"Overview of Information Technology in Korea and It's Contribution to Her Economic Growth."

Information Technology in Korea

Korea is well-known for its successful achievement of rapid economic development. In the period of four to five decades, Korea rose from one of the world's poorest nations to become one of the largest economies. Korea's GNI per capita stood at a mere US$87 in 1962. The figure surged to more than US$10,000 in 1995, vaulted above US$20,000 in 2007. The development of the IT sector has been one of the core drivers of Korea's exceptional growth.

The number of Internet users aged 3 and above as of 2009 was 36.58 million and the usage rate reached 77.2%. In 2009, the number of mobile phone users marked 47.9 million, broadband Internet users, 16.3 million respectively. On the other hand, the number of fixed-line-telephone users was 20 million and is decreasing since 2008. In the area of Internet development in 2009, social networking sites prospered due to the explosion of smart phone use, and this led to the development of a variety of services specialized for mobile use. In particular, 'micro-blogging' services such as 'Twitter' received the spotlight, in which users can upload and exchange short messages through their mobile devices. Together with the diffusion of smart phones, accelerated by the launch of the 'iPhone' in Korea in November 2009, this service is expected to grow even faster in the future. In 2009, more search services were introduced than in at any other time. Portals in Korea also launched various services and joined into the fierce competition.

In terms of ICT infrastructure, projects for establishing 'Giga-Internet', Broadband Convergence Network (BcN) and IP-USN are currently all under execution with the aim of maintaining a world-class ICT infrastructure in the digital convergence environment. In addition, information security was one area that experienced an incident on July 7, 2009 when major portals and websites of public and financial organizations in Korea and overseas were attacked by Dedicated Denial of Service (DDoS) attacks, alerting people to cyber terrors. This incident raised the awareness that with the lack of a control tower, international cooperation framework, specialized manpower and equipment, and regular management of PCs by Internet users, serious problems can occur. In this regard, the government now plans to step up preventive and responsive measures.

While the 1990s were a phase for building a foundation for information service use, the

years in the 2000s are a phase for developing information services. In the area of E-government, Korea's endeavors and performance was finally recognized by the rest of the world in 2010, when Korea earned the highest scores in the 'E-government Development Index' among 192 countries surveyed by UN in 2010. In addition, many of Korea's E-government practices until now have been introduced to the world as the best cases and received worldwide acknowledgement. In 2010, Korea ranked top in other studies such as in Study on the Super High-Speed Internet Quality published by the University of Oxford, in ICT National Competitiveness Assessment for the White Paper 2010 Information and Communications released by the Japanese Ministry of Internal Affairs and Communications.

The information technology (IT) industry has made a significant contribution to the growth of the Korean economy since the 1990s. With the world's highest Internet penetration rate and the global first adoption of advanced telecommunication services such as DMB (Digital Multimedia Broadcasting) and WiBro (Wireless Broadband), Korea is a first-class IT country where cutting edge IT technologies have been put in place. This tech savvy nation's rapid development of the IT industry is largely attributed to the local companies that have created state-of-the-art IT products such as semiconductors, LCD panels and mobile phones. Their bold and forward-looking investments into facilities, research and development have enabled Korea's IT industry to take its current leading position in the global IT market. A report of the Organization for Economic Cooperation and Development (OECD) published in 2008 includes Samsung Electronics, LG Electronics and KT in its list of the world's top 50 IT companies. These Korean names that lead the evolution of the global IT industry are one of the main achievements of the IT industry in Korea.

In the media sector, IPTV service escaped from its long delay in the past caused by some legal issues and finally entered the stage of diffusion, strongly backed up by the amended IPTV law and the government support. As a result, the number of subscribers reached over 1 million in October 2009, 9 months since the start of service commercialization and a total of 2 million subscribers in April 2010. Following the mergers of wired and wireless communication service providers, integration of wired and wireless services was also facilitated. In June 2009, KT and KTF merged, followed by the establishment of the new integrated 'LG Telecom (or LG U+)' in January 2010, in which LG Telecom, LG Dacom and LG Powercomm were all merged.

The Korean government has been an important player of this outstanding progress of the IT industry. It has addressed a wide range of issues for both demand and supply sides:

technology development, human resource development, modification or creation of relevant laws and regulations, investments in high-speed Internet infrastructure, implementation of e-Government, privatization and market liberalization of telecommunication industry and execution of competition policies. Korea's IT industry is a typical example in which the government plays a leading role by continuously motivating the relevant companies to develop new technologies and organizing the relevant legal and regulatory systems. The Korean government even engaged in the direct development of major communication technologies such as TDX (Time Division Exchanger) and CDMA (Code Division Multiple Access) through one of its invested research institutes and set them as the local standards.

The Korean government's IT policies focused on satisfying the basic demand for telecommunications, developing the industry based on the electronics industry and building a foundation for informatization until the mid-1980s. Since that point until the mid-1990s, the government made intensive efforts at the national level to boost the country to be an IT superpower. Especially, once the country was under the International Monetary Fund's supervision (IMF) in late 1997, the government injected a large-scale fund into the IT industry in its desperate move to overcome the crisis. The decision was effective. The world's best IT infrastructure was built, the nationwide level of informatization was significantly enhanced, and the IT industry became a main engine for the growth of other industries. The government's following drives of the IT839 strategy and the development of the new growth engines provided a stepping stone for Korea to move away from its old model of simply following the advanced countries' technologies to a new model to actively lead the development of new technologies. With those innovative policies, the environments where different IT industries can grow together and Korea plays a leading role in the global IT development were created.

Korea's IT human resources development (HRD) policy has been focused on securing the quantitative supply base of IT human resources through an increase in IT departments in college and expansion of job transitional education, for instance. As a result, college graduates with IT degrees account for 47% of the entire engineering college graduates as of 2009.

Information Technology and Economic Growth in Korea

Korea's IT industry has rapidly grown since the 1990s, helped by the enhancement of technology competitiveness in memory chips and mobile handsets, whose share in the overall

economy has continuously expanded. IT industry production skyrocketed from 21.7 trillion won in 1992 to about 288.2 trillion won in 2008, whose share in GDP also soared to 11% in 2008. The consistent growth in the IT industry has made a remarkable contribution to the Korean economic growth that has slowed following the financial turmoil. About 0.3%p ~ 1.4p% of GDP growth was attributed to the IT industry from 2001 to 2009. In particular, from 2003 to 2004 when the Korean economy slowed due to falling consumption and investments, the IT industry accounted for almost half of GDP growth, confirming its importance in the Korean economy. Moreover, IT industry is making relatively fast recovery from the global financial crisis caused by Lehman Brothers' bankruptcy in 2008.

The main driver of the rapid growth of the IT industry was the enhancement of productivity by continuous technology development. Total Factor Productivity (TFP) has been widely used as a measure of productivity in economics. Growth in TFP represents output growth not accounted for by the growth in input. According to many research on TFP, the growth of TFP in Korea's IT industry exceeds those of other industries by a great margin. Unlike other industries, Korea's IT industry has grown more than 10% per year in TFP, since the 1990s. In particular, taking into account changes in productivity before and after the Asian financial crisis, the difference between IT and other industries is very clear. TFP in non-IT industries has relatively fallen since the economic turmoil while that of the IT industry has continuously risen. The enhancement in the productivity of the IT industry has made great contributions to the growth of the Korean economy as a whole by increasing the overall productivity.

IT capital goods are distinguished from others in terms of two characteristics. First, the enhancement of quality has been quickly achieved due to the rapid technological development. Second, IT capital goods have a characteristic of general purpose technologies that can be widely applied. Such features helped encourage the whole industry more actively to invest in IT capital goods. Informatization-related investments including computers, peripherals, networking, and software increased their share in the overall facility investments sharply from 24% in 1995 to 39.7% in 2001.

An increase in IT investments across the whole industry can have effects on economic growth through two channels. First, the rise in IT investments, as one of the factors of production, means an increase in capital, directly linked to economic growth. Second, the IT investment can lead to economic growth by enhancing business or industry productivity.

Changes in production, management, and organization accompanied by IT investment

further improve productivity. According to several research on the relationship between Korea's IT investments and economic growth, there exist the effects of IT investments on economic growth through increasing capital accumulation.

Generally, the number of workers is in proportion to the output and in inverse proportion to labor productivity. However, the direct impact of the IT industry on job creation and the indirect job creation in other areas caused by rising demand for IT should be considered at the same time. Employment coefficients or the number of employees per out in the IT industry (’90 : 21.1 → ’95 : 10.1 → ‘00 : 4.0 → ‘05 : 2.4 → ‘08 : 2.4) decreased faster than those in the non-IT industry (’90 : 24.6 → ’95 : 17.4 → ‘00 : 13.4 → ‘05 : 7.9 → ‘08 : 7.0). Despite falling employment coefficients, the number of workers in the IT industry increased. The increase in the final demand for the IT industry created more jobs in other industries, rather than the reciprocal of labor productivity. From 1998 to 2007, the annual average growth of employment in the IT industry was almost four times as high as that in the whole industry.

According to a series of OECD reports, technological changes in IT seem to reduce the number of jobs on a short-term basis by improving productivity but more jobs are created in countries rapidly adapting to such changes. With job creation, job quality should also be discussed. The recent argument that the smokestack industry should be promoted for job creation cannot be regarded as desirable in terms of employment quality. Increasing long-term growth potential has a significant meaning in job creation.

Weakness of IT Industry in Korea

Korea now has the highest level of Internet users throughout the globe, but it has failed to build a foundation by which different sectors effectively utilize the Internet and is actively used in many different ways. In addition, despite its quantitative growth, the local software industry has not produced tangible results in terms of global competitiveness and ripple effect on the national economy.

Jorgenson & Vu (2005) who investigated the IT investments’ contribution to the national economic growth in the 110 economies argued that Korea’s low contribution rate in the IT industry was attributed to a relatively low utilization rate of IT and a slow development of the software industry. He also pointed out that Korea was very strong in terms of IT hardware, but it was a way behind the developed nations in terms of the application of IT technologies such as convergence of IT and other industries and other software-style areas.

Korea's software and computer service industry is far behind those of advanced nations in terms of size and labor productivity, so that the size and added-value are required to be expanded. Such transformation is very important in reinforcing the job creation potential of the IT industry. The reason is that the software industry is relatively more labor-intensive than the IT manufacturing industry, creating higher-paying jobs.

As the percentage of the IT industry in production rises, the high import-inducing effects of the IT industry is raised as an issue. Such high import-inducing effects are attributed to the high reliance of the IT component/material industry on imports. The import-inducing coefficients of key IT components range from 0.46 to 0.70, about four times larger than that of Japan's electric & electronics industry (0.13). About 70 to 80% of the trade deficits with Japan are from the component/material imports, 40% of which are occurring in the IT industry.