Appendix F: South Korea

Overview

ITIF Rank: 1

Subscribers per Household[1]	0.93	Incumbent Government Owned	0%
Internet Users in Millions[2]	34.9	Local Loop Unbundling:[3]	
Internet Users per 100 Inhabitants[4]	72.75	Full Copper Loop	Yes
Average Speed in Megabits per Second (Mbps)[5]	49.5	Shared Copper Loop	Yes
Price Per Month of 1 Mbps USD PPP[6]	.45	Bitstream	Yes
Percent of Urban Population[7]	81	Cable	No
Population Density per sq. km[8]	481	Fiber	No

Geography and Demography

Although South Korea has a much higher population density than the United States (481 inhabitants per square mile as compared to 31)[9] the percentage of the population living in urban areas is nearly the same (81 percent in Korea versus 80 percent in the United States).[10] Yet, there is a key difference in the way that Korea's population is distributed compared to the United States: apartments make up more than 50 percent of Korea's housing.[11] However, this would not be as much of an advantage if the South Korean government had not created in 2000 "The Certification Program for Broadband Buildings," which requires all buildings to be designed to enable high-speed broadband connections, such as locating digital subscriber line (DSL) access multiplexers (DSLAMs) or cable head-ends in apartment basements. The program grades multiple unit buildings of 50 units based on the level of high-speed access they support, rating them as 1st, 2nd, 3rd class based on whether they provide access at speeds of 100 Mbps, 10-100 Mbps, or 10 Mbps, respectively.[12] The result of this combination of urban density, architectural preference, and government initiative is that 90 percent of South Korean households are within a radius of 4 km from a local exchange, which helps keep down the costs of the "last mile" to the home.[13]

Policy

The South Korea government established a national policy to promote the deployment of information technology in the public and private sectors with its "Framework Act on Informatization Promotion" of 1987. This act created the National Information Society Agency (NIA) to oversee the construction of high-speed networks, the use of information technology in government agencies, and programs to promote public access to broadband and digital literacy. The NIA established the Korean Information Infrastructure initiative (KII) in 1994 to construct a nationwide optical fiber network. The government followed KII with a string of 5- year programs that combined government loans with private sector contributions, including Cyber Korea 21 in 1999, e-Korea Vision 2006 in 2002, IT Korea Vision 2007 in 2003 and finally the Broadband Convergence Network (BcN) and IT 839 initiatives in 2004.[14] Through these programs, South Korea not only invested a substantial amount of money from the government budget, enacted promotional regulations, and provided incentives to private companies to build networks, it also enacted a number of successful efforts to spur broadband demand and digital literacy.[15] In addition to the NIA, the South Korean government established several agencies to promote broadband access in both the public and private sector including the South Korean agency for Digital Opportunity (KADO), which

Policy (*continued*)

ensures that all South Korean citizens have the ability to access the Internet, including the elderly and those with disabilities through targeted training programs.

The government created other agencies to spur demand for broadband access by ensuring that consumers know how to access the Internet (digital literacy), and that they feel secure while using it (Internet security and privacy). Accordingly, it created the Korea Information Security Agency (KISA) and the Korea Internet Safety Commission to oversee Internet security and consumer protection, as well as the National Internet Development Agency (NIDA) to promote the Internet society through education and promotional programs. These include the "PC for Everyone" program in 1996, a computer literacy drive in 1998, and the Cyber Korea 21 initiative in 1999 to promote digital literacy and e-commerce. The NIA also implemented programs to promote e-government. In 2004 the Ministry of Information and Communications (MIC) launched the IT839 strategy (also called the "u-Korea Master Plan") to create a ubiquitous information infrastructure by 2010.[16] It is named for its eight services (Wi-Bro, digital broadcasting, home networks, telematics, radio frequency identification (RFID), W-CDMA, terrestrial D-TV, and Internet telephony), three pillars (services, infrastructure, and new growth engines), and nine new growth engines (mobile handsets, digital televisions, home network equipment, system-on-chip products, next generation personal computers, embedded software, digital content, vehicle-based information equipment, and intelligent robot products). Also in 2004 the government launched the "Basic BcN Establishment Plan" to develop a next generation integrated network to allow seamless secure broadband access anytime, anywhere to convergent multimedia services, including telecommunications, broadcast, and Internet services.

The South Korean government's national broadband strategy includes direct and indirect support for broadband infrastructure development, including loans and other incentives. The KII consisted of three sectors and three phases: KII-Government, KII-Private, and KII-Testbed called KOREN (Korea Advanced Research Network). KII-Government spent $24 billion to construct a national high-speed public backbone network, which service providers could use to deploy broadband services to about 30,000 government and research institutes and around 10,000 schools.[17] The KOREN initiative also provided government test beds for companies to use for research and development.[18] Meanwhile, KII-Private worked to spur private funding to construct an access network for homes and businesses, aiming to stimulate broadband deployment in the "last mile." The KII provided a combination of government support and private sector investment. Specifically, the government provided $1.76 billion in government low-cost loans between 2000 and 2005 from its Public Fund Program while the private sector invested $14.5 billion for a total public-private investment of $16.3 billion. In addition, to stimulate demand for broadband, the South Korean government gave small and medium-sized businesses a tax exemption equal to 5 percent of their total investment in broadband communications systems. The lopsidedness of the percentage of government to private funding reflects the fact that the South Korean government expects its private companies to drive the investment in broadband infrastructure with government support in the form of loans and tax subsidies as their incentive. This pattern continued with the successor programs to the KII – the Broadband Convergence Network (BcN) and the IT839, though which the Korean government provided broadband service providers incentives of over $70 billion in low-cost loans to build high speed broadband networks while broadband providers pledged to invest an equal amount.[19]

Rural Access

In South Korea, as a condition of privatization, the government required KT (formerly Korea Telecom) to provide broadband access at speed of 1 Mbps or higher to all homes in villages.[20] To help offset some of these costs, the government provided a modest amount of loans ($926 million from 2001 to 2005) to providers through its "Digital Divide Closing Plan" to extend services to harder-to-reach areas through the construction of a fiber-optic backbone network to connect all 144 telecommunications service districts to the nationwide broadband network.[21]

Competition

In South Korea, there is intense competition between the three main broadband providers, KT, Dacom Powercomm, and Hanaro Telecom. This is because the government has been directly involved in promoting competition. For example, even though KT was government-owned until 2003, in 1997 the South Korean government licensed a new telecommunications service provider to compete directly with KT. So, in 1998 seven South Korean conglomerates provided funding to create Hanaro Telecom and by 1999 the new company began offering broadband services.[22] But Hanaro was not the first broadband provider in South Korea. That distinction goes to Thrunet, a cable provider that launched its service via cable modem in 1998. KT followed by offering its own asymmetric DSL (ADSL) service later in 1999. The government's encouragement of facilities-based competition (both Hanaro and Thrunet initially offered their services by leasing cable lines from KT and Powercomm) while exempting KT from regulation (the government didn't introduce local loop unbundling until 2002) provided the impetus for competition in pricing, infrastructure development, and quality of service.[23] Hanaro launched very high speed DSL (VDSL) service in 2002, with 20 Mbps downstream speeds and 6 Mbps upstream. KT followed with its own VDSL service in 2003 with 50 Mbps downstream and 4 Mbps upstream. Competitors have a further advantage because for multi-unit dwellings the landlords, not KT, own the local loop infrastructure. So Hanaro can simply extend fiber to the local exchange and then contract with landlords (not KT) for use of the local loop.[24] Not surprisingly, landlords would have an incentive to contract with Hanaro since broadband access would make their apartments more attractive.

By 2006 the market began to consolidate. Although South Korea had 79 Internet Service Providers (ISPs), the three largest providers control 85 percent of the broadband market via their affiliated ISPs: KT (KORNET) with 51 percent of the market, Dacom Powercomm (BORANET) with 22 percent, and Hanaro Telecom (HANANET) with 10 percent. Thrunet is the major provider of broadband services via cable, but other companies offer services by leasing access from Dacom's Powercomm (a subsidiary of South Korea's electronic appliance giant – Lucky Goldstar (LG)), which provides its service via cable modems through agreements with cable TV operators. Thrunet has built its subscriber base rather quickly, having only entered the market in 2005.[25] The company began by launching a high-speed fiber service called "Xpeed," advertising 100 Mbps connectivity for apartments and 10 Mbps for houses at prices lower than the 4 Mbps services offered by KT and Hanaro.[26] Intense competition in an increasingly saturated market also has forced providers to compete on price, with some negative results. For example, by 2003 Hanaro was facing huge financial difficulties and sold a controlling stake of 40 percent to a consortium lead by Newbridge Capitol and American International Group (AIG). In addition, Thrunet went bankrupt in 2003 and Hanaro bought the company in 2005 (beating out Dacom Powercomm).[27]

Fiber

South Korea is evolving toward fiber-to-the-home (FTTH), which is better suited to providing triple play services (telephone, Internet, and television), but the high cost of extending fiber to each household initially slowed development of these services. Nonetheless, high bit rate DSL (such as ADSL and VDSL) subscriptions are declining and Ethernet-based connections to optic fiber distribution nodes in or near apartments are increasing. Fiber broadband increased its market share from 9 percent at the end of 2004 to a third of all connections by 2007.[28] Getting fiber to the home also is one of the goals of the government's two recent initiatives, the Broadband Convergence Network (BcN) and IT839 programs. Both of these focus on creating a ubiquitous network combining wireline, wireless, and RFID technology to enable South Koreans to communicate anytime and anywhere through a variety of devices, including fixed line and mobile phones, personal computers, and via home networks and appliances. In 2004 the government selected three consortia led by KT, DACOM and SKT and expected them to develop trial BcNs using their own funding. Given the strong relationship between the South Korean government and industry, it is perhaps not surprising that the companies in these consortia agreed to this implicit government mandate. For example, in 2003 KT projected it would invest $58.3 billion in the BcN.[29]

Demand

As the market becomes saturated, companies are likely to move away from using low prices to gain subscribers and instead focus on other ways to increase demand. In South Korea, there is much available local content, such as games, South Korean music and movies, that have driven demand for broadband access. Television over Internet Protocol (IPTV) has lagged in South Korea as the government has not established regulations for Internet broadcasting. Yet KT, Hanaro, and Powercomm all are offering high-definition television via their broadband networks and bundling this with Internet and voice services in "triple-play" services. Koreans are willing to spend twice as much of their household income on broadband than U.S. consumers.[30] They seem to see broadband as a superior good and thus place a higher value on it. This may be because South Korea has a wide variety of broadband content, and the more services consumers can access using broadband, the greater its value to them.[31] For example, in the late 1990s Internet cafes providing high-speed access – called "PC-bang" – became popular with young people. Once these users had a taste of this level of access they wanted it at home, particularly as online games became more popular. By December 2005, more than 33 million Koreans over the age of 6 (about 73 percent of the population) had online access.[32] Online music services also are popular, such as SK Telecom's "Melon" and the "Melon Shop," which allows users to purchase almost everything related to music, including MP3 players, CDs, music tickets, and musical accessories.[33] Such services drive user demand for high-speed broadband connections. One example is an online service with millions of followers, "Cyworld." In 2005 SK Telecom was making up to $1 million per day on the site by charging small amounts for users to decorate their spaces, to play games, and to play roles.[34] Another example is "OhmyNews," a website that allows the public to general and post content with more than 10 million people using the service.[35]

Nearly all South Korea students are online, with a rate of Internet usage of over 99 percent.[36] Driving this rate of Internet usage are South Korean government programs that require teachers to encourage students' Internet usage by giving online assignments and communicating with them via e-mail. In addition, as part of the Closing the Digital Divide Act of 2002, the government provided free computers to 50,000 low-income students with good grades.[37] Also, the Educational Broadcasting System (EBS) broadcasts high school education programs via the Internet. Because students need broadband access in order to get their assignments and access education programs, these schemes encourage parents to get high-speed access for their children.[38]

The government's digital literacy programs also target groups that otherwise would be less likely to use the Internet. For example, the "Ten Million People Internet Education Project (2000-2002)" worked to provide Internet education to approximately a fourth of South Korea's citizens. Similarly, the government provided subsidies to around 1,000 private training institutes over the nation for the purpose of educating housewives, in order to create demand in households. Under this "Cyber 21" program the government offered 20-hour, week-long courses to housewives for only about $30. In just the first 10 days, 70,000 women signed up for the courses.[39] KADO also has a variety of programs to promote digital literacy and access to computers. These include establishing 8,263 Local Information Access Centers throughout Korea where the public can access the Internet for free, distributing free used PCs to the disabled and to those receiving public assistance, and education and training programs for the elderly and disabled.[40]

In addition, the government realized that broadband demand would not increase if its citizens did not have access to a PC at home. As a result, the PC diffusion promotion established in 1999 aimed to provide PCs at low-prices, partly through a PC purchase installment plan using the postal savings system. Through this program the government purchased 50,000 PCs, providing them to low-income families on a four-year lease with full support for broadband free for five years.[41]

ENDNOTES

1. OECD measures penetration on a per capita basis because comprehensive data on household penetration is generally unavailable. ITIF has used average household size as a multiplier to convert June 2007 OECD per capita penetration data to household penetration data. It should be noted that one problem with this method is that the OECD data likely also includes some DSL business subscribers.

2. International Telecommunications Union, "Internet Indicators: Subscribers, Users, and Broadband Subscribers," International Telecommunications Union ICT Statistics Database, 2006 <www.itu.int/ITU-D/icteye/Indicators/ Indicators.aspx#>.

3. Unbundling is a policy by which regulators require incumbent telecommunications operators (those with dominant market status who control access to the telecommunications infrastructure) or cable companies to give their competitors access to raw copper pairs, fiber, or coaxial cable networks so that they can install their own transmission equipment at the incumbent's central office (local exchange). *Full unbundling* requires the incumbent to make all copper pair frequencies or fiber networks available to competitors. *Shared access* to the local loop requires the incumbent to make the "high" frequency bands (those that carry data, but not voice) of the copper pair available to its competitors, allowing them to offer xDSL broadband services. *Bitstream access* requires incumbent operators to allow competitors access to the incumbents' equipment at their central office. *Cable access* enables competitors to use cable companies' coaxial cable local loops and fiber access requires telecommunications operators to give competitors access to their fiber local loops.

4. International Telecommunications Union, "Internet Indicators: Subscribers, Users, and Broadband Subscribers," International Telecommunications Union ICT Statistics Database, 2006 <www.itu.int/ITU-D/icteye/Indicators/ Indicators.aspx#>.

5. Our methodology for calculating broadband speed in the ITIF Broadband Rankings involves averaging the speeds of the incumbent DSL, cable and fiber offerings provided in the OECD's April 2006 "Multiple Play," report, with each assigned a weight according to that technology's respective percentage of the nations overall broadband subscribership, as reported in the OECD's "Broadband Statistics to December 2006."

6. USD price per bit (PPP) of the fastest available technology is calculated from the broadband offerings examined in the OECD's "Multiple Play: Pricing and Policy Trends" report.

7. The World Bank, "Information and Communications for Development 2006," (2006): 172.

8. The United Nations, "World Population Prospects: The 2006 Revision Population Database," 2007 <esa.un.org/unpp/>.

9. Ibid.

10. The World Bank, "Information and Communications for Development 2006," (2006): 218.

11. Martin Fransman (ed.), *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads* (Stanford, California: Stanford Business Books, 2006): 62.

12. Sung-Hee Joo, "Broadband Internet Adoption in Korea: A Maverick or a Model to Follow?" paper presented at the 33rd Research Conference on Communication, Information and Internet Policy, Telecommunications Policy Research Conference, Washington, DC (2005): 6.

13. Ibid: 10.

14. Arsyllfa Band Eang Cymru-Broadband Wales Observatory, "Korea Broadband Market Report 2005" <www. broadbandwalesobservatory.org.uk/broadband-3355>.

15. Yoonmi Kim, "Broadband Internet in Korea," FINPRO Korea, September 30, 2004 <akseli.tekes.fi/opencms/opencms/ OhjelmaPortaali/ohjelmat/CONE/fi/Dokumenttiarkisto/Viestinta_ja_aktivointi/Seminaarit/Maaselvsem06/Fixed_ Broadband-Korea_-_Kim.ppt >.

16. National Information Society Agency, Leading the Construction of u-Korea, (Seoul, Korea: 2006): 9.

17. John Borland and Michael Kanellos, "South Korea Leads the Way," *c/net News.Com* (July 28, 2004) <www.news.com/ South-Korea-leads-the-way/2009-1034_3-5261393.html>.

18. Arsyllfa Band Eang Cymru-Broadband Wales Observatory, "Korea Broadband Market Report 2005" <www.

broadbandwalesobservatory.org.uk/broadband-3355>.

19. Dong-Hee Shin and Won-Yong Kim, "An Analysis of Korean National Information Strategy of IT839," Proceedings of the 41st Hawaii International Conference on System Sciences, IEEE, Hawaii, 2008 <csdl2.computer.org/comp/proceedings/hicss/2008/3075/00/30750225.pdf>.

20. Arsyllfa Band Eang Cymru-Broadband Wales Observatory, "Korea Broadband Market Report 2005" <www.broadbandwalesobservatory.org.uk/broadband-3355>.

21. Yong-Hwan Chung, "Korean National Policies to Close the Digital Divide," Ministry of Information and Communication, August 6, 2002 <unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN006369.pdf>.

22. Martin Fransman (ed.), *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads* (Stanford, California: Stanford Business Books, 2006): 31.

23. United Kingdom Department of Trade and Industry, "Exploiting the Broadband Opportunity: Lessons from South Korea and Japan," *Global Watch Mission Report* (December 2005): 23.

24. Ibid.

25. Paul Budde Communication Pty Ltd, "South Korea – Broadband Market – Overview & Statistics," Telecommunications and Information Highways (2007): 9.

26. Arsyllfa Band Eang Cymru-Broadband Wales Observatory, "Korea Broadband Market Report 2005" <www.broadbandwalesobservatory.org.uk/broadband-3355>.

27. Martin Fransman (ed.), *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads* (Stanford, California: Stanford Business Books, 2006): 32.

28. OECD, "Percentage of Fiber Connections to Total Broadband (June 2007)," OECD Broadband Portal <www.oecd.org/dataoecd/21/58/39574845.xls>.

29. Insung Jun, "Broadband Networks in Korea," KT Presentation to the ITU, December 10, 2003 <www.itu.int/osg/spu/ni/futuremobile/pervasive/KTbroadbandnetworks2.pdf>.

30. James B. Speta, "Commentary: Policy Levers and Demand Drivers in Korean Broadband Penetration," *Journal of Korean Law*, Vol. 4, No. 1 (2004): 10.

31. Ibid: 11.

32. National Internet Development Agency of Korea, "Korea Internet White Paper," (2006): 31.

33. Ibid: 34.

34. United Kingdom Department of Trade and Industry, "Exploiting the Broadband Opportunity: Lessons from South Korea and Japan," *Global Watch Mission Report* (December 2005): 35.

35. Ibid: 36.

36. Ibid: 33.

37. Krishna Jayakar and Harmeet Sawhney, "Universal Access in the Information Economy: Tracking Policy Innovations Abroad," (Benton Foundation Universal Service Report, April 19, 2007): 43.

38. Sung-Hee Joo, "Broadband Internet Adoption in Korea: A Maverick or a Model to Follow?" paper presented at the 33rd Research Conference on Communication, Information and Internet Policy, Telecommunications Policy Research Conference, Washington, DC (2005): 7.

39. Jack Schofield, "Miracle Workers: In Just Five Years, South Korea has Shown the World What the Broadband Future Looks like," *The Guardian*, October, 17, 2002 <www.guardian.co.uk/internetnews/story/0,7369,812943,00.html>.

40. Korea Agency for Digital Opportunity and Promotion, "Introduction of KADO," <unpan1.un.org/intradoc/groups/public/documents/UNPAN/UNPAN028063.pdf>.

41. Kenji Kushida and Seung-Yuon Oh, "Understanding South Korea and Japan's Spectacular Broadband Development: Strategic Liberalization of the Telecommunications Sectors," BRIE Working Paper 175, BRIE, University of California, Berkeley, California: June 29, 2006 <brie.berkeley.edu/publications/wp175.pdf>.