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

Report of the Secretary-General*

Executive summary

While the digital divide is shrinking in most technologies, new dimensions of the divide are emerging as the gap in broadband access is widening. The emerging digital divide is between those who have access to the most advanced information and communications technologies (ICTs), and those who do not. Many of the most desirable applications envisioned for the information society are only possible through broadband access. Improving the broadband infrastructure and delivering affordable and advanced ICT services to all will therefore be the next major challenge. If this can be achieved, it can advance the ICT revolution that much of the developing world has begun.

Developing countries can pursue specific technological, financing and policy mechanisms for making broadband access a reality. Through new technological innovations, developing countries now have new possibilities for delivering less costly broadband access than before, using optical fibre cables interconnected with other critical infrastructure as well as emerging wireless broadband solutions. Developing countries could attract more foreign direct investment (FDI) to their telecommunications sectors and possibly harness collective remittances for the development of small-scale broadband solutions in local communities. And Governments from developing economies could ensure a policy framework that promotes investment in and deployment of broadband.

* This document was submitted on the above-mentioned date as a result of processing delays.

I. Introduction

1. The idea of the World Summit on the Information Society (WSIS) was proposed at the 1998 International Telecommunication Union (ITU) Plenipotentiary Conference. Five years later, the first phase of WSIS occurred in Geneva, 10–12 December 2003, on the vision of a "people-centred, development-oriented and inclusive information society." At the second phase WSIS meeting in Tunis, the agenda addressed aspects of the information society not covered in Geneva, namely financing pro-poor ICTs and Internet governance, with the newly created Internet Governance Forum materializing as an outcome. The year 2007 marked the mid-point between the formal adoption of the WSIS by the United Nations General Assembly and the prospective review of the outcomes of the summit in 2015.

2. At the tenth session of the Commission on Science and Technology for Development (CSTD) in May 2007, progress in the implementation of the WSIS outcomes at the regional and international levels were reviewed and corresponding recommendations made. CSTD advised the Economic and Social Council to adopt a resolution on information flows as a follow-up to WSIS, with the intent of ensuring adequate information flow between the implementation and follow-up processes. CSTD has agreed on a multi-work programme assessing WSIS outcomes and focusing in each biennium on a specific theme related to the developmental aspects of the information society for the purposes of bridging the digital divide. This year's theme "Development-oriented policies for socio-economic inclusive information society, including access, infrastructure and an enabling environment" is the first of the themes delineated in CSTD's Multi-year work programme in the report of the tenth session of CSTD.[1]

3. To contribute to a further understanding of the issues, and to assist CSTD in its deliberations at its eleventh session, the UNCTAD secretariat convened an inter-sessional panel meeting in Kuala Lumpur, Malaysia, from 28 to 30 November 2007. The present report is based on the findings of the panel, on national reports contributed by members of the CSTD, additional research by the UNCTAD secretariat, and other relevant literature.

II. Socio-economic inclusive information society

4. A socio-economic inclusive information society is a reality where "*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…" (emphasis added).[2] ICTs are strategically important infrastructure that can help developing nations reap the benefits of a knowledge-intensive, globalizing world.

5. Unfortunately, the concept of the socio-economic inclusive information society is not yet a reality because many people do not have access to information and communication. Though ICTs have the potential to stimulate development, those most in need of it (i.e. poor countries, low income groups, rural communities, women, the uneducated and illiterate, ethnic minorities and the disabled) often have the least access to them.

[1] E/2007/31: Report of the tenth session of the Commission on Science and Technology for Development.

[2] WSIS (2005). Geneva Declaration of Principles, in: *World Summit on the Information Society (WSIS) Outcome Documents Geneva 2003 - Tunis 2005:* 7–24 (Geneva, ITU).

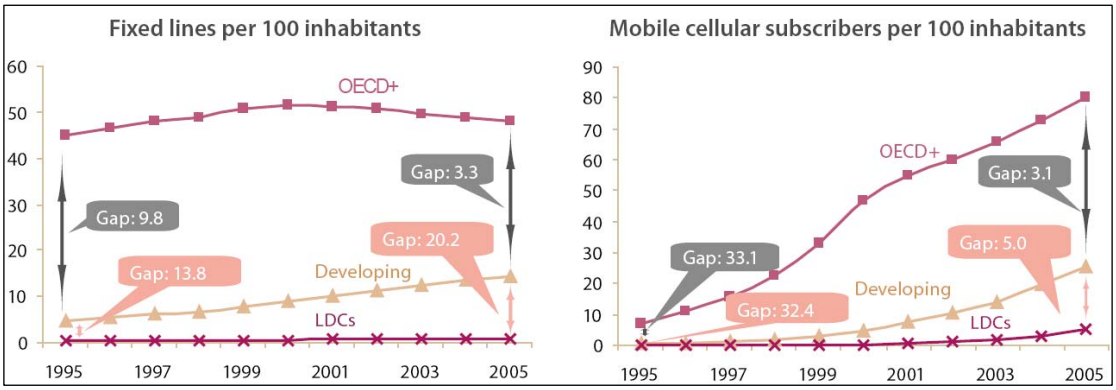
III. The next frontier of the digital divide: broadband[3]

6. Though the digital divide is shrinking in some aspects and increasing in others, access to broadband ICT for digital inclusion can help enable universal, sustainable, ubiquitous and affordable access to ICTs by all.

A. Closing the digital divide in telephony and Internet access

7. The clearest evidence of the narrowing of the digital divide is to be found in mobile telephony and fixed lines, where Organization for Economic Cooperation and Development (OECD)+ economies have seen declining teledensity since 2000, while the teledensity of developing economies continues to grow. Thus, the gap in fixed lines between OECD+ and developing economies has shrunk from 9.8 per 100 inhabitants in 1995 to 3.3 in 2005.[4]

Figure 1. Fixed line and mobile telephony, 1995–2005



Source: ITU World Telecommunication Indicators Database.

8. The diffusion of ICT in developing countries is growing, but except for the rapidly emerging East Asian "tigers", developing countries in general lag far behind the industrialized world in the application of ICT. A chief obstacle is lower rates of access to broadband Internet service[5].

9. Among ICTs, mobile phones are the most widely spread in the developing world. The number of mobile phone subscribers in developing countries has almost tripled in the last five years, and now account for 58 per cent of mobile phone subscribers worldwide. This marked increase suggests that mobile telephony serves as a "digital bridge", which will help many developing countries reduce the connectivity divide. In Africa, where the increase in terms of the number of mobile phone subscribers and penetration has been greatest, this technology can improve the economic life of the population as a whole.[6]

10. The Internet has continued growing worldwide in terms of users and penetration. Although developed countries still account for the majority of Internet users and have the highest Internet penetration, developing economies are slowly catching up. While in 2002 Internet penetration in developed economies was 10 times higher than in developing economies, in 2006 it was six

[3] The data in this section is drawn, in part, from ITU & UNCTAD (2007). *World Information Society Report 2007: Beyond WSIS* (Geneva, International Telecommunications Union (ITU)).

[4] "OECD+" includes the 30 economically advanced member States of OECD (plus their dependencies) and the four Asian Tigers (Hong Kong (China), Macau (China), Singapore and Taiwan Province of China), representing 18.7 per cent of the world's population.

[5] UNCTAD (2008). *Information Economy Report 2007–2008: Science and technology for development: the new paradigm of ICT* (New York and Geneva, United Nations).

[6] *ibid.*

times higher. Countries with economies in transition had the highest annual Internet penetration growth rates between 2002 and 2006.[7] Several developing countries are taking active steps to expand Internet use through (a) policies to improve ICT access and skills; (b) regulatory reforms to increase competition and the availability of services at competitive prices; and (c) investment in ICT infrastructure.

11. However, the gap in broadband access has been widening since 2002. It is estimated by UNCTAD that in 2008 the broadband penetration rates are 28 per cent in developed countries, 3 per cent in developing countries, and more than 4 per cent for countries with economies in transition.

B. Broadband: next dimension of ICT revolution in the developing world

12. 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". The emerging digital divide is between those who do have access to the advanced information and communications technologies and applications, and those who do not have such access.[8]

13. Although the ratio of broadband subscribers in OECD+ economies to developing economies has declined, the absolute gap grew almost 10-fold between 2000 and 2005. While the world saw 281 million broadband subscribers by the end of 2006, only 1.1 million, less than 0.4 percent, had subscribed in Africa (figure 1). Also, the gap between the African regions is tremendous: 95 per cent of all broadband subscribers were concentrated in five African countries: Tunisia, Morocco, Algeria, Egypt and South Africa.

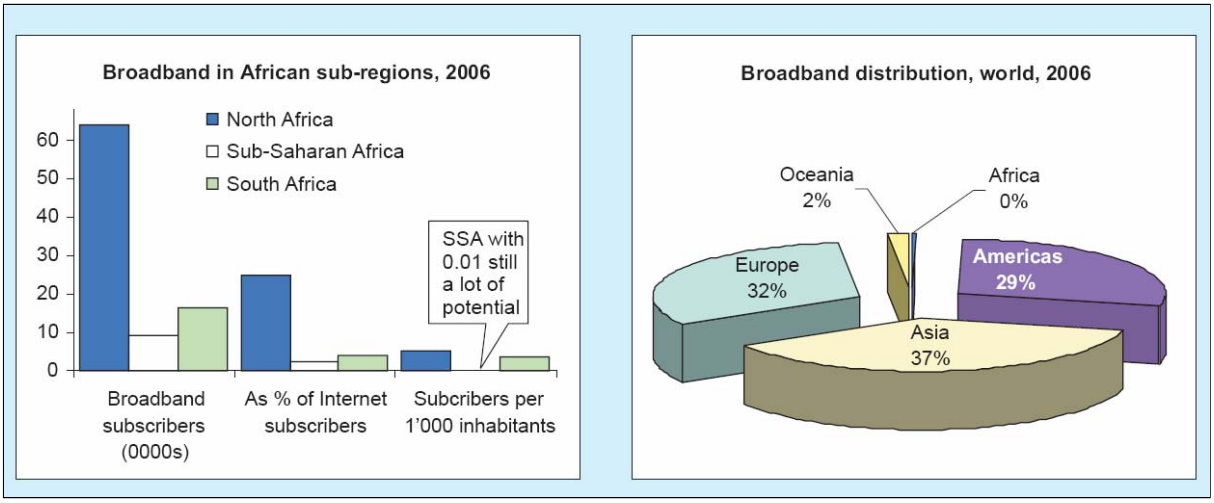
14. Africa has fewer international circuits than Ireland, despite the fact that Africa has more than 200 times as many inhabitants. Sixteen African countries still rely on a single 10 million bits per second (mbps) international Internet connection (or less). In 2006, broadband was available in only 25 African countries. South Africa alone had 881.5 mbps of international Internet bandwidth in 2006. This statistic alone illustrates the broadband digital divide within Africa. African countries all together had a total of 28,177 mbps bandwidth available in 2006, while, for instance, Asia accounted for 809,951 mbps of the world's 5,504,127 mbps bandwidth.

15. Consumers in a high-income economy spend only 2 per cent of their average monthly income on broadband connectivity, whereas in a low-income economy, even the least costly broadband offering costs more than nine times average income. For example, a sample of representative offers for broadband service in Africa (on the basis of 100 hours per month or one gigabyte of data per month) costs on average $745 per month, more than three times the average for Asia (and nearly six times higher, expressed as a percentage of gross national income per capita).

[7] *Ibid.*

[8] Ganswindt T (2005). Encouraging an enabling environment for effective and sustainable use of ICT for development, in: Gilhooly D (Ed) *Creating an Enabling Environment: Toward the Millennium Development Goals*. Proceedings of the Berlin Global Forum of the United Nations ICT Task Force, pp. 20–28 (New York, NY, United Nations ICT Task Force).

Figure 2. Broadband in African subregions and regional distribution of broadband subscribers in 2006



Source: ITU World Telecommunication/ICT Indicators Database.

16. Improving the broadband infrastructure and delivering affordable and advanced ICT services to all will therefore be the next major challenge in the ICT sector. If this can be achieved, it will advance the ICT revolution that the developing world has begun.[9]

C. Does the developing world really need broadband?

17. Because of limited financial resources available for development projects, many argue that people in developing countries need clean water, and not telecommunications; good schools, not information technology; and basic health services, not broadband access. But, in fact, people in developing countries need all of these things, because health, education and prosperity go along with and are enhanced by access to and use of ICTs.[10]

18. Many of the most desirable applications envisioned for the Information Society are only possible through broadband access.[11] Maximizing the potential of ICTs to be harnessed for development may require maximizing the technological possibilities for connectivity.

19. The unprecedented exponential growth in telecommunications infrastructure and transmission capacity has changed the way businesses function in developed countries. Corporations, institutions and Governments in most of the world can now interact with their clients, vendors and their global branches with teleconference technologies, driving the demand for network bandwidth. Most Western corporations now base their decisions to establish a business presence or manufacturing facilities abroad on the availability of modern telecommunications infrastructure. Thus, upgrading to high-speed or broadband access will enable developing country enterprises to compete most effectively in the global market. The availability of reliable broadband access is

[9] World Bank (2007). *Connecting Africa: How ICT is Transforming a Continent*. Brochure (Washington, D.C., Global ICT Department – The World Bank Group).
[10] Ganswindt T (2005).
[11] ITU (2006). *World Information Society Report 2006* (Geneva, International Telecommunications Union (ITU)).

crucial for investors, because it allows the companies to take part in the global division of labour (e.g. outsourcing).[12]

20. Broadband connectivity to rural communities can enhance the prospects of rural telecentre sustainability by making it potentially profitable for small operators to function as local Internet Service Providers (ISPs). Its power lies in the potential to strengthen local communication networks at low cost.[13]

21. For most people in a village, entertainment and communication are of greater importance than personal computer (PC) functionality. Some argue that, for computers to be more relevant to the needs of many in rural villages, there may be a need for more powerful PCs that provide video or voice communication rather than text or e-mail.[14] This could make it easier for those in the village to communicate within the village and the rest of the world.

22. High bandwidth is necessary, not simply for rich multimedia content and significant levels of interactivity, but when several computers share one connection, even for relatively unsophisticated applications. Increased and more sophisticated Internet use within schools requires high bandwidth and generates increased demand, as more complex sites become accessible and faster response times stimulate usage.[15]

IV. Technologies for broadband

23. Through new technological innovations, developing countries now have new possibilities for delivering less costly broadband access than before, using optical fibre cables interconnected with other critical infrastructure, as well as emerging wireless broadband solutions.

A. Fibre optic cable-based solutions

24. One barrier to the growth of broadband in developing countries is the lack of the necessary underlying wired infrastructure, such as copper telephone lines and coaxial television cable.[16]

25. However, ICT infrastructure can co-develop with other infrastructure in creative, cost-effective and integrated ways. Many real-world examples are available where fibre optic cables are laid alongside other critical infrastructure, such as gas and oil pipelines, sewers, drinking water pipes, railroads, electricity power grids, sewer pipes and roads. This arrangement can take advantage of the right of way of utility owners and their conduits to provide facilities for ICT infrastructure, radically reducing the construction costs associated with ICT and making its services available in places where other utilities operate (see box 1).

26. Additionally, power lines can be used as communications media to deploy broadband Internet access. In Eastern and Southern Africa – the only major region in the world not connected to the global broadband infrastructure by fibre optic cables – Goal Technology Solutions (GTS) is pioneering Broadband over

[12] ITU (2007). *Telecommunication/ICT Markets and Trends in Africa.* (Geneva, International Telecommunication Union (ITU)).
[13] Proenza FJ (2005). The road to broadband development in developing countries is through competition driven by wireless and VoIP. Wireless communication and development: a global perspective (Annenberg Research Network on International Communication).
[14] Reddy R (Carnegie Mellon University) (2004). PCtvt: A multifunction information appliance for illiterate people – mythology and reality of the digital divide problem, in: *ICT4B Retreat* (University of California at Berkeley).
[15] OECD (2001). *Learning to Change: ICT in Schools*. Schooling for Tomorrow Series (Paris, Centre for Educational Research and Innovation - OECD).
[16] ITU (2006).

Powerline (BPL) technology in South Africa, Uganda and Rwanda. Namibia's Nampower and Kenya's KPLC are also eying PLC and BPL technologies for enhanced power grid management and maintenance and increased telecommunications access.[17]

Box 1. India providing broadband through railways

With railways offering a good right of access, many countries are offering public–private partnerships to install fibre networks along their railways. Indian Railways is the world's second-largest railway network, with nearly 62,800 km (39,250 miles) of tracks linking 7,000 stations across India. RailTel Corporation of India Ltd., a wholly-owned subsidiary of India's Ministry of Railways, was established in September 2000 as a Public Sector Undertaking to meet internal railway requirements and also to commercially exploit use of the State-owned railway communication infrastructure.

It was during 1996 that the railway took a major policy decision to provide optic fibre cables as a better and economical medium of communication, instead of copper cable, to expeditiously modernize the railways' train control and operational and safety systems and networks. In addition to meeting internal requirements, RailTel wanted to create a nationwide broadband telecom and multimedia network to supplement national telecom infrastructure to spur growth of telecom Internet and ICT-enabled value added services in all parts of the country, especially rural, remote and backward areas.

In the first phase of the project, the railways built an optic fibre network linking Delhi, Mumbai, Calcutta and Madras and four cities emerging as strong information technology centres – Bangalore, Hyderabad, Pune and Ahmedabad. RailTel is confident that its plans of taking the Internet to small towns will fetch it handsome returns. Ultimately, it hopes to connect as many as 150 Indian cities and 1,500 railway stations. By offering Internet connectivity to tourists and businessmen visiting a small town through the same wireless local area network technology that is being used to provide connectivity on a moving train, RailTel is aiming to penetrate a market that was previously completely unexplored.

RailTel plans to open about 250 cyber cafes on railway stations across the country. In the first phase, 83 cities have been identified for cafes of which at least seven are now operational –New Delhi, Hyedrabad, Bangalore, Gorakhpur, Asansol, Jhansi and Pune. RailTel is also capable of providing virtual private networks for corporate customers. RailTel has already established over 28,250 km of optic fibre cable network covering 2,800 points of presence across the country. It intends to extend to 42,000 km by 2008 thus creating over 4,000 points of presence.

Source: Bell Jr. BW and Juma C (2008).

B. Wireless broadband solutions

27. Since Africa is lacking fixed-line infrastructure, wireless access is considered a possible solution for bridging the digital divide. Wireless technologies are giving developing countries new low-cost alternatives to provide broadband access to rural and remote areas. Moreover, with mobile technology being the fastest-growing form of connectivity in many developing

[17] Bell Jr. BW and Juma C (Forthcoming) (2008). The case for bundling ICT with other critical infrastructure in sub-Saharan Africa. *Int. J. Technology and Globalization.*

countries and equipment manufacturers looking for new markets, developing countries may adopt mobile communications as the main way of connecting to the Internet, as long as services become more affordable.[18]

28. WiMAX, is being promoted as a solution for high-speed access, as it will enable broadband connections at high speed at distances of over 20 km from a single base station. Since WiMAX provides another high-speed alternative, it can also intensify competition among digital subscriber line (DSL) and cable television providers, and lead to lower broadband prices. WiMAX allows networks to be built bottom-up, according to local needs, in line with local demand. Local Governments and communities can get involved, installing affordable infrastructure.[19]

29. WiMAX is not just a technological possibility but an emerging reality. Some 23 developing countries are planning to or already have begun to deploy WiMax systems. Those with existing WiMax implementations include the Dominican Republic, Pakistan, South Africa, and Uganda.[20]

30. As the people of Banda Aceh, Indonesia, have been rebuilding their lives after December 2004's catastrophic Indian Ocean tsunami, Intel has been helping to reconnect that part of South Asia with the rest of the world. A very large wireless broadband "umbrella" lets humanitarian and disaster relief groups in hard-hit Banda Aceh communicate with each other and the rest of the world.[21]

31. Rwanda was rocked by a devastating civil war and genocide in 1994. Today, it is keen to reconcile its past and looks towards a digital future. Rwandatel has launched a broadband wireless network to compete with Rwanda's first mobile operator, a subsidiary of MTN South Africa. The new wireless network is Africa's fastest 3G system with broadband speeds of up to 2 megabits per second. Rwanda has a small territory with one of the highest population densities in Africa, and achieved a mobile population coverage of around 90 per cent by 2006, one of the highest in Africa.[22]

V. Innovative financing for broadband

A. Public–private partnerships and FDI

32. Public–private partnerships (PPPs) have been a driving force behind the massive extension of ICTs all over the world. Opening up the private companies to competition has led to huge inflows of investment over the past several years. According to the World Bank, between 1990 and 2003, 122 developing countries received FDI in telecommunications. FDI in telecommunications in developing countries has increased from just $2 billion in 1990 to over $40 billion in 2005. In the next few years, annual investment in the ICT sector of developing countries could reach $100 billion.

33. Of the total global $201.5 billion of telecom investment, 4 per cent – or $8.1 billion – was invested in Africa. Although Africa's share of global telecom investment is higher than its share of world telecommunication revenues, it is quite obvious that Africa (and the greater developing world) may need more investments in telecommunication in order to participate more fully within the

[18] ITU (2006); ITU (2007).

[19] Curley M (2005). Innovation to improve access to ICT, in: Danofsky S (ed.) *Open Access for Africa: Challenges, Recommendations and Examples*: 134–139. (New York, United Nations ICT Task Force); ITU (2006).

[20] World Bank (2008). *Global Economic Prospects: Technology Diffusion in the Developing World* (Washington, D.C., the International Bank for Reconstruction and Development/the World Bank).

[21] Curley M (2005).

[22] ITU and UNCTAD (2007).

Information Society as well as in the regional and global economy.[23] Attracting investments in ICT through FDI can have a huge impact on developing economies, as the case of Intel in Costa Rica shows (see box 2).

Box 2. Intel's massive investment in Costa Rica

The 1996 announcement by Intel, the world's largest semiconductor company, that it would construct a new $300 million assembly and test plant in Costa Rica aroused considerable interest in the foreign investor community. With annual revenues of more than $20 billion, Intel's gross sales were approaching twice the GDP of tiny Costa Rica, which had a population of only 3.5 million. Intel's plan called for the establishment of a campus that could accommodate up to four plants employing 3,500 over time, eventually reaching an estimated $500 million in total investment.

Arguably, the most immediate strategic impact that Intel brought to Costa Rica was a significantly better country image for FDI. Intel's investment and presence also had an overwhelmingly positive impact on Costa Rica, generating both direct and multiplier effects on the country's economy, industry, educational institutions and business culture.

The country's gross domestic product (GDP) has been intrinsically tied to Intel. GDP and per capita income in Costa Rica surged from 1997 through 1999. In 1999, it grew 8.4 per cent, but excluding Intel's contribution, it would have grown only 3 per cent. Thus, more than 60 per cent of growth in 1999 could be directly attributed to Intel.

During 1998, electronics surpassed the traditional top exports, such as bananas and coffee. Costa Rica's economy has evolved from production of its "golden bean" (coffee) to the "golden chip". Thirty years ago, traditional exports such as coffee and bananas represented 80 per cent of exports; by 2006, non-traditional exports represented 80 per cent.

Electronics is now Costa Rica's largest sector with Intel as the largest player. The industry employs 12,000 and exports $1.65 billion in products a year. Local support industry for Intel alone reflects a base of 460 suppliers and $50–150 million in local purchases of goods and services per year.

Source: MIGA (2006). The impact of Intel in Costa Rica: nine years after the decision to invest. Investing in Development Series (Washington, D.C., World Bank Group/Multilateral Investment Guarantee Agency (MIGA)); Spar D (1998). Attracting high-technology investment: Intel's Costa Rican plant (Foreign Investment Advisory Service, International Finance Corporation; World Bank).

B. Public–private partnerships involving diaspora communities

34. Remittances to developing countries have grown steadily in recent years, reaching $207 billion in 2006, and are now larger than FDI and equity inflows in many countries, especially small, low-income countries.[24] In the context of limited resources for development financing, the focus has also shifted to a search for new and innovative financing mechanisms to address a variety of development objectives, including global hunger.

[23] ITU (2007).
[24] World Bank (2008).

35. New technologies are frequently introduced and promoted by members of national diaspora communities, both directly through networks and indirectly through investments financed from remittances. Many immigrant expatriates might be receptive to the introduction of new voluntary mechanisms for donating small contributions toward ICT-based development. In this respect, new possibilities could be explored to facilitate such contributions on a simple, technology-driven basis, while ensuring that any funds collected are devoted directly to pertinent development needs.[25]

36. Collective remittances can be harnessed for the development of small-scale broadband solutions in local communities. Some municipalities are already using remittances as a new form of public–private collaboration for developing small-scale infrastructure, as shown in the case of Zacatecas, Mexico. Migrants' capital can offer a possible entry point for local ICT-focused development in poor regions that have experienced heavy international migration (see box. 3).

Box 3. Three-for-One Programme in Zacatecas, Mexico

Remittances in Mexico have grown rapidly over the past several decades. In 2006, remittances represented the second largest source of dollar revenues and accounted for 80 per cent of revenues generated from oil exports.

Recent attempts by several Mexican State Governments to promote more productive use of remittances have led to interesting new forms of public–private collaboration for developing small-scale infrastructure in migrants' hometowns through programmes and projects partially financed with remittances. Hometown associations are becoming a vehicle for the diffusion of information about investment opportunities in Mexico and for pooling the financial resources of small-scale savers and investors in the United States. Migrants' associations have long financed social and religious festivities in their hometowns, but lately they have also begun to direct their efforts toward improving their native communities.

In 1993, Zacatecas took the first step with the Three-for-One Programme. The Zacatecas programme channels community remittances to small-scale infrastructure projects. For each $1 contributed by migrants, the Mexican Government contributes $1–$3 from the federal Government, $1 from the State Government, and $1 from the municipal Government. This programme has funded more than 400 projects in eight years.

Typical projects include (a) construction of roads; (b) street paving; (c) provision of water, sewage and electricity; and (d) construction and improvement of other community facilities, including churches, cemeteries, parks and squares, community centres, and sports grounds. Recently, investments have also been made in the purchase of computers for high schools and the construction of small dams and water treatment facilities.

Source: Torres F and Kuznetsov Y (2006). Mexico: Leveraging migrants' capital to develop hometown communities, in: Kuznetsov YN (ed.). *Diaspora Networks and the International Migration of Skills: How Countries Can Draw on Their Talent Abroad*. World Bank Institute Development Studies (Washington, D.C., World Bank).

[25] TFFM (2004). The report of the task force on financial mechanisms for ICT for development. (United Nations Task Force on Financial Mechanisms (TFFM).)

37. The goal through PPPs' involving diaspora communities is to trigger local economic development in hometown communities that would not be dependent on remittances, whether collective or family remittances. Transitioning from a remittance agenda to a broader development agenda is not an easy task, but is a possible direction for the future of hometown associations in supporting an ICT-led strategy that diversifies local economies into more productive activities.

38. As a policy option, national development banks can develop a system of private financing for ICT, with the participation of migrants and hometown associations. National development banks could mobilize seed capital, technical assistance, and training in relation to targeted programmes and projects in delivering high-speed connectivity. The objective would be to develop a self-sustainable private system for the development of projects and local programmes financed totally or partially with remittances and savings from the communities abroad. Available regional and international aid funds could also be used to support some of the initiatives.[26]

VI. Competition policy for affordable telecommunications in the developing world

39. Governments could ensure a pro-competitive and market-driven policy framework that promotes investment in and deployment of broadband for business users as well as consumers.[27]

40. The old model of the State-owned-and-managed telecommunications monopoly adopted in the second half of the twentieth century simply does not accommodate the fast-changing, knowledge-based and global information revolution. In order to survive in the highly competitive world of the global knowledge economy, many countries have introduced competition, privatized the national fixed line provider, and established a relatively independent regulatory agency.[28] The telecommunication market and the customers usually profit from competition, as the example of Morocco shows (see box 4).

Box 4. Morocco's encouraging competition for increased ICT access

Traditionally in Morocco, almost all public telecommunication infrastructures have been controlled by the Government. Until the late 1990s, Morocco was, like many other countries, a monopolistic telecommunication market.

In 1997, the Moroccan parliament adopted the Post Office Telecommunication Act and some related laws, which opened the way for the foundation of the National Telecommunication Regulation Agency in 1998. This agency was appointed in charge of the introduction of competition through transparent tenders and regulation policy.

In 2000, the French global media company Vivendi Universal bought its first 35 percent equity stake and another 16 percent of the incumbent Morocco Telecom (IAM) in 2004. While the mobile market was already liberalized in 1999 with the market entry of Meditel competing with the larger Maroc Telecom, the fixed-line market is still dominated by Maroc Telecom, even

[26] Torres F and Kuznetsov Y (2006).

[27] Hassan A (2005). Promoting an enabling environment for digital development and ICT, in: Gilhooly D (Ed). *Creating an Enabling Environment: Toward the Millennium Development Goals*. Proceedings of the Berlin Global Forum of the United Nations ICT Task Force: 41–50 (New York, United Nations ICT Task Force).

[28] Gross D (2005). The enabling environment: pro-competitive policy and regulatory reform, in: Gilhooly D (ed.). *Creating an Enabling Environment: Toward the Millennium Development Goals*. Proceedings of the Berlin Global Forum of the United Nations ICT Task Force: 13–19 (New York, United Nations ICT Task Force).

though the second mobile operator is allowed to operate its own international gateway.

Mobile and Internet technologies that were provided by privatized operators acting under competition have enjoyed the greatest uptake by the Moroccans. In May 2006, Meditel was granted a licence to offer fixed wireless services. Limited wireless in the local loop (WLL) services include Meditel and the new third Operator Wana (under the brand name Bayn) the opportunity to compete directly with Maroc Telecom in the fixed line market. In Morocco, privatization and liberalization have accompanied increases in mobile and Internet penetration rates. With competition recently introduced, the penetration of main (fixed) line services could also improve.

Source: ITU (2007).

VII. Findings and recommendations

A. Main findings

41. The concept of the socio-economic inclusive Information Society is not yet a reality because many people do not have access to information and communication.

42. 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”. The emerging digital divide is between those who do have access to the advanced information and communications technologies and applications, and those who do not have such access.

43. Improving the broadband infrastructure and delivering affordable and advanced ICT services to all will therefore be the next major challenge in the ICT sector. If this can be achieved, it will advance the ICT revolution that the developing world has begun.

44. Many of the most desirable applications envisioned for the Information Society are only possible through broadband access. Maximizing the potential of ICTs to be harnessed for development may require maximizing the technological possibilities for connectivity.

45. One barrier to the growth of broadband in developing nations is the lack of the necessary underlying wired infrastructure, such as copper telephone lines and coaxial television cable. However, ICT infrastructure can co-develop with other infrastructure in creative, cost-effective and integrated ways.

46. Since Africa is lacking fixed-line infrastructure, broadband wireless access seems to be a feasible short-term solution to spreading broadband in developing nations.

47. Public Private Partnerships have been the driving force behind the massive extension of ICTs all over the world. Although Africa’s share of global telecom investment is higher than its share of world telecommunication revenues, it is quite obvious that Africa (and the greater developing world) may need more investments in telecommunication in order to participate more fully within the Information Society as well as in the regional and global economy.

48. Foreign investors will invest in countries that provide the most support for their activities, because such support will serve to increase potential rewards and reduce risks. Such investment in ICTs will thus flow towards those countries in which (a) government rules have been streamlined and stabilized; (b) fully

independent telecom operators have been established; (c) States have loosened up their ownership of telecoms; (d) investment restrictions have been lifted; and (e) communication service providers have been allowed and encouraged to compete.

49. Remittances to developing countries have grown steadily in recent years and are now larger than FDI and equity inflows in many countries, especially small, low-income countries. Many immigrant expatriates would be receptive to the introduction of new voluntary mechanisms for donating small contributions toward ICT-based development.

50. In order to survive in the highly competitive world of the global knowledge economy, many countries have introduced competition, privatized the national telecom operators, and established relatively independent regulatory agencies.

B. Recommendations

51. The CSTD panel has put forward the recommendations set out below for consideration by the Commission at its eleventh session:

(a) Through new technological innovations, developing countries could explore new possibilities for delivering less costly broadband access than before, using optical fibre cables along with other critical infrastructure, as well as emerging wireless broadband solutions.

(b) Developing countries could strive to attract more FDI to their telecommunications sectors and harness collective remittances for development for small-scale broadband solutions in local communities. National development banks can develop a system of private financing for ICT, with the participation of migrants and hometown associations, in conjunction with available regional and international aid funds.

(c) Governments could ensure a pro-competitive and market-driven policy framework that promotes investment in and deployment of broadband for business users as well as consumers.

(d) CSTD could provide a forum for developing countries to share success stories and lessons learned in new technologies, financing mechanisms, and regulatory measures for providing broadband connectivity in their respective communities.

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