

Working Group (WG) on Wireless Technology Information Note

Wireless Technology Policies in Selected Overseas Places

1. Introduction and Background

1.1 At the first WG meeting on 3 December 2004, Members suggested to gather information about the wireless technologies policies in selected developed telecoms markets, such as South Korea and Singapore. The purpose of this information note is to brief Members the key success factors and recent development of wireless technology policies in these places.

2. South Korea

2.1 Top-level Leadership and Commitment

The success of Korea's wireless technology industry is in a large part due to the pro-active approach and ICT policies that the Government has adopted. Korea's ICT and broadcasting policies are shaped and promoted by several government bodies, including the Ministry of Information and Communications (MIC) and the National Computerization Agency (NCA) as well as central and local governments. Both the MIC and NCA have played an active role in promoting wireless industry in Korea.

As ICT industry is targeted as an important driver for Korea's economic growth, a top-level authority, namely, Informatization Promotion Committee (IPC) was formed in 1996 to promote the Korea's future ICT development. This Committee, chaired by the Prime Minister and also included 25 Ministers, is to oversee and coordinate the entire range of ICT policies and projects across different branches of the Government. Moreover, an Information Promotion Advisory Committee comprising members of 26 experts with extensive knowledge and experience in ICT industry was also formed in the same year to advise Government on the overall ICT policies.

2.2 Forward-looking Master Plan on ICT

Since early-1990s, the Korean Government has intervened directly in improving the status of ICT industry by implementing its vision of an information society in a series of plans. Among the more ambitious of these was the National Informatization Framework which was established in 1996. Other important ICT strategies that had been implemented over the past 10 years included "the Korea Information Infrastructure", "Cyber Korea 21", "e-Korea Vision 2006" and "Broadband IT KOREA VISION 2007".

Of all these master plans, Korean Government's approach is characterized by intervention at the following three levels:

- Creating the right environment mainly through the pro-market policies of telecoms liberalization and privatization;
- Funding the public Internet backbone;
- Developing the non-market-end of the supply-chain, in particular through the provision of IT training for its citizens.

Recently, Korean Government has further announced "IT839 strategy" to build the foundation for boosting its economic growth by upgrading its ICT industry, introducing innovative services and promoting investment in its network infrastructure.

2.3 Harmonious Public-Private Relationship

One of the key factors behind the success of Korea in ICT industries is the positive and supportive relationship between private and public sector. Part of the Government's strategy to achieve this goal is to get business and government officials together on ICT projects and come up with different types of funding mechanisms and policies that can protect interests of private sector.

One of the salient examples was that the Korean Government has offered a low interest loan program to encourage telecoms operators to invest in broadband access networks. The other example to attract companies to invest in ICT is a "Certification Program for Broadband Buildings and Apartments" which is aimed to certify the informatization level of new apartments and buildings. Under this program, building receives 1st, 2nd and 3rd class certificate, depending on whether it carries over 100 Mbps, 10-100 Mbps or 10Mbps Internet connections.

2.4 Wise re-investment in ICT promotion

Unlike other overseas countries which are often to put the revenues from spectrum licences and taxes on operators into Government's general budget and used to fund other non-telecoms related projects, the Korean Government has pooled the fees from spectrum licences together into a government fund called "IT Promotion Fund". The purpose of this Fund is to require telecoms operators to contribute to government programmes for improving the overall connectivity, upgrading infrastructure and promoting ICT industry development in Korea.

In addition to the one-off revenue from spectrum auctions, the Korean Government also keeps a steady flow of new money flowing into fund by requiring telecoms operators to pay a fee that amounts to 0.8% of their revenue in the Fund.

2.5 Inter-modal Competition

The fierce competition in Korea's telecoms markets has played a major role in helping the Government reach its goals for universal broadband access. Unlike many other economies, the competition situation in Korea is a type of "Inter-modal Competition" which means that a single carrier may offer broadband services over a wide range of technologies. For examples: Korea Telecom offers access over four different technologies: xDSL, apartment LAN, wireless LAN and satellite and, Hanaro offers broadband over five different technologies: xDSL, cable modem, apartment LAN, LMDS (B-WILL) and wireless LAN.

Such high-level of inter-modal competition has several advantages. First, Koreans can have many technology options for broadband. Second, it has brought down prices substantially and facilitates the deployment of technologies in remote areas. Third, the competitive market fosters the rapid roll-out of new technologies and innovative value-added services.

For example, Korea Telecom's NETSPOT has already built an extensive Wi-Fi access in 10,000 areas, such as universities, hotels, exhibition halls and other public areas around the country. NETSPOT subscribers also have their own Wi-Fi access points at home which extend the reach of the overall wireless network. NETSPOT subscribers only have to pay an extra US\$8.4 a month for unlimited NETSPOT usage at home and from any of the country's access points. As more and more users join and become nodes, the Wi-Fi connectivity across Korea has been greatly improved.

2.6 Regulatory Framework

One of the factors behind the high-level of competition in Korea is the open access policy featured in its regulatory framework. Under this open access policy on broadband networks, it allows any carrier to provide service over other types of networks. Many economies have unbundled the local loop, with varying degree. However, Korea has gone a step further by also unbundling the cable loop. This has allowed competitors to take unbundled lines from the incumbent operators to provide competitive service nationwide and over multiple technologies. Another characteristic of Korean's regulatory framework is that the mandate coverage obligations in its licensing exercise on telecoms sector. This is to ensure the wider deployment of network and technologies.

2.7 Active Government Involvement in Information Infrastructure Project

As considered that a nationwide fibre network backbone is vital for Korea's ICT development, the Korean Government was committed in a 10-year plan in developing a high-speed nationwide backbone network

in 1993. Instead of funding the backbone completely, the Government put up an investment fund initially and then agreed to become a tenant on the line to connect all government offices and public bodies so as to ensure sufficient demand for the telecoms operators.

In addition to backbone network, the Korean Government has also maintained regulatory control over critical information infrastructure, such as the Internet Exchanges, in an effort to offer better connectivity to all competitors. Currently, there are three private Internet exchanges and one non-profit exchange in Korea. All four Exchanges are inter-connected and most ISPs connect with each other through the Exchanges rather than private peering arrangements.

2.8 Strong R&D Capability

Recognizing that ICT is key to the nation's advancement, the Korean Government has placed great emphasis on building strong R&D capabilities. There are three major organizations, namely, Electronics and Telecommunications Research Institute (ETRI), NCA and Institute of Information Technology Assessment (IITA), to promote research and development. Among these three organizations, ETRI has played an active and critical role in driving R&D in ICT sector. The major current researches at ETRI include mobile telecommunications, computer and software, future security network, and information processing and telecommunications systems, etc.

As the country's premier developer of innovative technologies, ETRI's customers include not only public sector, but also the private sector, especially those SMEs. ETRI's technology transfer mechanism allows it to commercialize new technology while also helping to support its existence. Once a project has been sufficiently developed and is ready to be commercialized, it is handed over to the private sector. Over 800 technologies have so far been transferred from ETRI to some 1 800 private companies.

The commercialization of CDMA is, in fact, the most salient example to demonstrate the success of ETRI in helping transfer technology into commercial use and establish Korea's leading position in global mobile communications market.

Apart from research in technology development, there is another government sponsored research institute, namely, the Korea Information Society Development Institute (KISDI) to provide the vision and policy direction towards a knowledge-based society in Korea by carrying out research in ICT policy.

2.9 Recent Development

The major initiatives targeted by the Korean Government recently on wireless technologies are summarized as follows:

Broadband Converged Network (BCN) – The Korean Government has been planning for a converged network which will merge the mobile and broadband networks. Some of the Government's initiatives in 2004 included:

- To collaborate with the public sector, research institutes and academics to develop and improve the standards of BCN;
- To develop and promote BCN-related applications and services to the public;
- To cooperate with the private sector to promote pilot projects on BCN.

Portable Internet – Korea's policy makers, broadband providers and mobile operators has recently come up with a plan to develop a new data network that is more efficient at offering mobile data than either broadband or mobile – that is Portable Internet. This technology, which fits will between WLAN and IMT-2000 will handle the vast majority of mobile data traffic while voice calls will be routed over the existing CDMA and WCDMA networks. The purpose of this plan is to leverage the comparative advantages of each technology and provide Koreans an effective way to have fast data access everywhere.

Mobile gateways – this is a networking hardware that passes information back and forth between different, privately owned networks. The Korean Government has initiated a mobile exchange, similar to Internet exchanges that pass Internet traffic from one network to another. The Government has mandated the use of such exchange by all carriers, as a way to push quickly towards a single network. Moreover, MIC also authorized one of the telecoms operators (SKTelecom) to propose and open the gateway to both wired and wireless carriers as well as portals and other content providers. The goal of the project is to create competition in mobile Internet content.

IPv6 – To prevent the shortage of Internet address, Korea and the EU signed an agreement to work together to develop applications and services based on IP addressing system in Jan 2004. Some of the Government's initiatives in this area include:

- To establish KOREAv6 networks model so as to support development of Digital Home and Telematics;
- To construct IP Security infrastructure for e-government and provide the public sector the necessary support of address conversion from IPv4 to IPv6.

ENUM - The Korean Government has started ENUM trials – a method

to merge the Public Switched Telephone Network (PSTN) with the IP networks's IP addressing system by "mapping" a telephone number into a typical Uniform Resource Locator (URL). It could help lay the foundation of the Korean broadband converged network by combining two different directory structures, the domain name system and the PSTN numbering system. A successful internal ENUM trial in July of 2003 has led to a public trial capable of handling over 100,000 users. Some of the Government's initiatives in this area included:

- To test the system and the service was being commercialized in 2004.

Intelligent Home Networking – MIC has identified intelligent home networking as a key focus area in the Government's overall ICT strategy. The Government has targeted a set of initiatives to establish the foundation for intelligent home networks. These include developing a home network platform that combines mobile communications, RFID and sensor networks, broadcast, video and gaming; starting a one-year pilot project to develop a home network platform based on the Linux operating systems. Some of the Government's initiatives in 2004 included:

- To develop core technologies for home network such as home service infrastructure, home gateway, home networking and ubiquitous computing technology;
- To set up an RFID research center to develop RFID, sensor networks and the BCN on the platform of intelligent home networks.

Telematics – Korea is keen to develop telematics technologies. The Korean Government has declared that cars will become the "third Internet arena" serving as a telematics traffic information center that will deliver real-time traffic information. Some of the Government's initiatives in 2004 included

- To develop platform technology for telematrix, server technology, wireless access technology;
- To invest in public electronic maps.

Other initiatives to strengthen the competitiveness of IT-related SMEs

- To help promising enterprises strengthen their R&D functions and access global markets through consulting services;
- To set up a "IT M&A Fund" to encourage mergers and alliances among SMEs IT venture firms that show prospects of greater synergy effects;
- To invest in SMEs that are in field of new technologies, such as Post PC and intelligent home applications and so on;
- To increase investment in "Korea Global IT Fund" to

encourage more Korean enterprises to enter international markets;

- To encourage the establishment of a collaborative call center in overseas markets to ensure Korean enterprises having adequate infrastructural support in other countries.

3. Singapore

3.1 A Centralized and High-level Implementation Framework

Singapore's ICT policies are formulated by the Infocomm Development Authority of Singapore (IDA) which is a statutory board under the Ministry of Information, Communications and The Arts (MITA) of the Government of Singapore. The major responsibilities of IDA are to perform as an industry developer and a promoter to create an enabling and competitive environment for Singapore's ICT industry to prosper. Moreover, IDA is also served as the Government's CIO to conceptualise and manage service-wide initiatives to support the implementation of eGovernment in Singapore.

3.2 Visionary ICT Master Plan

Under the initiative of IDA, Infocomm 21 was formulated in 2000 to develop Singapore into a vibrant and dynamic global infocomm capital, with a thriving and prosperous e-Economy and an infocomm-savvy e-Society.

In 2003, IDA delivered its second master plan – Connected Singapore – with a vision to make infocomm as a key enabler to bring the power of computing, communications and content, to create new business opportunities, consumer value and cultural experiences to Singapore. Of the five key areas under this blueprint, value-added mobile services, infrastructure for wireless and wired networks, multimedia processing and management are the three areas that have been identified to offer high growth potential from 2003 to 2006.

3.3 Strong Promotion Efforts in Wireless Technologies

To promote wireless technologies applications and services in different industrial sectors, IDA has rolled out a “Wired With Wireless” program in 2000 with an aim to develop Singapore into a living lab for wireless development in Asia. Under this program, IDA has collaborated with the industry to identify, develop and launch key projects with industry-wide impact in five areas, including location-based services, wireless enterprise, mobile commerce, wireless multimedia and messaging, and machine-to-machine communications. Initiatives of this program are summarized as follows:

- **Pilot and Trial Hotspots (PATH)** – an industry development

program to support the trial and piloting of merging Infocomm technologies and best-of-breed devices;

- **Wireless Technology Alliance (WTA)** – an initiative to provide a platform for the sharing of technology, co-development and co-deployment of new wireless products and services. Currently, four WTA partnerships have formed:
 - Java Wireless Competence Centre
 - Siemens Location Enabling Centre
 - Singapore Infocomm Technology Federation Wireless Chapter
 - Wireless Intellect Labs.
- **Market Development (MADE)** – an initiative to support testing marketing, joint marketing research and joint marketing activities to help companies access potential markets and establish their market identity. For example, IDA has lead a delegation of local wireless players to the 3GSM World Congree in Cannes of France in Feb 2004 to showcase Singapore’s wireless technologies and applications.
- **Wireless Enterprise Case Study Series** – an initiative to raise the awareness and profile of successful local deployment of wireless enterprise solutions.
- **Call for Collaboration (CFC) Wireless Projects** – a program to encourage industrial consortia to develop specific or innovative wireless applications. Examples of projects include
 - Mobile Payment Systems (solutions for retail and person-to-person payment using direct debit payment, stored value and credit card solutions);
 - Mobile Workforce Solutions (personal information management, sales force automation, supply chain management, resource planning and remote monitoring);
 - Wireless Java Solutions (Wireless Financial Portal on Java2 for Mobile Devices, Mobile Communication Centre, Elixir Report Mobile Edition, etc.);
 - Pervasive Wireless Access (a Test Bed to demonstrate pervasive wireless access to contents and applications through the use of GPRS, 802.11 WLAN and Bluetooth technologies);
 - Location-based Service; and
 - Smart Airport and Passenger Travel.

3.4 e-Government as an Agent for Change

Together with industry players and other government agencies, IDA conducts numerous technical trials in key emerging technologies identified as potentially strategic to Singapore in the public sector. Such

trials offer an independent assessment of new technologies for the benefit of the wider infocomm community, so as to provide a sound basis for well-informed decisions for adoption and deployment in other industrial sector. Areas covered so far included Free Space Optics, Next Generation Wireless Local Area Network and Ultra-Wideband (UWB).

3.5 Recent Development

The major initiatives targeted by the Government of Singapore on wireless technologies recently are summarized as follows:

Review of the Telecom Competition Code – The Code, which was first introduced in 2000, set out the competition guidelines in Singapore’s telecom market. To promote effective competition in the telecoms market in the future, IDA will scale back its regulatory role, for example, by taking a less prescription approach towards consumer protection. Other proposed revisions to the Code include reviewing the definition of a dominant licensee.

Spectrum Allocations for Wireless Broadband Trials and Commercial Deployment – IDA has allocated the 2.3 GHz and 2.5 GHz spectrum bands for trials and commercial deployment of wireless broadband in early 2004. IDA has also issued a Consultation Paper on the Licensing Framework for Deployment of Wireless Broadband Technologies. Major features of the licensing framework are as follows:

- To introduce a *Market Trial Framework* to help companies and licensees better test the commercial viability of innovative technologies;
- To propose a market-based approach to allocate spectrum via auction;
- The duration of spectrum rights will be set at 7 years;
- The reserve price of each spectrum lot was set at levels sufficient to at least cover the cost of administering spectrum. The annual recurrent Facilities-Based Operator licence fees were kept separate from the price of the spectrum lots;
- To require the successful bidders to roll out wireless broadband services within 2 years from obtaining the spectrum from IDA;
- To consider permitting the 3G operators to deploy wireless broadband technologies that do not belong to the IMT-2000 family of standards in their 3G spectrum;
- To consider permitting existing DSL and cable modem broadband infrastructure providers and 3G operators to bid for spectrum, but with intention to limit the amount of spectrum they can bid;
- To require wireless broadband operators to interconnect their wireless broadband networks to the networks of any other service provider licensed by IDA in a way to ensure fair and

- equitable open access to any content or service providers;
- To require wireless broadband operators to comply with the minimum Quality of Service standards issued by IDA from time to time.

Mobile Computing Centre – this centre is to provide Palm OS platform training and certification for developers located in Singapore and around Asia Pacific, equipping themselves with skills to address an increasing worldwide demand for handheld computing solutions.

Connected Homes – an initiative to facilitate pilot home networking solutions be developed and deployed in the community. The projects encompass solutions in data communications, entertainment, automation and security.

RFID – In 2004, IDA has set aside US\$6.1 million over the next 3 years to promote the adoption and development of RFID. Some of the initiatives include:

- To work with the educational institutions to develop new courses in RFID skills in order to improve manpower capability in this area;
- To establish Joint Research Centre with global centres of excellence like MIT Auto-Labs to form a Singapore RFID Alliance to develop reference architecture, share best practices and align standards;
- To encourage EPCglobal to set up Asia-Pacific HQ in Singapore;
- To work with the industry to develop a regional forum that initiates cross-border RFID projects;
- To build five RFID-enabling supply chain clusters by 2006 in manufacturing, consumer packaged goods manufacturing, pharmaceutical manufacturing, retails and logistics industries so as to encourage the deployment of RFID.

4. Wireless Cities

Over the past few years, many overseas governments are set to transform their cities by harnessing the potential of wireless technologies. The followings are some of the examples:

Taipei Wireless City 2006 – The plan was initiated in 2004 to increase Taipei citizens' mobility by enabling Internet access to information any time and at any place. Some initiatives include:

- Installing Public Wireless Local Network in the Metro by early 2005;
- Setting up 15,000 to 20,000 hot spots in the city so that

wireless internet is expected to be available citywide by the end of 2005;

- Establishing Dynamic Bus Information System and Location Base Services;
- Building information networks for citizens with physical handicaps;
- Setting up Taipei e-Campus and online learning programs; and
- Installing Public Wireless Local Network in Guandu Nature Park.

Wireless Philadelphia – The plan was initiated in mid-2004 to provide wireless access for the entire city. The purpose of this plan is to create a truly digital city that supports economic development, social development and helps close the digital divide in this knowledge-based world. Specifically, the city of Philadelphia will invest in the creation of a new wireless mesh network serving the entire city based upon the current Wi-Fi 802.11b standards. It is estimated that this type of wireless mesh network can be deployed for approximately US\$60,000 per square mile. For the City of Philadelphia with approximately 135 square miles of land area, the entire network will cost about US\$7 to US\$10 million.

Others:

City of Westminster (UK)

<http://www.westminster.gov.uk/councilgovernmentanddemocracy/councils/modernisation/westminsterwirelesscity/presentations.cfm>

Calgary Wireless City Project (Canada)

http://www.wirelesscity.ca/city/bins/content_page.asp?cid=1600-1608

Paris Wireless City (France) - an experiment is under way that aims to turn the city be the first largest Wi-Fi hot spot in the world. Moreover, an Intelligent Wi-Fi Bus, which is equipped with a mobile access router which enables continuous access to all centralised information through hotspots and GPRS, has been used in the city of Paris.