UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UN Commission on Science and Technology for Development

Panel on

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

Kuala Lumpur, Malaysia
28-30 November 2007

UNCLEARED, UNEDITED DRAFT

NOT TO BE CITED

Prepared by the UNCTAD Secretariat

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Executive Summary

A socio-economic inclusive Information Society is a society in which "*everyone* can create, access, utilize, and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential". To date, many countries have been excluded from the global Information Society, partly in reflection of underlying socioeconomic and political realities that restrict access to information and communication technologies (ICTs). Communities lacking ICT infrastructure often lack access to other critical infrastructure as well. Income divides continue to sustain the digital divide between countries and between individuals within a country.

Although a number of middle-income developing countries (led by China and India) are narrowing gaps in fixed line access with OECD countries, the gap in access with Least Developed Countries (LDCs) is widening. For mobile telephony, the gap between OECD and developing countries has been reduced, with LDCs making considerable gains as well. In 2005, half of all OECD's citizens were Internet users, compared with just one in every twelve inhabitants of developing economies and one in every hundred in the LDCs. Nevertheless, even in Internet access, the digital divide has shrunk remarkably. The debate over the future digital divide is now moving from inequalities in basic “quantity” and “access” to include differences in “quality” and “capacity.”

The critical challenge is how to provide access to ICT infrastructure in infrastructure-poor communities. This issues paper examines innovative ways in which ICT infrastructure can be developed alongside other infrastructure to help achieve national socioeconomic development objectives. It examines the cases of:

- ***ICT-Bundled Infrastructure***: ICT infrastructure can be laid alongside other critical infrastructure such as gas and oil pipelines, sewers, drinking water pipes, railroads, electricity power grids and roads that can accommodate fibre optic cables.
- ***ICT-Enabled Infrastructure***: power lines can be used as communications media. This type of infrastructure is being deployed across America, Europe and Africa.
- ***ICT-Shared Infrastructure***: this type of infrastructure includes, for example, the sharing of common ICT infrastructure by mobile operators to provide coverage to areas that may be otherwise non-economically viable.

An enabling environment at the national and international levels can foster a socio-economic inclusive Information Society. Through a development-oriented policy and regulatory framework based on national context, governments can help build a people-centred Information Society. Governments can also intervene to correct market failures, maintain competition, attract domestic and foreign investment and enhance ICT infrastructure and applications to maximize the socioeconomic benefits of ICTs, especially for underserved communities.

Background

The World Summit on the Information Society (WSIS) took place in two phases, in 2003 in Geneva, and 2005 in Tunis. In the Geneva Declaration of Principles, the first Phase of the World Summit on the Information Society (WSIS) adopted a common vision and commitment to building a people-centred, inclusive and development-oriented Information Society.

The Geneva Phase of the Summit also adopted a Plan of Action, which seeks to translate this vision into concrete objectives, goals and targets, to be met by 2015, along a series of eleven Action Lines and main themes. The second Phase of the Summit at Tunis endorsed the outcomes of the first Phase and adopted a Commitment and an Agenda for the Information Society, which addressed, *inter alia*, the themes of financial mechanisms, Internet governance and WSIS implementation. In recognition of the multi-stakeholder efforts needed at all levels to achieve the objectives of the Summit, the Tunis Agenda for the Information Society established clear mechanisms for implementation and follow-up at national, regional and international levels.

At its tenth session held in May 2007, the United Nations Commission on Science and Technology for Development (CSTD) reviewed progress in the implementation of the WSIS outcomes at the regional and international levels, and recommended for adoption by the Economic and Social Council (ECOSOC) a resolution on the flow of information for the follow-up to the World Summit on the Information Society.[1]

In addition, as requested by the Council in its resolution 2006/46, the Commission agreed on a multi-year work programme that would allow it to undertake annually a review and assessment of progress made at the international and regional levels in the implementation of World Summit outcomes, while also focusing, in each biennium, on a specific theme related to the building of the information society, with a view to bridging the digital divide. In addition, the Commission would continue to examine, within its original mandate, the implications of science and technology for development.

The Commission selected, for the 2007-2009 biennium, "Development-oriented policies for socio-economic inclusive information society, including access, infrastructure and an enabling environment", as a specific theme related to the building of the information society.

1. Access to ICTs: The Global Digital Divide[2]

A socio-economic inclusive Information Society is a society in which "*everyone* can create, access, utilize, and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life…" (WSIS 2005a).

To date, many countries have been excluded from the global Information Society, which reflects existing socioeconomic and political realities that restrict access to information and

[1] Economic and Social Council resolution 2007/8.

[2] This section is based on findings from ITU & UNCTAD (2007), "*World Information Society Report 2007: Beyond WSIS*" Geneva, ITU, 2007.

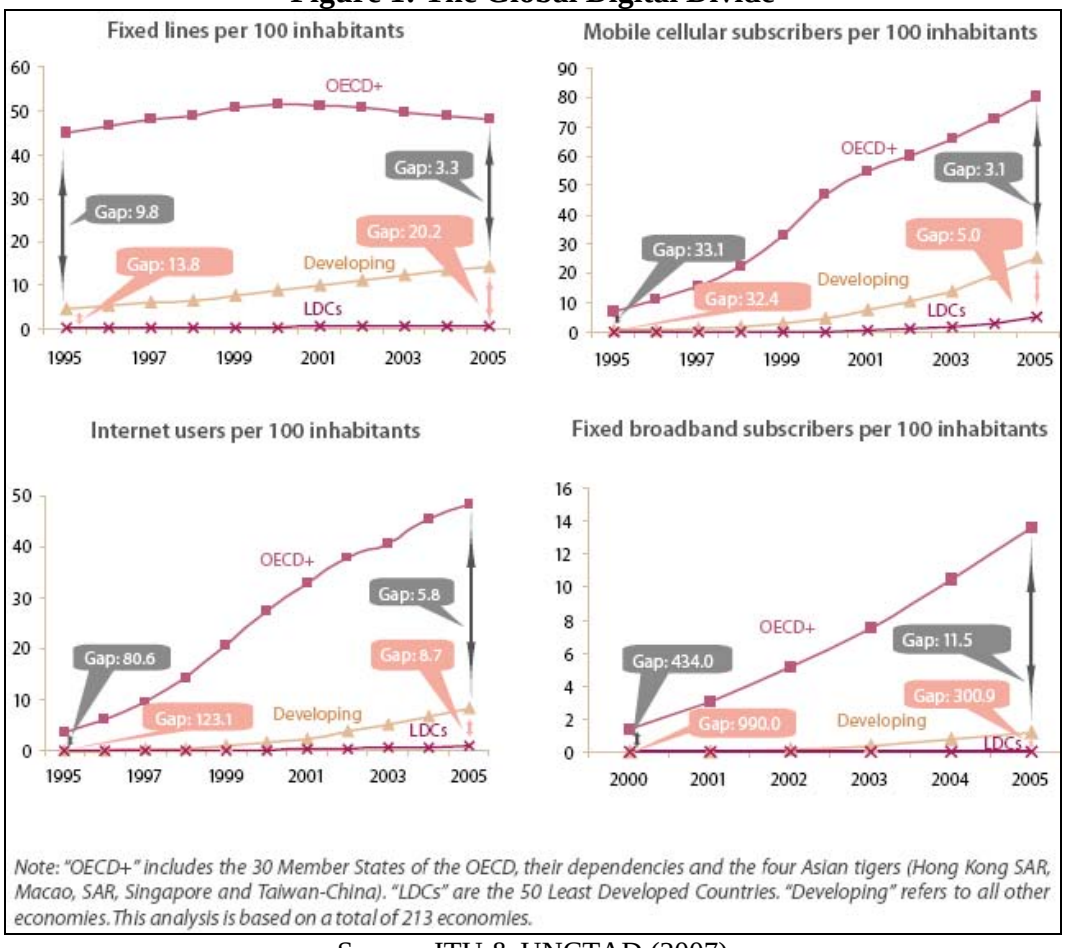
communication. ICTs have the potential to stimulate development, but those most in need of it (i.e., developing nations, low-income groups, rural communities, women, the uneducated and illiterate, ethnic minorities and the disabled) often have only restricted access to ICTs (UNCTAD 2006a).

The digital divide is a dynamic concept. At the exception of mobile telephony, older technologies tend to be more evenly diffused than newer ones. For example, TV sets are more evenly distributed than 3G mobile phones. There is not a single divide, but multiple divides: for instance, within countries, between men and women, between the young and the elderly, different regions etc. The main factor underlying these divides is differences in income and wealth, between countries and between individuals. While disparities in wealth continue to exist, the digital divide will persist. Wealth divides will continue to sustain the digital divide between countries and between individuals in a particular economy.

1.1 Trends in the Global Digital Divide

Figure 1 presents measures of the gap between different groups of countries in the penetration rates of fixed lines, mobile cellular subscribers, Internet users and fixed broadband subscribers for 1995, 2000 and 2005. The gap is measured as the ratio of average penetration rates between different groups of countries in 1995 and 2005 (2000 and 2005 for broadband subscribers).

Figure 1: The Global Digital Divide

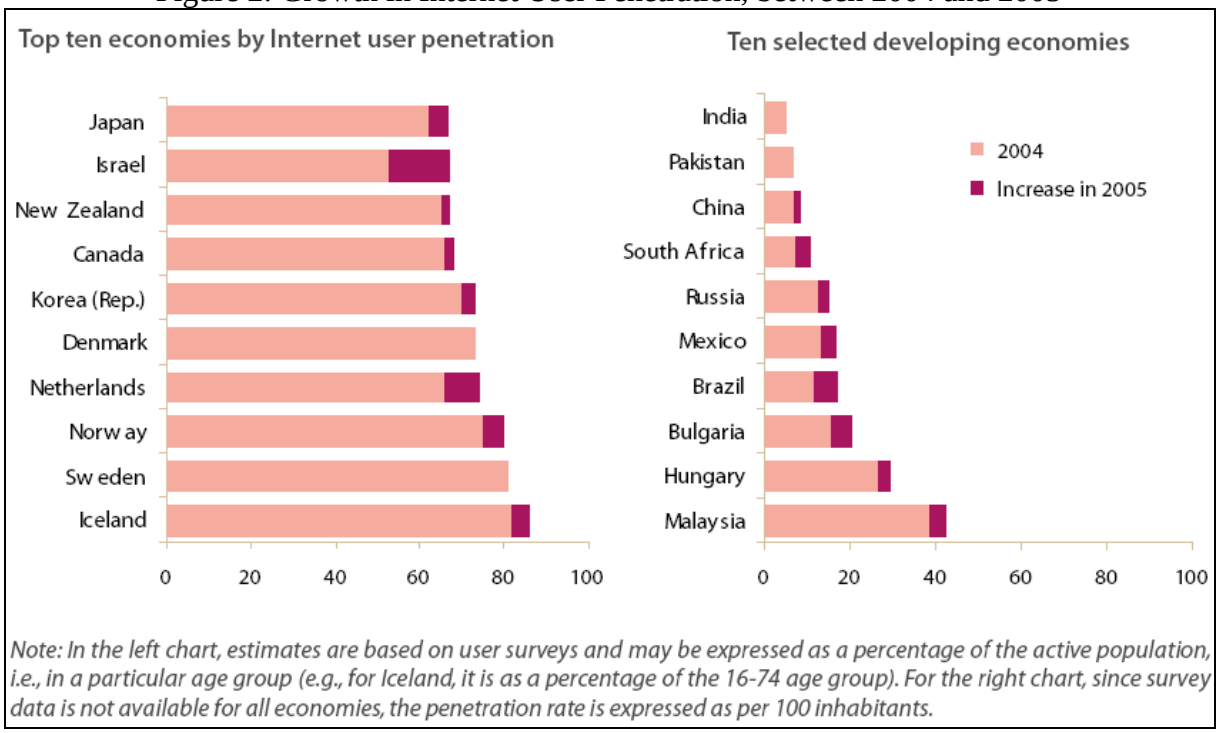


Source: ITU & UNCTAD (2007)

Although middle-income developing countries (led by China and India) are closing gaps in fixed line access with OECD+ countries, the gap with LDCs is widening. For mobile telephony, the gap between OECD+ and developing countries has been reduced with LDCs making considerable progress as well.

In 2005, half of all OECD+ citizens were Internet users, compared with just one in every twelve citizens in developing economies and one in every hundred in the LDCs. Nevertheless, even for Internet access, the digital divide has shrunk remarkably, with the ratio between OECD+ and developing economies plummeting from 80.6:1 to 5.8:1 over the past decade. Indeed, in 2005, almost twice as many new Internet users were added in developing economies and LDCs as in OECD+ economies. As OECD+ economies approach saturation at around 65-70 Internet users per 100 inhabitants, or up to 80-85 per cent of the active population (see Figure 2), the potential for fresh Internet growth derives mainly from the developing world.

Figure 2: Growth in Internet User Penetration, between 2004 and 2005



Note: In the left chart, estimates are based on user surveys and may be expressed as a percentage of the active population, i.e., in a particular age group (e.g., for Iceland, it is as a percentage of the 16-74 age group). For the right chart, since survey data is not available for all economies, the penetration rate is expressed as per 100 inhabitants.

Source: ITU & UNCTAD (2007)

For these reasons, the debate over the future digital divide is now moving away from inequalities in basic "quantity" and "access" to include differences in "quality" and "capacity." Although the ratio of broadband subscribers between OECD+ economies and developing economies declined, the absolute gap grew almost tenfold between 2000 and 2005. In LDCs, broadband penetration is uncommon, with users paying over US$2,000 per 100 kbit/s per month in Cape Verde, for example. However, in Japan or the Republic of Korea, broadband subscribers often pay less than 10 US cents per 100 kbit/s per month.

1.2 Penetration Rates by Income

Another approach for measuring the distribution of ICTs is based on the World Bank categories of high-, upper-middle, lower-middle and low-income economies. By comparing the share of ICTs with share of population, it is possible to determine whether the digital

divide reflects underlying disparities in wealth or whether it is actually reinforcing them. As shown in Table 1, although high-income economies represent less than 16 per cent of world population, they account for almost 80 per cent of global Gross Domestic Product (GDP). Low-income economies account for over a third of world population, but just 3 per cent of global GDP.

Table 1: Distribution of population and GDP by income group

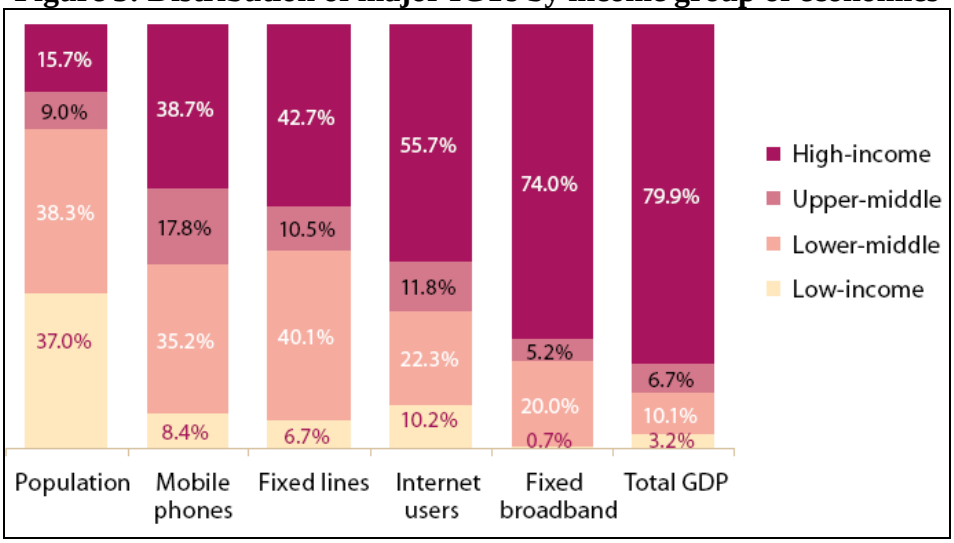
Income group	Number of economies 2005	GDP per capita US$, 2005	Population millions 2005	Population % 2005	Total GDP % 2004
High	55	29'434	1'013.3	15.7%	79.9%
Upper-middle	39	4'344	584.8	9.0%	6.7%
Lower-middle	54	1'521	2'479.1	38.3%	10.1%
Low-middle	58	503	2'396.3	37.0%	3.2%
World	206	5'768	6'473.5	100.0%	100.0%

Source: ITU & UNCTAD (2007)

1.3 Digital Divide and Economic Inequality

Inequality in the distribution of ICTs is not as extreme as inequality in the distribution of global wealth as was the case a few years ago (Figure 3). Mobile phones are the most evenly distributed communications technology and fixed broadband connections the least. Intriguingly, among low-income countries, their greatest share of global ICTs is in Internet users, with low-income countries accounting for 10.2 per cent of global Internet users, since Internet usage in low-income countries includes many forms of communal access (e.g., through schools or telecentres). Overall, mobile phones are more evenly distributed than fixed line telephones. At the end of 2005, there were 1.7 mobiles for every fixed line. Nearly three-quarters of broadband subscribers worldwide were located in high-income countries in 2005, which were home to just 16 per cent of world population.

Figure 3: Distribution of major ICTs by income group of economies



Note: Population data and ICT data are for year-end 2005; GDP data relate to year-end 2004.
Source: ITU & UNCTAD (2007)

Although the digital divide is shrinking in some aspects and increasing in others, only access to ICT infrastructure for digital inclusion will enable universal, sustainable, ubiquitous and

affordable access to ICTs by all (WSIS 2005b). In fact, ICT infrastructure is the foundation for building the Information Society, without which ICT services would be unavailable. The WSIS recommendation for better and more extensive infrastructure is to make socioeconomic inclusion a tangible dimension of the current and emerging Information Society for every ICT service (UNCTAD 2006b).

2. Availability of ICT Infrastructure – The Challenge of the "Infrastructure Divide"

The digital divide is a complex concept that is the result of underlying socioeconomic inequalities. Communities lacking ICT infrastructure usually do not have access to other critical infrastructures as well, including water, sanitation, energy, and transport. Rural populations in particular suffer from structural infrastructure deficiencies, limiting access to ICTs (UNCTAD 2006a). ITU observes that:

> *There is a positive causal link between ICT and the rest of other critical infrastructures and this relationship is mutually reinforcing. When there is access to ICT, there is tendency for economic growth as a result of increased domestic and sometimes foreign direct investment in other sectors especially in small and medium enterprises. Economic growth or increased economic activity has a ripple effect to the growth or development of roads, water, energy etc. The same holds true with respect to the development and availability of other infrastructures: when these develop, demand for ICT tends to increase and a natural attraction of providers of such services emerges due to the high potential return on investment (Zavazava 2007).*

The electricity divide reinforces the digital divide, presenting major barriers to the acquisition of modern ICTs in developing countries for mass production (UNCTAD 2006b; Guinena 2007). In Nigeria, for example, the indivisibility of the various 'wired' facilities are shown, particularly with electrical power and telephone on the one hand, and networks variables comprising personal computers (PCs), modems, and other telecommunication facilities on the other in a group of 42 African countries (Oyelaran-Oyeyinka 2006). The correlations between electrical power and various ICTs are high and significant.

Failure to develop ICT infrastructure along with other critical infrastructure marginalizes developing countries from integration into the global knowledge economy and participation in the Information Society. *The critical challenge is how to provide access to ICT infrastructure in infrastructure-poor communities?*

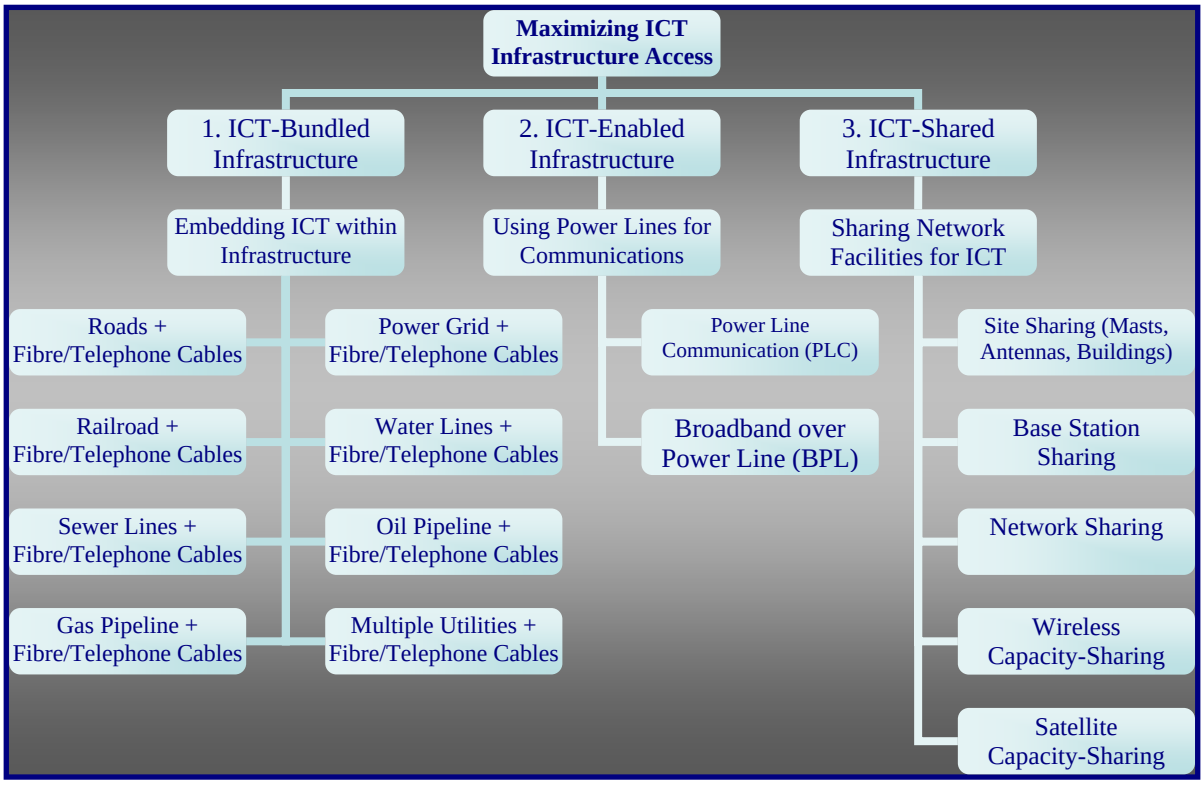
3. Increasing ICT Access by Maximizing Infrastructural Interdependencies

ICT infrastructure can be developed alongside other infrastructure. This has proved to be a cost-effective way to improve access to ICTs. Different types of infrastructure are often interlinked and interdependent. For example, ICT infrastructure is dependent on existing energy infrastructure, and without it, ICT infrastructure is irrelevant. On the other hand, ICTs are increasingly being integrated into the development, performance, maintenance, and upgrading of other critical infrastructures, especially internal communications systems for monitoring.

It is possible to link ICT infrastructure development with almost any other form of infrastructure. Developing access to one form of infrastructure can boost the development of infrastructure in related sectors. Infrastructure projects can be coordinated to maximize these synergies and radically reduce cost, especially for ICT infrastructure and services. As Figure 4 illustrates, this paper examines three ways in which access to ICT infrastructure can be enhanced, through:

- ***ICT-Bundled Infrastructure***: ICT infrastructure can be laid alongside other critical infrastructure such as gas and oil pipelines, sewers, drinking water pipes, railroads, electricity power grids and roads that can accommodate fibre optic cables.
- ***ICT-Enabled Infrastructure***: power lines can be used as communications media. This type of infrastructure is being deployed across America, Europe and Africa.
- ***ICT-Shared Infrastructure***: this type of infrastructure includes, for example, the sharing of common ICT infrastructure by mobile operators to provide coverage to areas that may be otherwise non-economically viable.

Figure 4: Models for Maximizing Infrastructure Interdependencies for ICT Access



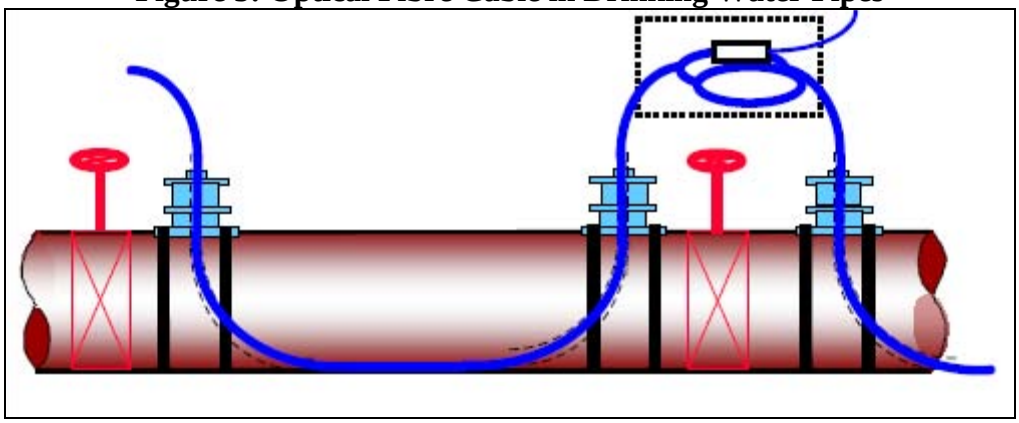
Many real-world examples are available where infrastructure interdependencies were maximized for increased access to ICTs (Figure 4).

3.1 ICT-Bundled Infrastructure

ICT-Bundled Infrastructure accommodates ICT infrastructure as part of or alongside its construction. ICT-bundled infrastructure can take advantage of Rights Of Way (ROW) of utility owners and their conduits to provide facilities for ICT infrastructure, reducing construction costs associated with ICTs and making ICT services available in places where other utilities operate. Sanitary sewers, combined sewers, potable water pipes, natural gas pipes, petroleum pipelines, irrigation pipelines and industrial waste lines can be used as conduits for running fibre optics cables to accommodate the growth of the Internet in the global economy (Jeyapalan 2007). There are rich examples across the world that have demonstrated the technical feasibility, increased ICT access, and reduced cost of bundling critical infrastructure with ICT cabling.

Latin American and African countries are increasingly moving towards an ICT-bundled power infrastructure business. Ecuador's Transelectric completed construction of a 1,000 km national fiber-optic backbone along its electric power transmission network in mid-2005 (Business News Americas 2004). With railways offering good rights of access, many countries are offering public-private partnerships to install fibre networks along their railways (Guinena 2007). Contrary to conventional wisdom, even sanitation and water services are prime candidates for ICT-bundled infrastructure. Drinking water pipes have long been home to telecommunication cables, as far back as 100 years ago (Jeyapalan 2007). Figure 5 below shows a recent technological solution for the installation of fibre in water pipes.

Figure 5: Optical Fibre Cable in Drinking Water Pipes



Source: Jeyapalan (2007)

Some countries are not limiting ICT-bundled infrastructure to their main infrastructure sectors, but are bundling various other infrastructures with ICT. The model case is that of Reykjavik Energy in Iceland, formed in 2000 with the merger of Reykjavik Electricity, Reykjavik Hot Water Works, and Reykjavik ColdWaterWorks. Reykjavik Energy recently bundled these three basic utilities with fibre data networks as the fourth utility and sewage management as its fifth utility in a common pipe-based infrastructure (Birgisson & Svavarsson 2006).

3.2 ICT-Enabled Infrastructure

ICT-Enabled infrastructure is where power lines are used to transmit telecommunications signals. Power line communication (PLC) and Broadband over Power Lines (BPL) are key technologies that allow the transmission of data over power lines. PLC is based on the concept that any copper medium will transport any electrical signal for a certain distance. If the electrical signal is modulated with the data to be sent, then the copper medium (power lines) supply data as well as electricity (GTS 2007; Hofstra 2005).

Africa is beginning to harness PLC and BPL technologies to expand ICT access through the power grid infrastructure. Goal Technology Solutions (GTS) in South Africa is pioneering BPL technology at home and throughout the continent for the roll-out of broadband Internet in a way that is significantly less costly than fibre-based solutions, with contracts in Uganda and Rwanda (Mochiko 2007; Hill 2006; New Vision 2007; Nabyama 2007). Namibia's Nampower and Kenya's KPLC are also eyeing PLC and BPL technologies for enhanced power grid management and maintenance and increased telecommunications access (Stork 2005; Mark 2007).

3.3 ICT-Shared Infrastructure

ICT-shared infrastructure is where various ICT services share the same communications infrastructure or facilities. Unlike the other two models, ICT-shared infrastructure does not necessarily incorporate another form of infrastructure. Rather, it maximizes the potential of common telecommunications infrastructure to facilitate increased ICT access, reduced costs, and/or differentiated ICT services. ICT-shared infrastructure makes telecommunication services more economically viable for rural areas, reducing costs and avoiding infrastructure duplication (Stern et al. 2006; ITU 2005). Infrastructure-sharing can happen at various levels, from the more "passive" sharing of sites to the more "active" sharing of network infrastructure (ITU 2005).

3.4 Benefits of Maximizing Infrastructure Interdependencies for Increased ICT access

The greatest benefits from a developmental perspective are increased access to ICTs and potentially less costly services. Utilizing common network infrastructure or other critical infrastructure can catalyze socioeconomic inclusion within the Information Society. Damage to the environment can be minimized, where infrastructure interdependencies are maximized (Southwood 2007a; Stern et al. 2006). Besides these developmental benefits, financial incentives can be made available to utility and telecommunications companies to maximize these infrastructure interdependencies.

Bundling ICT infrastructure with other utility infrastructure is a way to generate alternative revenue streams and reduce operating costs. More money can be made available through contracts with telecommunication firms using the ICT infrastructure - energy companies in particular may experience "added power sales from a more dynamic local community that has access to ICT tools" (Spintrack AB 2005). Additionally, operating costs related to utility troubleshooting, measurement and monitoring can be reduced, with the integration of communications systems within a utility's infrastructure. Political will may also be increased for the roll-out of ICT infrastructure, if the government utilities have a business model for benefiting from the increased ICT access. Finally, the additional revenues generated can be used for other public-sector needs (Horan & Jakubiak 1996).

3.5 Critical Considerations related to Infrastructure Interdependencies

Increasing access to ICT infrastructure by maximizing its interdependencies with other infrastructures requires effective national planning with inter-ministerial coordination to establish an enabling legal and regulatory framework (Zavazava 2007). National long-term sector plans or master plans for infrastructure systems can be developed, with a focus on how best to integrate ICT infrastructure (Hawkins et al. 2006). Regulations can be introduced promoting infrastructure and facilities sharing, including the use of rights-of-way for telecommunication operators and other public service companies and operators (Stern et al. 2006). For example, the Nigerian Communications Commission developed an ICT-Infrastructure Sharing Policy where telecommunications operators can negotiate sharing arrangements with utility and other telecommunications operators and firms (Ikhemuemhe

2006). National governments can also find ways of providing incentives to the infrastructure building processes "from the top" and "from below" so that there is some citizen/consumer dynamic in the process (Southwood 2007b).

The decision of whether to involve utilities in the telecommunications sector is also affected by legislative, regulatory, managerial, and financial concerns. For example, if the national telecommunications incumbent has the right to operate the infrastructure under non-competitive terms, prices will remain high and the services will be rarely used. Stakeholders must reach a clear understanding of the potential institutional blockages created by government's ownership and protection of the incumbent to create opportunities for a wider national interest in lowering charges as sustainably as possible (Southwood 2007b).

Some utility companies may not have Rights of Way for any other purpose than providing their particular service (e.g., water, electricity, roads). The utility companies may violate legal requirements like the separation of businesses or the prohibition of the use of its funds for telecommunications. The utility company's charter or governmental legislation may disallow it from offering external telecommunications services. Separate accounting or administrative requirements for entering the telecommunications sector may be a disincentive.

4. Enabling Environment for Increasing ICT Access: Policy Issues

An enabling environment at the national, regional, and international levels can foster a socio-economic inclusive Information Society. Through a development-oriented policy and regulatory framework reflecting national realities, governments can help build a people-centred Information Society. Governments can also intervene to correct market failures, maintain competition, attract domestic and foreign investment, and enhance ICT infrastructure and application development for maximal socioeconomic benefits. Governments should encourage the adoption of international standards for increased diffusion and more affordable consumer access to ICT technologies and services (WSIS 2005a).

Other stakeholders also have a role to play in promoting a more inclusive Information Society. The private sector is chiefly responsible for technical development and commercial availability of ICT products and services. Civil society has and will continue to play an important role in diffusing ICT technologies and infrastructure to specific communities. Intergovernmental organizations are indispensable in their policy analysis and research on ICT- and Internet-related issues. International and multilateral organizations are instrumental in the development of Internet-related technical standards and relevant policies.

Critical components of an enabling environment for ICTs include: basic and ICT education; a regulatory framework which promotes competition and fosters entrepreneurship; telecoms and trade liberalization; promoting innovation and creativity (IPR protection); a good investment climate; a stable and predictable legal system; a comprehensive, transparent and non-discriminatory legal framework; sound macro-economic, fiscal and monetary policies; a dynamic economic base; and rising standards of education, health care and social infrastructure.

Availability and the affordability of ICTs are the basic foundations for inclusive access to ICTs. Although disparities between high and low-income countries (as well as high- and low-income consumers) may persist, competition, regulatory changes and innovative micro-

finance programmes can help make phone and Internet services more affordable. A combination of benchmarks on affordability and more complete information regarding true levels of demand would help policy-makers and industry stakeholders target access programmes more accurately to reach non-users and reduce current obstacles to growth in services (ITU 2006). This section discusses specific aspects of an enabling environment for increased access to ICTs in the developing world.

4.1 Regulatory Framework

Developing countries need to decide whether (and to what extent) regulation is required, as this is often an essential incentive for investment. Although the focus of telecom regulation depends upon the country and the stage of the industry, regulation may address: universal service, competitive markets, favorable investment climate, consumer protection, interconnection, spectrum management and regulatory targets.

Ensuring that telecommunication services remain affordable often depends on regulatory control of prices.. Countries may seek to promote a dynamic, efficient and responsive market serving a broad cross-section of customers. Countries need state policy and legislation to cover the ICT market, where one or both of these are not yet available. Policy should provide explicitly-stated government objectives for the ICT sector, for ICT production, retail, applications and operation. Legislation can provide clearly established and enforceable guidelines in respect of the ICT sector that market agents can operate by.

To increase access and foster diversity of choice, it is important that governments adopt a policy framework that maximizes competition and that allows users to choose the technology that best meets their specific needs, based on considerations such as performance, quality, reliability, security and cost. Government policies that limit such choice - or promote one form of technology over another - can deprive users (including governments) of the best solutions and prevent the realization of the full benefits of available technologies.

Domestic and regional Internet exchanges permit the internal exchange of domestic traffic without using valuable and costly international bandwidth, which can be saved for other purposes. If countries do not yet have a domestic Internet exchange, or an ISP association representing the interests of the emerging ISP market, they should consider establishing them. Internet exchanges can also permit the domestic and neutral interconnection and exchange of domestic traffic.

4.2 Investment

Since telecommunications infrastructure is expensive, this capital-intensive industry relies heavily on private and/or external financing. Liberalization can encourage private investment necessary to finance he communication infrastructure, lower prices for ICT services and address inequities related to ICT access (Kirigia et al. 2005). Governments have many competing responsibilities and claims on their revenues. The large investments needed to upgrade and maintain communications networks and make them available to all citizens may be beyond for the resources of the state. At the same time, both foreign and domestic private investors are eager to invest in upgrading infrastructure and rolling out new networks and services. Liberalizing the telecoms market can create opportunities to attract further investment.

Determinants of foreign investment comprise a variety of public and private factors, including, but not limited to:

- A stable, accountable political system;
- Open and constructive attitude towards the private sector and other stakeholders (both local and foreign);
- A predictable, comprehensive, and transparent regulatory framework;
- Respect for the rule of law and due process;
- Sound macro-economic, fiscal and monetary policies (including currency stability and convertibility) that are sufficiently flexible to adapt to market signals;
- Moderate levels of personal and corporate taxation; and
- Dynamic economic base supported by an expanding domestic market, growing demand and purchasing power, a healthy local private sector of suppliers, distributors and competitors, and efficient capital markets and financial service.

4.3 Education and Training for ICTs

Education is the cornerstone of success in the use of ICTs and in promoting an information society for all. All people must have access to basic education as a first step, and ICT-related skills development as a second step. The digital divide is no longer about basic connectivity, but increasingly about utilization and how people are using ICTs. New skills are needed to take full advantage of ICTs and participate in the digital world..

Governments should aim to strengthen human capacities for utilization of ICT at all levels of the national health and education systems (Kirigia et al. 2005). Training in ICT skills should be widely available. Partnerships between governments, employers, schools and college authorities need to be developed to provide the necessary training. Practical ways in which new businesses can access the appropriate hardware and communications infrastructure must also be developed. Information about the market (current and expected) should be used to establish what skills and training are required. There should also be special programmes in developing countries to address societal needs for the education and training of women.

4.4 Accessibility

Many developing countries have developed policies on access and regulatory targets adopted for universal access commitments. A good example is Malaysia, which distinguished between the right to collective access (or universal access) and individual access, and stated a clear preference for collective access. Other aspects of State policy on access include recognition of gender equality, non-discrimination, and access by minorities and promotional programmes for rural areas, schools and hospitals. Regulatory targets can include: geographic coverage (by population, territory, penetration targets); rural lines, as a proportion of urban lines, installation and universalization targets, access to public telephones, quality of service, and response times. State policy on access also includes broader awareness programmes, wider education policy, and computer training in schools and libraries to improve computer literacy.

4.5 Affordability

Stakeholders (namely, governments, intergovernmental and non-governmental organization, and business entities) can support:

- Supply-side financing models (e.g., the provision of structural funds for IT equipment and training investments) and
- demand-side financing models to ensure equitable access and promote the creation of financing mechanisms (i.e., trust funds and corporations for partnerships) in ICTs.

IT market and regulatory surveys should be undertaken to guide such investment decisions (Laroque & Latham 2003). Socially progressive tariff schemes use progressive pricing to make access less costly for rural areas and public interest groups. In some countries, initiatives to promote affordability have focused on subsidies to specific groups or programmes to recycle and rehabilitate used equipment (ITU & UNCTAD 2007).

Mobile penetration has also increased greatly due to operators' marketing strategies, including prepaid subscriptions and discounted plans. Value-stored prepaid cards have increased the access of low-income users to phone services and given consumers more control over their expenditures. Competition among mobile providers not only reduces the cost of telecom services, but has also resulted in innovative offers for prepaid users in many countries (ITU 2006).

4.6 Regional Implementation Activities and Action Plans

Regional intergovernmental organizations can carry out WSIS implementation activities, exchanging information and best practices at the regional level, as well as facilitating policy debate on the use of ICT for development, with a focus on attaining the internationally agreed development goals and objectives, including the Millennium Development Goals (MDGs). In fact, most United Nations Regional Commissions have adopted regional plans of action for WSIS implementation. These plans are designed as roadmaps towards regional implementation of WSIS outcomes, as well as overall development goals, including those in the Millennium Declaration (MDGs). They set priorities, targets and timeframes based on the specific circumstances of each region. The development of these plans was largely coordinated by the regional commissions, through multi-stakeholder consultations. They generally have a phased approach to implementation towards 2015, with built-in follow-up mechanisms to ensure monitoring and assessment on a regular basis.

4.7 International Organizations in support of the Inclusive Information Society

In collaboration with regional commissions and other development partners, international organizations can support developing countries in their efforts to engage in consultative and participatory design and review of ICT-strategies. Specific plans of actions include regular consultations to review and assess progress made and lessons learned and to share good practice examples, as well as continued efforts to measure the information society.

Considerable progress has been made in measuring the information society through the Partnership on Measuring ICT for Development, launched during UNCTAD XI in June 2004. Current partners include ITU, OECD, UNCTAD, UNESCO Institute for Statistics, the UN Regional Commissions (ECLAC, ESCWA, ESCAP, and ECA), the UN ICT Task Force/GAID, the World Bank, and EUROSTAT. The Partnership has developed a common set of core household and business ICT indicators, as a basis for harmonized data collection on ICT statistics at the international level. A key objective of the Partnership is to enhance the capacities of national statistical organizations (NSOs) in developing countries and to build competence to develop statistical compilation programmes on the information society, based

on internationally agreed upon indicators. Regional Workshops on ICT indicators have been held in Asia-Pacific and Latin America, and OECD held a Seminar on ICT Statistics in Beijing, China. The Partnership also intends to develop a global database of ICT indicators to be available online.

5. Questions for Discussion

Access

1) What are the main barriers to access to ICT infrastructure in the developing world?
2) Will new technologies revolutionize ICT access and applications in the developing world?
3) The debate over the future digital divide is now moving away from inequalities in basic "quantity" and "access" to include differences in "quality" and "capacity." What radical measures are needed to make broadband more affordable in the developing world?
4) How can countries empower low-income groups, rural communities, women, the uneducated and illiterate, ethnic minorities, and the disabled to utilize ICTs?

Infrastructure

5) Could the coordination of ICT infrastructure development with other infrastructure increase access to ICTs in the developing world?
6) What are the policy, regulatory, and legislative challenges to coordinating ICT infrastructure with other infrastructure projects on the national and regional levels?

Enabling Environment

7) How can countries enhance their investment climate and stimulate FDI in telecommunications?
8) What are the most appropriate ways to stimulate ICT capacity-building, especially for underserved communities?
9) How can countries encourage increased competition, regulatory changes, and innovative micro-finance programmes in the telecommunications sector to make telephone and Internet services more affordable and available?
10) What incentives should be made for private sector telecommunications operators for increased access and affordability?

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