed several arguments:

- Productivity improvement is the basic measure of development impact.
- “The emphasis in the MCA is on economic growth. ...This reflects a view shared by the Administration and an increasing number of development specialists that systematic poverty should be addressed primarily by increasing productive jobs and economic activity.”
- “Technological change is the mother of productivity growth.”
- ICTs’ contribution to productivity improvements is only anecdotally documented in poorer economies, and it may be culturally variable, but the ICT/productivity correlation is strong.
- ICTs have demonstrated capabilities to advance all three MCA goals: “ruling justly,” “investing in people,; and “promoting economic freedom.”
- “Information technology is central to the MCA emphasis on productivity, transparency and accountability.”
- “ICT is not at the margins of development any more than it is a short cut around the development process. Rather, ICT offers crosscutting tools increasingly central to development and can help transform the dynamics of development in poor settings.”
- “ICT generates, processes and adds value to information, a critical catalyst for the development process, as it also makes information easier to access.”
- “Countries that fail to absorb ICT and have flat productivity growth will lose competitiveness compared to technology-absorbers; they will not just stagnate, but even fall backwards in absolute terms as what little global market share they hold is taken away by erstwhile brothers-in-poverty.”
- “ICT for management, evaluation, and control is relevant to all MCA activities, and can be a model for other programs.”

4. National ICT Strategies: Pursuing Priorities through Collaboration

Singapore is implementing its fourth “e-Strategy”. From 1980 to 1985 it instituted a national computerization plan as part of a national strategy to overcome its shortage of natural resources and exploit its human resource base. This first plan focused on building capacities within the civil service. The second National IT Plan (1986 to 1991) used the network technologies that emerged in the mid-80s to spread connections to the private sector and professional groups through trade, law and health services. The vision was transformed in 1992 into a global vision of an intelligent island –IT 2000. The fourth strategic plan--Infocomm 21—is intended to ensure that Singapore stays ahead of the technology competitiveness curve with a pervasive infocomm-savvy e-society.²⁶

National strategic plans for the application of ICTs to development have proliferated in recent years among less-developed and transitional countries. International organizations have been promoting the formulation of such strategies for a number of years as a way of focusing limited resources and capitalizing on potential synergies.²⁷ The International Telecommunication Union and United Nations Development Programme have specialized staffs to assist countries in developing these strategies. The United Nations Economic Commission for Africa (UNECA) has sponsored a series of National Information and Communications Initiatives (NICIs) that now number more than two dozen in Africa alone. Both the G-8 DOT Force and its United Nations successor, the U.N. ICT Task Force, emphasized the value of comprehensive national strategies for the effective integration and application of ICTs to development agendas. One of the seven working groups of the DOT Force was focused on national strategies of ICT for development and the promotion of initiatives to generate such efforts.²⁸ The U.N. ICT Task Force continued that emphasis in its Working Group 2, which is sponsoring with UNDP a series of regional gatherings for countries that have created national strategic plans or are in the process of doing so. McConnell International estimates that there are now more than 70 countries with the equivalent of national “e-strategies” or ICT for development plans.²⁹ UNDP puts the figure at 90 and counting.³⁰ Indeed, as Kate Wild’s summary (above) of the four stages of Singapore’s strategies makes clear, many countries have been through several “generations” of ICT strategies, even though these may vary widely in scope, depth and ambition—as well as in the degree to which they reflect the political will and broad support necessary to achieve funding and implementation.

Observers from Western developed countries may well question why, in a post-socialist, global-capitalist economy any country would need or want a comprehensive national plan of ICT for development. National strategic plans smack of old-fashioned central planning or industrial policy by which government “bureaucrats” presume to judge a likely or preferred future—both what is possible and what is desirable—and then seek to engineer that utopia by policy decrees, tax incentives and regulatory manipulation. Developing countries are often criticized for the continued centralization and hierarchy reflected in their national planning processes. Such criticism misconstrues both the nature of proposed ICT strategies and the circumstances of developing countries that make them essential. National ICT strategies are not meant to resemble the socialist five-year plans of old; nor should they attempt to resolve all choices among available technologies. Furthermore, rather than central government control, they should have as a central rationale the need to engage and expand the private sector and civil society. At the same time, in most developing countries the government remains the primary director and dispenser of national assets. Despite the liberalization and privatization that has occurred throughout the world over the past generation, the

²⁶ Kate Wild, “A global overview of e-strategies—making the link with poverty and the Millennium Development Goals,” UNICTTF V/GF/2003/08, (Discussion paper for the 5th Session of the U.N. ICT Task Force in Geneva, September 2003.) Quoting William Hioe, National Infocomm Strategy and Policy: Singapore’s Experience, ICA Information no.74, June 2001. <http://www.ica-it.org/docs/issue74>)

²⁷ See, e.g., “Knowledge Societies: Information Technology for Sustainable Development,” United Nations Commission of Science and Technology for Development, 1996.

²⁸ The Global Digital Opportunity Initiative of Markle, UNDP and other partners was one product of that Working Group.

²⁹ Summary of an informal survey by McConnell International in March 2003. MI also rates these national plans on several scales.

³⁰ Raul Zambrano of UNDP in “Implementing e-Strategies: A Snapshot of Current Situation,” *Conference on e-Strategies for Development*, Maputo, Mozambique, 1-4 September 2003.

proportion of GDP and national assets still controlled and allocated by national, regional and local governments is substantial—in some poorer countries exceeding 3/4 of GDP. Therefore, national plans that include compatible objectives for government budget allocations, legislative mandates and regulatory priorities are often an imperative in countries whose assets and resources are severely limited.

External actors often reinforce this imperative, particularly in the poorest countries. The G-8 governments and Bretton Woods institutions themselves encourage detailed government planning and centralized control in the less-developed countries. These countries, by virtue of their dependency on IMF and World Bank lending—in particular as a condition of qualifying for the HIPC program (“Highly-Indebted Poor Country”)—face the requirement to draft Poverty Reduction Strategy Papers (PRSPs) that constitute their comprehensive development commitments to these institutions and their national government constituents. Very few of these plans yet make explicit reference to the role of ICTs (thereby giving rise to arguments that they should be recast to “mainstream” or highlight technology priorities as an integral component of planning. These national strategies for economic growth and development become the vehicles for negotiation and agreement with the range of global outsiders. (While their bargaining power may be limited (and resistance often futile), without a unified and coherent basis on which to represent the interests of the country, such negotiations become even more one-sided than they would otherwise be.

Nevertheless, the experience to date with efforts to forge national strategic plans of ICT for development is quite mixed and often disappointing. Many strategic exercises never leave the drawing board (or its modern equivalent, the PowerPoint slide). As UNDP’s Raul Zambrano has put it, many countries become preoccupied with “a micro/pilot approach to critical issues,” treating ICT for development as a series of small sectoral experiments with little connection to broader development goals.³¹ Allison Gillwald of the LINK Centre in South Africa goes even further in reviewing “the initiatives that have deployed ICTs to alleviate poverty to date.”

In most cases these have been small-scale projects or pilots that are often not scalable or sustainable and have often only been made possible by donor intervention, whether to source infrastructure or to cover the high usage costs. Often successfully demonstrating the applicability of ICTs to development, the outcomes of these endeavors tend to be localized and at best can only be ameliorative.

Therefore, in learning from the experience to date with national strategy formulation, several key points deserve emphasis.

- *Maintaining a Comprehensive, Integrated Focus*

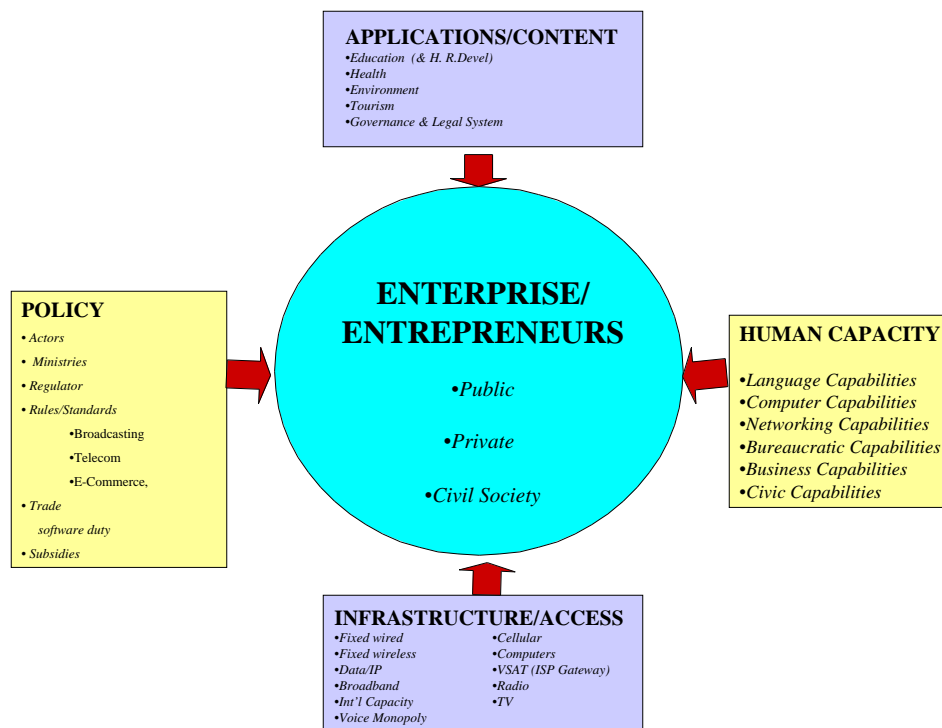
Comprehensive Map. The key starting point for strategic deliberation must be an accurate picture of where the country stands in its adoption and utilization of ICTs to date. The DOI Report suggests one possible version of a framework, and the various efforts to identify the “readiness” of countries offer similar constructs that might accomplish the same objective. But the key is to supplement the usual focus on technology with other factors that affect the viability of a given initiative. Infrastructure without useful applications, policies to promote competition without investors (enterprise) to initiate it, or talented people who lack the access to networks to apply their skills—each of these situations illustrates the need for a comprehensive approach to development programs. Too often, however, strategies are initiated without regard to work already done and information already compiled and available. Some countries have been the subject of multiple “e-Readiness” assessments, each of which fails to build on those before and ignore data already generated.

³¹ Zambrano, “Implementing e-Strategies: A Snapshot of Current Situation,” *Conference on e-Strategies for Development*, Maputo, Mozambique, 1-4 September 2003. See also the remarks of UNDP Regional Policy Advisor, Pierre Dandjinou, at the same conference.

Integrated Approach. Just as a comprehensive map suggests the appropriate scope of a national strategy, an integrated approach suggests the method. As suggested above, the challenge of ICT for development is not simply one of choosing the best set of the ICT applications for a preferred set of objectives, but achieving broad synergistic effects and maximum efficiencies from investments in infrastructure, software and training. Scarce resources and limited human capacity make such efficiencies and synergies a key point of the entire undertaking. Major choices about infrastructure, software, and ICT education and training are best made with the full panoply of priorities in mind.

Enterprise Focus. While the DOI Report was careful to avoid treating any particular dimension of its ICT framework as deserving priority, the temptation in formulating such strategies seems to be to take one of two unfortunate paths. One is to focus on infrastructure as the pre-condition for progress and to develop plans for the expansion and diversification of technologies as the principal opportunity. The other, even more common approach, is to treat strategy as a compilation of sector-specific initiatives. Both emphases also seem to drive toward and overweighing of generic “best practices” that may or may not be applicable to national circumstances.

To guard against either tendency, the authors of this Report suggest a different starting point. A more productive approach is to begin strategy deliberations by focusing on the Enterprise & Entrepreneurial dimensions of ICT for development. How can the entities and individuals that comprise the main actors in a given developing country’s economy become more productive? In addition to commercial businesses--profit-driven; privately-owned; small, medium and large--these actors include public enterprises--government ministries, government-controlled corporations and regulators—as well as civic or non-profit enterprises--interest groups, foundations and other NGO’s. Economic growth and development is essentially the consequence of their collective activities. One approach, therefore, is to frame the other dimensions of the DOI framework--*applications, infrastructure, human capacity and policy*—as in one way or the other supporting or facilitating the effective performance of these economic actors and their supporting institutions. From this perspective, enterprises use *content and applications* whose availability and effectiveness depend on underlying *infrastructure*. *Policy* should be seen as facilitating and supporting this objective, while promoting *human capacity* is the pervasive challenge to all of these efforts. The financial resources necessary for their performance may come from several sources, either as revenues generated by the entity or as subsidies derived from government or other sources (taxes, fees, donations). However, the recurrent test for each of the other dimensions of ICT initiative should be whether they contribute most effectively to enterprise viability and performance. This emphasis will become clearer in discussing the various dimensions of the DOI framework individually in the following sections of the Report. *The diagram below seeks to highlight this enterprise focus.*



- ***Building Momentum for Implementation***

The process for achieving an effective national strategy will depend crucially on the national political system and culture of each country. Therefore, the choice of effective leadership and other participation for the strategy-setting process will vary greatly from place to place. But the following points seem to be common features of most of the plans considered.

Clear Priorities. National Strategies should begin with a basic clarity about the goals to be achieved and the priorities attached to them. Many national strategy efforts to date are little more than “shopping lists,” comprising the sum of preferred programs from each ministry or province without any indication of the relationship or potential synergy among them. In government, corporate and non-profit organizations, people frequently confuse the term strategy, with what is better described as a vision, agenda or “wish list” of desired outcomes. National culture and politics must come into play from the outset. In Korea, for example, the priority attached to the education of youth, and the central role of the national testing system, made education a principal driver of the broadband roll-out that has made that country the leader in per capita access to broadband services at home. In South Africa, the priority attached to overcoming years of systematic discrimination set the initial political imperative of establishing service to these areas in particular. In other countries, priorities are often influenced as much by the donors as the governments or leaders themselves. Thus in Southern Africa, the crisis of the HIV/AIDs pandemic is a major preoccupation of outside donor organizations, but is not always treated with the same priority inside countries. Nevertheless, countries that are heavily dependent on donor largesse often design their strategy documents as “donor catalogues” of potential funding opportunities and may be reluctant to eliminate any particular option that might appeal to an outside donor, even if it might have less importance to the country itself.

Resource Allocation & Time Frames. A strategy must effectively guide decision-makers in making choices—setting priorities, establishing targets and time frames and allocating resources. In order to do so, major programs and project components need to specify with some reliability the relative resource and time requirements necessary to make them effective. These overviews should resemble “business

cases” similar to those that normally drive investment decisions in commercial enterprises. Yet it is extremely rare to find within any national ICT strategy such orders of magnitude.

For strategic direction, it must make clear not only what is to be done, but also (if only by implication) what will not be attempted. Where it is not possible--for reasons of politics or national pride--to eliminate certain, otherwise less defensible initiatives, strategies may treat these choices indirectly, for example, by postponing these initiatives. The reality of strategic choice often only becomes clear through the allocation of time and resources. In some countries, the process by which governments determine their budgets displays some of this analytical discipline. But in others, such political strategic clarity and sustainability may be assured only through the involvement of the national parliament or legislature, acting collectively and embodying the decision in law.

Benchmarking & Monitoring. Finally, the strategy should build in from the outset an expectation of how progress will be measured and assessed on a regular and reliable basis. The discipline of having to decide in the beginning what will constitute satisfactory impact provides a healthy antidote to unrealistic or overly abstract concepts of “information society.” Unfortunately, however, this imperative has all too often led to the tendency to rely on available data, such as quantitative measures of infrastructure penetration, rather than more closely related indicators of development impact. The NGO, *WorldLinks*, for example, has an ongoing contract with SRI International to measure the impact of its programs on the teachers it trains--assessments that include both quantitative statistics and qualitative judgments.

- *Cultivating Collaboration*

Senior Political Leadership. Because the issues implicated in a national development strategy are so numerous and sweeping, leadership from the highest levels of government is necessary on a continuing basis. Countries generally choose one of three basic alternatives. First is the model of what might be called an “ICT Czar”—a senior official with the authority and clout to organize and direct national efforts. In Estonia, Singapore, Mozambique, Mauritius and other examples, it has been Presidents or Prime Ministers whose personal determination has maintained focus and assured the political support necessary to overcome resistance or shortfalls. In Bolivia, that responsibility has been lodged in the office of the Vice President. Other countries take a second approach, designating one Minister with a mandate to lead and given some resources at his command, but who must nevertheless rely heavily on persuasion to assure the collaboration of key government colleagues. South Africa, for example, has given leadership of its e-Strategy efforts to the Department of Communications. However, reliance on the leadership of one cabinet official tends to associate the strategy with the mandate of a single ministry and is less likely to produce the multi-dimensional scope that makes ICT initiatives most effective. The third approach seems least effective--namely, designating an ICT “champion” who has little authority and must rely completely on his ability to get attention, access and cooperation from colleagues who are more powerful and therefore less willing to be “coordinated.”³²

Given the scope of the issues involved in an ICT for development strategy, a major reason for having a formal strategy process is to provide additional leverage for overcoming the political infighting, turf battles and bureaucratic resistance that can otherwise stall such a major undertaking. In the context of a national planning process in a poor country, such processes all too easily become seen as “zero sum” games, in which Ministries and the interests that support them compete for scarce resources and are reluctant to collaborate effectively across their narrower mandates. In this regard, a comprehensive plan, developed through wide consultation and transparent definition, can itself become a liberalizing process, engaging and empowering a wider set of actors and making the process of implementation less contentious.

Multi-Sector Engagement. Equally important, collaboration on strategy must extend well beyond the ranks of government officials to include key leaders in the private sector, the university community and civil society interest groups with a stake in its outcome. While consensus may never be universal, without a critical mass of support in these other sectors, effective implementation and sustained

³² For a similar breakdown of bureaucratic alternatives as applied by various state governments in the United States, see the RAND study, <http://www.rand.org/publications/MR/MR1704/>

commitment will be far more difficult to achieve. For this reason, the product of each National ICT Strategy process is probably best thought of not as a written document, but as the formation of an on-going, networked team of committed leaders from various sectors of the society to develop a basic consensus and to press for its implementation. Estonia, for example, has succeeded in creating an atmosphere of technological opportunism and a culture of ICT receptivity that generates its own spontaneous collaborations and individual initiatives.³³ In fact, even if the final product is not one that reflects a uniform strategy or game plan, the very process of discussion and debate will often lead to de facto decisions of what not to do.

In all convocations dealing with development these days, such as the recent Johannesburg World Summit on Sustainable Development (WSSD), great emphasis is placed on the importance of “Public-Private Partnerships” as a tool for bringing the skills and resources of the business and NGO sectors into strategic collaboration and alignment. A number of these “partnerships,” such as the Global Forest Watch program highlighted below, have proved to be highly successful arrangements that serve the interests of the companies, NGOs and governments involved. At the same time, prospective partners should approach any of these arrangements with a clear understanding not only of the goals behind them, but of the concrete commitments made by each participant regarding the resources, people, time frames and deliverable results expected of them. .³⁴

Local/Regional Outreach. Finally, because the implementation of any realistic strategy will require support and participation well beyond government ministries and capitol cities, it is especially important to engage leaders in provincial centers, large municipalities, and other centers of influence throughout the country. Before finalizing its Implementation Strategy, the ICT Policy Commission in Mozambique conducted a series of briefings and discussions with provincial leaders in each of the ten provinces of the country. Both local political leaders and those from the private sector participated in these sessions and expressed appreciation for being consulted and interest in follow-up possibilities.

³³ <http://www.opt-init.org/framework/pages/appendix3Case3.html>

³⁴ See remarks of Tipson, “The Parts of a Partnership,” *Conference on e-Strategies for Development in Africa*, Maputo, Mozambique, 1-4 September 2003.

HIGHLIGHT: Global Digital Opportunity Initiative - - National Strategies
Collaborating with UNDP and other partners in supporting ICT for development strategies

In partnership with the United Nations Development Programme, the Markle Foundation participated in a series of consultations with specific countries on their national strategies. Two principal projects were in Africa:

- In *Mozambique*, the focus was on assistance to the ICT Policy Commission in the finalization of their “Implementation Strategy” for a comprehensive approach to ICT for Development.
 - UNDP and Markle supported five international consultants to assist in a final intensive review and revision of the draft strategy, leading to its approval by the Cabinet in June 2002.³⁵
 - Markle supported a set of provincial consultations to engage officials and private sector leaders outside of the capital and thereby broaden support for the strategy and the its component programs.
 - UNDP agreed with the Government to support and fund key dimensions of this strategy;
 - Markle provided funding to support specific elements of the UNDP [or Moz?] approach.
- In the *Republic of South Africa*, Markle supported the participation of seven international consultants to participate on the legislatively-mandated “e-Strategy Task Team” to frame a national strategy.³⁶
 - These consultants worked for six months with their South African counterparts in the areas of education, healthcare, infrastructure/access, telecom sector reform and job creation.
 - Input included an integrated scenario of ICT initiatives, as well as individual contributions in these focus areas.
 - The final Report will be the subject of a series of public consultation sessions, leading up to the introduction of implementing legislation in 2004.

Regional Conferences. The final phase of the project involved a series of regional meetings involving countries that are developing or implementing national strategies of ICT for development. The first was held in Maputo, Mozambique, September 1-4, 2003. The second was in Kuala Lumpur, Malaysia, October 20-22, the third in Baku, Azerbaijan, November 6-8. These conferences afforded country leaders the opportunity to compare experiences, identify best practices, and learn about the most successful or promising initiatives underway in other countries.

³⁵ The Mozambique team was led by Kate Wild and included Raul Zambrano, Pierre Dandjinou, Carlos Alberto, Vincenzo Puliatti, and Fred Tipson. The Mozambique Information & Communication Policy Implementation Strategy (June 2002) is available at www.infopol.gov.mz.

³⁶ This team was led by Ira Magaziner and included Goren Carstedt, Allen Hammond, Joseph Kvedar, James Moore, Marcus Osborne, and Fred Tipson. Iris Kedar provided additional support on healthcare issues.

5. Enterprise & Entrepreneurship: Promoting Productivity

In January 2002, a team from UNDP and the Markle Foundation sat in a sunny café in the Bolivian capital of La Paz to hear the views of one of the government's bright young economists on ICT for development. Using a laptop to illustrate his major points with graphs and tables, this official put in perspective the basic challenge facing ICT for development strategies in Bolivia. The message was stark: given the demographics of the country and its existing and projected growth rates, Bolivia needed major increases in productivity and personal income simply to sustain current growth rates. Investments in ICT by government, whether for job creation, education, healthcare or e-government had to be able to show a significant impact on these aggregate economic objectives in order to justify diverting the money from other development priorities, such as the construction of roads, irrigation systems or hospitals. Even with massive injections of outside assistance, Bolivia would slide further behind its Latin neighbors and even its less developed peers, unless its industrial competitiveness and attractiveness to investors and tourists could be increased substantially. How, he asked, would ICT contribute to this general economic transformation in a country where subsistence agriculture and diverse ethnic groupings were scarcely amenable to easy technological fixes?

The DOI Report of 2001 made a valuable distinction between ICT as a “sector” of a country’s economy in its own right, and ICT as an “enabler” of change in other sectors. The authors suggested further distinctions within the ICT Sector between an export market focus and a focus on the domestic market, and within the Enabler category between global positioning for competitiveness and national concentration on development impacts. The dilemma for Bolivia highlighted above captures the basic challenge to the strategic application of ICTs in the poorest countries. It is a challenge not simply of improving the performance of specific sectors or organizations, but of generating growth and competitiveness on a scale that improves a country’s aggregate economic performance.

Some developing countries interpret the ICT opportunity primarily as one of developing the sector itself. They look to Bangalore or Costa Rica and seek to build the software, semi-conductor and outsourcing industries that offer IT jobs and export potential. Yet, valuable as such sector development may be—both as a component of GDP and as a source of innovation for other sectors—a country such as Bolivia cannot realistically hope to achieve growth on the scale required to significantly reduce poverty through ICT sector development alone. The larger question is how a very poor, and largely agrarian, society can use technology to transform its entire economic base to compete in a global economy, generating jobs and improving productivity in both traditional and new sectors--despite severely limited resources and human capital.

For this purpose, ICT for development strategies must focus on the commercial enterprises and individuals that currently make up a country’s basic economy: farms, hotels, small vendors, service providers, traders--as well as those supporting public institutions--utilities, government agencies, municipal authorities--at the local levels of operation that effect law enforcement, official documentation, sanitation, land registry, and so forth. Rather than starting from aggregate statistics and proposing large infrastructure investments and software applications to address presumed technology shortfalls, strategy deliberations should begin by considering which entities must be created or transformed in order to have the impacts intended, and then by determining how technology might realistically be obtained and applied to accomplish those changes. To have development impact, the technology must be applied to create or enhance the ability of these smaller, often isolated enterprises to perform—to provide their existing products and services more widely and efficiently, but also to create new products and services facilitated by the technologies themselves.

- ***Networking Local Entities***

Development at the local level is often a matter of improving the productivity of small enterprises: farms, shops, local government agencies, schools, and hospitals. Rather than elaborate applications of technology, the contributions of ICT may better be understood as incremental improvements in the

availability and application of useful information to improve performance over time. The kinds of information and improvements can include the following:

- Useful, reliable and consistent information (costs, market prices, weather, pests, etc.)
- Lower borrowing costs and other costs of operations, streamline clerical or administrative tasks,
- Expanded customer or client base,
- Improved inventory management,
- Increased distribution capabilities,
- Reduced time and expense of dealing with government,
- Increased transparency to promote reduce corruption & market collusion,
- Improved security and political stability.

In contrast with the dramatic, large-scale changes often associated with technology innovations, networks and computing should be introduced in a manner, format and time frame that increases the output or improves the service delivery of the smallest enterprises in the most cost-effective way. The operators of such entities have a limited capacity to absorb major upgrades in brief periods. Sometimes basic literacy or “numeracy” is a major impediment. Indeed, a principal danger in seeking to improve the productivity of small enterprises is to aim too high on the technology scale and overshoot the capacity of individuals and enterprises to use them. Designing or prescribing programs that require change to occur too quickly and demand immediate sophistication with complex software or the flawless performance of underlying infrastructure is often a recipe for failure.³⁷ It is vital to keep in mind in the poorer, more rural areas in particular that a slower pace of adoption or a modest improvement in productivity does not mean that significant progress is not occurring in relative terms. One recent study, for example, highlights the ingenuity and tenacity of individual entrepreneurs and visionaries in Africa who initiated pioneering changes with few resources and limited expertise—changes that became the foundation for continuing progress.³⁸

ITC, one of India’s foremost private companies, provides an example of increased ICT efficiencies in the agricultural sector. An initiative called e-Choupal places computers with Internet access in rural farming villages that serve both as a social gathering place for exchange of information and as an e-commerce hub. (Choupal means “gathering place” in Hindi.) The computer is typically housed in a trained farmer’s house, linked to the Internet, and serves an average of 600 farmers in 5 to 10 surrounding villages within about a 5 kilometer distance. Using the system costs the farmers nothing, but the host farmer is obligated to serve the entire community. Farmers use the computer to access daily closing prices on local government-mandated markets, find information about new farming techniques, and pre-order seeds and fertilizers. At harvest time, ITC offers to buy the crop directly from any farmer, at the previous day’s closing price; the farmer then transports his crop to an ITC processing center, where the crop is weighed electronically, its quality assessed, and the farmer is paid for the crop and a transport fee. Thus, the e-Choupal system bypasses the local market, where farmers must sell to middlemen that profit at the expense of the farmer and of the ultimate buyer. Farmers benefit from more accurate weighing, faster processing time, higher prices for their grain, and prompt payment; the company benefits from lower procurement costs, from using the network as a distribution channel for its products, and from new product ideas suggested by farmers. The e-Choupal system gives farmers a greater share of the value of their crops and access to information to improve their productivity. By providing a more transparent process and empowering local people as key nodes in the system, ITC increases trust and fairness. The increased efficiencies and potential for improving crop quality contribute to making Indian agriculture more competitive. Despite difficulties from undependable phone and electric power infrastructure that sometimes limits the hours of use, the system is a significant step toward rural transformation.³⁹

³⁷ In a report titled, “Future Directions in Agriculture and ICTs at USAID,” Winrock International and the Academy for International Development have categorized some of the main approaches to agricultural development where the inclusion of ICT can and does add value to improved agricultural planning, research, education, business opportunities, gender dimensions and governance.

³⁸ See, in particular, the experiences summarized “Rowing Upstream: Snapshots of Pioneers of the Information Age in Africa,” (Lisbeth Levey & Stacey Young eds., May 2002. www.sn.apc.org/rowing_upstream/).

³⁹ ITC’s e-Choupal as a Model of Profitable Rural Transformation, Univ. of Michigan, <http://www.digitaldividend.org/case/case.htm>

Akashganga's IT Tools for the Indian Dairy Industry. To improve on the quality, efficiency, and productivity of India's local dairy cooperatives, Shree Kamdhenu Electronics Private (SKEPL,) a small entrepreneurial business has developed IT-based tools that automate the milk collection process. Marketed under the brand name Akashganga, the company's 600 installed systems selling for approximately US\$ 3,300, incorporate an electronic weighing system, a milk analyzer, a personal computer and accounting and management software. Located at local cooperatives, the systems allow farmers to insert ID cards into readers, pour their milk into buckets on a weighing scale that displays digital readouts automatically transferred to PC-based systems, measure fat content, calculate the amount to be paid to the farmer, and print a receipt. The Akashganga system not only minimizes handling and increases efficiency, but also increases transparency by eliminating corruption that occurs with manual paper based systems, and creates a basis for improving the quality of the milk produced.⁴⁰

- ***Re-engineering Large Enterprises***

The next level of enterprise enhancement through ICT is the one that receives far more attention: the provincial or nation-wide entities that have the highest economic and political visibility and support. In their case, ICT applications must be coincident with deliberate re-engineering of the major operational processes to achieve the productivity improvements that networks offer.

ICT Sector Development. Virtually every developing country seeks to duplicate the success of India's Bangalore and surrounding region. National leaders look for ways of creating a comparable sector. These include forms of subsidy and tax incentive, special zones or technology parks, free land and financing in the hopes of generating new enterprises in information technology and IT-related businesses. Jordan, Rwanda, Hungary, and South Africa are just a few of the countries whose national plans envision significant sector development for both regional and global positioning. Offshore business process outsourcing is the world's fastest growing IT industry segment, with IT services growing at 68 per cent CAGR, from 2002 to 2007, according to Gartner Inc. Demand comes from the U.S, Europe and Japan.⁴¹ Countries with English language skills, suitable time zones, telecom infrastructure, government support to education, and proactive investment policy have comparative advantage. India, China, Ireland, Brazil and the Philippines—and potentially Ghana and South Africa—are leading BPO providers. Services range from low level skills like call centers and data entry to professional services, including legal, accounting, and medical services.

“Old Business” Transformation. Yet, important as this sector may be, for aggregate national impact there is no alternative to the parallel modernization and streamlining of businesses outside the ICT umbrella.⁴² The financial services industry is a major case in point. The Chilean banking sector provides an example of the powerful effects of transforming old businesses with streamlined technology-based processes. Chile's largest private institutions—Banco Santander and Banco Santiago (which merged in 2002 and are owned by Spain's Santander Central Hispano) and Banco de Chile—have made remarkable gains through innovative branch formats, extensive outsourcing, and lean operating processes. The banks have radically transformed their traditional branch network to address the lower-income market. For basic transactions, they use *Servipag*—a bill-payment network that came into existence partly as a response to a Chilean law obliging banks to provide clients and non-clients alike with services such as utility-bill payments, tax collection, and check cashing. By delegating these payments to a specialist network with spartan kiosks and basement offices staffed by clerks who lack full banking qualifications, financial institutions have reduced their personnel and infrastructure costs. More than 20 percent of all monetary

⁴⁰ "What Works: Akashganga's IT Tools For the Indian Dairy Industry" World Resources Institute Case Study (2003), http://www.digitaldividend.org/case/case_akashganga.htm

⁴¹ "Consolidation in outsourcing may hit Indian cos: Gartner," Business Line, July 17, 2003: <http://www.thehindubusinessline.com/bline/2003/07/17/stories/2003071701600700.htm>

⁴² See Scott Beardsley et al, "The Business Dimension – ICT: A Critical Enabler of Managerial Innovation," Chapter 4 in *GITR:2003*.

transactions once handled by branch tellers now go through this external channel, at half the previous expense.⁴³

Government Agency Reform. Government ministries frequently embrace the cause of ICT modernization for all the right reasons—but often without acknowledging the full extent of the changes required to implement it. Enhancing the performance of government agencies is most often interpreted to mean increasing the internal efficiency of the agencies themselves through the wider use of email, spreadsheets and databases. However, it is particularly useful to think of this process as analogous to the transformation of “old business” enterprises just discussed.

At the same time, it is important in devising appropriate strategies for e-government in developing countries that the appeal of improved service delivery not get ahead of the goal of improved internal performance. ICT initiatives for government cannot be limited, however, to the training of civil servants on computer skills. Most of these programs unfortunately do not seem to go beyond the rudiments of basic software and email. Valuable as these skills are, without broader revision in the way their organizations function, most of these newly-trained officials will return to jobs in which software applications, database management and even reliable email connectivity may be problematic at best. Even if they do become conversant in ICT lingo and systems, the task of implementing many of the programs and projects envisioned in a national ICT strategy go well beyond the skills of technology manipulation. Indeed, one of the great shortfalls in government performance—and therefore one of the great opportunities in ICT for development—relates to the broader skills of project management, financial budgeting & accounting and human resource development.⁴⁴

- ***Integrating Multinational Collaborators***

Despite their critical role in facilitating the application of ICTs to development problems, the role and contributions of enterprises outside of national boundaries are seldom directly incorporated into national strategies. While international organizations, multilateral and bilateral donors, multinational corporations and NGO’s may play important, even indispensable roles in national development programs, most resist long-term commitments that reduce their independence or otherwise link them with domestic political agendas. Often they also insist on special relationships or public profiles that distinguish their involvement from other outside participants.

For their part, national leaders are often reluctant to specify roles for outside entities that might suggest dependencies or otherwise add to the powerful leverage already exerted by global enterprises. As a result, while outsiders are eager to give advice or offer criticism of national strategies, they seldom participate as effective collaborators in the formulation of national initiatives. The typical arrangement is for government ministries to establish “advisory councils” that include representatives of outside organizations who meet periodically for brief and general discussion but seldom lend more than the patina of expert advice.

International Organization & Donor Collaboration. Poor countries that rely heavily on international organizations and outside donors confront a particular challenge in formulating workable national ICT strategies. Both multilateral and bilateral donors must be concerned not only to assure that their resources and expertise make positive contributions to national development. They also need to be able to demonstrate and defend those contributions to financial supporters. Further, because the priorities and preferred approaches tend to shift over time with changes in leadership or in the layers of political and parliamentary supervision (as well as the changes in “fashion” among development strategists), there can sometimes be a tentative and fitful quality to the behavior of donor agencies. One practical consequence is

⁴³ “Chile’s lesson in lean banking”: Tomás Elewaut, Patricia Lindenboim, and Damián I. Scokin, *The McKinsey Quarterly*, 2003 Number 3 <http://www.mckinseyquarterly.com/links/7695>

⁴⁴ In recognition of this need for management and administrative skills, New York University’s Wagner School of Public Service under the leadership of Professor Dennis Smith, is developing a relationship with the faculty of Eduardo Mondlane University, looking toward collaboration in training the next generation of managers in Mozambique. In furtherance of this relationship, the Markle Foundation sponsored a graduate student project in early 2003 to identify training requirements for ICT applications in the health sector: “Building Management Capacity and Human Resources Development for the Health Sector in Mozambique”.

that few agencies are willing to assume subordinate roles or commit themselves to long-term support. But another consequence is that “strategies” formulated by national governments are often more akin to “donor catalogues” of programs and projects tailored to fit into generic parameters or otherwise designed to attract financial support rather than integrated combinations of initiatives.

MNCs & New Business Models. Multinational corporations must also be able to demonstrate the profit potential of undertakings to their shareholders. Except for those whose interest in the developing world relates to extractive industries rather than human capital, MNCs generally avoid markets where the risks are not commensurate with the returns. However, some of the more promising opportunities by which ICTs facilitate the interest of MNCs in developing countries concern the “return” side of the equation. Networking and computing technologies have the potential to shift the economics of a business case to take advantage of customer scale and geographic scope. One such effort to initiate a shift in perspective on relative returns is illustrated by the work of Allan Hammond of the World Resources Institute. In a report co-sponsored by the Markle Foundation and the World Resources Institute and published by the Harvard Business Review, Hammond and C.K. Prahalad, Professor of Business at the University of Michigan, focus on innovative business models -- many of them made possible by digital technologies-- and detail the social benefits of bringing poor communities into the market by providing them with efficient and affordable access to basic goods and services.⁴⁵

HIGHLIGHT: Allen Hammond/World Resources Institute:

Identifying and promoting new markets and new business models for small & large enterprises

Allen Hammond is the Vice President for Innovation and Director of the Digital Dividend Project of the World Resources Institute. The World Resources Institute has undertaken a private sector strategy with Markle support. The strategy seeks to turn the digital divide into a digital opportunity by catalyzing private sector engagement in ICT for development and facilitating entrepreneurial enterprises, business approaches, and market-oriented solutions. The activities have included:

- Digital Dividend Clearinghouse, an on-line surveillance system to track bottom-up, village-level ICT for development projects in developing countries; contains more than 900 projects;
- Documenting innovative approaches through business model case studies of entrepreneurial enterprises using ICT tools to stimulate productivity, market transformation, and development, in partnership with leading business schools;
- “Creating Digital Dividends” Conference, in Seattle in November 2000, bringing together major digital companies, entrepreneurs from developing countries, development agencies and foundations, and government officials to explore private sector solutions;
- Private sector engagement, by working with a number of major companies to help them develop ICT-driven business models that serve poor communities, and through analyses and articles (“Serving the World’s Poor, Profitably,” *Harvard Business Review*, September, 2002) based on the business model case studies.
- Participation in the DOT Force and UNICT Task Force Working Group #6 on Enterprise, leading to creation of a Fund for enterprise by the DOT Force and an HP-convened Micro-Development Finance Group of microfinance institutions under the auspices of the Task Force.

Conclusions

- The conference on “Creating Digital Dividends” demonstrated corporate interest in the potential for finding business solutions to close the digital divide.
- WRI’s *Digital Dividend Clearinghouse* is demonstrating and tracking very rapid innovation in ICT for development among NGOs and entrepreneurs serving poor communities.
- By documenting innovations with scalable, replicable business models, WRI’s work suggests the potential for business drivers and hence for private sector roles in ICT for development in poor communities.

⁴⁵ Prahalad, C.K. and Hammond, Allen. *What Works: Serving the Poor, Profitably*. Markle Foundation, September 2002. http://www.markle.org/news/What_works_Servingthepoorprofitably.pdf

- Both analytical efforts (published in the Harvard Business Review and elsewhere) and engagements with several large corporations suggest that MNCs have an opportunity both to expand their markets and help accelerate the pace of development.
- Work with an HP-led group of microfinance organizations under the auspices of the UNICT taskforce working group on entrepreneurship is demonstrating the potential to use end-to-end ICT solutions to help microfinance become more efficient and to reach scale.

NGO's & New Tools. A further area of emphasis, and opportunity, is the better integration in national strategies of the contributions of Non-Governmental Organizations (NGO's). The enormous proliferation and substantially increased influence of NGO's is in some respects a phenomenon made possible by ICTs. The ability of email alone to connect far-flung members and attract financial and political support is being increasingly supplemented by the use of Web-based audio and video-conferencing, mobile telephones and Internet access.

Markle has supported the largest umbrella organization of U.S.-based NGO's, InterAction, in testing new ways of utilizing ICTs to facilitate both its own agenda and those of its member organizations. For example, the InterAction ICT Speaker Series, sponsored by USAID DOT-COM and Markle, explores and shares information about innovative and effective uses of technology in development efforts and challenges to effective implementation.⁴⁶

HIGHLIGHT: InterAction (American Council for Voluntary International Action):
Supporting NGO's applications of ICT to enhance core functions

InterAction is the largest alliance of US-based international development and humanitarian nongovernmental organizations. With more than 160 members operating in every developing country, its members work to overcome poverty, exclusion and suffering by advocating social justice and basic dignity for all.

InterAction's ICT Initiative, supported by the Markle Foundation, seeks to enhance members' use of ICTs as tools to increase their impact in relief and development efforts--both internally and on the ground. Specifically, it aims to:

- Encourage and increase information sharing, innovation, exchange of ideas, support and effective ICT use in member organizations
- Facilitate collaboration and engage in cross-sectoral networking opportunities.
- Define a vision of NGO use of technology for development and bring clarity, understanding and appreciation of the role and comparative advantage of NGOs in ICT-D.
- Improve InterAction's use of ICT to better communicate with and serve its membership.

Tools that help NGOs function more efficiently:

- **Advocacy Tools:** Connecting with current and potential supporters, disseminating their messages , targeting audiences and tracking the effectiveness of their efforts.
- **Outreach Tools:** Simplifying current systems, deploying message marketing tools such as newsletters with automated, database-driven content and click-through tracking, and listserv and web-based communication tools that will enable them to communicate and archive that communication.
- **Content Management Systems:** Managing content, and tracking usage of those systems.
- **Intranets and Extranets:** Sharing company information internally and with local development partners.

Interaction Member ICT application examples from the field:

- **GeekCorps** By working with staff members of Rwandan software company AlphaSoft, GeekCorps led a project to build a database to track local genocide trials. This database is now central to the court docket system used throughout the country for over 100,000 accused Rwandans standing trial.
www.geekcorps.org

⁴⁶ Topics have included: "Connectivity in Low Resource Environments," "e-Riding and the International NGO Community: International Tech Support Challenges, Issues and Solutions," and "The Impact of ICTs on Democratization and Good Governance." http://www.dot-com-alliance.org/SS2_connectivity.htm#speakers

- **Academy for Educational Development LearnLink's *Proyecto Enlace Quiche*** works in the rural Department of El Quiche, Guatemala to prepare teachers to teach in the local languages of K'iche' and Ixil. Using ICTs such as computer centers, web development software and audio and video creation tools, this program worked with local government, community and school administration support to develop a series of multimedia tools to better prepare bilingual teachers in the Department of El Quiche. To overcome the normally high costs of printing and disseminating teaching materials, *Enlace Quiche* transferred several manuals to CD ROMs which offer an excellent means of disseminating information at low cost (approximately \$1 per CD in rural Guatemala). Furthermore, Enlace Quiche allows anyone to copy and distribute its materials for free.

6. Content & Applications: Customizing Solutions

India is a nation so vast, diverse and populous that all generalizations about the country are inherently suspect. As the largest democracy in the world, comprised of regions, provinces and even some municipalities that dwarf most countries, India faces formidable challenges in developing and implementing cohesive national strategies for change. Until the mid-1990's, it maintained a largely protected and insular market in computing and telecommunications, looking to its own vast human resource pool, industrial conglomerates and mammoth government agencies to apply them effectively. Powerful government bureaucrats and unionized workers strenuously and successfully resisted reforms in telecommunications, trade and foreign investment until well into the 1990's, when a wave of new economic policies began the larger transformation of the country. Yet, in part because of the tight control of the Indian central government bureaucracy, much of the innovation and dynamism that has since become evident went on "under the radar" of federal antennae, in the provinces, municipalities and villages. India is still in need of major reform in its electoral, administrative and financial institutions, but it has become at the local level a vast laboratory of ICT experimentation for development and commercialization.

Content and applications are the valuable currency of the information revolution, the productive capabilities around which all other factors depend. Information has utility only insofar as it is captured, packaged, communicated and utilized—and it is the realm of content and applications that defines this value. Moving from an identification of the enterprises and entrepreneurs whose productivity we seek to enhance, national strategies should facilitate their acquisition of the capabilities that would improve their performance. Barriers of language, shortcomings in computer skills, policy restrictions on access or use, lack of available capacity for transmission—all may limit the appropriate choices in particular settings or highlight the major deficiencies that impede effective use of ICTs. All too often a given website, software application or database is presumed to have significant value in one locale because it is alleged to have had that value somewhere else. But in fields as complex and multi-faceted as education, healthcare, and governance, to name the most prominent ICT arenas, a “top down” view of ICT value must be tested against a “bottom up” confirmation that the results intended—in training teachers, informing healthcare workers, registering voters, etc.—can be achieved in the time and place targeted.

Consequently, proposing appropriate content and applications requires local knowledge and understanding of what content and applications are realistically available, as well as what is possible in terms of all five factors noted above. The vast literature of reports, case studies and proposals surrounding ICT for development is overwhelmingly couched as examples represented as exemplars, or “best practices.” Experiments and pilots from one location are often generalized as solutions for others—in many cases even before the experience has been fully completed and assessed in its own locale. Unfortunately, however, much of what constitutes “best practice” in the wealthier, better educated countries depends in significant part on the presence of an environment of relative affluence in which the needed factors are taken for granted, but nonetheless essential. Reliable electricity, technology-literate officials, and budgetary consistency are some of the requirements not always available.

Before addressing some of the particular opportunities that consistently seem promising, we should mention two large issues that underlie much of the discussion of content and applications. The first issue is language—and the *English language* in particular. In countries where English is not the main tongue, or where it is spoken only by the most educated and affluent, the issue of whether to make content available in other languages can be a major strategic determinant of the country's ICT for development prospects in general. In South Africa, for example, where there are eleven official languages in the country as a whole, and at least three candidates for priority in most provinces, the additional expense and complication of assuring that school curricula, health databases, or e-Government portals are available in multiple languages pose special challenges to the viability of the underlying applications. While there is no generic answer appropriate to this issue, and different countries will place different priorities on the importance of language diversity and indigenous content, it is nevertheless important to address the issue as a recurrent question for ICT applications. On the one hand, choice of language is not an, either/or priority that should apply to all applications in a given country. In some cases, such as disease tracking, the

imperative of a common national format to capture information may require that a single language—most likely English to facilitate external communication of the data as well—be the choice, even if health information for patients is useful only if provided in local languages. Cost/benefit comparisons will be useful in most settings—such as comparing the cost of a national portal in two or three languages that is accessible to the bulk of the population versus one in five or more languages.

However, the role of English also highlights a key consideration in the “social transformation” point made earlier. If the objective of a national ICT for development strategy is to position a country for competitive success in a global economy or to achieve closer national integration among diverse populations, national leaders must also consider what language choices are most appropriate to achieve that purpose. While some local political figures may insist on “official” recognition of co-equal status for certain indigenous tongues, it is also often the case that many citizens recognize the value for their businesses and their children’s future in promoting the use of a more broadly applicable language, such as English. In Bolivia, for example, it was notable that local parents organizations even in rural areas were supportive of Internet access initiatives because they felt it would give their children the opportunity to learn Spanish and English, and thereby have better economic and cultural prospects for the future.

The second major controversy surrounds the issue of “*Open Source*” software, and the extent to which it should be a strategic objective in national ICT plans to expand not only the availability but the adoption of non-proprietary software. While the cost of the Microsoft operating system and its applications suite is frequently cited as the principal problem, the issues surrounding “open source” are far more complex than those associated with initial cost or with Microsoft’s or any other company’s operating system. Adoption of “open source” standards, particularly when imposed by top down decree, can have costs and challenges themselves that are not always weighed adequately in such decisions. Advocates of open source platforms place great weight on the value of encouraging indigenous software industries and local programming skills that assure participation in the global software industry.⁴⁷ Yet the realism of counting on this local development to offset other considerations depends crucially on what Bridges.org has called the “enabling environment”. This set of factors includes the following:

- Technical Support—the availability of skilled people just to keep computers and software functional.
- Human Capacity—the availability of people who can write and design software to take advantage of Open Source opportunities.
- Cost—the “total cost of ownership” or TCO calculations, which are often unique to local conditions.
- Economic Implications—the evolution of business models in the software industry that shift the larger balance between intellectual property rights and a value-added services approach.
- Technical Considerations—Ease of use, reliability, value of standardization and security.⁴⁸

The enabling environment will vary widely depending on the nature of the entities that will be using the software. For example, rural tele-centers will not have the options open to more urban or university centered institutions, and smaller countries cannot count on being able to achieve the scale necessary to compete effectively in a global market. On this issue, as on so many others in the ICT for development agenda, global generalizations can obscure local realities and realistic opportunities.

- ***Enhancing Local Performance***

<p><i>Business Creation</i> In country after country, one of the greatest barriers to new business formation and innovation is the bureaucratic maze of reviews, permits, fees and license approvals that confronts</p>	<p>The World Bank has developed a table comparing the entry regulations and procedures regarding the creation of a business in order to highlight these issues.⁴⁹ For example, in Australia it takes two procedures, six days and two percent of average annual income to legally start a new company. In contrast, in Bolivia it takes 18 procedures, 77 business days, and 164% of average</p>
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⁴⁷ See, e.g., Kramer, “Action Agenda: The Case for an Open Source Operating Platform for Web Systems,” All Africa Global Media, (July 2002). <http://xml-commu.org>

⁴⁸ See forthcoming study by Bridges.org. http://www.bridges.org/software_comparison

⁴⁹ <http://rru.worldbank.org/doingbusiness/>

<p>any prospective entrepreneur.</p>	<p>annual income to legally start a business. Common obstacles to formal business formation include:</p> <ul style="list-style-type: none"> • Contracts with suppliers and buyers are rarely enforceable by court systems discouraging financiers. • Expansion of business activity often depends on obtaining a number of approvals, licenses, and permits. • State-owned banks frequently give credit to unprofitable enterprises at the direction of politicians, eliminating opportunities for more efficient and value producing enterprises.⁵⁰ <p>A key opportunity to use ICTs to stimulate small business, therefore, is to streamline the applications process through centralized systems and databases that integrate government requirements and reduce processing and review intervals, as well as to reduce regulation and improve the legal system for dispute resolution.</p>
<p>Land Title Registry Another application that appeals strongly to governments, but is proving to be far more difficult to execute in the field, is the clarification and database capture of land tenure, leading eventually to automated land registries. As Hernando de Soto argues in his widely read book, <i>The Mystery of Capital</i>,⁵¹ the economies of many developing countries are severely hampered by the uncertainty surrounding land ownership. People without reliable claim to land cannot borrow against it to fund other business needs. Computerization of land registries can reduce and also eliminate the incidence of multiple allocations of land, inappropriate land use, and corruption in current land allocation systems. Difficult as it may be to translate the informal systems of allocation to more formal status to facilitate the liquidity of debt, many countries have embarked on this course. The government of Italy has made it a key component of their e-government advice to developing</p>	<p><i>Computerization of Land Records Scheme (CLRS) in India</i> has enabled quicker storing, processing and retrieving of information and reduction in corruption. Decentralized planning and administration brought about by the 73rd Amendment to the Constitution of India made it more necessary to collect timely and accurate data on land use for a national planning process. Central to the project is the computerized system of producing a farmer's Record of Rights Tenancy & Crops (RTC) – an all-important identity paper needed by the farmer to obtain bank loans (for diverse activities ranging from children's education to buying seeds), settle land disputes and even use as collateral for bail. It is no less than a social ID.⁵²</p> <p>The objectives of the Computerization of Land Records Scheme included:</p> <ul style="list-style-type: none"> • Facilitation and maintenance of changes that occur in land database due to availability of irrigation/natural calamities/consolidation or on account of legal changes. • Comprehensive scrutiny to make land records tamper-proof. • Facilitation of detailed planning for infrastructure as well as environment development. • Preparation of accurate annual set of records for recording revenue collection details • Provision of database for agricultural census <p>Results in several states (Karnataka, Himachal Pradesh, and Haryana) have included</p> <ul style="list-style-type: none"> • Computerization of the state's 20 million rural land records, involving some 6.7 million farmers, • Elimination of lengthy process of pursuing village revenue accountants who are often corrupt, through an accountability mechanism using fingerprint identification software, • Reduction of land demarcation request from months or years

⁵⁰ http://rru.worldbank.org/HotTopics/Hot_Topics_Djankov.asp

⁵¹ Hernando de Soto, *Mystery of Capital: Why Capitalism Triumphs in the West & Fails Everywhere Else* (2000). <http://www.ild.org.pe/index.html>.

⁵² "India's Move To E-Governance Exposes Ancient System Flaws," Panos Features, <http://www.panos.org.uk/newsfeatures/featuredetails.asp?id=1127>

countries.	to less than a week, and <ul style="list-style-type: none"> • Availability of land records being issued to the public on demand.⁵³
<p>Micro-Finance Because most economic activity in developing countries is generated by small business, access to financing, even in very small amounts, can have outsized impacts on economic development and job creation. Yet large banks have been slow to provide the necessary capital for these customers due to the costs of maintaining physical bank locations, high transaction costs and low profit margins on small loans. However, ICTs are helping to lower the overhead costs of providing access to required credit by allowing better communications with rural areas and easier tracking and monitoring through database applications and customer information. Even in poorer, rural areas, versions of smart cards and ATMs add further dimensions to the systems. Although the majority of microfinance institutions are donor funded (of the more than 7,000 MFIs worldwide, less than 100 are self-sustaining), new systems and common software platforms are attracting a set of multinational players and the ever wider availability of access.</p>	<p>PRODEM FFP, a financial institution in Bolivia specializing in rural and urban microfinance has developed smart ATMs. The ATMs are designed and assembled locally, accessed with a thumbprint-encoded smart card, and allow customers to interact with it in any of three local languages and via a touch screen. They thus provide access to funds 24 hours a day, provide secure identity without the need to memorize a PIN, and overcome the literacy barrier, enabling PRODEM to serve a wider range of customers efficiently. BASIX, India's largest micro-finance organization, is experimenting with handheld terminals and smart card technology to automate the loan process and keep track of repayments, in order to reduce labor and cash handling costs. BASIX's Mobile Portfolio Management System also helps to minimize accounting errors. Through its Indirect Channels Partnership Model, ICICI, the second largest bank in India, is partnering with NGOs and private companies who are building rural Internet connected kiosks. ICICI envisions setting up ATMs in these kiosks once regulatory hurdles are cleared. Currently being developed at the IIT in Madras, the ATM will be a stripped-down version of a conventional ATM, specifically designed for the rural markets. With a simple interface and multiple language capabilities, the unit is expected to cost only \$600 USD, which will make them far cheaper than conventional ATMs that can cost up to \$16,000 USD.⁵⁴</p>

- **Scaling National Programs in Key Sectors**

In distinction from local capabilities that must generally be customized to the situation, opportunities at the national level can focus on those functions that require or benefit from the centralization, scale and relative uniformity that a national approach supports. (Or, as UNDP's Pierre Dandjinou puts it even more succinctly: "Think Big, Start Small and Scale Fast."⁵⁵) The most successful kinds of applications include the following:

Education. With ICT applications in education, a key distinction needs to be recognized between applications that enhance the effectiveness of classroom teachers, and uses of ICTs that try to substitute completely for in-person instruction. Except for the more routine functions of transmitting content that is

⁵³ "Information Age Government: Success Stories of Online Land Records & Revenue governance from India, by Dr. KM Baharul Islam, for UNECA, http://www.uneca.org/codi/Documents/PDF/Information_Age_Government.pdf

⁵⁴ http://www.digitaldividend.org/pubs/pubs_05_overview_microfinance.htm

⁵⁵ Dandjinou, "The Status of e-Strategies in Africa (Revisiting e-Strategies), *Conference on e-Strategies for Development in Africa*, Maputo, Mozambique, 1-4 September 2003.

less dependent on human contact for acquisition, the most powerful applications in education seem to be those directed to training and supporting teachers (and even the administrators of schools) rather than the students. The following examples are indicative:

<p>Curriculum Development & Distribution Particularly in countries such as South Africa and Jordan, where the reform of the education curriculum is part of a broader political and social reform program, the need to standardize both curriculum content and delivery argues for a centralized design and roll-out. Whether this is achieved through consistent on-line access or by means of distribution through CD ROMs, the application of ICTs has been central to the ambition of broad national reform.</p>	<p>Jordan Education Initiative Under the auspices of the World Economic Forum, Jordan has been selected to pilot an e-education initiative involving leaders from telecom and IT industries and government ministries, providing "a practical model of public-private partnership in the area of ICT that can ignite the engines of growth for future generations in Jordan and the region," according to His Majesty King Abdullah II of Jordan. The Initiative supports the Jordanian government's vision of building a knowledge economy. Ninety-six "Discovery Schools" have been selected to serve as a test bed of how ICT can enable new systems to be used and benefit schools and their pupils. The pilot will serve to later transform all 3,000 Jordanian schools, and the scheme will help a five-year educational reform officially launched in July '03 and hoped to modernize curricula and teaching methods, putting more emphasis on critical skills, innovative thinking, self-discovery and self-determination. Though focused on the advancement of learning in Jordan, the plan also provides the opportunity for the sustained development of the local information technology industry through infrastructure and e-content development activity. The Jordan Education Initiative will be a key catalyst for social and economic development not just in Jordan but eventually across the region.⁵⁶</p>
<p>Teacher Training While computer training can be useful in itself, greater educational impact seems to be achieved by curricula that assist classroom teachers in understanding how computers and communications can be used by teachers to better convey the content of their more traditional courses. The NGO <i>World Links</i> has had particular success in amplifying the effectiveness and creativity of teachers through a well-developed set of tools and training programs.</p>	<p>The World Bank initiated the <i>World Links</i> program in 1997 with the principal capacity-building objective to provide developing country schools and ministries of education with sustainable solutions for mobilizing the necessary technologies, skills, and educational resources to prepare students and teachers to enter the networked world. Spun off in 1999 as an independent non-profit organization, World Links has expanded to over 25 developing countries in Africa, Asia, the Middle East, and Latin America. Drawing lessons from education programs throughout the world, WorldLinks realized the lack of support for teachers professional development in best integrating technology into their teaching. World Links has focused its training on helping teachers who are the core of any successful program to use technology as a catalyst to transform their classrooms into interactive, inquisitive learning environments. In face-to-face workshops, instructors and youth are exposed to educational resources and exchanges on the Internet, and to the power of "student-to-student" collaboration. Teachers learn how to fully integrate the use of technology into their daily lesson plans, including how to create new educational content on the Internet which is linked to the curriculum. The structure of the World Links education and training component consists of: (i) educational and training materials, including print, CD-ROMs, web sites and multimedia distance learning methodologies; (ii) face-to-face training of trainers workshops; (iii) on-going local technical and pedagogical support; and (iv) on-line support.</p> <p>Impacts: More than 130,000 teachers world-wide have been trained by World Links in the use of the Internet as a pedagogical tool. The</p>

⁵⁶ The Jordan Education Initiative is a public-private partnership between the members of the World Economic Forum and the Government of Jordan, and the following organizations are engaged: BlueArc Corporation; CISCO Systems; Commercial Ware; Computer Associates; Connectivity Partners International; Corning Cable Systems; Cryptomatic A/S; Dell; Digital Envoy Inc.; HP; IBM; Intel; International Technologies; Microsoft; the Ministry of Education of Jordan; the Ministry of Information and Communications Technology of Jordan; the Ministry of Planning of Jordan; NIIT; Pearson; Siemens; Skillsoft; Sun Microsystems; and World Links.

	effectiveness of these professional development materials has been proven by external evaluation conducted by SRI International (formerly Stanford Research Institute), which included quantitative and qualitative assessment of both students and teachers educational performance. ⁵⁷
Distance Learning	Despite the enormous value of remote learning approaches at the university and advanced levels, the success of distance learning at the elementary and secondary levels also appears to be where broadcast capabilities are integrated with live classroom teachers rather than used as surrogates for the presentation of teachers. For this purpose, non-live productions on videocassette or CD ROM often provide much lower cost delivery and even increase teaching flexibility—a case of “lower tech” approaches producing higher returns.

Healthcare. Similarly, the technology opportunities for improving healthcare systems receive high priority in most national ICT for development plans. Several examples demonstrate the particular utility of applications that improve the accuracy and accessibility of patient information, the cost and reliability of patient monitoring, and the dissemination of preventive health information.

Disease tracking	<i>Voxiva</i> , a voice & data solutions provider dedicated to public health (<i>see below</i>), uses mobile phones and voice mailbox platforms to organize comprehensive systems for the collection and dissemination of patient data in Peru and other locations. Healthcare workers input disease tracking information into interactive voice response systems which aggregate data, allowing for further analysis and monitoring of disease outbreaks.
Drug treatment	<i>SMS technology for TB treatment</i> In South Africa, a pilot project in the coastal city of Cape Town uses the text message service available on most cell phones to remind patients to take their medication, saving the over-stretched public health services and patients time and money. Cape Town has one of the world's highest incidences of TB, largely due to socio-economic and climatic factors. TB patients must strictly follow a difficult drug regime -- four tablets five times a week for six months -- and they often forget to take their medication. Non-compliance with the drug treatment has exacerbated the high occurrence of TB and has created difficulties for the local, overburdened healthcare service. Non-compliance causes the TB virus to become increasingly drug resistant. Healthcare professional were skeptical whether the uptake of cell phone technology was high enough to justify the project. However, 50% of people in the Cape Peninsula had access to cell phones. At the clinic where the pilot study was conducted, 71% of TB patients had access to a cell phone. The doctor enters the names of TB patients onto a database. Every half an hour his computer server reads the database and sends personalized messages to the patients, reminding them to take their medication. The technology that he uses to send out the messages is extremely low-cost and robust: an open source software operating system, web server, mail transport agent, applications, and a database. Currently the doctor charges the City of Cape Town R11.80 per patient per month to send out SMS messages. Initially the SMS message sent to patients read: "Take your Rifafour now." When patients complained about the boring message, the doctor sent them a variety of alerts, including jokes and lifestyle tips with the result that he now has as database of over 800 messages that he changes on a daily basis. Of the 138 patients involved in the pilot, there was only one treatment failure. ⁵⁸
Tele-Medicine As Internet access makes webcasting & videoconfer-	<i>Operation Village Health</i> A telemedicine application provided through a partnership by Partners Telemedicine, Sihanouk Hospital, and American Assistance for Cambodia/Japan Relief of Cambodia, called Operation Village Health, supported by the Markle Foundation, is serving individual patients

⁵⁷ <http://www.world-links.org/english/html/training.html>

⁵⁸ http://www.bridges.org/iicd_casestudies/compliance/

encing more cost-effective and accessible, applications of distance medicine become more promising.	seeking medical advice and broadening the availability of information on public health to improve healthy practices through education. Patients from these rural villages receive consultative care remotely from top specialists at Massachusetts General Hospital and Brigham and Women's Hospital. A mobile nurse takes a medical history and physical examination and sends the information with digital photographs via email to Partners Telemedicine for physician consultation. Replies are returned within 24 hours of receipt, which the nurse uses to decide whether to treat patients in the village or transfer them to an area hospital. Operation Village Health has transformed the lives of residents in the remote regions of Cambodia that have been minimally exposed to organized healthcare. ⁵⁹
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HIGHLIGHT: Voxiva

Solving development problems with creative solutions employing accessible technologies.

Voxiva is a voice & data solutions provider dedicated to public health. (The Markle Foundation acted as incubator and initial capital investor in the company.) Voxiva develops easy-to-use phone and web-based solutions to address a broad range of communication and information collection issues. Including disease surveillance and adverse event reporting, its applications allow public health agencies to collect critical data from and communicate with front-line health workers and patients in real-time allowing them to respond immediately. Using existing telephone infrastructure, as well as the Internet and wireless data devices, Voxiva allows its customers to expand beyond the reach of the Internet.

Voxiva activities include:

- Deploying a disease surveillance solution for the Ministry of Health in Peru under a grant from the World Bank. It allows frontline health workers to interact with regional, national and other health providers from any telephone or Internet access device such as a PC, PDA or web-enabled mobile phone. Once logged-in to a Voxiva server, they submit individual case histories and other data through tailored menus; retrieve information in the form of targeted data or macro trend analysis; visualize the data with integrated GIS mapping applications; and communicate directly with central authorities or peers throughout the network.
- USAID contract to deploy national disease surveillance system in Iraq.
- Washington DC and San Diego Health Department contracts to monitor disease among school children.
- Voxiva's systems have also been deployed for US federal agencies including the Food and Drug Administration (FDA) and the Department of Defense (DoD).

Lessons:

- Start with the human problems, design solutions, adapt the technology (not the reverse order.)
- Technology as one dimension of the solution, not the magic bullet
- Behavioral and organizational changes are the harder parts
- Incorporate technology into the workflow process of the project itself to improve efficiency
- Facilitate real-time uses for information, including monitoring and accountability
- Minimize data collection to essential triggers; don't overburden users by collecting unnecessary data.
- Look to technology to provide one standard integrated platform across silos; eg. develop one platform incrementally for TB, malaria and HIV/AIDS surveillance rather than replicate paper systems that require healthcare workers to input to three different systems.

e-Government. While the potential applications of ICT to government are extensive and are becoming familiar features of government performance in most developed countries,⁶⁰ particular value to developing countries seems to result from initiatives in two key areas: procurement and customs.

<i>E-Procurement</i> One of the largest contributors to	<i>ComprasNet</i> in Brazil is a joint consortium among global systems integrator, Unisys; a local software provider, Vesta
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⁵⁹ <http://www.telemedicine.partners.org/>

⁶⁰ See, e.g., "Roadmap for e-Government in the Developing World: Ten Questions e-Government Leaders Should Ask Themselves," *Report of the Working Group of the Pacific Council on International Policy* (April 2002).

<p>national corruption, according to Transparency International, is the inefficiency and opaqueness of the process of major government purchases.⁶¹ ICT systems provide savings amounting to 10-25% through reduced administrative costs, more efficient competition, and transparency, such as public access to records on government spending. E-procurement initiatives also tend to bolster the private sector. Government is often the biggest customer in developing nations, and therefore the process of government procurement represents much of gross domestic product (GDP).</p>	<p>Technologies; and government agency, Serpro, which manages production and operations. In Chile, local application service provider, Sonda, operates Chilecompra on behalf of the government. <i>Microsoft and Compaq</i> contributed to the site's development thus making a significant start to a local ICT service industry. Romania has an aggressive IT government procurement program requiring by law many government agencies to purchase goods or services through computerized tenders. Enforcing online contracting only that forced some firms who wanted to sell to the government to augment their IT staff. Romania is also trying to encourage the IT sector by letting programmers forgo income tax payments.⁶²</p>
<p>Customs Bureaucratic export and import procedures resulting in lengthy customs clearance duration slows the growth of many developing economies. Such inefficiencies nullify the benefits of speed in transactions offered by e-commerce.</p>	<p>Using an "off-the-shelf" customs application package, the <i>Philippines Customs Bureau</i> has developed an on-line system to process clearance of imports, payment of duty, and delivery of release orders for shipments to leave the docks. Funded primarily by the World Bank, the new on-line system has lessened the cost of trade for businesses, reduced opportunities for fraud, and helped the Bureau to maximize revenue collection.⁶³ The World Customs Organization provides extensive guidelines on the application of ICT to customs modernization.⁶⁴</p>
<p>Life Events Documentation In terms of services citizens need from their government, the most critical are those official documents that legitimize birth, marriage and death.</p>	<p>The Sustainable Access in Rural India (SARI) project aims to show the economic self-sustainability of rural communications and Internet and, ultimately, to demonstrate the social and economic development impacts of the network. SARI is a project of IIT, Madras; the Berkman Center for Internet and Society, Harvard University; MIT's Program on Internet and Telecoms Convergence; and the I-Gyan Foundation. N-logue Communications Pvt. Ltd. is the private sector implementing partner. Under the pilot phase of the SARI project, Internet access and purpose-built applications and content are being provided to over 80 sites in 50 villages in the Madurai District of the southeastern Indian State of Tamil Nadu. These initial tele-kiosks were installed in late 2001 and early services include communications, education and training, tele-agriculture, tele-medicine, entertainment, and e-government. Actively promoted by the District Administration and State government, villagers can now send online applications for pensions, birth, death, Below Poverty Line (BPL) and encumbrance certificates; register complaints of broken street lights and drinking water problems; and send petitions to the government politicians and bureaucrats – allowing interaction at five different levels of government. In Tamil Nadu, the cost to a villager when applying for a birth certificate online drops</p>

⁶¹ Transparency International <http://www.transparency.org/sourcebook/02.html>.

⁶² Romania IT, NPR Morning Edition, Emily Harris

⁶³ <http://www1.worldbank.org/publicsector/egov/philippinecustomscs.htm>

⁶⁴ http://www.wcoomd.org/ie/En/Topics_Issues/topics_issues.html

⁶⁵ "Sustainable Access in Rural India: Preliminary Results and Early Successes" Michael L. Best, Corresponding author: MIT, E15-391, Cambridge, MA 02139. mikeb@media.mit.edu.

	from the usual \$6 to \$2. Over 600 such applications were sent within 10 months ⁶⁵
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- ***Building National Portals and Global Networks***

ICT applications to involve outsiders more effectively in national activities center on the development of various networking approaches to promote collaboration across countries and on a global basis.

<p>National Portals National Portals are one of the most promising applications of Web-based capabilities to enhance integration and collaboration across the development community. Portals provide the opportunity to aggregate and integrate databases to centralize information about all development programs and projects in a particular developing country. Care must be taken to assure that they are developed and ultimately managed by local nationals to assure local ownership and avoid undermining local efforts to create and aggregate content.</p>	<p><u><i>Development Gateway(s)</i></u>. The potential of national networking is perhaps best illustrated in the Development Gateway initiative, recently been spun off from the World Bank into a separate foundation with multiple funding sources (www.dgfoundation.org). The Gateway attempts to exploit the potential of web-based information portals to tie together diverse elements and actors, building partnerships and information systems that provide access to knowledge for development. The Development Gateway deploys web portal technology and applications globally, regionally, and locally, to:</p> <ul style="list-style-type: none"> • Increase knowledge sharing; • Enable aid effectiveness; • Improve public sector transparency; and • Build local capacity to empower communities. <p>Its interactive content and resources on development include on-line interactive communities, the AiDA database of development projects, dgMarket online public tendering services, and Country Gateways in a growing number of developing nations.</p>
<p>Global Monitoring Networks ICTs also facilitate the creation of collaborative networks among NGO's and commercial companies, with or without formal government involvement, depending on the objectives. Global Forest Watch, formed during the lead-up to the World Summit on Sustainable Development, is a particular case in point.</p>	<p><i>Global Forest Watch (GFW)</i> is a consortium using ICT to promote environmental management worldwide through an affiliation of non-governmental organizations (NGOs) in 10 countries focused on illegal logging.⁶⁶ The organization accesses satellite imagery of forest areas of concern, imagery that catches illegal logging before it has devastated an area – just as rogue logging roads sprout. Satellite imagery has been a powerful force in international security since the 1950s; today it is used to monitor environmental behavior in an open network manner. GFW uses satellite imagery, but the Internet is the dissemination medium that makes this information powerful. The marketing consequences of turning a blind eye to illegal logging can be made greater than the legal/judicial exposure. A key partner to GFW is Ikea, the world's third largest wood products retailer. Ikea is using GFW maps in dealings with Russian wood product suppliers, and will refuse to do business with producers who cannot certify that they are harvesting raw materials sustainably.⁶⁷ Private sector involvement is essential: Ikea alone sells \$8.5 billion of this furniture a year, almost as much as the entire U.S. foreign assistance budget.⁶⁸</p>

⁶⁶ <http://www.globalforestwatch.org/english/about/index.htm>.

⁶⁷ See <http://mediaserver4.ikea.framfab.se/ikea/IKEA-85C42A67-87CA-4D5E-9EF5-08547D1D03E9/enviromental.pdf> for Ikea's relationship with GFW.

⁶⁸ "The Teflon Shield", Newsweek, March 12, 2001, page 26.

	From China alone, the U.S. imported nearly \$1 billion in wood furniture by 1999 (up from \$21 million in 1989). ⁶⁹ Linking buying patterns to sound environmental management through ICT has a positive development impact.
<p>Global Experts Networks Linking available expertise to potential clients for development assistance is another obvious possibility increasingly facilitated by global connectivity and Web technologies. The most ambitious effort to date in this regard would appear to be the Canada-led “e-Pol Net”.</p>	<p><i>e-Pol Net</i>. In the DOT Force Plan of Action endorsed by G8 Leaders at the 2001 Genoa Summit, a commitment was made to establish an experts network, designed to marshal global efforts in support of national e-strategies for development. Led by the Canadian government, the <i>Global ePolicy Resource Network (ePol-NET)</i>, as it is now called, will have a Network Secretariat in Ireland and a series of regional nodes to provide policy makers in developing countries with easier access to development assistance services and expertise. Products and services will be offered to individuals or institutions requiring access to information about e-strategies or support in acquiring knowledge, formulating and implementation e-strategies and policy frameworks.</p>

⁶⁹ “US Demand for Finished Wood in Growing”, *Philadelphia Inquirer*, May 26, 2001.

7. Infrastructure & Access: *Exploiting Networks*

China far outstrips the rest of the developing world in infrastructure construction during the past decade. "It is predicted that during the "10th Five-year Plan" period [2000-2005] the number of China's telephone users is going to rise at an annual average of 26 percent, of which 24 percent will be in the east, 26 percent in central China and 30 percent in the west. The number of telephone users throughout China will hit 500 million by 2005. More and more ordinary consumers will join China's mobile phone users. Mobile phone business will expand from simple call to data exchange, intermediate and advanced multi-media trade. During the "10th Five-year Plan", data and Internet users in China will increase at an annual growth rate of 70 percent. Internet users will be over 200 million by 2005. *The Peoples' Daily Online*, April 8, 2003⁷⁰

Aggregate statistics on infrastructure growth and tele-density, such as those for China, can make dramatic impressions. Indeed, in the case of China, there is no question that these massive investments in ICT have fueled China's unprecedented economic growth in the past generation. Yet, what will be important for China is not necessarily important for all developing countries. As noted in section 2 above, ICT initiatives in poor countries are often driven by the simple assumption that more infrastructure is always better—even where limited resources might be better spent on other dimensions of the development equation. Network switches, Internet routers and computer terminals have the solid aura of reality and serious purpose that provide politicians and senior executives with evidence of permanent accomplishment. But numbers can also be deceptive. The "highest tech" application is not necessarily the "highest return" approach. If development is truly about increasing the productivity of enterprises of all kinds, then the capabilities of infrastructure must relate to the needs of those who can get access to it, at a price they can afford, and for the purposes that will make them successful. The fact that a key capability can be provided by means of a certain technology does not mean that in a given national setting it will be effectively exploited or that it is even the most cost effective choice among the technologies available. The Internet, in particular, may not be the best platform for the accomplishment of a particular development application. As useful and innovative as the Web can be, the challenge of creating a sufficiently reliable, cost-effective, widely-usable application on the Net is frequently beyond the realistic capabilities of particular locales.

The test of development potential in fact has more to do with the availability of usable access. To highlight the point, Bridges.org coined the term "Real Access," encompassing the following criteria:

- Physical access – Is technology available and physically accessible?
- Appropriate Technology – What is the appropriate technology according to local conditions?
- Affordability – Is technology access affordable for people to use?
- Capacity – Do people understand how to use technology--and its *potential* uses?
- Relevant Content – Is there locally relevant content, especially in terms of language?
- Integration – Does technology burden people's lives or does it integrate into daily routines?
- Socio-cultural factors – Are people limited in their use based on gender, race or other factors?
- Trust – Do people have confidence in the technology re: privacy, security and cybercrime?
- Legal/Regulatory Framework – How do laws affect technology use and what changes are needed to foster it?
- Local Economic Environment – Is there a local economy that will sustain technology use?
- Macro-economic environment – Is national economic policy conducive to widespread use re: transparency, deregulation, investment and labour issues?
- Political Will – Is there a political will in government to do what is needed to enable the integration of technology throughout society?⁷¹

This checklist becomes an effective reality test for all proposed initiatives.

⁷⁰ For a revealing account of Internet penetration in China, see the studies directed by Guo Liang of the Chinese Academy of Social Sciences "Approaching the Internet in Chinese Small Cities," and "Surveying Internet Usage and Impact in Twelve Chinese Cities," funded by the Markle Foundation and released in October 2003, available at <http://www.markle.org/>

⁷¹ Bridges.org, "What do we mean by *Real Access* to ICT?" Presentation to Intel/UNITAR Campus on ICT, 20 August 2003.

HIGHLIGHT: Bridges.org:

Emphasizing local focus, "grass roots" engagement, multi-sectoral integration

Bridges.org is a Cape Town, South Africa based NGO whose mission is to tackle the digital divide and enable the effective use of ICT in developing countries, principally in Africa. The Markle Foundation has been one of its major supporters. Bridges works both at the national and international policy level and at ground level on project implementation and evaluation, and in partnership with governments, civil society and the private sector to bring about change. It is recognized as a leader in the field of e-readiness, has authored definitive texts on the digital divide and e-policy in Africa, and introduced the concept of "Real Access" to ICT – the factors that make it possible for people to use technology effectively to improve their lives.

Objectives:

- Contribute to the ICT policy debate at national and international levels through involvement in a variety of fora (G8 DOT Force, UN ICT Task Force, WEF Global Digital Divide Initiative, e- Africa Commission), national bodies in South Africa (Presidential National Commission on ICT, Presidential International Advisory Council), and high-level Government contacts in African countries.
- Facilitate dialogue between all stakeholders so that decisions related to ICT policy are fully understood and conflicting views are presented in a neutral environment.
- Establish best practice in and advise on ICT for Development based on local conditions.
- Provide informed and unbiased evaluation of ICT related projects and initiatives and encourage publication of lessons learned to avoid repetitive mistakes.
- Encourage a holistic approach to tackling the digital divide.
- Promote entrepreneurial activity and encourage sustainable, replicable initiatives.

Selected Outputs:

- Evaluation of the Western Cape Government's e-Government Portal and first ever Digital Divide assessment at city level conducted in Cape Town.
- Report on e-readiness across Africa for WEF and NEPAD (building on SADC report).
- Report on e-readiness in the Southern African Development Community (SADC).
- Continuing development of the real access criteria and the 7 Habits of Highly Effective ICT-Enabled Development Initiatives – freely available evaluation tools.
- Work in support of the South African President's International advisory Committee on ICT.
- Support for GDOI's e-Strategy work in South Africa and the World Resources Institute's development of an ICT project database.
- Ongoing work with civil society organizations and submissions on proposed ICT legislation in Africa.
- Evaluation of the impact of aid in the form of mentoring by established private sector companies (Accenture, KPMG) for SMMEs in Cape Town, with the aim of fostering entrepreneurship.

Lessons :

- **Increased sharing of knowledge among development organizations and donors would decrease duplication of effort.** Far too many e-readiness assessments are conducted in countries which have already been assessed, some as many as 9 times, and there is little interest in using the results of these assessments to drive the planning process forward. In addition, valuable lessons that could be learned from failed initiatives go unlearned. Some development organizations are too protective of their own projects and proprietorial about the results. There is a distinct reluctance to allow objective, independent evaluation in this field.
- **Solutions must involve local adaptation and participation.** Successful initiatives are built on an accurate assessment of local needs and a sympathetic understanding of local conditions based on consultation with stakeholders. Solutions designed for the developed world cannot be imposed on the developing world, and there is no universal solution to the problems faced in the developing world. Local solutions need to be found to local problems, and the local community must be part of the process.
- **Preliminary research is required.** A related issue is the fact that not enough time is taken before embarking on ICT related development initiatives to find out what has gone before, what has worked, what has not worked, and what local adjustments are needed for success.

- **Aggregating Local Access**

One of the most appealing general propositions in ICT for development is that access to networks should be aggregated through arrangements that permit large numbers of users to share terminals and costs. Old-fashioned telecom networks use “party lines” and payphones for this purpose, for example. But the classic case of aggregated access is through traditional radio and television.

Broadcast Media: Community Radio & TV. Community radio provides a tool for opening up wider information networks to remote communities using local languages for rural extension and rural development. A study by the Agricultural Research & Extension Network of the British government's Department for International Development (DFID) found that vernacular radio programmes resulted in increased awareness of soil and water conservation practices and reduction of harmful practices.⁷² Other applications have been particularly useful in cases of natural disaster.

Community Radio in Mozambique. After the 2000 floods in Mozambique, Radio Mozambique, backed by international NGO, Media Action International (MAI), developed new radio programmes designed to bring news and information to the flood stricken communities. Funded by DFID, the programmes conveyed vital information on health, education, agriculture, law and other relevant issues. Nearly 7200 Freeplay wind-up radios were donated by the United Methodist Church of Mozambique, DFID and private donors via the *Freeplay Foundation*. The radios, manufactured by the Freeplay Energy Group, did not require batteries or electricity and operated using kinetic energy. Combined with solar power and rechargeable batteries, this suite of patented technology is collectively known as “self-sufficient energy”. An evaluation of the program concluded that although there were delays in distribution, and 50% of respondents reported a breakage or fault with their radio, the Freeplay wind-up and solar powered radio vastly increased access to information in the flood-affected regions of Mozambique. It provided a way for people to find friends and family, and educated people on how to rebuild their lives and preserve the health of their families. By eliminating the cost of batteries, its capacity as a tool for sustainable human development is considerable. Its impact could be increased by strategically distributing more radios, ideally before a disaster occurs.⁷³

Community Centers: Tele-Centers, Internet Cafes & Kiosks. Particular emphasis has been placed in ICT for development plans on various kinds of tele-centers and common access venues. Although both donor-funded and private tele-centers have proliferated in developing countries, user cost and overall sustainability remain major concerns. Commercial cafes, although widespread in major cities, often survive on the strength of the revenues from games, gambling, pornography and foreign tourists—not the kinds of uses most promising from a development standpoint. Community tele-centers seem to have somewhat different user profiles overall, but are generally even more dependent on various forms of subsidy. At best, many of these centers cover only their operating costs (sometimes not even including the salaries of supervisors or the monthly phone charges), and often have major problems with vandalism, theft and maintenance. In fact, most of the externally funded tele-centers have been projects of top-down or generic design, incorporating local participation but only within the guidelines and supervision of the external funders.

Nevertheless, some version of the tele-center model appears to be an essential component of any strategy to expand information access and ICT capabilities to wider communities. Several studies provide insights into the key dimensions of sustainability.⁷⁴ A report of the World Bank Institute suggests that sustainability should be understood as an on-going process of adjustment to local conditions and not simply measured in the short-term. The report divides sustainability into the following subsections for analysis:

⁷²DFID, “Rural Radio in Agricultural Extension: The Example of Vernacular radio Programmes on soil and water conservation in N. Ghana,” http://www.odi.org.uk/agren/papers/agrenpaper_127.pdf

⁷³Evaluation conducted by Robert F Wagner Graduate School of Public Service at New York University (NYU) and University of Eduardo Mondlane in Mozambique. <http://www.freeplayfoundation.org/News/NewsItems/MozEval.htm>

⁷⁴ *The Community Telecenter Cookbook for Africa, Recipes for Self-sustainability*, by Mike Jensen and Anreitte Esterhuysen, UNESCO, Paris 2001 <http://unesdoc.unesco.org/images/0012/001230/123004e.pdf>, Development Gateway: Community Telecenters: Assuring Impact & Sustainability <http://www.developmentgateway.org/node/133831/sdm/docview?docid=441647>

- β Sustainability of Infrastructure and Equipment
- β Sustainability of Services and Service Relevancy
- β Sustainability of Human Resources
- β Financial Sustainability for Community Telecentres ⁷⁵

These points seem to boil down consistently into a series of underlying challenges:

- β reliability of electricity and phone connectivity,
- β relevancy of local content and services for illiterate and oral communities,
- β limited skills of local management, and
- β lack of sizable profits in rural areas.

Experience shows great variability from country to country and documents the fragility and complexity of the challenge of sustaining these centers. But it does not suggest the impossibility of doing so. In Mozambique an alternative model is being trialed, called the Provincial Digital Resource Center. This approach attempts to supplement the typical phone, fax and Internet services offered by most community tele-centers with a set of additional substantive services and information sources to be offered and subsidized by government ministries. The objective is to create a critical mass of useful information and services that draw citizens to the centers and provide additional reasons for them to learn the value of computers and network access.⁷⁶ In short, community tele-centers require careful planning that is sensitive to local culture and economics with regard to design, implementation and the monitoring of performance. They require constant supervision, and should be supported not only for their economic results, but also for their broader social and cultural benefits.

Personal Terminals: Cell phones, PDAs & Laptops. Local access by means of personal terminals such as regular cell phones is becoming the means of choice in the developing world, at least in the major urban areas. Other applications have been trialed or proposed incorporating more sophisticated data capabilities of Personal Digital Assistants (PDAs) and laptop computers.

SATELLIFE, a non-profit based in Boston, has been providing health and medical information to the developing world for 12 years. The SATELLIFE PDA program loads PDAs with the latest medical texts, field surveys, health references and guides for diagnosing diseases and ships them to medical professionals working in Africa. SATELLIFE provided more than 80 PDAs loaded with an easy-to-use malaria survey and medical content software half to medical students in Kenya (Moi University Medical School), and the other half to practicing doctors in Uganda (Makerere University Medical School). Bridges.org, a South African NGO evaluated the project and found that handheld computers proved to be an effective tool for collection and dissemination of health data, provision of healthcare and an appropriate technology for use in the African context. Lessons learned included:

- training and technical support are critical,
- content must be locally relevant,
- battery-powered units are best for electricity-deprived areas, and
- synchronization into a central data system must be simple and convenient.

Challenges consisted of:

- High cost of PDAs for the average person in Africa
- Repairs for handheld computers are currently not feasible in Africa
- Broader ICT infrastructure is needed to support the widespread use of handheld computers in Africa.
- Issues of privacy, data protection, and security will affect the widespread use of handheld computers in healthcare in Africa in the long term.

⁷⁵ *The African Community Telecentres: In Search of Sustainability* By Meddie Mayanja, World Bank Institute
<http://www.cominit.com/st2003/sld-7725.html>,

⁷⁶ The Provincial Digital Resource Center is described in Mozambique's "Implementation Strategy" report. Republic of Mozambique, *Information & Communication Policy Implementation Strategy: Toward the Global Information Society*, approved by the Council of Ministers on June 27, 2002, available at http://www.infopol.gov.mz/pdf/strg_eng.pdf

- Linkages with alternative power sources such as solar panel and wind up technologies may offer innovative opportunities for solving power supply problems.⁷⁷

However, given the proliferation of cell phones and their familiarity to a growing proportion of the population even in poorer locations, the greatest opportunities may well be in exploiting the capabilities of these networks rather than the more expensive and sophisticated technologies.

- ***Enhancing Network Capabilities***

Fixed Telecom Networks: VOIP & Broadband. Voice Over Internet Protocol (VOIP) provides a low cost solution to international and even local calling that would allow developing countries greater access to international markets, new opportunities for out-sourcing and distance learning, and increased innovation and higher productivity in general. The impediments to its wider use are not technological but regulatory and economic. Incumbent monopolies have generally tried to restrict use of VOIP because it undercuts the fundamental economics on which traditional circuit-switched networks are based. VOIP also makes more difficult the collection of revenue for universal service funds, the payment of access or settlement charges, and the monitoring of service quality. Absent the problem of sunk investment in older technologies, incumbent carriers could actually benefit in the longer run from the wide use of this technology, which facilitates the following:

- Increased overall traffic and revenue including local service demand
- Integrated voice, text, audio and video over a single connection
- Substantial cost savings on IP switching equipment and infrastructure development compared to PSTN⁷⁸

Meanwhile, however, there is largely a “gray market” for VOIP services in the developing world, although some carriers have plans to integrate VOIP as a transport layer on international links through joint ventures with international VOIP companies like ITXC. In the case of Peru, among other countries, the private sector is driving development of IP services.

Private VOIP networks in Peru. The development of private VOIP networks in Peru has basically been spearheaded by large private companies, such as banking institutions, industries or firms involved in natural resource extraction with multiple points of presence in the country, such as mining and oil companies, etc. The construction of private communication networks took place chiefly to reduce costs, the only other alternative being to use public networks, which were still under a monopoly until 1998, as is the case with local fixed telephony. Currently many companies such as Banco Continental, Banco Latino and Banco Interbank use voice over frame relay internally to supply voice and data services between their regional offices.⁷⁹

Mobile Telephony: GSM to WAP to 3G. Market liberalization and continual improvements in mobile cellular technology have been essential for sustaining mobile telephony growth rates. This has allowed for rapid mobile network infrastructure deployment and pricing and service options like pre-paid cards that are essential to users in low-income environments who do not qualify for subscription-based services. Mobile data services are a key to future growth. Short Message Service (SMS) has been a leading application, for example, in healthcare environments where it has been piloted for disease tracking and medication treatment reminders. SMS has also taken off in youth culture making a significant social impact in how young people interact in traditional societies. Wireless Application Protocol (WAP), which allows mobile phones to browse the Internet, has been constrained by a shortage of handsets, slow speed and a lack of applications.

Even greater uncertainty surrounds the prospects for “third generation” (3G) mobile networks. While they promise significant upgrades if their economic viability can be demonstrated, they have not to date proven viable even in developed countries, where the licensing process typically involved expensive

⁷⁷ See <http://www.bridges.org/satellife/index/html> for further information on bridges.org’s evaluation of the SATELLIFE project using PDAs in Healthcare.

⁷⁸ “VOIP-The Future of Communications,” April 2002, GIPI, <http://www.internetpolicy.net/practices/voip.pdf>

⁷⁹ ITU Case Study: Peru: IP Telephony and the Internet, <http://www.itu.int/osg/spu/ni/iptel/countries/peru/index.html>

auctions which delayed development and deployment. The 3G standard would allow compatibility across regions and nations much like the current GSM standard and would also support broadband Internet access. If the higher cost of handsets can be overcome with volume, 3G could provide additional applications in low income environments that could not otherwise support computers or PDAs. However, significant hurdles for 3G in developing countries must be overcome, including regulatory uncertainties, network and handset costs, and the availability of locally relevant content adapted to small screen sizes.

WiFi. The more dramatic and promising technology for wireless broadband is that of spread spectrum wireless, especially the various versions of 802.11 technologies known as “WiFi.” These technologies provide huge bandwidth at low cost over short ranges. In developed countries, the multiplication of “hot spots”--zones of WiFi accessibility--has created a new network model whose impact is only just beginning to be felt. WiFi has not yet been widely used in developing countries, but is quickly being installed in high traffic areas such as major hotels and international airports. Impediments to its wider deployment are a combination of regulatory proscription (pressed by monopoly telcos who fear adverse impacts on their traditional business model similar to the impact of VOIP) or uncertainty (no clarity or regulatory definition about who can deploy), as well as limitations of human capacity (lack of engineering talent and financing). Nevertheless, trials of WiFi applications are multiplying throughout the developing world. The next generation of wireless technologies may offer even more potential for cheap broadband access in the developing world. WiMax is a spread spectrum technology to be available in 2004 that will provide 72 Mbit/sec speeds with a broadcast range up to 30 miles. This technology, combined with local distribution on local WiFi networks, could provide very low cost access to schools, clinics, telecenters, and small businesses in many parts of the developing world, thereby creating new opportunities for broadband applications now beyond consideration.

Wizzy Internet, a South African NGO is deploying WiFi on the back of a truck that drives a route passing a number of schools, updating their websites and other software and transmitting e-mails to the data store on the truck as it passes the schools, then uploading those to the Internet at the Wizzy Internet office, thus providing the schools served with an intermittent broadband connection and a low-cost way of downloading large files. Also, the government technology development and tech transfer agency, CSIR, has developed a low-cost point-to-point WiFi application for use in connecting rural locations, such as a school or health clinic or small business, at distances up to 10 kilometers from an optical fiber or other backbone Internet connection, and is prepared to work with local industry or government ministries in deploying the application.

RebelNet. Onno Purbo, a prominent Indonesian IT expert fed up with the Indonesian telecommunications companies, left his work as a civil servant and created a bottom up community based ICT infrastructure. Using WIFI and VOIP as the backbone and bypassing the Telco system’s “last mile,” this infrastructure currently supports about 4 million Indonesians, more than 2000 cyber cafes and more than 1500 schools on the Internet running on more than 2500 WiFi nodes, with no World Bank, IMF or other donor funding. It is a paradigm shift away from the traditional telecommunications infrastructure, which is normally licensed and built and run by the telecommunications operators for the subscribers.⁸⁰

- *Rationalizing Global Connectivity*

Internet Transmission Costs & Internet Exchange Points (IXPs). Among the least understood features of the Internet is the cost disadvantage faced by developing countries regarding international transmission. Since most Web sites and routers are located in the wealthier countries—the United States and Europe in particular—countries in the south and east must access these Internet Exchange Points (IXPs) using international network connections. This factor greatly increases both the cost and the time required for this indirect routing of traffic. Furthermore, unlike the traditional cost-sharing (accounting rate) arrangements for international telephone transmission, these costs must be born almost entirely by the remote countries on the basis of “transit agreements” rather than “peering arrangements” that would provide more equal sharing of the costs. To quote a recent position paper by the Global Internet Policy Initiative:

⁸⁰ <http://www.cerncourier.com/main/article/43/6/20>

“[D]eveloping country ISPs must pay 100% of both outbound and inbound traffic; under the terms of the transit agreement, the ISP on the other end of the international link does not share the cost of exchanged traffic. This means that the developing country ISP must pay 100% of the international transit costs for all packet traffic (email, web pages, file transfers, etc.) that originates with its customers and that terminates with its customers.”⁸¹

Such costs must therefore be factored into the business cases of Internet Service Providers in the developing world, which significantly increases the cost of Internet use and thereby dampens the appeal of Internet applications, searches, and file sharing to all users. From time to time, developing countries have sought to raise these issues and propose revisions in the peering, transit and accounting principles by which the Internet is managed. One such initiative, a Task Force of the Asia Pacific Economic Cooperation forum called ICAIS (International Charging Arrangements for Internet Services) was actually spearheaded by the Australian delegation. But it ran up against virulent opposition from the principal Internet transmission carriers in the United States and was not successful.⁸² These structural realities make it important for all countries to reduce their dependence on international transmissions by increasing the number of Internet Exchange Points in each region, as well as developing national IXPs that reduce the amount of intra-country traffic that is exchanged outside the country.

Regional Registries & Country Domains. Most developing countries have yet to fully participate in the addressing configurations of the Internet. Every computer has a unique address, or numeric identifier, the recognition of which is facilitated by the Domain Name System (DNS) that incorporates more recognizable alphabetical terminology. The root server system that routes traffic across the Internet depends on the accuracy of this system to get content where it is intended. Managing the addressing system on a centralized basis is the task of the Internet Corporation for Assigned Names (ICANN) under a contract with the U.S. Department of Commerce. ICANN is responsible to “coordinate the domain name space, particularly at the top-level; allocate IP address space; manage the root server system; and coordinate protocol number assignment; and to engage in policy development...”⁸³ While ICANN has recently sought to encourage participation by developing country representatives, it has a great deal more work to do to achieve this goal.

In addition, ICANN needs to address the configuration issues for the developing world. Africa, in particular, lacks a regional Internet registry (RIR) to manage its domain space and allocate IP numbers. Currently, that space is managed by the RIRs of Asia/Pacific (APNIC), Europe (RIPE-NCC) and the United States (ARIN). A proposal to create such a node, known as AfriNic, was issued in 1997 and is still in the process of discussion, as it would require not just a policy decision, but the availability of well-trained, well-equipped “hostmasters”, and sufficient resources to assure periodic meetings.⁸⁴ At the same time, Africa recently became host to its first root name server with the opening at the Johannesburg Internet Exchange (JINX).⁸⁵

⁸¹ GIPI, “Internet Exchange Points: Their Importance to Development of the Internet and Strategies for their Deployment – The African Example,” 6 June 2002.

⁸² See, e.g., the APEC paper by Australian carrier Telstra, “The problem with International Internet Charging” (TELWG/21/ICAIS/06).

⁸³ “Towards a partnership between ICANN and the UN-ICT to enhance participation by Developing Nations’ Stakeholders,” UN-ICT Taskforce Working Group 1 Strategic Plan towards increasing participation by developing nations in ICANN (2002).

⁸⁴ See GIPI paper at note 70 above.

⁸⁵ <http://shorl.com/hatrediprygrebi>

8. Human Capacity: Cultivating Cultures

Mozambique is a country of great beauty and wrenching poverty, of admirable tenacity and terrible luck. Over the past generation alone, it has endured the sudden end of an impoverishing colonial legacy, a horrific civil war and a series of devastating natural disasters. It is one of the poorest countries in the world, even as it has been one of the fastest growing on the African continent (although from a low base, to be sure). Because of its current political stability and macroeconomic discipline, Mozambique is favored with the attention of numerous national and international development agencies. The contributions of outside donors comprise some 70% of its Gross Domestic Product. During 2001 and 2002, the government of Mozambique, under the personal leadership of Prime Minister Pascoal Mocumbi, engaged in the development of a comprehensive national strategy on ICT for Development followed by a more detailed “ICT Implementation Strategy.”⁸⁶ However, in seeking to follow through with this ambitious agenda, a major challenge is to overcome the severe shortage of skilled people available to implement the designated programs. Mozambique is blessed with a small core of dedicated ICT experts and senior government officials who repeatedly take the lead in promoting initiatives to capitalize on technology opportunities. But these few champions are not sufficient to assume operational responsibility for all the project elements of the strategy. In some respects, therefore, the principal challenge for Mozambique in implementing its ICT for development plans is training or enlisting the administrative and managerial talent to carry them forward.

The finest strategy and the deepest pockets will not produce a modern “information society” if citizens are not able to capitalize on the options created. The challenge for all countries is to promote “cultures” of ICT capability—local, provincial and national capacity to use technology effectively. We use the term “culture” advisedly. Like the strong relationships and values that social scientists refer to as “social capital,” establishing stronger conditions for the effective use of information and communications in economic and social pursuits involves a holistic change in “lifestyle” and attitudes in order to facilitate the kind of collaboration these technologies make possible. Yet changing culture in this fundamental manner is a daunting assignment that suggests the kind of “social engineering” more characteristic of authoritarian societies.

Instead, what is involved is “capacity development” in the sense suggested by UNDP’s Stephen Browne: “[c]apacity development is an essentially organic process whereby societies as a whole acquire the ability from within to set and meet their development goals,” including capacities to plan, execute, monitor, and so forth.⁸⁷ Much as we have framed it in this paper, Browne develops this conception through the various levels of human initiative: individual capacity, organizational capacity, societal or national capacity, and global capacity. Let us consider some major opportunities at each level.

- **Engaging Women & Youth**

The irony in many developing countries is that, despite the severe shortages in human capacity that are frequently lamented, large parts of the population are often excluded for cultural or other reasons from participating in the sector. Initiatives to make women and young people more knowledgeable about technology and its applications may be in most societies the most influential cultural interventions available.

Women. In most developing countries, one of the greatest opportunities to add human capacity to the challenges of development is to find ways of engaging women in this effort.⁸⁸ Unless women are actively involved in the planning and use of new information technologies, there is a risk that ICTs will

⁸⁶ Republic of Mozambique, *Information & Communication Policy Implementation Strategy: Toward the Global Information Society*, approved by the Council of Ministers on June 27, 2002, http://www.infopol.gov.mz/pdf/strg_eng.pdf

⁸⁷ Browne, “ICTS and Poverty Reduction: Two Conceptual Approaches” Paper prepared for conference at Harvard, September 2003; see also, Stephen Browne, ed., *Capacity Development Through Technical Cooperation: Country Studies* (2002).

⁸⁸ See, e.g., the *Arab Development Report* (UNDP, 2002), and the follow-up study a year later, which is available at <http://www.undp.org/rbas/ahdr/english2003.html>. See also the work of Nancy Hafkin, e.g., “Gender, Information Technology and Developing Countries: An Analytic Study,” (with Nancy Taggart) for the Academy of Educational Development (June 2001) at <http://learnlink.aed.org>

Entra 2. Preparing Youth to Enter the Modern Workplace The International Youth Foundation (IYF) and the Multilateral Investment Fund (MIF) of the Inter-American Development Bank have joined forces to help young people in Latin America and the Caribbean enter the 21st century work force. In up to 26 countries, the US\$25 million program *-entra 21-* will co-finance 35 locally conceived and executed projects that will train youth in skills related to information technologies (IT), and place them in jobs. As of March 2003, IYF has reviewed more than 180 applications and has awarded 8 grants. By the summer, 12 more projects should be underway. The Foundation should award all grants by the end of 2003. www.iyfn.org

also marked by high levels of cross-sectoral cooperation, Professor Wilson developed a model of ICT expansion based on four sided negotiations among public officials, private entrepreneurs, NGO leaders and researchers which he calls a “Quad” model. He argues that the more robust the Quad interaction, the more robust the diffusion and impact of ICTs. In a sense, the social architecture supports the Internet’s technical and commercial architecture.

Professor Wilson convened an international colloquium on “Leadership in the Digital Age” in July 2003 to analyze the ‘Quad’ model with ICT leadership experts from India, Italy, Russia, South Africa, the U.K. and from across the U.S. Their experiences generally supported the utility of the Quad approach, and advanced it by identifying the features separating ‘digital leaders’ from non-leaders. The former seemed to possess unique combinations of new attitudes, skills, knowledge and experiences particularly appropriate for creating knowledge-oriented Quads.

HIGHLIGHT: Ernest Wilson

Building Leadership Cultures Across Sectors – the “Quad” Framework

Professor Ernest Wilson is Director of the Center for International Development and Conflict Management at the University of Maryland. With the support of Markle, he has been researching issues regarding the development of leaders and ICT “champions” in a range of developing countries, such as China, Brazil, South Africa and India, and comparing their experiences with those of leaders in developed locales, such as Silicon Valley and the Washington, DC metropolitan area.

Conclusions

- The most successful leaders in the networked world have created a unique and innovative form of distributed leadership.
- This leadership style is conducive to and facilitated by the networking characteristics of more knowledge-intensive societies.
- Leadership for the knowledge society requires multi-sectoral collaboration rather than the top-down approach of state-dominated policy making systems
- This form of cross-sectoral collaboration is most effective when it includes each of the four key sectors: government, business, researchers in labs and universities, and civil society organizations.
- This suggests a four sector or “Quad” model whose dynamics can be explored and compared across a range of societies.
- Strong “Quads” are associated with effective ICT performance that ensures sustainability.
- Comparative country studies demonstrate concrete steps and tools to strengthen networked leadership.

- ***Engaging Outsiders***

Except for the largest developing countries—China, India, Brazil, Mexico, South Africa—the shortfalls in human capacity that currently impede effective ICT programs cannot be met in the short-term with local training alone. Therefore, most countries have no choice but to combine their internal capacity-building priorities with strategies for more effectively engaging external actors.

“Technical assistance.” This term is the development professionals’ euphemism for the myriad ways in which outside “experts” seek to help “local” citizens with time and skills rather than financial resources alone. In the process, so the expectation runs, these skills and “know-how” are transferred to local actors who will eventually be able to dispense with outside assistance. The ICT for development world increasingly adds to this scenario the model of “virtual” technical assistance, whereby outside experts perform this service remotely—perhaps from the other side of the world. However, the paternalistic version of this scenario where noble outsiders provide the expertise to carry out specific projects for the benefit of grateful (but incompetent) locals, and to train them in the process, seldom reflects reality. Effective transfer of skills is typically a longer and more collaborative process by which the outsider learns as much about the unique challenges of a local environment as the locals learn about the skills themselves.

Bridges to the Future (BFI). Funded by the U.S. Dept of Education, the International Literacy Institute at the University of Pennsylvania (PENN) created Bridges to the Future (BFI), a public-private collaboration of national, and international agencies, non-profit institutions, corporations and foundations whose main focus is to remove the joint barriers of literacy and technological literacy, thereby assisting the world's poorest peoples to gain a stronger foothold in determining their own. Three components of the BFI activities are envisioned for each participating country: (1) Development of Community Learning and Technology Centers for lifelong learning, basic and ICT skill acquisition and high-impact information resources; (2) Development of ICT-based tools to improve teacher training and (3) Development of innovative ICT applications for human development and sustainability, social and economic future.⁹²

Diaspora Dynamics. The familiar story of expatriates seeking to assist their home country (without necessarily repatriating) has become an exciting model for all developing countries—even those with limited diasporas to draw on. Recently, the United Nations has begun to try to regularize and expand these interactions through a series of regional and country networks. In a collaborative effort with the United Nations Fund for International Partnerships (UNFIP), the United Nations Development Fund for Women (UNIFEM), Digital Partners, and Gruppo CERFE, the United Nations ICT Task Force has launched Digital Diaspora Networks for Africa and Latin America that seek to mobilize technological, entrepreneurial and professional expertise and resources of the African and Latin American Diaspora to promote development in achievement of the Millennium Development Goals.⁹³

The potential value of the African Diaspora alone is enormous. A study by Lindsay Lowell and Allan Findlay for Britain's Department for International Development found that three-quarters of Africa's emigrants have higher (tertiary) education, and roughly half of Asia's and South America's. Of the 1m people from India living in the United States, more than three-quarters of those of working age have a bachelor's degree or better. About 30% of all highly educated Ghanaians and Sierra Leoneans live abroad.⁹⁴ These educated communities provide a wealth of resources combined with local knowledge and cultural understanding that can communicate and influence home countries via online networks. Another approach is to bring home expatriates for temporary periods. The United Nations Development Programme runs one such program, called Transfer of Knowledge Through Expatriate Nationals, or TOKTEN, helping skilled expatriates return to work on specific projects.

“Global Compacts”. The format and incentives for major collaboration by global actors is a recurrent subject of discussion. U.N. Secretary General Kofi Annan introduced a major initiative in 2002 titled the “Global Compact”, according to which large corporate and other institutions would commit to a platform of principles to guide their international behavior against which they could be judged transparently by the public around the world. In UNDP's 2003 Human Development Report, Mark Malloch Brown extends this concept as a general construct for the engagement of non-governmental institutions in concrete programs of investment and development to achieve the Millennium Development Goals: a “Millennium Compact”.

Yet, if external partners are to be effectively integrated into national strategies, they must be committed for the long haul; but the incentives for outsiders to maintain consistent, reliable involvement in strategy development and implementation, even when they are otherwise present or invested in a country, are not conducive. What could be helpful in clarifying these issues is a framework for rating not simply the performance of aid recipients—their “readiness” to make use of assistance---but the reciprocal performance of donors—perhaps referred to as their “steadiness” as reliable partners.

⁹² http://literacy.org/bfi_ili/index.html

⁹³ <http://www.ddn-latinamericacaribbean.org/>

⁹⁴ “Do developing countries gain or lose when their brightest talents go abroad?” Outward bound. *Economist*, Sep 26th 2002, http://www.economist.com/displaystory.cfm?story_id=1352810

9. Policy & Governance: *Leading Change*

Until ten years ago, the apartheid government of South Africa regarded the “digital divide” within its borders not as a cause of concern, but as an accomplishment of its segregationist philosophy. In other words, the divide was not a problem but a policy. One particularly obnoxious feature of the apartheid system was the systematic attempt to prevent access by non-white peoples to modern technologies and to the skills essential for their utilization. Following the historic transition to democracy in 1993-1994, one urgent goal was to close the yawning technology divides enshrined and protected by earlier policies. A particular priority was to build out the telephone network to areas previously unserved, or underserved, by the telephone monopoly, Telkom South Africa. In a deliberate trade-off, the government agreed to grant Telkom an additional five years on its fixed line monopoly (1997-2002), in return for the company’s commitment to extend its network into under-served areas. An ambitious build-out plan was developed for nearly 3 million new lines with annual targets measured on the basis of lines installed and penalties imposed for failure to meet them. By 2002, however, in a meeting of the national e-Strategy Task Team, it became clear that the total number of fixed lines had actually decreased in five years—despite Telkom’s best efforts to extend its fixed network.

In the poorer countries of the world, governments remain the central actors in the ICT for development picture. Their roles and tools have undergone enormous change since the end of the Cold War,⁹⁵ but governments—central/federal, regional/provincial and municipal/local—remain the major locus of key decisions and the dispensers of a major proportion of national wealth. Government policies are therefore routinely the principal determinants of ICT options as well as critical drivers of change. This is not to suggest that government officials should determine alone what those policies need to be. But their leadership in steering resources and priorities remains central and indispensable.

In facilitating ICT for development, the single greatest policy challenge to national governments is managing the transition from a traditional circuit-switched telecommunications network to a more versatile, ubiquitous and lower cost set of networks capable of supporting a diverse set of capabilities and applications.⁹⁶ This task is far more complicated than making a policy decision in favor of privatization, liberalization and independent regulation—though each of these elements will play a part in any healthy transition strategy.⁹⁷ The track record of reform in many developing countries highlights just how difficult this transition can be to manage effectively and how much culture, politics, and other local factors determine the outcome.

- ***Facilitating Local Access & Productivity***

“Universal Service”. Governments generally place a high priority on promoting access to infrastructure by the poorer and more remote citizens. Indeed, until recently the economic structure of the telecommunications industry in every country in the world was based on some variant of cross-subsidization from long distance and international service revenues to cover local costs in order to promote local access and affordability. As that model has become unsustainable under the twin pressures of technology evolution and regulatory revisionism, governments now search for new methods of subsidy to keep the costs of local service down.⁹⁸ Most have decided to implement versions of a universal access fund siphoning off revenues from carrier profits to fund network expansion rather than to artificially constrain prices for local service.⁹⁹

⁹⁵ For a particularly insightful summary of these changes, see Lanvin, “Leaders and Facilitators: The New Roles of Governments in Digital Economies,” Chapter 5 in *GITR: 2003*.

⁹⁶ Beardsley et al, “The Elements of Successful Telecommunications Sector Reform,” chapter 12 in *GITR: 2001-02* at 138.

⁹⁷ See Allison Gillwald, “Transforming Telecom Reform for Development,” Paper prepared for symposium. (September 2003).

⁹⁸ For an insightful discussion of the universal access dilemma in a converged environment, see Akash Kapur, “Bridging the Digital Divide: Regulating Universal Access in India,” (Dissertation submitted for a doctorate in law, Nuffield College, Oxford University, September, 2003).

⁹⁹ Sabater, Dymond & Juntunen, “Telecommunications and Information Services for the Poor,” *World Bank Discussion Paper* No. 432 (2002).

But the social target of increasing the “numbers of new lines” continues as a presumed priority. Considerations of equity and politics reinforce each other in maintaining this focus. However, the effect of using this metric is often to drive programs toward connectivity for its own sake—running phone lines to schools and rural villages—rather than efforts to provide affordable access to phone service. Furthermore, as in most countries, the structure of fixed telephony service was based upon metered local calling in addition to monthly rental fees, thereby increasing the likelihood that installed lines might not be affordable by users on an ongoing basis without additional operating subsidies as well.

In contrast with the obsolescing business model for fixed networks, the cellular phone companies in developing countries rapidly established business models, relying on cheaper network costs and pre-paid calling plans, that more closely fit the limited means of many citizens—while mobility often better matched their lifestyles. As a result, with no government subsidies whatsoever, the number of cellular phone users has rapidly climbed past the number of fixed line customers almost everywhere.

In South Africa today, for example the number of cell phone customers is more than triple the country’s now- shrinking number of fixed lines. Policy-makers can now make the case that the countries “universal service” objectives would be better applied to the mobile networks, as the networks of choice, than to the fixed network.¹⁰⁰ Moreover, one of the cell phone operators, Vodacom, found an innovative way to meet its universal service obligation. It established community service phone shops in refurbished shipping containers located in poorer communities. Phone shops are owned and operated by local entrepreneurs, have 5 or 10 phones linked to Vodacom’s cellular network, and offer pre-paid calls at a government mandated rate that is less than one-third the commercial per-minute rate. The system is very popular and has grown to 4400 phone shops and some 24,000 phones, which are heavily used by the communities they serve—typically 100 hours of calling per month per phone. Yet it generates jobs to staff the phone shops, profits for the entrepreneurs, and revenue that covers Vodacom’s fixed costs for the program.¹⁰¹ The phone shop model has since been copied by one of Vodacom’s competitors.

Egypt has taken the goal of universal service even further, providing a system of subsidies that creates low-cost, almost ubiquitous access to the Internet over the telecom network.¹⁰²

- ***Managing Telecom Transitions & Internet Policies***

Promoting local access is only one dimension of the challenge faced by policy-makers in providing the foundation for ICT applications. Reducing the overall cost of telecom services—including both the retail services to businesses and consumers and the wholesale services to large businesses and other service providers—while promoting Internet access and other new forms of capability, requires a difficult balance of policy changes and regulatory supervision. Yet success in managing this transition is a basic precondition for the facilitation and multiplication of ICT applications of almost every kind. Increasing the pace for the introduction of new services and promoting the flexibility of offers to large users is also a major source of innovation and growth. Nevertheless, the transition from the typical state-owned monopoly to an efficient, competitive enterprise has repeatedly stalled. Why is this transition so difficult?

In most developing countries (as was true twenty years ago in many developed ones), the telecommunications system represents a major proportion of overall national wealth. The net international settlements payments received from the carriers in other countries for international phone calls are typically

¹⁰⁰For a description of the program and a persuasive argument for expanding the definition of universal service to include mobile service, see James Hodge, “Extending Telecoms Ownership in South Africa: Policy, Performance and Future Options,” *Trade and Industrial Policy Strategies (TIPS) Working Paper 7-2003*. On the South African tele-center program in particular, see also Peter Benjamin, *Reviewing Universal Access in South Africa*, 2 *The Southern African Journal of Information and Communication* #1, 2002. For a thorough account of South African telecom policy through 1999, see Robert B. Horwitz, *Communication and Democratic Reform in South Africa* (2001).

¹⁰¹ “What Works: Vodacom’s Community Service Phone Shops,” A Case Study of the World Resources Institute, August, 2003, http://www.digitaldividend.org/case/case_vodacom.htm.

¹⁰² Presentation of the Egyptian representative at the *Conference on e-Strategies for Development in Africa*, Maputo, Mozambique, 1-4 September 2003.

the largest single source of hard currency for the country as a whole. The revenue derived from domestic telecom services—whether directly appropriated by government, where the telco is wholly owned, or received through royalty or tax arrangements when the company has been privatized—is often the largest single source of government income. In many of the world’s poorest countries, the dominant telecom operator is also the country’s largest employer, its principal consumer of technology and a major trainer of corporate management.

Add to these economic factors the common view among military and police officials that the national telecommunications network remains a major national asset, to be protected as a matter of national security and sovereignty, and we can begin to gauge the strength of resistance in many countries to privatization and competition. Reform of the telecom sector in most countries, therefore, is not only a matter of liberalization—of introducing competition and tightening regulation to increase customer choice and drive lower prices.¹⁰³ It is the challenge of simultaneously engineering major transitions in the labor market, the financial system and the security services. Understandably, with this much at stake, there is a tendency on the part of government officials, whether personally rewarded or not, to want to maximize the return on any sale of these assets. The internal political rationale for such changes, notwithstanding World Bank demands and the market access pressures of the World Trade Organization, is often hard to advocate. Commitments in principal from national leaders to outside authorities have been notoriously slow and incomplete in fulfillment. The poorer countries of Africa and Asia are not alone in this foot-dragging; South Africa, China and Mexico are also prominent laggards.

Internet Policies. Enter the Internet. One of the most effective opportunities to persuade policy-makers and other stakeholders to reform the cost structure and inflexibility of telecommunications networks is the rationale of facilitating expanded access and a favorable regulatory climate for Internet use. The value of this focus for policy advocacy and education has been demonstrated in a number of developing and transitional countries by the Global Internet Policy Initiative (GIPI).

HIGHLIGHT: Global Internet Policy Initiative (GIPI)

Advocating policy frameworks for local facilitation of Internet access and applications

GIPI works in developing and transitional countries to promote the adoption of legal and regulatory frameworks that support the growth of an open, affordable and user-controlled Internet – an Internet that can drive economic growth and advance economic and social development. The Markle Foundation has provided major financial support. GIPI’s local policy coordinators in 17 countries are convening dialogues and seeking to build informed consensus among all stakeholder groups in their countries. They provide objective expertise on policy issues, commenting on draft legislation, and assisting policymakers and civil society in achieving a better understanding of the legal and regulatory environment needed for the Internet to develop. GIPI’s premise is that effective laws and policies will be developed only with local discussion, advocacy and consensus building, backed up by international expertise. In each country where GIPI operates, it establishes offices with full-time local policy coordinators that aim to build effective coalitions, working with ISPs, content providers, telecommunications and wireless service providers, NGOs, universities, users, who desire open and freely available Internet. These local coordinators are supported by lawyers and technology experts at the Center for Democracy and Technology (CDT). This GIPI core provides training to the local coordinators and has developed a comprehensive set of position papers and best practices papers to support the local coordinators and the broader audience of policymakers and stakeholders in each country. This information may be found at <http://www.internetpolicy.net>.

GIPI activities include:

- advocating loosening restrictions on Internet Telephony (VoIP) and use of WiFi technology
- assisting in cybercrime legislation and e-commerce legislation
- providing guidelines for redelegating country code domain names to local non-profit entities;
- helping governments, telephone operators and ISPs reach consensus on reduction of Internet access charges;
- advocating elimination of burdensome licensing requirements on ISPs;

¹⁰³ See OECD, *ICT and Economic Growth, Evidence from OECD Countries, Industries and Firms*, May 8, 2003.

- supporting telecom liberalization;
- organizing educational seminars for policymakers;
- providing legal support for the creation of Internet Exchange Points;
- convening public roundtables on national ICT strategies.
- launching local ISP associations, Internet Society chapters and user groups.

Conclusions:

- International guidelines and models of the OECD, the WTO basic agreement on telecommunications, the EU regulatory framework for communications need to be adapted to local legal systems through an on-the-ground consultative, consensus-building approach.
- If local conditions are right, a full-time person working outside of government and properly selected, informed, motivated and guided, can have major influence on the ICT policy process in a country.
- Proper timing for intervention is critical. There can be a "tipping point" when policy change in the right direction becomes favorable to reform. There is often a spectrum of opinion among mid to upper-level policymakers that allow for varying degrees of influence. Unfortunately, various forces outside the control of local or international reformers can overwhelm any such project.

Radio Spectrum. Beyond the telecom monopoly itself, similar attitudes affect government policies in the management of spectrum and the licensing of services. There is a strong motivation to view spectrum in particular, not as a public commons, but as a government asset, to be parceled spectrum into a series of defined "franchises" that can be licensed for state revenue or sold to the highest bidder, whether foreign or local (most often a consortium of both).

As technology erodes the earlier constraints of limited spectrum, it is crucial that national strategists discard any residual mindset of scarcity and control that will otherwise plague policy-making. This is the tendency to see the world as a "zero-sum" game of finite resources and contesting interests in which the success of some is assumed to come at the expense of others. There is often an economic culture in which competition is considered a dangerous intrusion on centralized control and public assets are seen as opportunities to extract maximum rent.¹⁰⁴ From such a starting point, the liberalizing and decentralizing opportunities presented by ICTs will be difficult to realize.

- ***(Re-)Negotiating Global Regimes***

For developing countries, major parameters of ICT for development are determined not in the capital cities of their own countries, but in the government offices and financial centers of developed countries, and in the international institutions that set the terms for trade, credit, intellectual property protection, and investment. Improving the prospects for effective use of ICTs will require these countries to play a more effective role in the political processes that lead to these global practices, principles, standards and treaties. Mark Malloch Brown, in the 2003 Human Development Report highlights, in particular, the need to modify current trade regimes and practices to allow the poorer countries a fair opportunity to sell their products in developed country markets.¹⁰⁵

But more effective participation is essential not simply to influence the outcomes of these organizations and negotiations, many of which may well remain beyond realistic expectations for influence even with more effective coalition-building and solidarity among the developing world. Nor is it likely that a single agenda or set of positions will be in the interest of all poorer countries as a group. Developing countries need to participate simply to become knowledgeable and effective operators—to understand the parameters as much as to change them.

¹⁰⁴ See Michael Porter's useful discussion of "economic culture" in "Attitudes, Values, Beliefs, and the Microeconomics of Prosperity," in *Culture Matters: How Values Shape Human Progress* (Harrison & Huntington eds., 2000).

¹⁰⁵ *HDR 2003*. See also Scott, "The Great Divide in the Global Village," *Foreign Affairs* (Jan/Feb 2001).

It is not the purpose or focus of this Report to extend this discussion of global regimes and principles further. Other studies and initiatives are underway in this regard.¹⁰⁶ However, global political realities remain an important component of the ICT for development equation and are therefore integral to the success of any realistic national strategy.

¹⁰⁶ For a preliminary survey of the issues, see *"A Roadmap--Global Policymaking for Information and Communications Technologies: Enabling Meaningful Participation by Developing-nation Stakeholders,"* Report of the Implementation Team on Global Policy Participation of the G8 Digital Opportunity Task Force, Markle Foundation, June 2002. See also "Strengthening Participation by Developing Countries in International ICT Decision-Making," Commonwealth Telecommunications Organization & the Panos Institute, London 2002; and Steinberg & Mazarr, "Developing Country Participation in Transnational Decision-making: Lessons for IT Governance" (Brookings draft, 2003).

10. Conclusion: ICTs as “*Integration & Collaboration Technologies*”

National leaders confronted with the need to make decisions about technology strategy and investment resemble protagonists in an elaborate video game. They must navigate a treacherous terrain full of levels, hazards and hurdles that is moving and changing faster than it can be understood--much less managed--to everyone’s satisfaction. In theory, ICTs offer endless opportunities—a bridge to the global economy and an engine of development initiatives. But in actuality, decision-makers are confronted by a seemingly endless series of hostile attackers, officious authorities, and demanding allies who stand between them and their preferred development destinations. In such a setting, maintaining strategic focus and comprehensive intelligence is a formidable task, and ICT for development becomes a challenge of managing multiple arenas of influence with inadequate resources and competing advice.

In effect, ICT for development involves the development of collaborative networks of people in order to create integrated networks of information—information to increase the productivity of enterprises. It involves the application of computing and communications technologies to create working communities and sustainable organizations of expertise, resources and experience, both within and beyond local settings. If genuine change is to be accomplished, these networks must be more than routine patterns of informal communication and information exchange; they must become active mobilizers of collaborative action focused on solving local problems and achieving clear benchmarks of progress. Large organizations in developed countries are accustomed to forming these operational networks within their ranks in order to combine skills from various parts of the organization into targeted, often temporary, teams. Governments that function effectively across ministries and agencies achieve a similar mode of collaboration. ICTs make these opportunities increasingly viable for smaller entities as well as large bureaucracies.

Like all networks, their effectiveness depends upon certain critical features: interoperability, reliability, security, trust and sustainability.¹⁰⁷ Yet, unlike many networks, the effectiveness of development networks depends upon common commitments to act and spend in order to achieve agreed upon objectives, as well as on clear accountability for lapses and delays in executing these commitments. Developing such dedication is no simple matter. The incentives for people to make and keep such commitments—however modest and temporary they may be—remains for the most part very problematic. Much depends upon our ability to create realistic expectations on a global basis that there is great potential for constructive change by making the effort.

“Mainstreaming” ICT? The strongest advocates of ICT for development frequently couch their recommendations in terms of “mainstreaming ICT,” meaning to take it out of the margins of development strategy and to integrate the technologies into each kind of development initiative. Treating ICT as an exotic specialty or eventual afterthought fails to capitalize on the holistic impacts to be achieved by making it integral to development planning. After several years of highlighting ICT for development as a separate specialty, several of the principal international organizations seem to be changing their organizational ambitions for ICTs.

On the one hand, this change may reflect the success of ICT boosters in convincing sectoral specialists to make ICT a central component of their agendas. As experience grows and impact is demonstrated, the effective application of ICT capabilities should become second nature. On the other hand, the consequence of taking this advice may make ICT advocates feel more like “drowning” than “mainstreaming.” Submerged within the specialized, and sometimes parochial “cultures” of experts in sectors such as healthcare, education, government, and so forth, the broad approach to ICTs as problem-solving can easily become the more narrow focus on incremental use of phones and computers. The result will not be the comprehensive process of learning and changing that is essential for societies to adapt to the future that faces them. Failure to master and exploit these technologies for their preferred views of the future will leave leaders battered, undercut and marginalized in the global future we all confront.

¹⁰⁷On the state of network theory, see Stefaan Verhulst’s paper “Introduction to Network Theories (...and How to Apply Them)” available from Research@markle.org at the Markle Foundation.

Beyond WSIS. At the same time, it is vital to recognize that the continuing impacts of the ICT revolution do not depend upon the insights or support of political leaders. Whatever the value of gatherings like the World Summit on the Information Society, these leaders do not need to be reminded of how powerful these changes will continue to be on all aspects of their societies. What is at stake, however, are major implications regarding the distribution and fairness of these impacts—and whether the opportunities to apply technologies to the full range of development objectives to education, healthcare, and government services can be directed through political undertakings to reduce the unevenness of this revolution—both among and within societies. These opportunities are huge, and much of the innovation that has mesmerized the world and transformed the way of life in the richer societies, is only just beginning. In many respects, therefore, the challenge is not just to organize politically to realize these opportunities through broad national strategies, but also to prevent political resistance, bureaucratic drag and faulty global regimes from stalling them. In this regard, the WSIS will come and go (twice); the global digital opportunities will remain.