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Building regional connectivity for sustainable development: the creation of a seamless regional information space

Building regional connectivity for sustainable development: the creation of a seamless regional information space

Note by the secretariat

Summary

Despite the innovative digital opportunities unleashed by the information and communications technology (ICT) revolution, the region remains hampered by a growing digital divide in fixed and mobile broadband Internet, which are the very technologies that are at the cutting edge of the transformation to a knowledge-based society. This growing divide was echoed in the outcome document of the recently concluded United Nations Conference on Sustainable Development (Rio+20), in which the transformative potential of broadband was recognized. In the document, entitled “The future we want”, Heads of State and Government and high-level representatives agreed that it was essential to work towards improved access to ICT, especially broadband network and services, and bridge the digital divide to facilitate the flow of information between governments and the public. They also recognized that these technologies can promote capacity-building for sustainable development in an open and transparent manner. A key barrier to the universal uptake of broadband Internet in the Asia-Pacific region is the high Internet transit and broadband user costs due to, among other factors, the reliance on a single mode of data transmission, namely submarine cables. Not only does this barrier limit the ability of the open market to drive down the price of network services, it also increases the vulnerability of the region’s ICT infrastructure to disasters and accidents that in the past have proven to be highly disruptive to many sectors that have become dependent on broadband Internet. Consequently, interest in developing transnational fibre-optic infrastructure across the region’s landmass has gained momentum, as indicated, for example, in General Assembly resolution 64/186 of 21 December 2009.

The Committee may wish to provide the secretariat with guidance on the issues identified in the present document, as well as the secretariat’s proposals for future work to be conducted in partnership with international agencies, regional think tanks and existing initiatives on the following: (a) development of a regional map showing the status of fibre-optic backbone infrastructure in the Asia-Pacific region and identifying the missing links for cross-border fibre-optic connectivity; (b) an in-depth study on policy barriers that impede efforts to synchronize the deployment of infrastructure across sectors, including highway construction, and options for achieving it; (c) provision of a platform to pool regional expertise on the issue of cross-sectoral infrastructure development; and (d) promotion of a regional cooperation framework on transnational connectivity.

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I. Introduction

1. As developed economies remain mired in stagnation, realizing an Asia-Pacific century will depend on the ability of the region to harness the benefits of regional economic integration. In Asia and the Pacific, as in other regions of the world, mobile telephony and broadband Internet, in particular, have brought innovative digital opportunities that are accelerating this process. Dense layers of regionally networked societies have formed and brought a more region-centric process of development. The gains, however, are not shared universally. The region remains hampered by a growing digital divide in fixed and mobile broadband Internet, which are the very technologies that are at the cutting edge of the transformation to a knowledge-based society.

2. The reasons for this are complex and are related to wider sustainable development challenges. These issues will be discussed further under other agenda items, in particular items 5, 6 and 7. Under item 4, for which this

note has been prepared, the central premise is that if broadband Internet is to replicate the mobile phone success story and function as an accelerator of sustainable development, the roll-out of seamless infrastructure networks across the region for high-speed Internet access that is universal, affordable and reliable is an essential condition.

3. For the period 2010 to 2020, it has been estimated that the Asia-Pacific region needs to spend about \$8 trillion on infrastructure, with the ICT sector comprising 10 per cent of that amount.¹ As pointed out in *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*,² the theme study presented to the Commission at its sixty-eighth session, this figure, however, is based on the assumption that countries' investment patterns will not change significantly. As most developing countries in the region have been underspending on infrastructure, and rapid technological advances require substantial and constant upgrading of underlying infrastructure, the real funding requirements of closing these gaps are likely to be much larger.

4. Underspending has resulted in a lack of a seamless and efficient regional ICT infrastructure. Consequently, interregional and intraregional Internet traffic is routed through submarine cables operated by international consortia, with heavy reliance on Internet exchange points in the United States of America and other technologically advanced countries. Not surprisingly, international backhaul costs for the region can reach up to five times those in more developed regions of the global economy.

5. As regional integration accelerates, there are, however, encouraging signs that policymakers are increasingly focused on setting the right regulatory and policy environment to address connectivity gaps. Attention is now on the need for the region, with its large landmass, to shift to a cost-effective roll-out of broadband infrastructure that is comprised of a judicious mix of land- and sea-based fibre-optic cables and transnational initiatives. Satellite-based communications under special circumstances form part of the picture.

6. This reflects the importance accorded to strengthened international cooperation in expanding ICT infrastructures that bridge the digital divide as stipulated in the Declaration of Principles and the Plan of Action adopted by the World Summit on the Information Society in 2003 and 2005.³ Importantly, this was reiterated in the United Nations Conference on Sustainable Development (Rio+20) outcome document entitled "The future we want"⁴ and in General Assembly resolution 64/186 of 21 December 2009, in which the Assembly welcomed the Trans-Eurasian Information Super Highway (TASIM) initiative and encouraged interested Member States to participate in the development of regional connectivity solutions.

II. Broadband as the next frontier

7. Broadband, which is the technology that enables high-speed transfer of data, is inextricably linked to the emergence of the Internet as a knowledge tool for tackling sustainable development challenges. It is

¹ Asian Development Bank (ADB) and Asian Development Bank Institute (ADBI), *Infrastructure for a Seamless Asia* (Tokyo: Asian Development Bank, 2009).

² ST/ESCAP/2629.

³ See A/C.2/59/3, annex, and A/60/687.

⁴ See General Assembly resolution 66/288 of 27 July 2012.

instrumental for the exchange of content-rich materials and thus closely associated with the reshaping of the information economy and the transformation towards a knowledge-based society in the region. Mobile phones have proven to be very effective in conveying information on consumption and business transactions. Broadband has amplified this by enabling new ways of presenting information, ideas and services in such areas as e-health, e-education, e-banking, e-government, video streaming, musical composition, social networking and Internet telephony. Broadband therefore acts as a key link between information providers, namely individuals, communities, businesses or the government, and the inventiveness built around knowledge-networked societies.

8. The Asia-Pacific region is facing heightened instabilities and exogenous shocks that increasingly involve disasters. In this regard, broadband is helping to build e-resilient societies. Through knowledge networks, people are participating interactively in policy decisions that affect them and are better informed and more prepared, ex-ante, with wider choices that help them to recover from these shocks more expeditiously. For example, ICTs, such as early warning systems, crowdsourcing and social media, provide information that is more accessible, relevant and timely. This information is empowering a new digitally connected generation living in disaster-prone areas to better anticipate shocks. Real-time weather maps and public safety bulletins are rapidly shared through the Internet during disaster events and social groups are increasingly relying on social media in the aftermath of disasters on the view that it often provides the most up-to-date, precise and therefore the most reliable information. The enabling power of ICTs in building e-resilient societies is not limited to disasters caused by natural hazards. Numerous other examples could be cited. Information sharing through ICTs among universities and scientific institutes help insulate communities from deadly diseases. More transparent banking standards and services facilitated by ICTs can help reduce the likelihood of fraudulent transactions. During emergencies, mobile money provides the poor with remittances in a rapid, secure and cost-effective manner. The transformative potential of broadband is truly limitless, constrained only by the number of megabits that are needed to transmit and share the innovations of today's knowledge-networked societies for the region's future reorientation towards more inclusive and sustainable development that builds e-resilience to exogenous shocks.

9. The importance of broadband was recognized in the Rio+20 outcome document. Specifically, the Heads of State and Government and high-level representatives recognized that communication technologies facilitate the flow of information across societies, and promote knowledge exchange and capacity-building for sustainable development in an open and transparent manner. They agreed that it was essential to work towards improved access to ICT, especially broadband network and services, and bridging the digital divide, recognizing the contribution of international cooperation in this regard.

10. At this point, it should be noted, that increased dependence on the power of communication technologies creates its own form of e-vulnerability, as will be discussed below.

III. The Asia-Pacific situation: challenges in connectivity

11. With the world moving from narrowband to broadband Internet as the critical foundation of a knowledge-networked society, it is important to

take a closer look at the situation in the Asia-Pacific region for a better understanding of the challenges and identification of the gaps. Five challenges stand out, in particular, as discussed below.

A. The access divide

12. Although Asia and the Pacific is comprised of 60 per cent of the world's population, only 24.9 per cent of its residents had access to the Internet in 2011, the latest year for which information is available. This is much lower than in North America (78.4 per cent), Europe (68 per cent) and even Latin America and the Caribbean (32.7 per cent). Of even more concern is that only 5.1 per cent of the region's population in developing countries had access to broadband Internet. Thus, most of the region's population has been excluded from the Internet's potential transformative impacts and economic benefits.

13. This is borne out by evolving research on the contribution of broadband infrastructure to the growth of the gross domestic product (GDP). Notwithstanding the fact that studies of the socioeconomic impact of broadband have until recently focused on developed countries, and that, due to the newness of the technology, the timespan of the data and research is not sufficient to refine methodologies and results, overall findings confirm a positive impact between the two variables. These studies show that a 10 per cent increase in broadband penetration increases GDP growth by up to 1.38 per cent. More significantly from the region's development perspective, findings show that unless countries strive to dramatically increase their broadband deployment, the economic impact of the technology will remain quite limited. With low broadband access (under 20 per cent, as is the case for most Asia-Pacific developing countries) an increase of 10 per cent in broadband penetration contributes 0.08 per cent to GDP growth. For countries with medium broadband access (20-30 per cent), GDP increases by 0.14 per cent, while with broadband access higher than 30 per cent, the effect reaches 0.23 per cent.

B. Divergences in speed

14. The vast potential of the Internet can only be tapped with a high-speed connection. For example, data intensive collaboration among universities and scientific institutions can only be achieved with high-speed broadband connectivity, and even day-to-day use of widespread Internet applications, such as Skype and YouTube, and videoconferencing, or more sophisticated applications, such as sharing real time data in disaster situations, all require high-speed broadband Internet. The International Telecommunication Union (ITU) defines broadband as Internet speed that provides the user with a downstream speed of no less than 256 kilobits per second (Kbit/s). This speed, however, is no longer sufficient to take advantage of the myriad new capabilities of the Internet. Video content, for example, consumes an enormous amount of Internet bandwidth. Downloading a 20 MB video clip at a connection speed of 256 kbit/s takes more than 10 minutes as compared to two seconds at 100 megabits per second, the speed connection now available in some countries, such as Japan and the Republic of Korea.

15. Internet speed is determined by international bandwidth (akin, for example, to the width of highways in road transport) and is also known as the capacity to carry traffic internationally. This, in turn, depends on such factors as the physical infrastructure that is available within and across

countries. The key concern for the Asia-Pacific region is that great intraregional inequalities exist. Urban hub areas, such as Singapore and Hong Kong, China, enjoy levels of international Internet bandwidth speeds that lead the world, while many developing economies, particularly least developed countries, landlocked developing countries and Pacific island economies, lag far behind. Japan and the Republic of Korea, for example, have more than three times the number of bits per second of international bandwidth per user when compared to countries such as Bangladesh, Indonesia and Sri Lanka (see table).

Table
Broadband indicators, selected economies

Economy	International Internet bandwidth: bit/s per Internet user (2011)^a	Broadband fixed Internet (percentage of monthly GNI)^b
Australia	50 396	1.61
Bangladesh	2 924	12.08
China	2 692	4.52
EU-15 (weighted average 2011)	48 111	0.75
Fiji	8 019	6.51
Hong Kong, China	964 616	0.72
Indonesia	7 196	9.08
Japan	23 111	0.71
Kiribati	4 451	243.57
Lao People's Democratic Republic	2 048	147.87
Malaysia	10 651	3.07
Nepal	1 531	50.89
Papua New Guinea	5 703	14.91
Philippines	12 360	12.52
Republic of Korea	17 170	1.56
Singapore	547 064	0.78
Sri Lanka	5 224	2.58
Tajikistan	526	478.72
Thailand	10 622	5.71
United States	47 174	0.49
Uzbekistan	579	9.65
Vanuatu	2 764	70.49
Viet Nam	9 998	10.23

Source: ITU World Telecommunication/ICT indicators database.

Notes:

^a If 2011 data are not available, then latest data obtainable is used.

^b Latest data available from <http://data.worldbank.org/indicator/NY.GNP.PCAP.CD>.

GNI: gross national income.

C. High user costs

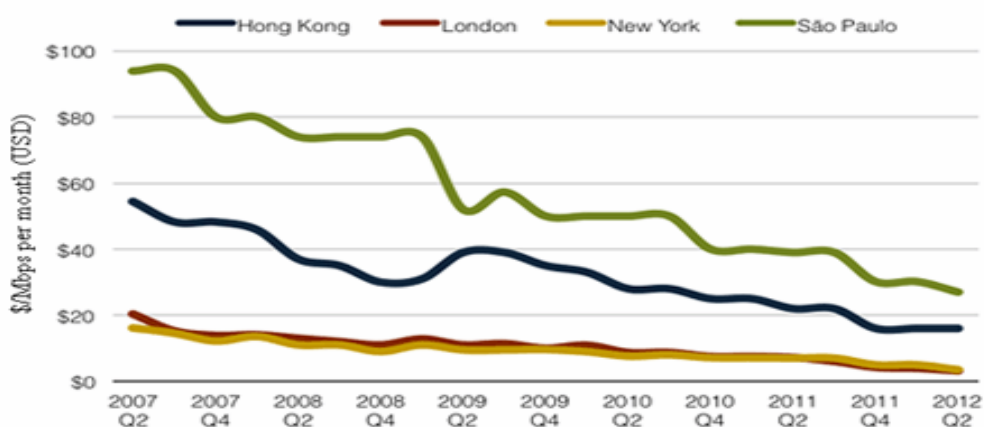
16. A major barrier in the universal uptake of broadband Internet is the high user costs prevailing in the Asia-Pacific region. In countries where users are least able to afford the Internet and where Internet speeds are the lowest, user costs are sharply higher (see table). In Europe, the United States and the developed economies of Asia and the Pacific, including advanced developing countries, such as the Republic of Korea and Singapore, the cost to purchase a monthly subscription for an entry-level broadband plan is less than 1 per cent of monthly gross national income (GNI) per capita. In developing economies of the region, the costs rise to 9.36 per cent, while for least developed countries, the equivalent figure rises to 47.14 per cent. These averages mask even higher rates in some countries, such as Vanuatu (70.5 per cent), the Lao People's Democratic Republic (147.9 per cent), Kiribati (243.57 per cent) and Tajikistan (478.72 per cent). Broadband prices (as a percentage of monthly GNI per user) have been decreasing substantially in some countries in Asia and Pacific (for example in Bangladesh from \$53.6 in 2008 to \$7.7 in 2011). Nevertheless, it must be noted that, as average GNI per capita remains below \$1,000 for many developing countries in the region, broadband remains too expensive for the majority of the population. Moreover, broadband prices are actually increasing in some of the countries with special needs, notably landlocked and island developing economies, such as Kiribati (from \$380.7 in 2008 to \$428.3 in 2011) and Kyrgyzstan (from \$28.4 in 2008 to \$54.2 in 2011).

17. The widespread adoption of mobile telephony in the Asia-Pacific region over the past decade was made possible because hardware and subscription service costs declined considerably as a result of technological innovation and competition. Similarly, broadband diffusion in the region will not progress on the same scale unless costs are significantly reduced.

18. Furthermore, viewed from an international perspective, Internet transit prices in major Asian Internet exchange points, such as Singapore, Hong Kong, China and Tokyo, are on average more than five times as expensive as those in the European Union for example. Even though such factors as deregulation, competition and new roll-out of infrastructure have lowered the costs, the wide gap that exists between Asia and the Western Hemisphere has remained evident. More specifically, although Hong Kong, China, is regarded as the most competitive Internet transit market in Asia and the Pacific, Internet prices in the territory are still approximately 2.5 to 3.5 times higher than in London (see figure 1). These costs are even higher in cities far from major Internet exchanges, such as Bangkok and Manila, due to the cost of transport back to the primary exchange.

Figure 1
Internet protocol transit prices in major Internet exchange points

Median GigE IP transit prices in major cities, Q2 2007-Q2 2012



Source: TeleGeography

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19. Consequently, the above challenges result in Internet users in the region paying high prices (in some countries, disproportionately high) for slow Internet connections, inferior quality of communications and slower content delivery.

D. Increase in demand and infrastructure network congestion

20. Looking forward, broadband Internet usage is expected to increase exponentially as narrowband usage and hardware prices continue to decline. Demand for international bandwidth grew 45 per cent globally in 2011. Moreover, from a global perspective, the surge in usage is expected to be highest in Asia and the Pacific due to the region's well-known dynamic growth processes, which are driving more region-centric trade, transportation, financial and energy flows. This may result in important qualitative shifts in the direction of Internet traffic as routes diversify away from their current United States centrality to Asia and the Pacific and the nature of the traffic as it moves from voice to data. Since data traffic (as compared to voice) relies much more on international bandwidth that is provided primarily by fibre optic cables (see section E below), increased

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