.kr

Korea, Republic of

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Total population	48,456,000 (2007)
Literacy rate	97.8% (2002)
GDP per capita	USD 20,045 (2007)
Computers per 100 inhabitants	54.1 (2006)
Fixed-line telephones per 100 inhabitants	48.1 (2007)
Mobile phone subscribers per 100 inhabitants	89.1 (2007)
Internet users per 100 inhabitants	76.3 (2007)
Domain names registered under .kr	930,485 (2007)
Broadband subscribers per 100 inhabitants	30.2 (2007)
International Internet Bandwidth	49,766 Mbit/s (2006)

(Sources: KOSIS 2007; NIA 2008a, 2008b)

INTRODUCTION

The Republic of Korea (referred to as Korea throughout this chapter) has consistently sought to keep pace with fast-changing information technology (IT) trends and become a full-fledged knowledge-information society. In the mid-1980s, Korea laid the foundation for informatization through the construction of the National Basic Information System (NBIS) in five major areas, namely, National Administration Information System, Financial Information System, Education/Research Information System, National Defense Information System, and National Security Information System. The NBIS is the first grand project focusing on deploying strategic IT applications and systems at the national level. In the mid-1990s, the Ministry of Information and Communication and the Informatization Promotion Committee (IPC) were created to promote national informatization, and the government enacted the 'Framework Act on Informatization Promotion'. Based on this, the 1st Master Plan for Informatization Promotion was formulated in 1996. Since then, the government has effectively pushed ahead with informatization, guided by a vision that is continually updated in response to the IT evolution — from Cyber Korea 21, to e-Korea 2006, to Broadband IT Korea Vision 2007, to the u-Korea Master Plan.

The informatization efforts of the government and the private sector in the last two decades have enabled Korea to build advanced IT infrastructure. All public services are available online, enabling citizens to print civil service documents, pay their taxes, and participate in political processes. Moreover, the Korean IT industry has consistently recorded high growth rates. In 2007, the IT industry's share in the total Gross Domestic Product (GDP) exceeded 16.9 percent and its contribution to

GDP growth was 30 percent. IT export and production are expected to show fair growth in 2008 as well.

IT is being applied to several fields. For example, students and teachers are benefiting from various e-learning programs such as cyber home learning and online university education. Korean netizens are posting their own content online through user-created content (UCC) websites. Thus, they are actively participating in the construction of the Internet and leading the Internet culture. However, easy access to the Internet has brought about a number of social problems, including Internet addiction and verbal violence in cyberspace. The Korean government is working on improving legal systems and providing assistance to individuals who are suffering from these problems.

With the inauguration of a new administration in February 2008, the government underwent a large-scale reorganization and the responsibilities of the Ministry of Information and Communication were distributed among existing and new ministries as Korea aims for ever more advanced levels of informatization.

TECHNOLOGY INFRASTRUCTURE

To achieve the vision of a ubiquitous network society where all objects are intelligent and networked to one another, the Korean government continues to enhance the country's IT infrastructure. In particular, the government has been pushing forward with policies and projects to construct the Broadband Convergence Network (BcN) and Ubiquitous Sensor Network (USN), and to promote the spread of Internet Protocol version 6 (IPv6) (NIA 2007a).

The BcN is a next-generation network integrating communications and broadcasting, wired and wireless services, and voice and data services. The construction of the BcN is expected to enable the provision of broadband multimedia service to 10 million fixed-line subscribers at speeds of 50–100 Mbps, and to 10 million wireless subscribers at speeds over 1 Mbps by 2010.

The USN is an information service infrastructure through which sensor nodes are networked with each other to recognize, integrate, and process information on humans, objects, and environments, thus enabling all people to use the information at will, anytime, anywhere. To come up with practical service models and commercialize them, USN pilot tests are being carried out in food and drug management, airline baggage management, munitions management, and road facilities management, among others.

In a ubiquitous network society, personal computers (PCs), electronic appliances like televisions and refrigerators, handheld devices such as personal digital assistants (PDAs) and mobile phones, cars, street lights and buildings will be connected to the Internet. This poses the threat of Internet Protocol (IP) addresses running out. To prepare for this possibility, the Korean government has released the 'Plan for accelerating adoption of IPv6', which requires research networks to adopt IPv6 in 2008 and provide IPv6 as a test bed network to communications equipment vendors and Internet service providers (ISPs). By 2010 public sector networks and systems should support both Internet Protocol version 4 (IPv4) and IPv6. ISPs are expected to adopt IPv6 for their major transport network by 2010 and for all access networks by 2013.

KEY INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

To promote national informatization in a systematic and efficient manner, the government reorganized the Ministry of Postal Service into the Ministry of Information and Communication in 1994 and unified information and communication-related efforts scattered across several ministries and offices. In June 1996, the Informatization Promotion Committee (IPC, http://www.ipc.go.kr) was created to take charge of national informatization plans and projects. The committee is chaired by the prime minister and comprises 25 members, including the ministers.

With the inauguration of President Lee Myung-bak in February 2008, the country's government ministries and agencies underwent a sweeping reorganization and their information and communication related work was adjusted. The Ministry of Information and Communication was absorbed into the new Korea Communications Commission (KCC, http://www.kcc.go.kr) established to regulate both broadcasting and communications.

Responsibility for promoting national informatization and the ICT industry was transferred to two newly created ministries, the Ministry of Public Administration and Security (MOPAS, http://www.mopas.go.kr) and the Ministry of Knowledge Economy (MKE, http://www.mke.go.kr). The MOPAS integrates the functions of the Ministry of Government Administration and Home Affairs (MOGAHA) and the Ministry of Information and Communication. It has organized the Informatization Strategy Office for the promotion of e-government and national informatization. To be more specific, the Office is charged with establishing master plans for national informatization, promoting e-government projects, developing policies for protecting personal information and privacy, narrowing the digital divide, and training the IT workforce.

The MKE was created by integrating the functions of the Ministry of Commerce, Industry and Energy (MOCIE), the ICT industry promotion function of the Ministry of Information and Communication, and the promotion of ICT research and development (R&D) of the Ministry of Science and Technology (MOST). Thus, the new ministry unifies the government's policies for the development of the ICT industry and promotes the growth of all industries through ICT.

National agencies that had been under the control of the Ministry of Information and Communication now belong to the new ministries. The National Information Society Agency (NIA, http://www.nia.or.kr), which helps the government develop national informatization master plans and establish e-government, and the Korea Agency for Digital Opportunity and Promotion (KADO, http://www.kado.or.kr), which is in charge of programs for closing the digital divide, are now under the MOPAS. The Institute for Information Technology Advancement (IITA, http://www.iita.re.kr), which supports ICT R&D and trains IT professionals, is now under the MKE.

ICT AND ICT-RELATED INDUSTRIES

The ICT industry has been the biggest engine of Korea's economic growth since the 1990s. Semiconductors, computers, and telecommunications equipment have been particularly strong. Total sales in the IT industry in 2007 increased by 4.5 percent from 2006 to KRW 267.594 trillion, and a high growth rate of 8.3 percent per year has been maintained since 2000 (NIA 2008b).

The production of the IT services sector has increased an average of 8.1 percent every year since 2000 and 5.1 percent from 2006, accounting for KRW 54.521 trillion or 20.4 percent of the total production.

IT equipment production in 2007 increased 4.4 percent from 2006 and an average of 8 percent since 2000 and has now reached KRW 190.257 trillion or 71.1 percent of the total production volume. As the export of telecommunications equipment like mobile terminals has increased, IT equipment production maintained a relatively stable growth despite the world's economic crisis caused by the high price of raw materials and oil. It is likely that the demand for mobile phone terminals could have contributed to the gradual growth of mobile phone production, and the growth of display panel production caused by price stabilization led the entire IT equipment production.

Software and computer-related service production increased 3.9 percent from 2006 and an average of 11.4 percent yearly since 2000, reaching KRW 22.816 trillion or 8.5 percent of total production. The increase somewhat slowed because of a decrease in large-scale IT investment, stagnation of the domestic market, and the possibility of a worldwide recession. However, the yearly average growth rate remains high.

IT exports in 2007 increased 10.5 percent to USD 125 billion despite difficulties in the market caused by the US subprime mortgage crisis, the exchange rate crisis, and the general decrease in the price of IT products. However, although it has recorded a two-digit increase for two consecutive years, this is lower than the growth rate of computing industry exports and the figure has been dropping after going up to as high as 36.9 percent in 2004.

IT imports in 2007 increased 9.9 percent to USD 64.75 billion, and showed a gradual one-digit annual increase for three years since 2005. The IT trade balance was USD 60.33 billion in surplus, which is about four times the balance of the computing industry (USD 14.64 billion in surplus).

IT production is expected to grow 5.7 percent to a record KRW 278.3 trillion (around USD 278.3 billion) in 2008 (KISDI 2007).

KEY ICT POLICIES AND PROGRAMS

The enactment of the Framework Act on Informatization Promotion and the creation of the IPC in 1996 paved the way for the advancement of information technology nationwide. The Korean government formulated and carried out the 1st Master Plan for Informatization Promotion in 1996, which reflected 10 key tasks for accelerating the advancement of information technology (Song 2006). In 1999, the Korean government launched Cyber Korea 21, the second master plan for informatization promotion. Cyber Korea 21 envisioned the construction of a creative knowledge-based economy for the 21st century and proposed a number of strategies and policy tasks to be carried out by 2002.

It contributed to the spread of the Internet and the promotion of the digital economy in Korea.

In 2002, the Korean government launched e-Korea Vision 2006 in response to the challenges of the new millennium, notably the globalization of the world economy and the rapid shift to a knowledge-information society. Its aim was to transform Korea into a global leader through the continued enhancement of broadband IT networks. The Broadband IT Korea Vision 2007 announced in December 2003 highlighted the government's commitment to improve administrative services through the implementation of open e-government; strengthen national competitiveness by applying IT to industries; construct a broadband convergence network; develop new IT growth engines; achieve a GNI per capita of USD 20,000; and become a global leader by strengthening international cooperation.

The emergence of ubiquitous technologies prompted a revision of the Broadband IT Korea Vision 2007 into the u-Korea Master Plan in March 2006 (Ministry of Information and Communication 2006). Under the Plan, the government intended to achieve FIRST, or the five key visions of 'Friendly Government', 'Intelligent Land', 'Regenerative Economy', 'Secure and Safe Social Environment', and 'Tailored u-Life Services'. It also intended to optimize four major engines (BEST): Balanced Global Leadership, Ecological Industrial Infrastructure, Streamlining Social Infrastructure, and Transparent Technological Iinfrastructure. The successful implementation of these tasks would result in ubiquitous technologies being applied to every sector of society, improved national competitiveness, a higher national income, and improvements in the quality of public life.

LEGAL AND REGULATORY ENVIRONMENT FOR ICT DEVELOPMENT

In Korea, laws on informatization are broadly divided into five categories according to their functions. The first category includes laws for building the infrastructure for an information society. The second category consists of laws supporting the revitalization of information services, including laws supporting informatization of private and public services. The third category includes laws fostering and advancing the ICT industry, as well as laws for developing new growth engines. Laws creating an environment for fair use of knowledge and information are included in the fourth category. The fifth category includes laws for preventing all sorts of malfunctions and adverse effects of informatization, including cybercrimes, the circulation of harmful information, the digital divide, invasion of privacy, and the like.

The significant ICT-related laws are the e-Government Act, Electronic Signature Act, Act on Managing Knowledge Information Resources, Act on Closing the Digital Divide, Act on Promotion of Utilization of Information and Communication Network and Data Protection, Telecommunications Business Act, e-Financial Transaction Act, and Act on Security of Personal Information Processed by Computers in IT Networks.

DIGITAL CONTENT

UCC is attracting more public attention than any other type of digital content. In the early stages, UCC consisted of personal commentary shared with friends. However, it is now evolving into proteur-created content (PCC), or content made by a 'proteur', a term coined by combining 'professional' and 'amateur'.

According to a survey conducted in April 2007, 74 percent of Internet users in Korea view UCC more than once a month. More than half of Internet users (51.1 percent) have experienced producing UCC, and 35.2 percent produce and post UCC on the Internet more than once a month. About half of those surveyed participate in UCC production by posting responses or comments (43.8 percent), evaluating them (41.6 percent), recommending them to acquaintances (40.7 percent), or copying them to post on other websites (38.8 percent).

The production of video UCC has also been increasing. The popular Korean video UCC sites are Gom TV (http://www.gomtv. com), Pandora TV (http://www.pandora.tv), Mgoon (http://www. mgoon.com), and Afreeca TV (http://www.afreecatv.com). The key to the success of these websites is to realize a profit through their UCC service. YouTube, a popular US-based video sharing website, is trying to develop a profit model for video UCC. Korean UCC websites usually derive profits from inserting a short video advertisement before content is played.

ONLINE SERVICES

The Korean government has focused on providing public services through the Internet to improve their accessibility. As a result, Korea was ranked sixth in the 2008 UN e-Government Readiness Index and second in the 2008 e-Participation Index (UN 2008).

The first steps in e-government were focused on putting key administrative information into databases. In 2001, 11 major e-government initiatives were undertaken, including the Government-for-Citizens (G4C) portal, e-Procurement System, and National Finance Information System. Through these initiatives, the Korean government has been able to integrate online services, and adopt single-window e-government. Customers can report

taxes, pay bills, and lodge complaints electronically. The kinds of certificates that can be issued or read online are also increasing (NIA 2007b).

The National Police Agency has launched a website through which people can report crimes, give information, or call the local police in an emergency.

Another example of online public services is the UNI-PASS of the Korea Customs Service (KCS, http://portal.customs. go.kr). UNI-PASS, the world's first 100 percent electronic clearance portal system, provides a one-stop PASS service by unifying all customs clearance procedures, including export/import clearance, duty drawback, inbound/outbound passenger control, and tracking of bonded cargo (MOGAHA 2007). The development of the system was made possible through intensive consultations with customs clients. With UNI-PASS, customs procedures can now be carried out at home, at the office, on the production site, or any place with an Internet connection.

ICT-RELATED EDUCATION AND CAPACITY-BUILDING PROGRAMS

The Korean government has promoted e-learning programs since 1997. The e-learning formats used include cyber home learning (http://www.kkulmat.com/index.jsp) and Educational Broadcasting System (EBS) online lectures (http://www.ebsi. co.kr/) for students preparing for the College Scholastic Ability Test (CSAT).

The cyber home learning program, which was started in April 2005, is for primary and high school students who are in need of supplementary study. Following an assessment of its effectiveness, the program has been systematically promoted by the government. The number of subscribers, which has increased steadily since the beginning of the service, was about two million at the end of 2006. Moreover, the daily average of visitors more than tripled in 2006, and nearly 200,000 people now access cyber home learning websites daily. Some 3,000 cyber classes are offered every semester and the number of students managed by cyber class teachers has reached about 170,000.

EBS lectures for the CSAT were launched in 2004 to help reduce the cost of private tutoring. The number of students subscribed to the service grew from 740,000 students in April 2004 to 2.5 million (60 percent of all high school students) as of the end of 2006.

e-Learning is also being applied to teacher training. Distance education programs for teachers have contributed to strengthening teachers' capacity and improving the quality of education.

Higher educational institutions in Korea are also utilizing e-learning. One hundred fourteen four-year universities (56.7 percent) are using e-learning to deliver 13 percent of their lectures. There are also 15 four-year and two two-year fully online universities in Korea. As of 2006, some 50,000 full-time students and 34,000 'pay-by-the-class' students were enrolled in online universities, and an estimated 130,000 people had graduated from online universities. Online or cyber universities are now classified as regular universities according to the Higher Education Act.

Public organizations and private firms are also utilizing e-learning for employee training. According to the e-Learning Industry Development Act of 2004, about 20 percent of the training courses for public servants is offered through e-learning. The Cyber Education Center, which was established by the Central Official Training Institute to provide training for government officials, has opened about 40 cyber classes and produced about 20,000 trainees. As one of the cities that are actively using e-learning to train public officials, Seoul City has opened some 140 classes and nearly 35,000 public servants have completed the training course.

Gyeonggi Province has established the Gyeonggi Women's e-Learning Center and about 50 classes for women to help them get jobs. The centre is focusing on developing e-business content and IT education for women who want to set up their own business. As of 2006, the e-learning use rate was about 33 percent for firms with over 50 employees.

The e-learning user market volume or e-learning expenditure of formal educational institutions, government, public institutions, businesses, and individuals increased 7.1 percent to KRW 1.728 trillion in 2007 from KRW 1.613 trillion in 2006. The e-learning supplier market volume, or e-learning sales in each area (solution, contents, service, etc.), was KRW 1.727 trillion in 2007, a 6.8 percent increase from KRW 1.618 trillion in 2006 (NIA 2008a).

OPEN SOURCE AND OPEN CONTENT INITIATIVES

Korea ranks high globally in all IT-related indexes except for software development where it is lagging. To create new markets and ultimately make the nation a software powerhouse, the government has been increasing demand for open source software (OSS) through large-scale public projects, and strengthening the production base of OSS through the revitalization of related communities.

Government efforts to encourage the use of OSS in the public sector boosted the growth of the OSS market from KRW 49 billion in 2002 to KRW 95.9 billion in 2006, representing an average annual growth rate of 18.3 percent. Linux has been used in building several administrative databases and it is now being adopted by the private sector, especially by dot-com companies like NHN Corporation (http://www.nhncorp.com, http://www.naver.com) and Daum Communications (http://www.daum.net). The desktop PC market is waiting for the release of a Linux PC with Asianux of Haansoft Corporation (http://www.haansoft.com) installed.

Linux adoption rates by firms and public organizations have been increasing steadily. As of 2006, public organizations showed the highest adoption rate (60 percent of the sector use OSS), followed by the distribution and service sector (35 percent), the financial sector (30 percent), and the manufacturing sector (23.8 percent). The average adoption rate was 40 percent, almost double the 19.6 percent adoption rate in 2005.

However, open source operating systems like Linux are not widely utilized in core servers, and Windows is the operating system of 98.9 percent of desktop PCs. Clearly, the share of OSS in corporate server and application markets needs to be increased. To eliminate prejudice against OSS, which is one reason why its use is not more widespread in Korea, the government has been focusing on developing OSS technologies and products, nurturing human resources, and documenting successful pilot cases and projects.

ICT RESEARCH AND DEVELOPMENT

The IT industry has a value chain structure that requires the organic harmony of three essential factors: service, infrastructure, and manufacturing capability. This perspective underpinned the release of the IT839 Strategy in February 2004. The strategy focused on eight core services, namely, high speed downlink packet access/wideband code division multiple access (HSDPA/WCDMA), Wireless Broadband (WiBro), broadband convergence service, digital multimedia broadcasting/digital multimedia broadcasting (DMB/DTV) service, u-home service, telematics/location-based service (LBS), radio frequency identification/ubiquitous sensor network (RFID/USN) service and IT service; three advanced infrastructure, namely, the broadband convergence network (BcN), USN, and soft infraware; and nine growth engines, namely, mobile/telematics devices, broadband/home network devices, digital TV/broadcasting devices, next-generation computing/peripheral devices, intelligent robots, IT SoC/convergence/parts, RFID/USN devices, embedded software (S/W) and digital content and S/W solutions.

The implementation of the IT839 Strategy has resulted in commercial success in several fields, and the u-IT839 Strategy is now being pursued as the Strategy's second phase (NIA 2007a).

In addition to strengthening the interfaces between and among the eight services, three infrastructure, and nine new growth engines, the focus on software policies has been enhanced.

The growth of the IT industry has recently been slowing down due to the market saturation and overheated competition. It needs a mutual-growth strategy, which aims to achieve growth through convergence with other industries such as manufacturing and service industries. Against this backdrop, the Korean government has formulated an IT convergence strategy that aims to apply IT in five major industries — automobiles, shipbuilding, construction, healthcare, and national defense — and to make them high value added industries. To push ahead with this strategy, the government will invest a total of KRW 1 trillion in developing IT convergence technologies by 2012. In 2008 KRW 70.6 billion has already been injected into the project.

For the auto industry, IT convergence technologies will provide a safe, convenient, and environment-friendly driving system, which should strengthen the industry's competitiveness. For the shipbuilding industry, technologies for design, production, and sailing will be integrated based on IT convergence technologies, creating high value added in the shipbuilding and marine industry. The government is also planning to promote the biomedical industry through the convergence of IT, nano-technology, and biotechnology. For the construction industry, the government aims to create an advanced construction environment by integrating the nation's traditional construction technology, construction materials, construction materials technology, construction logistics and process management technology, energy-saving and environment-friendly technology, construction-IT infrastructure technology, and intelligent technology. Finally, for the defense industry, the government will actively enhance informatization by using IT convergence technologies.

The Korean government is also pursuing efforts to develop green IT technologies, light emitting diode (LED) lamp, and u-healthcare. The goal is to use IT to address various social problems in the areas of environment, energy, aging population, and the like.

CHALLENGES AND OPPORTUNITIES

The anonymity that the Internet makes possible facilitates communication among people, but it also has adverse effects such as verbal violence and defamation in cyberspace. To prevent these adverse effects and encourage responsible behaviour on the Internet, the Act on the Promotion of Utilization of Information and Communication Network and Data Protection requires large private websites to include ways to track users by their national identity number.

Another social problem that has resulted from easy access to the Internet is Internet or online addiction. Internet addicts have difficulty controlling the amount of time they spend online, suffer withdrawal symptoms when away from the Internet, and are ultimately unable to engage in real life interaction and relationships. Internet addiction, which is also called pathological Internet use, is a problem that needs social attention because it can lead to criminal behaviour. In Korea, the K-Scale for the youth and A-Scale for adults have been developed to assess signs of Internet addiction. A 2006 study involving 3,000 people found that 9.2 percent of those sampled were Internet addicts. In response, public agencies, including KADO, have been providing people with education and counselling services to prevent and/or treat Internet addiction.

Meanwhile, as environmental pollution worsens, the environment is emerging as one of the biggest global issues. Global warming in particular is expected to have a serious impact on the global economy since an enormous amount of money is needed to fight global warming. In Korea, President Lee Myung-bak has suggested a national vision of 'Low Carbon, Green Growth' as the country's contribution to the international campaign to respond to climate change while maintaining economic growth. Green IT is grabbing much attention in Korea. Furthermore, a lot of research is being carried out on how to reduce the energy consumption and carbon emissions of the IT sector itself and how to use IT to improve energy efficiency and realize low-carbon economic growth.

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