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Issues Paper on

Development-oriented policies for a socio-economic inclusive information society, including access, infrastructure and an enabling environment

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Prepared by the UNCTAD Secretariat
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Executive Summary

At its eleventh session held in May 2008, the Commission on Science and Technology for Development (CSTD) reviewed the progress made in the implementation of the outcomes of the World Summit on the Information Society (WSIS). The substantive discussions of the Commission underscored the role of science and technology as essential tools for meeting development goals and the need for information and communication technologies (ICTs) to be accessible, fast, and affordable for low-income populations. The Commission also called for greater collaboration among the various entities, all stakeholders and governments to emphasize the importance of an enabling environment in building a truly development-oriented, people-centred and inclusive information society.

In response to the conclusion of the eleventh session of the Commission, this Issues Paper has been prepared by the UNCTAD Secretariat, with a view to examining some key policy initiatives and applications offering greater opportunities for improved access and infrastructure. The paper examines various factors, which facilitate or constrain ICT development based on practical experience of countries and proposes some relevant technical and institutional options.

Part I summarizes key trends in ICT access and infrastructure, and institutional issues. Part II highlights relevant experiences in how some countries have been able to forge ahead and overcome the technological limitations, especially in the rural areas. These examples provide the basis for analysis of how local innovations coupled with policy initiatives can boost levels of development. Part III evaluates the lessons that can be learned, particularly from institutional challenges at both the national and regional levels.
I. Overview

In its WSIS Follow-Up Report 2008, the CSTD Secretariat presented some of the most up-to-date ICT trends, some of which are reviewed below.

I.1. ICT Access: the Current Situation

I.1.1. Mobile Phones, Internet and Broadband

Trends in ICT access over the last year show the continued rapid growth of mobile phones and their emergence as the primary form of ICT access and connectivity in many developing countries. There are now estimated to be eight times as many mobile phones as fixed lines\(^1\), three times as many mobile phones as personal computers and nearly twice as many mobile phones as TV sets. In addition, twice as many people now use mobile phone SMS text messaging than e-mail. Given recent advances in mobile data technologies and services by mobile phone operators and handset manufacturers, communication by SMS is generally much easier, faster and cheaper than the access to the Internet via the PCs.

SMS not only provides a low-cost alternative to voice communications that is especially popular in low-income countries, but it enables a wide variety of data services, including financial transactions, news and market price updates. It is estimated that 1.9 trillion text messages\(^2\) were sent in 2007, producing revenues of US$ 52 bn for mobile operators, the Asia Pacific region, including Japan, being the biggest client base.

Regarding Internet access and connectivity, the global Internet user community grew by more than 300% between December 2000 and June 2008 when there were about 1.46 billion Internet users worldwide, which is equivalent to an overall user penetration rate of 21.9% (see figure 1). China has now the largest number of Internet users in the world (253 million) followed by the US (220 million). Chinese has become the second most important language among users over the Internet (more than 260 mil Chinese users vs. at least 311 mil English users). Regionally, North America and Europe recorded the slowest growth in the number of Internet users between Dec. 2000 and June 2008 (130% and 266%, respectively), while the Middle East and Africa recorded the fastest growth (1180% and 1030%, respectively).\(^3\)

Broadband services, however, show quite a different pattern. As figure 2 illustrates, broadband connectivity is mainly concentrated in the high-income economies, especially in Europe, which account for nearly three-quarters of the total 300mn broadband subscribers recorded at the end of 2007 (equivalent to a global penetration rate of only 4.6%). Lower-middle income economies accounted for 20% of global broadband subscribers (with China alone accounting for 87% of these or 15% of the global total). Low-income countries accounted for less than 1% of total global broadband subscribers, with India and Vietnam accounting for virtually all of these.

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2 Gartner study, see http://www.smstextnews.com/2008/05/2_3_trillion_messages_sent_this_year.html
3 http://www.internetworldstats.com/stats.htm>
Figure 1: Number of Internet users and Internet user penetration rate (2000-2008)

![Chart showing the number of Internet users and penetration rate for different regions from 2000 to 2008.](http://www.internetworldstats.com/stats.htm)


Figure 2: Top economies with highest number of broadband subscribers (Sept. 2007)

![Chart showing broadband subscribers and penetration rates for different countries.](http://www.internetworldstats.com/stats.htm)

I.1.2. ICT Devices

The demand for computers continues to rise due to various factors. One is the drop in price, which saw a release of lower cost machines costing about US$ 200 in late 2007. The highest growth rates in PC sales are within the European, Middle Eastern and African (EMEA) regions. The EMEA regions were also the largest PC markets in 2007, followed by the Asia-Pacific. Despite this rapid growth, PCs and portable laptops are still considered to be of relatively high-cost compared with per capita incomes, especially in low-income economies. The cost factor remains a major concern as it constrains the more widespread uptake of more advanced ICT services. As a result, only about 1 billion PCs were in use worldwide, and nearly three-quarters of these PCs were located in just 15 countries. China, India, Mexico and Russia were the only non-high-income countries represented in the list.

The demand for laptops and computers is also growing, partly owing to subsidisation by Internet service providers and various initiatives by the international community. The internet providers America Online and Orange launched laptop subsidy programmes for two-year contracts in the US and UK at the end of 2006 and in early 2007. Other operators, including T-mobile are expected to join the trend. Such subsidy schemes could have a major impact in developing countries where lower-income users are less able to pay the high once-off cost of buying a PC but may be better able to absorb such cost in monthly instalments.

Other initiatives designed for lower-income markets could also help to increase supply - for example, the One Laptop Per Child (OLPC) programme, a not-for-profit organisation, which hopes to spread low-cost computers to school children in developing countries. This effort has triggered a large number of commercial manufacturers to develop their own low-cost PC designs, the most well-known of which are the Intel Classmate PC, and the ASUS Eee PC, which are also now in commercial production. In November 2007, the OLPC programme started mass production with initial recipients being children in Mongolia, Peru and Uruguay. In an innovative fund-raising effort, OLPC launched a ‘buy one, give one’ project where consumers in North America can buy a laptop for themselves and donate another to a child overseas. AMD, the largest chip manufacturer in the world has also developed a range of low-cost PC units as part of its 50x15 initiative which aims to help accelerate digital inclusion by enabling affordable Internet connectivity and computing capabilities for 50% of the world’s population by the year 2015. By September 2007, the AMD programme had established about 25 Learning Labs around the world.

I.1.3. Shared Facilities and the use of Radio/TV Broadcasting

To increase ICT access to public, especially in rural areas, a key trend is the greater use of telecentres, public schools and libraries, and the convergent use of ICT and radio/TV broadcasting.

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4 http://www.forrester.com/ER/Press/Release/0,1769,1151,00.html
5 Other similar initiatives include: Alphasmart, Chang Feng, decTOP, InkPC, Intel Community PC, iT, ITP-C, IQ PC, Janata PC, Mecer Education PC, Sinomanic, Sirius, Solo and Terra PHD.
Efforts from international organisations and corporations, including UNESCO, the World Bank, the Canadian government’s International Development Research Centre (IDRC) and Microsoft, have sought to promote and to subsidise public access to ICTs and improved facilities for ICT access run by state programmes. These programmes aim to provide facilities to increase public access to information and ICTs and to help meet the needs of those who cannot afford their own personal access. The emergence of these facilities has accelerated over the last decade, in both developed and developing countries, in the form of commercial cybercafés and telecentre initiatives (often government-supported), which are now relatively common in many small towns and villages.

Public-private partnerships are also increasingly being used to share the costs of deployment of the community-based learning centres. In 2006, IDRC and Microsoft each contributed CAD 17mn (US$ 14.11 mn) to establish a new organisation called telecentre.org, which is devoted to capacity building of telecentre operators in developing countries. The Swiss Agency for Development and Cooperation (SDC), subsequently contributed an additional CHF 5 mn (US$ 4.35 mn) to the project, which aims to train over a million people to operate telecentres. The Asian Development Bank, the IDRC, and NEPAD’s African e-Schools programme supported ICT access initiatives in schools and libraries. The Bill and Melinda Gates Foundation established a Global Libraries initiative in 2006, which provided over US$ 30mn in 2007 to support the provision of free Internet access in national public library systems in Eastern Europe, Asia, Africa and Latin America. In addition, a number of private companies are supporting dedicated ICT training facilities and access points through corporate social responsibility programmes. For example, AMD’s 50x15 initiative mentioned above, and Microsoft, through its Unlimited Potential programme, had by 2007 invested about US$ 130mn in supporting community-based technology and learning centres in 89 countries worldwide.

In many developing countries, the majority of the population relies on existing facilities which can be improved through community-based ICT and appropriate applications, including radio and TV broadcasting services, which are low-cost and readily accessible to all. In Africa, there are more than three times as many radios as TVs, and ten times more radio receivers than fixed telephone lines. An estimated 60% of the population can be reached by existing radio networks. In a recent study found that the number of community radio stations was growing in the majority of countries studied, with a total of 402 community stations in operation in 2006 (although most of these were concentrated in South Africa and the Democratic Republic of Congo). In other countries, innovative uses of radio and TV broadcasting combined with other ICTs have developed, namely Internet and telephony for various activities (including listener clubs among farmers, 'beeping an engineer' project in Cameroon, 'Farmer-to-Farmer' exchange group in Bolivia, delivering healthcare information to patients, and communicating with children of

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6 More specifically: 20 radio receivers per hundred people compared to two fixed telephone lines for hundred people (Girard 2003). In 2006, the African Media Development Initiative studied radio-use in 17 African countries. It found that radio is the most accessible and the most consumed media in all of the countries, which included Angola, Botswana, Cameroon, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Mozambique, Nigeria, Senegal, Somalia, South Africa, Sierra Leone, Tanzania, Uganda, Zambia and Zimbabwe (BBC World Survey Trust 2006).


8 BBC World Survey Trust 2006.
HIV parents). Healthlink Worldwide carries out its projects in Ethiopia, Kenya, Tanzania, Uganda and Zimbabwe based on radio and TV broadcasting. Children can hear their mothers talking on the TV and radio about living with HIV, which can sometimes help them cope with their situation, while mothers have been trained to communicate about HIV and eventually disclose their positive status to their children.

I.2. ICT Infrastructure: National and International Networks and Traffic

The rapid growth in mobile phone and Internet use (particularly broadband) is placing increasing demands on the underlying telecommunication infrastructure. Relatively high volumes of international Internet traffic compared to domestic traffic may be needed in developing countries, due to more limited amount of local Internet content and applications. In most developing countries, at least 70 - 80% of Internet traffic is international, a pattern reinforced by recent macroeconomic trends, including Business Process Outsourcing (BPO) to low-wage nations, greater regional trade and cooperation, and the emergence of pan-regional operators, needing increased intra-regional telecommunications bandwidth. With the capacity limitations of satellite, there is sufficient demand to warrant the construction of fibre-optic connectivity and a reduced use of satellite. There is also a growing need for upgrades in quality of the existing lines and an increase in the number of providers to ensure continuity of service and to avoid monopoly pricing practices.

There are now many international fibre-optic cable projects underway, either to link countries not previously connected to the global-fibre grid, or to augment existing international links. Of particular note are projects linking the countries of the Greater Mekong Sub-region (GMS), and plans to lay cable along the Eastern coast of Africa, which is the longest stretch of coastline in the world without extensive international fibre-optic connectivity. These international fibre projects will vastly improve the availability of international and cross-continental bandwidth over the next two to three years. Intercontinental capacity is expected to increase from the current 1.7 Tbps (Figure 3), to at least 30 Tbps by 2011/2012, covering the need for international bandwidth for almost all countries, except some LDCs of the South Pacific and a number of small islands in the middle of the oceans (e.g., the Laccadive Islands, Seychelles, St. Helena, Ascension and Tristan da Cunha, etc.), where the cost of a cable connectivity remains unjustifiable. These islands will likely continue to remain connected to the Internet by satellite.

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9 ICT in Africa: Boosting Economic Growth and Poverty Reduction, 10th Meeting of the Africa Partnership Forum, Tokyo, Japan, 2008
10 See http://news.bbc.co.uk/1/hi/world/africa/country_profiles/6748187.stm
The demand for national fibre infrastructure in developing countries follows a similar pattern to international infrastructure. Due to the often dispersed population of developing regions, many infrastructure projects seek to establish not only for the national backbones to service major towns, but also to serve as international links to neighbouring countries. In this context, South-South investment plays a significant role. For example, a recent African survey documented the largest build-up of long-distance telecommunication infrastructure recorded to date. Since the start of the project in mid-2006, over US$ 1 billion in contracts have been issued for about 30,000 km of optic fibre in 17 countries, with loans from China Exim Bank for about two-thirds of the amount. These projects will help accelerate the ICT uptake and smooth out the variations in access to ICT infrastructure within and between African countries.

Many countries are considering the alternative infrastructure available and are taking advantage of technological convergence. To augment ICT access and connectivity, various countries have launched new satellites and provided open access networks. In Africa, the NEPAD Broadband Infrastructure Network (NBIN) is similar to a project run in Stokab (the Swedish City of Stockholm’s open access network) and will interconnect countries in East and Southern Africa. Its operation is based on an equal, open-access principle, which will result in increasing operational efficiency and reduced costs. In other countries, satellite continues to play a vital role in television broadcasting and in connecting more isolated and rural areas. Two satellites were launched in 2007 to cater for these needs in Africa - the Regional African Satellite Communication Organisation (RASCOM) launched a satellite with the aim of reducing costs for countries with no international cable connectivity, as well as providing domestic links for those with limited national terrestrial networks. In cooperation with China, Nigeria launched a communication satellite in May 2007,
with a footprint covering 38 African and five European countries. Other developing
countries that have launched communication satellites in the last 12 months include
Brazil, China and Vietnam.

Technological convergence can also provide multiple, low-cost backbone
activities to supplement the national and international telecommunication
infrastructure. Developments such as Internet Exchange Points (IXPs), local
domain name servers, Internet TV (IPTV) and radio, Internet Protocol or IP-based
infrastructure (including Next Generation Networks or NGN, IPv4, and IPv6), and
VoIP operator (Skype) can help reduce the costs of international Internet connectivity
and improve access speeds to local websites. One estimate suggests that only US$ 40,000
could fund the establishment of an IXP. Furthermore, mirror servers, which
help reduce demands for international bandwidth as well as improving reliability and
responsiveness for users, are often located in IXPs, and are not costly to set up. The
use of these devices can prove problematic as the need for large amounts of reliable
bandwidth increases. On a long-term basis, the need for fibre optic cable connecting
directly to the end-user may prove inevitable.

I.3. ICT Use: Current Key Trends

Promoting ICT access is a starting point but not a sufficient element to ensure
full benefits from ICTs. The potential of ICTs to bring social or economic value for its
users depends also on other factors such as user's ability to access relevant content or
to derive economic opportunities from using ICTs.

To understanding how individuals, organizations, governments and enterprises
are using ICTs and how different participants of the information society benefit from
such technologies, detailed quantitative and qualitative studies that look beyond the
evolution in the number of mobile subscribers or Internet penetration rates are
required. In this regard, UNCTAD carries out work to examine how enterprises use
ICT (see UNCTAD's work on measuring ICT use by enterprises) and to understand
how individuals from disadvantaged communities, including those that depend on
telecentres, are exploiting ICTs to their benefit.

To assess to what extent disadvantaged communities benefit from ICTs,
Report 2006. The Development Perspective. Geneva, New York} developed the 12 C's Pro-Poor ICTs Framework (see Box 1). The
framework identifies 12 key areas for meeting the needs of the poor. As the framework
shows, Connectivity (e.g., ICT access) is one element among several that influence
the ability of people to benefit from ICT. The key message of the framework is that
policy makers and ICT practitioners should take into account several issues, and not
only ICT access, to ensure that ICTs bring a positive impact to its users. Governments
looking at creating awareness and building pro-poor ICT capacities, both at policy and
programme levels, may wish to consider UNCTAD's framework to examine to what extent
specific ICT policies or programmes are pro-poor.\footnote{UNCTAD (2006).}
### Box 1: The 12 Cs of the pro-poor ICTs framework

<table>
<thead>
<tr>
<th>12 Cs</th>
<th>Key issues</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td>- Infrastructure &amp; technology (hw/sw) accessible &amp; affordable</td>
<td>Extent to which the planned infrastructure and technology ensure the people living in poverty can use and afford them.</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>- Relevant - Accessible - Beneficiaries involved</td>
<td>Extent to which the content is relevant to the needs of the targeted population. Can women and men access and use it to meet their needs? Is it available in the local language &amp; accessible to non-literate and ICT-illiterate people? Do beneficiaries participate in the development of the content?</td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td>- Who benefits? - Beneficiaries participate</td>
<td>Who should be the target group? How do the different stakeholders participate in the programme? Are beneficiaries taking part in the design and implementation of the programme? How will the intervention affect the different groups (women, men, old, young, illiterate, etc.) of the community?</td>
</tr>
<tr>
<td><strong>Commerce</strong></td>
<td>- Supports livelihoods</td>
<td>Does the planned intervention sustain the livelihoods of the beneficiaries? To what extent does it support the economic activities of the beneficiaries?</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>- Beneficiaries’ capacity - Organizations’ capacity</td>
<td>Do beneficiaries have, or can they acquire, the capacity to participate in the programme? Do the organizations involved have the (financial and organizational) capacity to develop and implement the programme?</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td>- Supportive culture - Learning promoted</td>
<td>Is there a forward-looking and supportive culture for using ICTs for poverty alleviation?</td>
</tr>
<tr>
<td><strong>Cooperation</strong></td>
<td>- Stakeholders cooperation favourable</td>
<td>To what extent is the cooperation among the different stakeholders favourable to ICTs for poverty alleviation?</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>- Financial sustainability</td>
<td>Are there sufficient financial resources?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>- Adapted to context - Influences context</td>
<td>Is the policy or programme adapted to the local context? Is the intervention able to influence changes for a more favourable context for using ICTs for poverty alleviation?</td>
</tr>
<tr>
<td><strong>Continuity</strong></td>
<td>- Monitoring and evaluation - Flexible, promotes learning - Potential for increased impact - Socially sustainable</td>
<td>Does the policy or programme incorporate a monitoring and evaluation component? Does it promote learning and allow flexibility for adaptation? Could the ICT programme be scaled up? To what extent is it socially sustainable?</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>- Beneficiaries’ ownership - Stakeholders accountable</td>
<td>Do beneficiaries have ownership of the policy or programme? Do beneficiaries have a say in the design, implementation and evaluation of the policy or programme? Are the different stakeholders accountable?</td>
</tr>
<tr>
<td><strong>Coherence</strong></td>
<td>- Pro-poor</td>
<td>To what extent is the ICT policy or programme consistent with other pro-poor policies and interventions?</td>
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</tbody>
</table>

Online social networking and services based on user-provided content are now among the fastest growing areas of the Internet, and the biggest consumers of bandwidth. Services such as My Space, Facebook, Friendster, Wikipedia, YouTube, Bebo and Orkut have enjoyed explosive growth over the last two to three years. In 2007, it was estimated that Wikipedia, the free, volunteer-created encyclopedia, had more than six million articles in more than 250 languages, while YouTube hosted 15 million video streams a day and shared daily an estimated 1 bn songs in MP3 format via P2P networks.

For developing countries, some immediate benefits from the use of social networking tools are online fund-raising and micro-lending activities. RealityCharity, for instance, invites organisations and individuals to raise funds by posting appeals and then using social networking tools on its site, using Facebook, Twitter, StumbleUpon, and Slashdot to spread the word to potential donors. Money raised through RealityCharity is disbursed electronically to fund-raisers, without an intermediary. Two of the biggest services, Firstgiving in the US and its UK counterpart, Justgiving, work only with charities and non-profit organisations based in these two countries.

There are also other applications of social networking systems that have been adopted by the private sector, such as the Elephant Design website in Japan, which involves consumers in advising companies on how to make better products. It claims that 6 out of 10 of the top selling products of one leading Japanese retailer have been developed through the site.

I.4. Institutional Reform

The latter part of the twentieth century has witnessed a global trend moving away from state-run economies towards more open market economies. Telecommunications have been included in this movement - there has been a steady trend toward the privatization of state-owned companies, growth of competition and foreign investment, and liberalization of regulation. In ITU words: “...today’s telecommunication market: [is] private, competitive, mobile and global. The pace at which these have occurred is remarkable, that calls for liberalization of the industry are increasingly overtaken by reality.” The ITU regulatory survey reported that since its start in 1994, the number of countries that have privatized the ICT sector has doubled and the number of countries providing competitive basic services has grown by over 500%, including such services as voice telephone services (for example, VoIP), fixed-line broadband and broadband wireless access (ITU, 2008).

In addition to liberalizing market-entry types of regulations, governments have placed ICT planning and initiatives high on their agenda. Some examples of this include:

- Chile was the first country in South America that had taken a leadership position in developing a comprehensive ICT plan, developing e-government services, a comprehensive school network and curriculum programme and coordinating telecentres.

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The Indian Government has convened task forces which led planning and reform, and both national and state governments have encouraged investment in infrastructure and supported efforts to bring telephony and Internet connectivity to rural villages.

The Singapore Government has played a major role in ICT planning by making direct investments and developing and offering e-government services.

In addition to planning ICT development, the Chinese Government has allowed state-owned enterprises to compete with each other and has allowed competition among companies connecting to state-owned backbones.

In the United States, the National Science Foundation (NSF) has funded the building of a backbone Internet network, while universities and research networks pay for their individual connection to the network.\(^\text{16}\)

Despite the progress of liberalization and planning initiatives, some obstacles remain, including the lack of free institutions, appropriate property rights protections, freedom from corruption, labour freedom and, to a large extent, the lack of human technical capacity.

II. Forging ahead: Progress and Innovations

To varying degrees, nearly all countries have liberalized their telecommunication industries during the last twenty-five years, and there is some evidence to suggest that the consequent increase in competition among retail providers have led to more innovative services at lower prices. Market liberalization has resulted in considerable advances, but some basic elements - financial, technological, infrastructure, human capacity - are still lacking in some markets preventing even greater connectivity. Part II of this Report highlights some examples of how innovative uses, adaptations and good practices can maximize ICT connectivity, through a mixture of local knowledge, business innovation and government-led initiatives. It then goes on to discuss the various factors which can boost ICT connectivity, promote competitiveness and reach a wider population base. In no way does this analysis seek to establish any pre-requisites or propose a 'one-size-fit-all' approach. Rather, it offers possible options based on country experiences for consideration. A hybrid approach, taking into account country’s specific circumstances, could yield greater connectivity for urban as well as rural areas.

Box 2 gives examples of how the rapid growth in mobile phones complemented by dramatic reductions in its costs and the use of pre-paid mobile telephony, can significantly increase access to ICTs through the use of SMS text messaging, and other low-bandwidth text-based services. Innovative uses and applications, such as m-banking, payments, trading, news or market information\(^\text{17}\) mean that SMEs, microenterprises, as well as individuals (a proportion of whom are


\(^{17}\) The impact of telephony on the bottom of the socio-economic pyramid is demonstrated in a study in Laos PDR conducted by Gi-Soon Song, which found that 80% of users earned less than 1 dollar a day. Their phone use focuses on contact with family members and information on government issues and by substituting one trip per month by a phone call, it was found that the poor could generate an average surplus of up to US$ 103 per year. Source: \text{http://www.lao.net/html/ICT/conf01soonson.htm}.
"unbanked"), have better access to simple forms of banking and sources of financing, making financial transactions faster, cheaper and safer. In Kenya, for example, workers in urban areas no longer need to hand precious wages over to bus drivers, to pass on to their relatives at the workers' home villages en route to their destination.

Another approach that has emerged recently for providing access for those who cannot afford their own equipment is to provide people with their own telephone number and a voice mailbox. In South Africa, a company announced a service in early 2008, where agents operate pay-phones in shops or kiosks, offering customers with a free phone number and selling them airtime. Customers are given a secure PIN code and once they log in, they can make low-cost calls and operate a voice mailbox with free message retrieval.

Mobile telephony can facilitate economic growth in many ways, at the macro as well as the micro levels. In a study of the economic impact of mobile communications in developing countries sponsored by Vodafone, Waverman et al., (2005) found that a doubling of mobile penetration in “Low income” and “lower-middle-income” developing countries would lead to a 10 per cent rise in output. At micro level, the impact is even more promising for its use in the conduct of businesses, for direct and indirect employment opportunities, in the healthcare system, agricultural sectors, to name a few.

<table>
<thead>
<tr>
<th>Box 2: Some examples of successful mobile applications</th>
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<tbody>
<tr>
<td>Mobile phones can be used for more than simple phone calls. In Africa, the diversity of mobile applications is impressive in disseminating and sharing information:</td>
</tr>
<tr>
<td>- In South Africa, Wizzit allows anybody with a mobile phone to access his/her bank account from their pocket, with the opportunity to make person-to-person payments, transfers and pre-paid purchases without a bank account. There is no monthly fee - people only pay for transactions they execute.</td>
</tr>
<tr>
<td>- In Kenya, an SMS job vacancy service has succeeded in creating annual revenue of US$100,000. The service has more than 30,000 subscribers who receive between 150-200 job vacancy announcements per week. Using a pre-paid service, they pay per offer they receive. 60-70% of the offers are filled by the subscribers, which results in much faster results for the employers.</td>
</tr>
<tr>
<td>- TradeNet, now operating in 17 countries, provides information about agricultural goods for people wishing to sell or buy commodities. After negative experiences with external funding, TradeNet decided to provide the basic information for free but charge for tailored and more sophisticated services to remain financially sustainable in the long-term.</td>
</tr>
<tr>
<td>- The relevance of mobile phones in African people’s lives has also been recognized by Google which announced that it will need to tailor its products to work better on mobile phones in order to make a real headway in penetrating markets in Africa.</td>
</tr>
<tr>
<td>- In Cape Town, South Africa, SMS is used in healthcare project to alert Tuberculosis (TB) patients to take their medication, thereby boosting recovery rates of patients and reducing financial costs and the burden on the public healthcare system as a whole.</td>
</tr>
<tr>
<td>- In India, mobile phones facilitate social ties and blur cast boundaries. It has been the major help, especially for women to maintain the communication with their families in cases, where they may be mistreated in their in-law’s house, fall ill, or face starvation.</td>
</tr>
</tbody>
</table>

Source:
- http://www.wizzit.co.za
- http://www.tradenet.net

Government policies which promote competition can be helpful to the development of countries' mobile markets, as broad experiences in many countries suggest that greater competition can reduce the cost of telecommunication services significantly and improve mobile telephony services. Governments may explore locally relevant policies to adapt, change and extend mobile services and networks in order to allow greater ICT access in remote rural areas.

At the international level, international organizations join efforts to bring about worldwide recognition of the business practices which contribute to the implementation of the Millennium Development Goals (MDGs). The *World Business and Development Award* is an example of a joint award hosted by the International Chamber of Commerce (ICC), the Prince of Wales International Business Leaders Forum (IBLF) and the United Nations Development Programme (UNDP). This year (2008), three companies (among ten winners) have been awarded for their innovative products and services in the ICT area, which contribute to the furthering of the MDGs. These companies include: the M-Pesa service of Safaricom, which provides credit services to the poor through mobile phones in Kenya; the SMART services and products, which provide access to communication and micro-enterprise opportunities in the Philippines; and the ZMQ products, which raise awareness about HIV/AIDS with pioneering mobile games in India.¹⁹

With regard to providing greater access to public, telecentre initiatives can be used as platforms in bridging the digital divide by not only providing access to ICTs but also by offering other added value services such as ICT training. These projects can benefit from funding by the state administration, private corporations, or by Non-Governmental Organizations (NGOs). Centres established in close collaboration with the community can help address key issues of decentralization, accountability and increased voice and participation (Box 3).

¹⁹http://www.iccwbo.org
Box 3: Telecentres and cybercafés

Telecentres are public facilities where people can access the Internet, use computers and other information and communication technologies to gather information, communicate with others and develop digital skills (telecentre.org), while Cybercafes are privately owned, primarily established in urban areas and providing limited services such as e-mailing and browsing (Fillip and Foote 2007). These institutions may be dedicated facilities or provided through existing entities (for example, store-front shops, libraries, community centres, police stations and clinics). Their institutionalization is considered an important way of meeting universal service objectives in rural and remote locations. There are many national programmes and international projects underway throughout Africa, Latin America and South Asia to test different telecentre models, means of implementation and mechanisms for sustainability. All these different models have one common goal: to serve the community and support local development.

• In Kenya, the Government has launched the Digital Village Project to establish ICT centres throughout the country. To jump-start the process, this programme is training 1000 digital village managers to oversee centres in 210 national constituencies. Managers undergo an intensive three-week training programme in the basics of business management. The ICT centres will be operated on a public-private partnership basis with the Ministry of Information and Communications and will involve collaboration across government, public and private sector organizations, development partners, civil society and individuals.

• In India, the Government has launched two major initiatives for the use of telecentres: the e-governance initiatives (NeGP project); and the E-Gram initiative. The former initiative aims to ensure the availability of government services at grassroots level, including health, legal, employment and other services on a local level and to generate income through direct and indirect job creation. Under this project, the Government intends to create 100,000 technology-enabled points-of-presence called Common Service Centers (CSC) for some 600,000 villages. Implementation will be carried out through public-private partnerships and selected service center agencies responsible for an area. By contrast, the E-Gram initiative aims to digitize household information for the government. Outsourced individuals will go from house to house collecting details of a family's health, education, agriculture, and sources of incomes to be compiled into a family datasheet. Based on these data, families eligible for government entitlements can be identified, and information regarding these entitlements can be relayed back to them.

Sources:
1 ICT in Africa: Boosting Economic Growth and Poverty Reduction, 10th Meeting of the Africa Partnership Forum, Tokyo, Japan, 2008
2 http://dqindia.ciol.com/content/top_stories/2008/108061901.asp
3 http://www.indiatogther.org/2008/may/gov-telectr.htm

To exploit the full potential of telecentres for supporting local development, policy makers can examine the key areas highlighted in the 12 C's Pro-poor ICT Framework. For instance, to narrow the gender and other digital divides, policy makers and telecentre managers must pay attention to the Community component and examine who benefits from telecentres. As the study of Chilean telecentres shows (See box 4), there are windows of opportunity to ensure that different members of the community can benefit from accessing and using ICTs through telecentres.
In 2006, UNCTAD conducted a study on Chilean telecentres and their contribution to poverty, in particular among women. Chile was selected as a case study because the Government has put in place a broad ICT strategy for development that includes support for Chilean telecentre networks. Chile’s development in the last decade, including in the area of access to and use of ICTs, has been notable. However, wide gender and economic disparities, including in ICT access and use, persist (Cecchini, 2005).

The research used UNCTAD’s 12 Cs pro-poor ICT framework as the point of departure for a survey and follow-up interviews among stakeholders from different Chilean telecentre networks. The 15 in-depth responses, albeit from a limited number of participants, provide a flavour of the capacity of the telecentres to support livelihoods.

The Chilean telecentre network is a resourceful initiative: (a) it has strong and continued political support; (b) it strenuously engages with different actors; (c) it has implemented a large-scale ICT literacy campaign; and (d) it has had successful experiences in sustainability and community involvement.

However, its relevance for reducing poverty among women is limited by several factors: (a) some stakeholders understate, where others take for granted, the importance of telecentres for reducing poverty; (b) there is limited understanding of how poor men and women use and benefit from telecentres; (c) gender is not mainstreamed — for instance, no specific training content, evaluations or resources have been developed/earmarked for (poor) women — and the involvement and ICT capacity of women's institutions and organisations are limited; and (d) telecentres have yet to provide specific skills and livelihood opportunities.


Regarding the commerce component, telecentres often have not been fully successful at providing economic opportunities for their managers and users20, largely due to the limited availability of content and services, lack of capacity of the governments to develop e-government services in the short term, and the absence of broader economic and business structures and conditions21. Nevertheless, best practices show that telecentres can enhance their ability to provide economic opportunities to disadvantaged communities when:

- They support local communities. For example, by providing access to government services such as land records or by offering customized information services.
- Specific support to those that need it most is provided. For example, using community infomediaries (i.e. persons that can make a link between information available through the Internet and individual information needs) is particularly important if communities with low literacy levels are to benefit from the Internet.

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20 Telecentres are public facilities where people can access the Internet, computers and other information and communication technologies to gather information, communicate with others and develop digital skills (telecentre.org).
21 UNCTAD (2007a).
In terms of Capital and Continuity, that is financial and social sustainability, public private partnerships (PPPs) among government authorities, local civil society organizations and private organizations, can help in the financial and social sustainability of these telecentres. A good practice has been to establish a joint committee comprising of the centre staff and people drawn from the community. This committee comes together on a regular basis to discuss the current activities of the telecentre, areas that need to be strengthened and ways to strengthen them, and future activities.

These initiatives have achieved some success in addressing the issues of financing, community monitoring and ownership. Technology is only one enabling factor for successful increase in ICT connectivity; more importantly, softer issues – such as local inclusion, training and management – often determine the success or failure of a programme:

- **Inclusion:**
  1) Telecentres should be established in rural, disadvantaged locations as priority.
  2) Information should be available in the local language and in electronic forms so people can obtain information for themselves.
  3) The centre should ideally also conduct computer training for villagers.
  4) The staff should include local people, catering to local information needs and give the community a sense of ownership of the initiative.
  5) Telecentres should provide public spaces and ICT access, encouraging social integration between rich and poor, men and women, young and old alike. This also helps change the balance of power in local culture, albeit slowly.

- **Social Sustainability and PPP Financing:**

  As the centres become indispensable to the lives of the community, especially in terms of access to knowledge, the financing of telecentre initiatives has been based on PPP (Private Public Partnerships), village contributions and other voluntary contributions.

- **Community monitoring and ownership:**

  The general practice has been to establish a joint committee comprising of the centre staff and people drawn from the community. This committee comes together on a regular basis to discuss the current activities of the telecentre, areas that need to be strengthened and ways to strengthen them, and future activities.

  With regard to ownership, governments as well as international efforts have helped train information workers in the managerial aspects of running the telecentres, so trained workers can run the centres smoothly.

- **Outsourcing:**

  Due to limited manpower, this alternative confines the government’s responsibility to the area of supervision, while the day-to-day running of the local telecentres is left, for example, in the hands of the communities.

Another important aspect of the use of telecentres is that they can promote "soft penetration" by narrowing the gap for the gender divide. Sociocultural and religious customs (for example, restrictions on travel by women and girls, restrictions on interactions with members of the opposite sex, and preconceptions about the ability of females to understand and manipulate technology) all contribute to reducing women's use of ICT. Furthermore, female workloads including domestic, income-generation and community activities mean that they often do not have free time to travel to, learn about and use ICTs. Increasing public access centres in rural areas has helped to enhance the participation of women and girls. As important as the
ICT access is the content - locally developed content strategies can help to ensure that the interests, concerns and perspectives in terms of information and language needs of women are better reflected.

As with telecentres, the use of radio and TV broadcasting has also helped change entrenched gender practices and behaviours. The Radio Farm Forum (RFF) in Zambia is one case in point.22 As farmers recognized that their wives could benefit from the RFF programme, the women were encouraged to listen to the programme and practice what they learned. Many women reported that this had imbued them with a role and a sense of importance for contribution in family and community development. Factors determining the success of the operations of RFF include the following ones:

- **Broadcasting time:**
  As women’s participation in the RFF groups is increasing, the timings of the programmes have been adapted to accommodate women’s daily workloads.

- **Local content:**
  There has been a focus on the development of locally relevant content applicable to for small-scale farmers and their families.

- **Local languages:**
  The delivery of RFF programmes in local languages has made the information understandable by more people.

- **Government support:**
  Government support has been forthcoming in terms of financial supports for the air time, and facilitation efforts in recording, producing and transmitting the radio programmes, as well as the introduction of new technologies, including free-play radio sets, which have enabled farmers to use alternative sources of power, other than batteries.

Recognizing the impacts of these developments on the livelihoods of people living in poverty and particularly for women and girls, it is vital that policy-makers take these points into account when formulating measures to ensure the financial and skill supports for the effective use of the broadcasting system. Government can seek views and inputs from stakeholders to policies to the needs of the community. (Box 5)

22 Zambia: The Radio Farm Forum by Richard Siaciwena, 2000, Case Studies of Non-Formal Education by Distance and Open Learning
Box 5: Elements of appropriate community radio legislation

Insufficient legislation and high licensing fees are key constraints for community radio stations. Appropriate community radio legislation includes:

1. a legal framework with a three-tier system for broadcasting - public, commercial, and community radio;
2. government support and policies that clearly recognize and promote the special role of non-profit community broadcasting for, by and about the community, including them in their own communication strategy and allocating funds accordingly;
3. open and participatory decision-making processes for ensuring the fair allocation of the frequency spectrum for broadcasting time and uses;
4. scope for community radio to have recourse to use commercial advertising.

Source: http://www.gersterconsulting.ch/docs/Synthesis_report.pdf

III. Institutional Environment - Challenges and Opportunities

The specific innovations and policy initiatives discussed above provide some lessons for policies to promote ICT development. However, the challenges and opportunities lie within a broader context of policy coordination. A coherent approach to national policy is needed, taking into account political, educational, cultural, scientific, legal, regulatory and financial factors. The main objective of regulation is to ensure transparency and openness while promoting a level playing field limiting the abuse of market power. Effective regulation can promote and strengthen predictability, stability and consistency for telecommunication operators, as well as for investors and end-users. At the policy level, multi-thematic, coherent policy-making has produced tangible results. (Box 6)

Box 6: Multiple Policy Perspectives

- Mauritius is among the top four sub-Saharan African countries (South Africa, Seychelles and Botswana) in the e-Government Readiness Index and digital diffusion index (United Nations, 2004). Mauritius' development vision identified early-on the importance of building an information economy (including ICT development) in ensuring that it could develop into a modern nation and to enhance its competitiveness in the global market place. Its reforms in the telecommunication sector began in 1997 with analytical work and extensive consultations. Recent top-level commitment and specific funding for ICT projects such e-government and e-education has generated a new impulse to strengthening Mauritius' emerging knowledge economy. A key step towards the realization of its goal has been Mauritius' decision to connect to the Southern Africa Far East fibre optic submarine cable, as this significantly enhanced its connectivity. Today, 90% of the population have access to the Internet, and 89% of Mauritian households have fixed line telephone access. Other factors which have helped determine the country’s supportive ICT environment include: stable politics, follow-through in ensuring regulations were implemented and effective liberalization of the ICT sector. In the international context, its bilingual environment is another asset. Overall, Mauritius has achieved tremendous progress in ICT development thanks to a common vision and a supportive public policy framework.

- Chile succeeds in promoting competition in the ICT sector through government planning and applications. Chile is the first Latin American nation to privatize and liberalize its telecommunication sector. The results have shown improvements in teledensity and efficiency. To strive for providing universal service, the Chilean Government will require operators applying for licenses to cover rural areas or charge a universal service fee to subsidize the rural areas. In other cases, providers have to bid for the government subsidy in return for extending their services to cover remote areas (Wellenius, 1997). Today, Chile ranks first or second among South American countries in nearly all per capita telecommunication indicators, including fixed and mobile subscribers, Internet users, personal computers, cost of calls and Internet access (World Bank 2006). In the Chilean national plan -- the Digital Agenda -- it defines an action plan of 34 initiatives, covering many areas, including e-government, education and community access, to name a few. All of these initiatives intend to achieve the using of ICT for the economic, social and cultural empowerment of its people.

Sources:
National policy-making and investment promotion must also take place in the context of regional planning. For example, in the case of African infrastructure projects, while the west coast of Africa has several fibre landing points, the east coast does not. The Eastern African Submarine Cable System (EASSy) proposes an 8,000 km cable project that will connect East Africa to Asia. EASSy is scheduled to begin its operation by the end of 2007, and, if successful, will provide landing point networks such as the one proposed by Tongia\(^\text{23}\) and connectivity for national backbones.

In addition to the benefits in infrastructure cooperation, regional cooperation can play an important role in capacity-building and providing platforms for policy discussion, as shown in the case of Communications Regulators’ Association of Southern Africa (CRASA). (Box 7) Such initiatives can contribute towards regional integration, which is increasingly important for the ICT development, especially as telecommunication, broadcasting, internet and allied technologies and services are converging rapidly. Given market size and harmonized investment and regulatory frameworks at regional levels, the issues of hospitable investment conditions, the protection of intellectual property rights, transparency of regulation, and protection of privacy and personal data, and to a certain extent, the information society issues such as computer misuse and cyber crime, electronic signatures and transactions, as well as elements of e-government and broadcasting can be addressed more effectively.

Box 7: CRASA’s role as catalyst

CRASA, previously known as TRASA, is one of a number of regional associations of independent national communications regulators in Africa – the change in name reflects an increased diversity: from telecommunications to communications. It sees itself as “providing a platform for regulators to exchange ideas, views and experiences in all aspects of regulation of the information and communications sector” and serves as facilitator for regional harmonization in the SADC region. One of the central functions of CRASA is to make recommendations on key policy guidelines. Furthermore, CRASA helps promote capacity-building among its members, which include authorities from 13 different countries. It also has an associate member from the private sector, working with the Nokia Siemens Networks.

Source:
\[\text{http://www.crasa.org}\]

IV. Summary

In many parts of the world, the lack of basic infrastructure (for example, energy supply), combined with high prices and scarce resources for installation and maintenance costs are key barriers to the effective implementation of ICT access and various ICT applications in rural areas. Two additional difficulties are those of the regulatory and planning issues and limited local capacity and involvement. Finally, scarce funding, coordination problems among stakeholders and inequality in terms of access to technology can also make it difficult to replicate successful initiatives.

\(^{23}\) Source: Tongia (2005)
However, some countries have succeeded in implementing initiatives, mainly through the involvement of a broad range of different stakeholders and effective coordination among them. Fully involving the community is crucial for successful and sustainable community access initiatives which can improve the livelihoods of the rural poor through appropriate local technology and content.

Successful projects are also generally self-managed and driven by a bottom-up (i.e. community-generated) approaches, preferably with trained local technical support in the area and with a good network of local, national and international stakeholders. Local governments (decentralized public bodies) and/or schools can often act at least as facilitators. Their involvement is especially valuable in the most isolated rural areas, where these actors can represent the integrating link among community members.

Furthermore, most rural ICT projects depend upon the execution of a coherent national plan, responding to the need for an application of open access, the fostering of liberalization for greater competition and multiple players in the telecom markets. Enabling policies and financing frameworks are needed, along with simplified licensing regulation, procedures, and cost. Such positive political will provides a 'quality seal', vital for obtaining (non-governmental) national or international funding for rural ICT initiatives to support the basic infrastructure (including accessible roads and the provision of basic services, such as energy).

Lastly, it is important to recognize that policies and strategies must take the country-specific circumstances into account. Approaches need to be adapted to each country's situation for an effective enabling environment and regulation to work. Specifically, the translation of “traditional urban-centric” legal/regulatory frameworks (mostly focused on competitive markets where consumers have choice) to rural areas (where “business models”, economic contexts, communication needs and appropriate technologies are different) may not work. Diverse network operators and providers should be encouraged, catering to the different needs of various groups of consumers by providing incentives to encourage competitive behaviour. Collaboration can also be effective to take advantage of complementarities between different aspects of infrastructure ownership and service provision – for example, public-private partnerships involving telecom as well as non-telecom partners in fostering and financing infrastructure development, and encouraging the aggregation of demand for financial and technical resources.

V. Questions for discussion

The following are some of the questions that may help guide the discussion at the CSTD panel:

- What is an effective enabling environment that is necessary for pro-poor use of ICTs in rural areas, particularly with regard to cost of and access to ICTs?
- What evidence is there and which recommendations can be drawn regarding the appropriate enabling environment for the implementation of ICT-related
policies, especially with the aim of having a positive impact on rural livelihoods? Is sound governance a vital issue? Is over-regulation a good practice?

- How could other modes of access in addition to mobile telephony be made available and accessible to the rural population?
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