

6

Jumping Up to the Internet-Based Society: Lessons from Korea

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1. INTRODUCTION

Asian countries have already started making efforts to diffuse the Internet nationwide. But they are facing a lot of hurdles such as building infrastructure, deregulation of telecommunications, high price of equipment and systems, security and digital divide.

Even if they could succeed in encouraging IT, rapid diffusion causes frictions economically and socially. This is mainly because all of the people and social systems cannot react and change themselves flexibly in accordance with rapid technological changes. In addition, IT will also change the sense of values especially among younger generations that brings cultural problems and ethic conflicts between generations. Some of the troubles cannot be coped with using existing laws and dispute settlement processes.

As a pioneer of broadband Internet and mobile phones, Korea has made efforts to encourage IT and overcome problems. The Korean government has shown initiatives to promote the introduction of IT. As a result of the efforts, Korea emerged as one of the most advanced countries in the world in the introduction of broadband Internet, especially ADSL (Asymmetric Digital Subscriber Line), and mobile phones. But

some problems still remain and new social and economic issues are emerging.

Although there are differences in preconditions between Korea and other developing countries for diffusion of IT, for example income levels and infrastructure, there are common factors and policy issues for developing countries. In this sense, other developing countries can garner lots of information to learn from Korea's experiences.

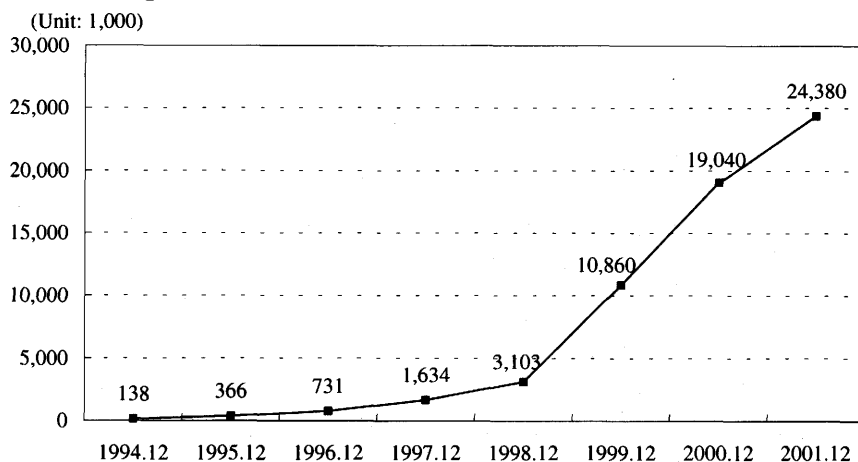
This paper firstly reviews the process of rapid diffusion of IT and explains its effects on Korea. Then problems in the business area are mentioned. After that, social issues are made clear. Finally some implications for developing countries will be derived.

2. RAPID DIFFUSION OF NEW TECHNOLOGIES

2.1. Rapid Increase in Users of Internet and Broadband Internet

The number of Internet uses in Korea has increased rapidly since the commercial Internet access service started in 1994. It increased from 138 thousand in 1994 to 1,634 thousand in 1997, and the average annual growth rate was more than 100 percent. Although a credit crunch happened in Korea in 1997, the number of users increased to 1,634 thousand and the growth rate was 220 percent in 1997. Although the number of users reached 3,103 thousand the penetration rate for the Internet was still 6.7 percent (Figure 6.1).

Figure 6.1: The Number of Internet Users in Korea



Source: KRNIC.

The turning point was in 1999. The growth rate jumped to 250 percent and penetration to 23.2 percent in 1999. In 2000 the number of Internet users reached 19 million and penetration 40.5 percent. Technologically, diffusion of broadband accelerated in 2000. The number of high-speed Internet subscribers was 49.6 thousand in January 2000 and over 4 million in December. Categorizing by technologies, approximately 2.1 million households were subscribing to ADSL Internet and 1.4 million to cable modem Internet. The share of ADSL was above 50 percent and cable modem was about 35 percent (Table 6.1).

Table 6.1: The Number of High Speed Internet Subscribers

(Unit: 1,000)

	1999.12	2000.3	2000.6	2000.9	2000.12	2001.3	2001.6	2001.9	2001.12
Korea Total	374	864	1,575	2,626	4,017	5,095	6,251	7,039	7,806
ADSL+CATV	365	847	1,243	2,142	3,460	4,563	5,458	6,437	7,176
ADSL	171	546	679	1,268	2,074	2,806	3,505	4,009	4,453
CATV	193	301	564	874	1,386	1,757	1,953	2,428	2,723
Other	9	16	332	484	557	532	793	602	630
Japan DSL+CATV	154	216	330	466	635	855	1,258	1,802	2,827
DSL	n.a.	0	1	3	10	71	291	651	1,524
CATV	154	216	329	463	625	784	967	1,151	1,303

Source: MIC (Korea), Ministry of Public Management, Home Affairs, Posts and Telecommunications (Japan).

2.2. Proceeding in the Introduction of New Technologies

In addition to broadband Internet, Korea is proceeding in the introduction of new information technologies. A variety of contents and applications encourage the usage of broadband although the relation between the two is a chicken-and-egg problem.

2.2.1. Mobile Internet

The number of wireless Internet subscribers was over 15 million as of December 2000. Although the number of users is not as high as Japan, Korea started providing the service early and the number of WAP/ME users is growing rapidly (Table 6.2).

Table 6.2: The Number of Mobile-Phone-Based Internet Users

(Unit: 1,000)

	2000.3	2000.9	2000.12	2001.9	2001.12
ISMS	3,121	6,882	6,965	6,508	5,684
WAP/ME	1,104	5,311	8,820	15,924	18,190
Total	4,225	12,193	15,785	22,432	23,874
Japan	7,499	19,679	26,866	44,937	48,495

Source: MIC (Korea), Ministry of Public Management, Home Affairs, Posts and Telecommunications (Japan).

LG Telecom was a pioneer of the mobile Internet service. This company started mobile Internet service in May 1999. It is said that this was the first commercialization of the 2.5G (cdma 2000 1x) service. LG Telecom is also the first provider of WAP in Korea and mobile JAVA in the world (NCA and MIC [2001]).

2.2.2. *Streaming and Webcasting*

Broad diffusion of broadband Internet enhanced needs for streaming and Webcasting that resulted in an increase of contents providers. MIC [2001] said that there are about 30 companies in Korea that provide paid Internet movie services. There was a remarkable increase in Webcasting stations in 2000. The number of Webcasting stations, which was about 200 as of January 2000, reached about 1,000 by the end of 2000. In addition to this, lots of illegal copies, even of brand new content, can be found on Websites. These contents-rich situations promoted the use of broadband Internet.

2.2.3. *VoIP*

ITU [2001] indicates that 50 percent of the Voice-over-IP (VoIP, Internet phone) market is occupied by five VoIP carriers: Serome is top with a 22 percent share, followed by ITCX (11 percent), Net2Phone (7 percent), iBasis (6 percent) and Deltathree.com (4 percent).

Serome was the first VoIP service provider in Korea. Serome launched its VoIP service named Dialpad in October 1999 in the US and in January 2000 in Korea. Serome is the largest VoIP service provider in Korea with about five million subscribers in 2001. Web2Phone and other

companies followed Serome.

Web2Phone was established in November 1999, launched the Wowcall pilot service in February 2000 and formally opened Wowcall in July 2000. The number of subscribers had reached over 2.2 million by the middle of 2001.

The uniqueness of the Web2Phone is its payment system. Subscribers can use the services from the company's Website that is like a portal that is providing such services as Web phone, video chatting and shopping mall. Subscribers need to pay by a coupon named Wow to use the VoIP service. They can buy it by paying 10,000 won for 2,200 Wow (4.5 won/Wow). The fee for domestic calling in Korea nationwide is 10 Wow/minute that is 45 won and the fee for international calls from Korea to Japan is 30Wow/minute that is 135 won. Subscribers can also get the coupon by clicking a banner advertisement or by buying something via the shopping mall linked with the Website. That means that 10 Wow/minute for domestic calling is the highest price and subscribers can call free.

3. ACCELERATORS OF RAPID PENETRATION OF NEW TECHNOLOGIES

As seen above, the Internet spread across Korea in a short time. KRNIC [2000] analyzed factors for the sharp increase in Internet users from four aspects: social, government policy, technical and business (Table 6.3). By analyzing information from interviews conducted in Korea and published articles, characteristic aspects for explaining the rapid diffusion of new technologies may be the deregulation of the telecommunication sector, a significant government role and the Korean mentality.

3.1. Deregulation of the Telecommunication Sector

Multinational trade negotiations in the Uruguay Round and WTO in the 1990s strongly affected the stance of the Korean government on regulations on the basic telecommunications sector (Lee and Lie [2000]). The government transformed the regulations into more pro-competition ones under agreements of multinational negotiations and even autonomously. The government has eased regulations for entry and pricing conditions, and foreign ownership limitations.¹

Two significant changes in the regulatory regime happened in 1997.

Table 6.3: Factors of Internet Diffusion in Korea

Social Aspects	Change in social perception
	Geopolitical characteristics
	Cultural characteristics
Government Policy Aspects	Policy change in service charge
	Internet promotion policies
	Change in education policies
	Nationwide promotion
	Start-up company support
Technical Aspects	Openness of Internet policies
	Enhanced Internet Infrastructure
	High speed national information infrastructure project
	Intensive technical support to IT industry
Business Aspects	Investment on Internet infrastructure
	Emergence of SOHO
	Change in perception of the IT industry
	Increase in IT businesses

Source: KRNIC [2000].

One was a change in the classification of service providers in accordance with the amendment of the Telecommunication Business Act. According to commitments made in the WTO agreement on basic telecommunications, the government newly introduced a category of special service provider that is a leased-line-based service provider and clarified the positions of new services including VoIP for regulation. Broadband Internet was classified as a value-added service, where entry and pricing were deregulated. This enabled entry into new markets and promoted competition in services.

The second was the introduction of competition to local call services that had been exclusively dominated by Korea Telecom (KT). As a result, Hanaro Telecom, the pioneer of ADSL in Korea, was permitted to enter the local call market. Hanaro launched local call and high-speed Internet commercial services in April 1999. It is said that Hanaro started its ADSL business for differentiation of service. KT followed Hanaro.

As a pioneer in ADSL, Hanaro acquired 156.1 thousand subscribers and 91 percent of the ADSL market by December 1999. KT had only 7.3 thousand subscribers and 4.3 percent. In December 2000, the market share of KT overtook Hanaro's although both companies increased the number of subscribers (KT: 1,322.5 thousand subscribers and 63.8 percent, Hanaro: 651.8 thousands and 31.4 percent).²

One of the reasons for the reverse seems to be the absence of an unbundling rule for other facility-based service providers (FSPs).³ KT could use its own local loop network to provide ADSL nationwide. In addition the distance issue in ADSL does not apply to KT because more than 90 percent of total households are located within a four-kilometer radius of its branch offices (UBS Warburg [2001]).⁴ But Hanaro invested in local loop, or leased networks from Powercomm, a network operator and subsidiary of Korea Electric Power Corporation. However, the cost and time seemed to be a burden to Hanaro.

3.2. Significance of the Government's Role and Support

Historically, the Korean government has taken initiatives in promoting industrial and technological policies. The Korean government promoted policies to foster industries in the old economy such as steel, shipbuilding, petrochemical, home appliances, automobile and semiconductors. The government selected target technologies or sectors and implemented industrial policies to promote exports or substitute domestic products for imports. This is true also for information technologies. Policy priorities shifted from building telecommunication infrastructure to creating the environment for R&D and new businesses.

3.2.1. Building Infrastructures Based on National Plans

The government promoted information technology policies from the 1980s. The Korean backbone computer network project (1987-1992) was launched to facilitate the use of PCs. That was followed by the Korean information infrastructure (KII) project to build a high-speed network. In 1995 the government allocated a budget to the KII project and the completion date was set at 2010 but later the schedule for the project was moved up.

In addition to network infrastructure, after it launched Cyber Korea 21 in March 1999, a comprehensive master plan aimed at the transition of Korea to a creative knowledge-based nation, the government gave more priority to development of human resources and input resources into projects related with education and the digital divide (MIC [1999], [2001]).

These network and human resource infrastructures provided the foundations for rapid diffusion of the Internet after 1999.

3.2.2. Certification and Evaluation of Technologies

Generally speaking, the Korean government plays a role in (1) analysis of trends, development and evaluation of policies for industrial technology, (2) support of development of industrial technology which includes contributions to funding projects for development of targeted technologies, evaluation and certification of venture industry, and (3) promotion of nurturing technology bases and technology diffusion.

In the research of information technologies, the Electronics and Telecommunications Research Institute (ETRI) under MIC has played a role. ETRI is a non-profit government-funded research organization that was established in 1976. The institute has succeeded in the development of information technologies such as high-density semiconductors and CDMA.

In 2000, to develop core technologies for information and communication, the government selected six priority fields and two base fields, for which the government would provide financial support (Table 6.4).

Table 6.4: Six Priority Goals and Two Base Fields for Technology Development

	Position	Strategic Core Technologies
6 Priority	Next Generation Internet	Fast Routers, Internet Protocols, Electronic Commerce, Informatio Protection, etc.
	Optical Communication	Next Generation Switching Technology, Optical Transmission Technology, Subscriber Networks, LAN Technology, etc.
	Digital Broadcasting	Integrated Digital Broadcasting Systems, Broadcasting Signal Processing Technology, Digital Contents, etc.
	Wireless Communication	IMT-2000, B-WLL, Very Short-distance Wireless Communications, Satellite Communication Technology, etc.
	Software	Component Software, Information Processing Technology, 3-dimensional GIS Technology, Virtual Reality, etc.
	Computer	High-performance Multimedia Servers, Portable Information Terminals,
2 Base Fields	Core Parts	IMT-2000 Core Parts, Optical Components, Display Elements, etc.
	Source Bases	Optical Elements, Human Interface, Nano Technologies, etc.

Source: MIC [2000].

3.2.3. *Supporting Venture Businesses*

The government established funds to invest in venture business. MOFE prepared an organization to evaluate and certificate technologies to make decisions regarding financing. After the latest recession in the US, the role of the government in financing is increasing. Other governmental organizations, for example ETRI under MIC and the Korea Institute of Industrial Technology Evaluation and Planning (ITEP) have facilities to evaluate technologies.

Evaluation of technologies by the governmental sector seems to have had an influence on companies' R&D strategies, investment strategies by investors and decisions on standards from the supply side. This behavior by the government is interesting because selection of technical standards is remitted to the private sector or decided through market competition that is the so called *de facto* standard, and the contribution to such decisions by the government has decreased recently.

3.3. **Mentality**

3.3.1. *Homogeneity and Group Consciousness*

UBS Warburg [2001] analyzed Korean homogenous culture as one of the key drivers that promoted the adoption of the Internet and mobile phones. Cho [2001] said that the Koreans see themselves as a single race living in a village and a country that strengthens their group consciousness compared with other races. This, he said, generates a mindset of 'all are one' and 'I can do what he can do,' and creates a sense of alienation in the case of differences. This mindset can also explain the popularity of playing online games in 'PC bangs' (Internet cafés) with friends and community sites for alumni in Korea.⁵

Based on this Korean follow-the-leader mentality and given the fact that most of the population in urban areas live in apartments,⁶ coupled with an eagerness for education, creates a sense of unease at the thought of being left behind in the drive toward an information society. As a result, Internet literacy is increasingly perceived as a basic skill in the knowledge-based society. And these factors in turn have pushed people to be more responsive to IT.

3.3.2. *Pari Pari Tendency*

The *pari pari* tendency, a Korean word that means quick-quick, has fueled a social atmosphere that encourages learning about computers and the Internet (KRNIC [2000]). This word is often heard in restaurants to urge servers to bring ordered dishes. This tendency seems to promote usage of IT, broadband and services (Cho [2001]).

Duration of viewing time on Web pages also seems to reflect this *pari pari* tendency and is very short in the case of Korean Internet users. The average time spent on a page was 29 seconds compared with 37 seconds in Japan in January 2001.⁷ Therefore it is necessary for Webmasters to put up attractive sites to hold Internet users (Cho [2001]). In the case of B2C e-commerce, the first priority for a Korean is to get something as early as possible. Problems are left behind and countermeasures against them tend to be thought out and made after the event.

3.3.3. *Job Consciousness*

Changes in job consciousness especially among the younger generation also seem to be important. Before the 1997 crisis, the highroad to success socially was only by access to a job in government or a large company. But these sectors were forced to restructure after the crisis. On the other hand, entrepreneurs in the IT sector became success stories. In addition, the younger generation has rebelled against the traditional hierarchical human relations of the society and as a result more young people are starting new enterprises and entering into venture businesses.

4. CONTRASTIVE EFFECTS OF ACCELERATORS ON E-COMMERCE⁸

4.1. Brief History of E-Commerce

Electronic commerce in Korea started in 1996. What is unique is that introduction of B2C preceded B2B. E-commerce and B2C were first introduced by Lotte department store and Interpark. Interpark started in 1995 as an in-house venture business of DACOM, a large communication company in Korea. B2B was started in 1999 by DACOM. But most of the B2B service was introduced after 2000 (KDI [2001]).

4.2. Policy Framework for Promotion of E-Commerce

The policy framework to promote e-commerce constitutes two parts: legal framework and a general plan.

Korea preceded other Asian countries in enactment of e-commerce related acts. The government enacted two fundamental acts in February 1999. The Basic Act on Electronic Commerce to promote the stable spread of e-commerce and the Act on Digital Signature to guarantee the security and reliability of e-commerce.

The general plan for promoting e-commerce was established with initiatives by the Ministry of Information and Communication (MIC), the Ministry of Commerce, Industry and Energy (MOCIE) and the Ministry of Finance and Economy (MOFE). This constituted the first comprehensive policy by the government to promote e-commerce. It is composed of five main objectives and 40 action programs. The five objectives are as follows: (1) to secure the reliability of the cyber market, (2) to expand e-commerce infrastructure, (3) to accelerate e-commerce in the public sector, (4) to encourage e-commerce in the industrial sector, and (5) to establish the basis for cyber trade (Table 6.5).

Table 6.5: Summary of the General Plan for Activating E-Commerce, February 2000

Main Object	Main Contents	Detailed Contents
Consolidate acts and policies to increase the reliability of cyber market	Obtain e-commerce reliability	Affirm identity of e-commerce user, prevent forgery of electronic paper, prevent abuse/misuse of personal data, protect e-commerce system from hacking
	Strengthen consumer protection	Strengthen refund system, clarify the responsibility relationship between consumer and supplier, clarify the duty and right of parties concerned with e-payment, consolidate international e-commerce related acts
	Improve e-commerce business conditions	Prepare tax support policy, abolish non-proper acts for e-commerce
	Early completion of Information Super Highway	Construct a high speed backbone network (1.5-2 Mbps) nationwide
Continuing expansion of e-commerce infrastructure	Promote technology development and standardization	Develop core technology by cooperation of government and private sectors (64.3 billion won by 2002), constantly promote standardization (10.5 billion won by 2002) reflecting ISO trends

Table 6.5 (continued)

Promote e-commerce acceleration in public sector	Train e-commerce experts	Offer greater e-commerce related courses in universities, execute national certificate systems
	Construct e-commerce material basis	Early completion of CALS/EC (2002), complete EDI system which is currently under test, by 2000, spread to 3,000 companies from 2001
	National defense sector	Early start of constructing e-supply system of bid contracts, compose and operate e-commerce 'regular conference' in construction sector
	Construction sector	Promote expansion from simple product purchasing to construction bid, reflect promotion results to management evaluation, consolidate acts and secure experts for spreading e-supply in government companies
	Government-run company	Complete electronization of supply business during 2000, expand use of cybermall in government purchase (from 500 to 5,000 items), support electronization of self-supply business in public organizations, establish government supply electronization environment
Spread industrial e-commerce	Expand model project	Complete e-commerce model projects in 9 main industrial sectors by 2002, induce civil investment by tax deduction, increase government support (51.3 billion won by 2002)
	Compose e-CEO council	Continuous promotion of B2B e-commerce boom
Establish basis for cyber trade	Amend cyber trade support act	Solve errors according to 'Cyber Trade Map,' electronize trade customs business (50% in 2000)
	Establish a unified buyer development system (Silk road21)	Provide One-Click service, strengthen e-commerce cooperation with advanced countries

Source: NCA and MIC [2001].

The Korean government aims to advance the country into a fully-fledged e-commerce nation by 2003. To facilitate e-commerce in the industrial sectors, MOCIE promoted pilot projects of B2B e-commerce and contributed financially to establishing infrastructures for e-commerce (MOCIE [2000]).

4.3. B2C E-Commerce and the Accelerators

4.3.1. Market Conditions

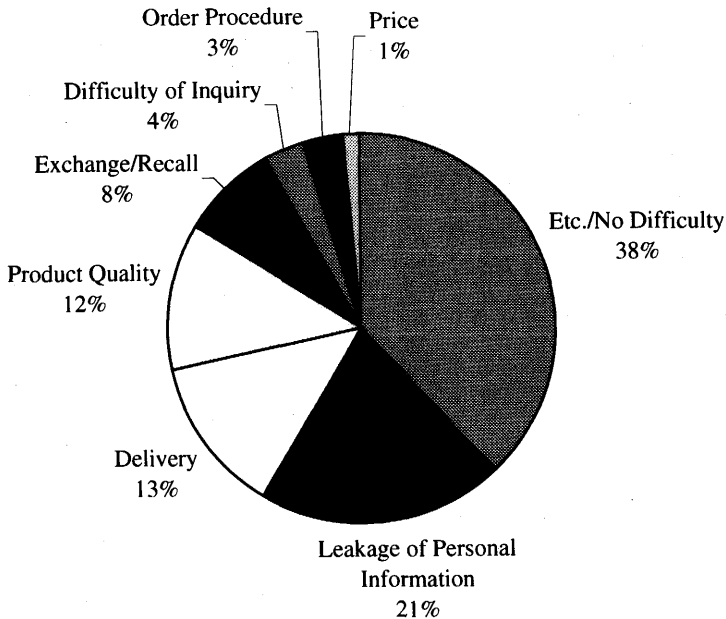
In accordance with rapid diffusion of the Internet, the final two years of the 20th century were a turning point for B2C. In 1999, the size of the B2C market was 246.4 billion won (US\$207 million), which was almost four times larger than 1998. In 2000, it was estimated to be 1,397 billion won (US\$1,235 million), 5.7 times larger than 1999. The projected size in 2001 is 1,801 billion won (NCA and MIC [2001]).

The number of Internet shops was over 1,800 as of August 2000. B2C constituted 1.1 percent of the total retail sales amount in August 2000 (MOCIE [2000]). Based on well-founded infrastructure, high penetration of PCs and constant access to the Internet, B2C is becoming familiar to Korean people. As of December 2000, there were 1,866 shopping malls. Seeing the classification of them by legal status of companies, 46 percent of them were run by individual enterprises and 52.6 percent by corporate bodies. Most of the malls specialized in specific products and use online together with offline (MIC [2001], p. 142).

Although the environment for B2C is improving, transactions through B2C are limited to standardized items which purchasers can get information on from catalogs or in stores and can experience part of the services before purchase. Computers and accessories (35.5 percent) are the biggest items in terms of purchased size, followed by home appliances, electronics and communications (14.5 percent) and books (6.4 percent). In terms of the number of purchases, books (42.2 percent) were largest, followed by computers and accessories (28.4 percent) and music, videos and musical instruments (27.2 percent) (NCA and MIC [2001]).

4.3.2. Existing Hurdles in Offline

Seeing complaints about Internet shopping, etc. — no difficulty as a response (38.2 percent) occupies the top spot. The greatest concern was leakage of personal information (20.6 percent), however this concern is not outstanding compared with other complaints. Other dissatisfactions were mainly problems related with offline procedures such as delivery, customer service and product quality (Figure 6.2). What seemed to be the biggest problem for the promotion of B2C is confidence, especially in payment procedures. In the case of Korea, shoppers on the Internet use

Figure 6.2: Internet Shopping Difficulties

Source: NCA and MIC [2001].

traditional methods for payment. Some 50.5 percent of them use online account transfers and 46.7 percent credit cards.

Although anxiety about personal information is not extremely high and credit cards are used for payment, the growth in credit fraud and theft is rapidly increasing. The total number was 1,161 as of the end of June 2001 but this figure is more than two times larger than the total of the previous year (479).⁹

A few Koreans I interviewed explained these facts as the Korean *pari pari* tendency and consciousness of security. That is to say, Koreans give priority to getting something sooner over security. Each Korean also feels that he/she is exceptionally secure. They seem to think that they can depend on the police when facing troubles.

4.4. B2B E-Commerce and the Accelerators

4.4.1. Market Conditions

In 2000, the market size for domestic B2B e-commerce sales was 6.69 trillion won (US\$6 billion), according to a report by the Korea Information Society Development Institute (KISDI). 54 percent of it was conducted via conventional EDI and 46 percent via the Internet. The amount of e-procurement, procurement via B2B, was about 4.67 trillion won (US\$4 billion). And 14.3 percent of it was made via conventional EDI and 81.9 percent via the Internet (NCA and MIC [2001], p. 57).¹⁰

As of March 2000, there were 153 e-marketplaces in Korea. By classification by industrial sectors, general market places and B2B business was top at 28, followed by machinery, information and communication (21), textiles (19), and petrochemicals (18). Classifying them by the nature of providers, offline dealers came top at 67, followed by joint ventures with IT and EC providers and offline dealers (41) and B2B specialized service providers (40).

After its start in 1999, results of B2B seem to be limited to some private market places. A large company or *Chaebol*, a Korean conglomerate or company group like the Japanese *Keiretsu*, initiates this type of market place and participants in the market seem to be limited to group companies. Large companies such as Samsung Electronics, LG Electronics and Posco are promoting e-procurement. It is said that Samsung made 85 percent of procurements via B2B that resulted in a reduction of indirect expenses by 250 billion won (US\$221 million) in 2000.

On the other hand, large parts of the public market place have not achieved results yet. These market places are open to all companies and are provided by private service providers. Although about 200 B2B companies were born by 2001, less than 25 of them have trading records.¹¹

4.4.2. Will Accelerators Turn into Hurdles?

Just after its startup Korean B2B is facing severe competition before attaining critical mass. Based on information gotten through interviews in Korea, the reasons why public market places are facing difficulties are broadly classified by three aspects: (1) technological factors, (2) economic factors and (3) mental factors.

(1) Technological factors

Standardization of the classification and code of goods, electronic documents and catalogs has not been promoted recently. Some problems existed in the settlement system. Although the Korean government has taken initiatives to coordinate among companies to solve the problems, the processes do not seem to be working well. These technological problems must be solved to facilitate the increase in demand for B2B and technological solutions.

(2) Economic factors

This will be a more serious factor for SMEs. SMEs do not have enough resources for information systems. They are too expensive for SMEs to introduce. Expenses for communications are also a burden for SMEs, because it is necessary to introduce secure systems for business use. The government has started a program to subsidize SMEs to introduce ERP. It plans to pay 20 million won to each firm as a subsidy, that is about 10 percent of the introduction cost of ERP, to 30 thousand companies by 2003.¹²

The business structure of Korean companies is also making it difficult to bridge company groups and Chaebols in order to found consortium for e-commerce by sector, like Covisint in the US automobile industry. Companies in a business sector have similar structures. In the case of the electronic industry, Korean companies concentrate their business into DRAMs and LCDs, and depend on imported materials. Of course that could provide an environment for their cooperation in procurement of materials. But that results in more intensive competition which makes it difficult to realize complementary relations especially in the sales market place.

This situation has its root in the government's initiated industrial policy for fostering protection against foreign countries in the era of traditional economy. Chaebols participated in sectors selected by the government. In the era of new economy, the government has prioritized the fostering of venture businesses and implements policies for promoting IT businesses and openness to foreign companies. But it seems to be difficult to completely deny a possibility that the problems have resurfaced especially in sectors where large companies are main players.

(3) Mental factors

It is said Chaebols have closer ties with group companies than Japanese Keiretsu. Their trade partners are limited to group companies. Excessive

competition between Chaebols is fueled by the follow-the-leader mentality and the rivalry among them. This state of affairs was heavily criticized because bankruptcy of a Chaebol caused by excessive investments triggered the credit crisis. However this closed hierarchical network has not completely diminished after the financial crisis. Rivalry between Chaebols is too intensive for them to cooperate with each other to acquire mutual benefits. This makes it difficult to found consortium for e-commerce by sector.

B2B is based on confidence, cooperation and sharing information between partners to cultivate benefits, therefore the current conditions in Korea are serious from this point of view. One respondent I interviewed said innovative reform is necessary for Korea to activate consortium for B2B. But this factor seems to be the most difficult hurdle to overcome, because there is no systematic countermeasure against it.

5. SOCIAL ISSUES CAUSED BY DIFFUSION OF THE INTERNET

5.1. Emerging Issues

Although new technologies have spread over Korean society widely, preparation for problems caused by new technologies may not be enough. Actually several issues have been raised:

- (1) Distortions in personal life and society
 - Internet addiction: Someone too absorbed by the Internet and online games to care about their daily life or mental health.
 - Pornographic and hate sites that cast aspersions on everything and everyone: both are thought of as reactions against the closeness of Confucian society.
- (2) Effects of input devices on language/culture
 - The young generation has innovated by shortening phrases or omitting a part of a Korean character to make it easier to input using the keyboard and mobile phone. This style of input promotes the use of Hangeul, the current characters used by Koreans and less use of traditional Chinese characters — documents written even 10 years ago are set to become 'classical' for younger generations.
- (3) High tech crimes
 - Leakage of personal information, privacy, mobile phone call records, theft of credit card numbers and so on.¹³

- Piracy: Korea was notorious for the piracy of brand-named watches, bags, etc., and software. Today illegal software, even the latest up-to-date, can easily be downloaded at *warez*¹⁴ sites, where illegal software, music files, pornographic contents and so on are uploaded.
- Hacking and Computer Viruses: Although some of the negative side effects of the Internet and new technologies are new, other issues raised are long-standing ones that result from traditional society. The Internet can show even tacit, latent or underground issues explicitly.

5.2. Countermeasures: The Case of Cyber Terrorism

As a result of jumping up from dial-up access to the Internet to a constant access environment, the number of reported hacking and virus incidents and arrests are also exploding. The government has established frameworks against these problems within the Korean National Police Agency (KNPA).

5.2.1. Rapid Increase of the Number of Cases

The number of reported hacking and virus incidents started exploding from 1999. That timing corresponded to the rapid diffusion of ADSL. The number of hacking cases for 1999 was three times as large as the previous year.

The total number of those arrested on cyber crime charges also jumped from 466 in 1998 to 2,089 in 1999. This seems to reflect an increase in damage done as well as reflect the expansion of the police organization responsible for such investigation mentioned in the next section. In 2001, the increase in arrests accelerated. The results for the first eight months in 2001 already exceed the total for 2000 (Table 6.6).

Among major cyber crimes, the number of hacking cases exploded in 2000. The number increased from 23 in 1999 to 360 in 2000, or about 16 times that of the previous year (Table 6.7).

The age distribution of those arrested for hacking between January and April, 2001 shows that more than half were teenagers. During those months the number of arrests was 397 (teenagers 225 or 56.7 percent, twenties 116 or 29.2 percent and thirties 17 or 4.3 percent).¹⁵

Table 6.6: Cyber Crime Statistics of Arrests

	Total	Major Cyber Crimes			Other Cyber Crime
		Sub-total	Hacking	Virus	
1997	141	6	6	0	135
1998	466	21	16	5	445
1999	2,089	26	23	3	2,063
2000	2,190	363	360	3	1,827
2001.1-8	2,724	635	624	8	2,089

Source: Korean National Police Agency.

Table 6.7: The Number of Reported Hacking and Virus Incidents

	1996	1997	1998	1999	2000
Hacking	147	64	158	572	1,943
Virus	226	256	276	379	572

Source: NCA and MIC [2001].

5.2.2. Organizational Framework for KNPA Investigation

The Hacker Investigation Squad was set up by the KNPA in 1995 for countermeasures against cyber terrorism. Afterward, the organization was expanded and renamed the Computer Crime Investigation Squad in 1997 and Cyber Crime Investigation Squad in 1999.

In July 2000, the Cyber Crime Investigation Squad was greatly expanded into the Cyber Terror Response Center in order to prevent and respond to cyber terrorism and all kinds of cyber crime more effectively. The organizational structure is constituted by four teams: (1) the cooperation team for planning, international cooperation and collaboration with private sectors, (2) the monitoring and alert team for patrol over cyber space, provision of consultation and issuance of warnings, (3) the investigation team for investigating major cyber crimes and (4) the development team for R&D into countermeasures.

This center is composed of 70 staff of the KNPA and 83 personnel in local police headquarters. In addition to them, two personnel are arrayed in each of 230 police offices. Out of a total personnel of 460 staff 20 staff work full-time for cyber crimes and the rest are engaged in both cyber and general crime work.

Officers in the KNPA include experts specially recruited for computer

crimes. Employment contracts are both long- and short-term. Moreover this offers the police officers opportunities to learn about various techniques both to analyze and respond to criminal acts. The Cyber Terror Response Center makes much of education and efforts to respond to technological progress.

5.2.3. International Cyber Terrorism and Framework for Investigation

Cyber terrorism and crime happen worldwide because there are no national borders in cyber space. One example that happened recently was attacks on Japanese organizations by Korean hackers. This was triggered by the Japanese Education Ministry's screening of a new history textbook. Sending massive amounts of e-mail and Web traffic to a specific site, or e-mail bombs in a denial of service (DoS) attack by Korean hackers crashed several Japanese organizations' Websites (NIPC [2001]). In order to cope with cyber terrorism and crime that occur over national borders some international framework for investigation is necessary. The KNPA can investigate all crime whether the servers are located in Korea or other countries but in the case of suspects that are living overseas the KNPA needs to depend on international cooperation.

There are two routes to ask for cooperation. One is the diplomatic channel, the other via Interpol. Generally the Interpol route is used because it takes three months to start investigations through diplomatic channels. Three months has a critical meaning because small businesses often do not reserve logs for more than three months. There also are cases which require the help of the Japanese NPA to utilize its network with police organizations in nine Asian countries. The Cyber Terror Response Center also has close relationships with the US's FBI, CIA, and so on.

Problems in international cooperation for investigation into cross-border crime are not only about swiftness but also reflect large differences in abilities and techniques among countries. To cope with these problems, it is necessary to deepen cooperation and the exchange of information on techniques for crime investigation between police organizations.

6. CONCLUDING REMARKS

Technology sometimes dramatically evolves and can seem to be out of control. But the new technology will diffuse on the basis of existing physical and social infrastructure that includes social, political and eco-

conomic systems, culture and ethics. Therefore the more receptive the infrastructure is to new technology, the faster the speed of diffusion in a country. That is why this paper focused on government policies and the Korean mentality.

From the case of e-commerce, these factors become the accelerator and brake. The pace of diffusion of B2C can be influenced by the mindset of users rather than business culture. But in the case of B2B corporate culture, previous relations between companies, will influence penetration. What complicates the problem in developing countries is that previous and ongoing industrial policies also influence B2B. Government initiatives for fostering specific industries can bear similar business structures among corporate groups, which will result in excess competition and make cooperation difficult between them in the case of a closed domestic market. On the other hand, there are merits to building information networks within a corporate group. The key that will decide the direction of B2B development is the openness of the offline and online market.

But diffusion of new technologies reveal problems and social frictions that underlie a society and the economy, such as freedom of speech, sexual representation, generation gap and realization of history. Especially in developing countries, there will be issues suppressed for political reasons. All of these issues can be opened on a Website with substantial effect.

These facts and problems mean that new technologies are restricted by existing social and economic systems, sense of values, ethics, and so on. For example the Internet is technologically fusing all media including scripts (newspaper and magazine), sound (radio and music) and image (picture, TV and movie) into IP (Internet protocol). But each society will require ways to match the character of each media with its sense of social values.

The open nature of the Internet makes it easy to expose and get access to existing issues that may be controversial, damaging or illegal in a given society. To cope with such situations in a borderless environment international cooperation is needed. A society that lays out conditions for deployment will develop by introducing IT, however a society that does not will become confused. To this end the Internet poses a challenge to society.

Notes

- ¹ Lee and Lie [2000] and Lee [2000], [2001] survey the process of recent regulatory reforms in Korea.
- ² KT: 3,340.5 thousand subscribers and 75.0 percent, Hanaro: 1,011 thousands and 22.7 percent (As of December 2001).
- ³ Local loop unbundling (LLU) was introduced in 2001. Lee [2001] insists that Korea pushed facilities-based competition at first, which promoted to set the price at a low level, deploy advanced networks and positively affected related equipment industry.
- ⁴ Quality of ADSL depends on the distance. The longer the distance is, the worse the quality is. Four-kilometer radius, which depends on the technological standard of ADSL, is enough for subscribers to access via ADSL and keep a level of quality.
- ⁵ I love school (iloveschool.co.kr) that opened in 1999 and had more than 9 million members in 2001.
- ⁶ 40 percent of Koreans live in apartments (KRNIC [2000]). High-speed Internet service providers use optical fibers installed by FSPs to the curb near apartments, which is called fiber to the curb (FTTC). ADSL service providers use ADSL as access network from the curb to each household, and CATV Internet use coaxial cable (hybrid fiber coax (HFC)).
- ⁷ Nielsen/NetRatings survey released on March 1, 2001.
- ⁸ Ueki [2001] tried to indicate current conditions of e-commerce in Asia and assess the effects on the electronic industry in Asia.
- ⁹ Joong Ang Ilbo (<http://japanese.joins.com/>), on August 22, 2001.
- ¹⁰ The figures seem to be depended on the definition of e-commerce. According to survey results announced by Korea National Statistical Office (NSO) in June 2001, the size of the transaction through e-commerce in 2000 was 57.6 trillion won and occupied 4.5 percent of the total amount of transactions. The size of B2B was 52.3 trillion won and B2C was 733.7 billion won. 72.1 percent of the B2B sales were via EDI and 62.8 percent of the B2B procurement was via the Internet (Joong Ang Ilbo on June 4, 2001).
- ¹¹ Joong Ang Ilbo, on February 22, 2001.
- ¹² Joong Ang Ilbo, on August 3, 2001.
- ¹³ In addition to illegal leakage of personal information, the number of provision of information by communications service companies for investigation organizations in the first half of 2001 was 127.3 thousands. That was 74.5 thousands in the first half of the previous year and the annual growth rate was 71 percent (donga.com, on August 21, 2001).
- ¹⁴ Etymology of warez is *wares* in the word of softwares. Warez means illegal copies of software that are circulated on the Internet.
- ¹⁵ Joong Ang Ilbo, on August 21, 2001.

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