A Discussion Paper

A Comparative Study of Broadband in Asia: Deployment and Policy[1]

2nd Draft

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Izumi Aizu
Principal, Asia Network Research
Executive Research Fellow, GLOCOM
izumi@anr.org
www.anr.org
Tokyo, JAPAN

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Summary

"Broadband" has become a buzzword in recent years. East Asia leads broadband penetration in the world. Korea, Hong Kong, Taiwan and Singapore are regarded as the leading "Asian Tiger" countries with significant amounts of export by their electronics industry, and also as the "Net Tigers" when it comes to the Internet. In the case of broadband, however, Korea is the sole front runner followed by Hong Kong, while Singapore and Japan are lagging far behind. What factors exist behind these differences?

Level of economy is not the biggest factor to determine broadband development, nor does government policy to promote broadband have much influence. Rather, social factors such as political situation, people's mentality and cultural context may play more significant roles than economy and policy.

In Korea, bottom-up, grass-roots entrepreneurship and aggressive Netizenship contributed the most to its rapid explosion of broadband, coupled with accidental excess of bandwidth supply, fierce market competition and freedom-hungry citizens' activities. The conservative and rigid institutional frameworks of Singapore and Japan may be the biggest barriers that suppress the healthy development of broadband applications, services and the market.

1. Internet Penetration in Asia

Asian Tigers such as Hong Kong, Korea, and Singapore enjoy high ratio of Internet penetration, with more than half the population using the Net in 2002 (Table 1). In Japan and Taiwan, however, less than 40% of the population is online. Nordic countries such as Sweden, Denmark, Norway and Iceland have the highest Internet penetration in the world with more than 60% of the population online (Table 2).

Table 1 Internet Penetration in East Asia (2002)

Country	Number of Users (Thousands)	Penetration Per Population (%)
Hong Kong	4,310	59.0
USA	161,140	58.5
Korea	24,380	56.6
Singapore	2,260	50.8
Japan	49,720	39.2
Taiwan	7,820	35.1

Source: NUA Internet Survey (www.nua.com)

Table 2 Internet Penetration in Nordic Countries (2002)

	Number of Users (Thousands)	Penetration Per Population (%)	Survey Month/Year
Sweden	5,740	64.5	Feb. 2002
Denmark	3,230	60.4	Feb. 2002
Iceland	168	60.8	Dec. 2000
Norway	2,450	54.4	July 2001

Source: NUA Internet Survey

Internet Penetration and Per Capita GDP

One can easily agree that ICT development is largely dependent on economic wealth. Rich countries in general have higher ICT penetration both in terms of ICT industry growth and the use of ICT in various sectors of society. The Internet is no exception. In 2000, the majority of Internet users were in the Northern hemisphere and their penetration rate already exceeded 30% of the population.

If one takes a closer look however, economic factors are not necessarily the single determinant of Internet penetration (Table 3). There are certain deviations within the

general framework of this digital divide. For example, Korea again, despite its lower per capita GDP, had 5 % higher Internet penetration than the richest neighbor of Japan. Korean GDP per capita in 2000 was almost a quarter of that of Japan. This becomes more evident when we compare "GDP Coefficient", the value of Internet Penetration Rate divided by GDP per capita, between Korea and Japan. The GDP Coefficient of Korea is 41.24 and that of Japan is 9.46. Therefore, Korea in a sense has four times more Internet penetration in relation to its economic potential than Japan. Similarly, Malaysia's coefficient is 19.53, two points higher than its neighbor Singapore with 17.52 (Fig. 1).

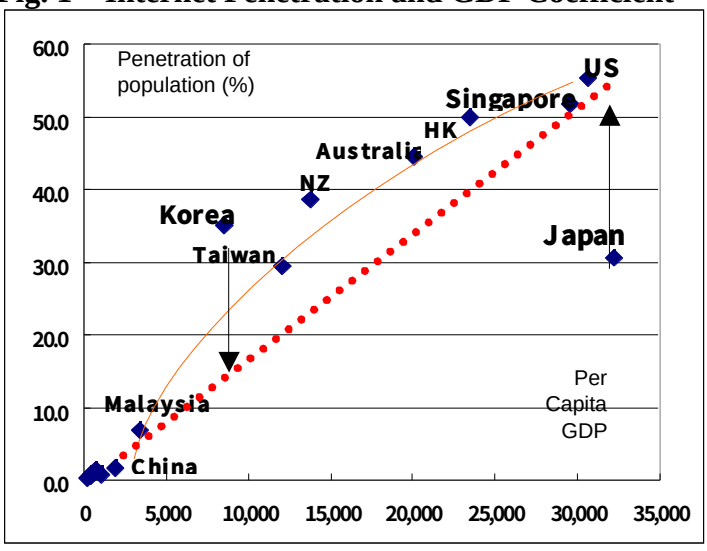
In the case of Internet penetration, the GDPs used were ones without purchasing power parity, so making a simple assumption may be a little bit risky. Nevertheless, the author believes that we can still safely conclude that level of economic development has significant impact on the diffusion of the Internet in general, but it should not always be considered the only determinant.

Table 3 Internet Penetration and GDP Coefficient (2000)

Country	Users (1,000)	Penetration (%)	Population (1,000)	GDP* Per Capita (USD)	GDP Coefficient**
USA	153,840	55.3	278,357	30,600	18.06
Singapore	1,850	51.9	3,567	29,610	17.52
Hong Kong	3,460	49.9	6,927	23,520	21.24
Australia	8,420	44.6	18,886	20,050	22.24
New Zealand	1,490	38.6	3,862	13,780	28.00
Korea	16,400	35.0	46,844	8,490	41.24
Japan	38,640	30.5	126,714	32,230	9.46
Taiwan	6,400	29.4	21,780	12,040	24.41
Malaysia	1,500	6.7	22,244	3,400	19.83
Thailand	1,000	1.63	61,399	1,960	8.31
China	16,900	1.32	1,277,558	780	16.96
Brunei	4	1.22	328	25,000	0.49
Pakistan	1,200	0.77	156,483	470	16.32
Philippines	500	0.66	75,967	1,020	6.45
India	4,500	0.44	1,013,662	450	9.87
Sri Lanka	65	0.35	18,827	820	4.21
Indonesia	400	0.19	212,107	580	3.25
Nepal	35	0.15	23,930	220	6.65
Vietnam	100	0.13	79,832	370	3.39
Mongolia	3	0.11	2,662	350	3.22
Lao	2	0.04	5,433	280	1.31
Bhutan	0.5	0.02	2,124	390	0.60
Bangladesh	30	0.02	129,155	370	0.63

Source: Nua Internet Survey, World Development Report (World Bank)
*GDP data is in 1999
** "GDP Coefficient" is the value of Internet Penetration Rate divided by GDP per capita

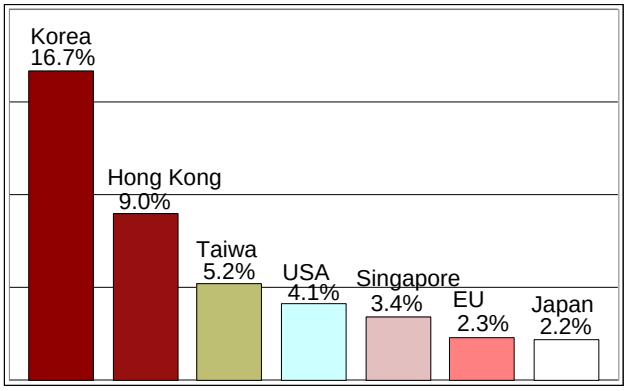
Fig. 1 Internet Penetration and GDP Coefficient



2. East Asian Countries Leading in Broadband

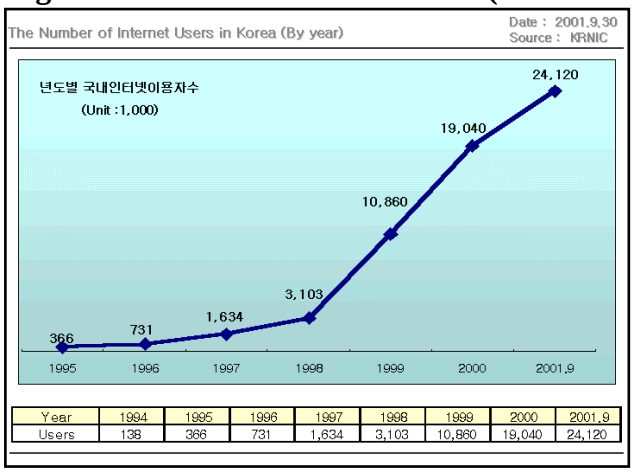
When it comes to broadband deployment, it is clear that East Asian countries, not northern European countries, are leading the world (Fig. 2). Among them, Korea is by far the most advanced. As of April 2002, Korean broadband subscribers reached close to 8 million or 16.7% of the population and almost half of its households. Considering that Korean household Internet penetration was less than 5%, with 731,000 subscribers in 1996, the rapid growth of the Internet in general and of broadband in particular in Korea is quite significant (Fig. 3 & 4).

Fig.2 Broadband Penetration in Asia by Population (Feb. 2002)



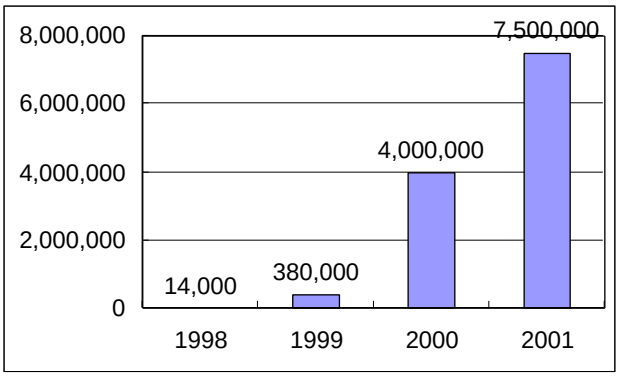
Source: Government agencies in each country

Fig. 3 Internet Users in Korea (1994 -2001)



Source: Korea Network Information Center (KRNIC)

Fig. 4 Broadband Users in Korea (1998 – 2001)



Source: Ministry of Information and Communication, Korea

It should also be noted that some Asian providers are now offering 1.5M to 8M bps DSL services, much higher speed than most services in the US at almost half the price. In Japan, even Fiber-to-the-Home with 10M to 100M bps service is starting to be introduced at less than $80 a month.

The second highest penetration of broadband in Asia is seen in Hong Kong. According to the Office of Telecommunications Authority (OFTA) of the Hong Kong Special Administrative Region Government, the number of broadband subscribers in Hong Kong reached 623,000 in February 2002, almost 10% of the population or one third of households. Taiwan is in third place among Asian countries in terms of broadband penetration. The number of broadband subscribers in Taiwan is 1,130,000 as of February 2002, 5.2% of the population according to the Institute for Information Industry (Table 4).

Singapore and Japan, on the contrary, are slow to increase broadband users even though they have high Internet penetration. Five years ago, Singapore was spearheading broadband deployment with its national project called SingaporeONE, launched in 1996. Despite this early start, however, current penetration of broadband in Singapore is quite low, with subscribers at just beyond 100,000, or less than 4 % of households. Japan is even lower in terms of penetration rate to the population: only 2.2% in February 2002, though the growth rate is rapidly accelerating (Table 4).

Table 4 Broadband Penetration in Asia per Population

	Sep. 2001		Dec. 2001	
	Penetration	Subscribers	Penetration	Subscribers
Korea	13.3%	6,251,000	16.7%	7,805,000
Hong Kong	6.0%	415,000	9.0%	623,000
Taiwan	2.9%	890,000	5.2%	1,130,000
USA	3.5%	9,616,000	4.1%	10,134,000
Singapore	2.8%	100,000	3.4%	120,000
EU (mean)	1.8%	68,5000	2.3%	860,000
Japan	1.0%	1,25,8000	2.2%	2,824,000

Source: Korea: Ministry of Information and Communication; Hong Kong: Office of Telecommunication Authority (OFTA); Taiwan: Institute for Information Industry (III); US: Federal Communications Commission (FCC); Singapore: various sources; EU: Development of Broadband Access Platforms in Europe, The European Commission, Japan: Ministry of Home Affairs, Public Administration, Post & Telecommunication

3. Why Broadband Exploded in Korea but not in Singapore or Japan

It seems that the penetration gap of broadband among East Asian countries is rather significant. What are the reasons why Korean broadband exploded while Japan and Singapore show very different processes and results?

One way to approach this question is to try to understand it in economic terms. In the case of Internet, we have seen that there exists a general tendency that Internet development and economic development go hand in hand. But in the case of broadband, at least looking at the East Asian situation compared with that of the US and Europe, it seems that economic factors have less to do with broadband deployment. Let us examine this by the available data.

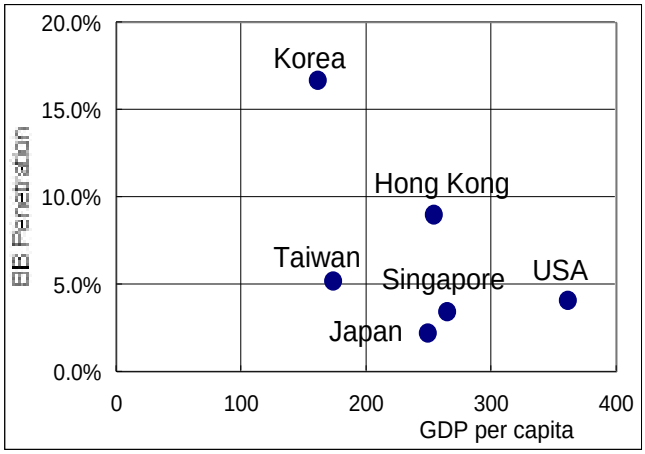
Table 5 compares broadband penetration and GDP per capita with Purchasing Power Parity. As the coefficient between the two values clearly indicates, there is little correlation with broadband penetration and the level of economy in the positive sense. Fig 5 is a visual representation of Table 5. This illustrates that of the six nations Korea is the lowest in GDP per capita, yet it boasts the highest broadband penetration--almost two times higher than the second highest, Hong Kong. The US has the highest GDP per capita but broadband penetration is below 5%, only slightly higher than Japan (2.2%) and Singapore (3.4%)[2].

[2] Since mid 2001, the take-up rate of Broadband in Japan has been showing very significant increase with aggressive price competition.

Table 5 Broadband Penetration and GDP per capita

	Broadband Penetration Per population (A)	GDP per capita (w/Purchasing Power Parity) (B)	Coefficient (A)/(B)
Korea	16.7%	$16,100	1.037
Hong Kong	9.0%	25,400	0.354
Taiwan	5.2%	17,400	0.299
USA	4.1%	36,200	0.113
Singapore	3.4%	26,500	0.128
Japan	2.2%	24,900	0.088

Fig. 5 Broadband Penetration and GDP per capita by country (Aug 2001)



For comparison purposes, let us examine the broadband situation in Europe. According to a NetValue survey, Nordic countries again seem to be leading broadband penetration (Table 6). Among them, Sweden and Denmark are ahead of the others. Since the difference in per capita GDP is relatively small among these European countries, the author assumes that the difference in broadband penetration in European countries has less to do with the level of economy as well.

Table 6 Broadband Penetration in Europe (Aug 2001)

	Cable	ADSL	Total		GDP Per capita
			Per household	Per population	
Sweden	3.3%	5.5%	13.8%	6.6%	$22,200
Denmark	6.6	6.6	13.2	5.7	25,500
Germany	3.6	4.2	7.8	3.4	23,400
France	3.2	2.8	6.4	2.5	24,400
Spain	2.7	3.5	6.2	1.8	18,000
Norway	3.5	1.4	5.1	2.3	27,200
UK	1.7	0.5	2.3	0.9	22,800
Italy	0.5	0.3	0.9	0.3	22,100

Source: Broadband Penetration from NetValue, www.netvalue.com/corp/plan/index.htm
Per capita GDP from CIA World Fact Book, with purchasing power parity

4. Policy, Politics, Cultural and Social Contexts: the Korean Case Analyzed

What other factors then, other than economic factors, account for the deployment of broadband? We can think of policy, political situation, and cultural and social context as possible elements that can affect the development of broadband services. By analyzing the Korean case in more detail we can examine the roles of these factors in relation to broadband penetration.

Government Policy

It is often assumed that the political will of leaders or aggressive government policy to promote Internet or Broadband is the leading factors of success. In fact, these days Korean government officials in charge often attribute their on-target policy as (at least as one of) the biggest reasons for the success of broadband. Let us examine if that is the case or not.

According to the Korean Ministry of Information and Communication (MIC), they have pushed Internet and Broadband related policies as follows[3]. The first of its kind was the KII, Korea Information Infrastructure plan, proposed by former President Kim Young-sam, in 1993. KII was revised twice since then to accommodate technological development and market situations. They have devised KII-G (Government), which includes the construction of nation-wide optical fiber network, completed in 2000, two years ahead of the original plan, and provision of broadband services to government agencies and public

[3] Interview with Mr. JH Lee, Deputy Director of MIC, Korea, Feb 2002.

institutions including all the public schools in Korea by the end of December 2000.

KII also consists of KII-P (Private), which provides a policy framework to allow highly competitive markets with flat-rate and low prices among telcos, loans to service providers to construct high-speed access network, promotion of a "New Life with Internet" program to support the "PC Bang" (Internet game centers), online stock exchange, and cyber education. They also started KII-R (Research), or KOREN (Korea Advanced Research Network), connecting GigaPoPs (Gigabit Point of Presence) in major cities as well as high-speed international links with counterparts in Japan, China, Singapore, Europe and the US.

Accidental Crisis and Competition

Given these very comprehensive policies in place, it is natural to think that these government-led initiatives actually played a very effective role in generating the explosion of broadband services in Korea. While the author agrees that there exist certain elements of truth in this, the author still believes that it was *not* the top-down government policy, but rather the grass-root entrepreneurs and the Netizens who actually made inroads into the world's first real market for broadband services.

The author has visited Korea six times between 1998 and 2002 and has observed the drastic changes and dynamic movements of the people who materialized the Internet and broadband applications. When they first noticed the rapid Internet growth taking place in Korea in 1998, government officials at the Ministry of Information and Communications (MIC) did not try to explain why that happened. Rather, almost all the Korean players the author met, including the MIC and Internet industry people, coherently insisted that no one really planned or even predicted that that kind of miracle would happen, and that is the very reason why Koreans were so successful in making the entirely new market a reality. One thing they could be proud of, though, is that they did try to remove barriers to healthy competition. The rest was up to the market and users.

Of course, one cannot deny the effect of early construction of nation-wide fiber optics networks. But one also has to remember that when the first phase of construction was completed in 1997, the Korean economy nose-dived into the worst crisis ever. This means that while there was plenty of supply of bandwidth, there was very little demand! Abundant supply with little demand led the aggressive price war in the area of data communications and leased line services, critical resources for the start-up ISPs and

corporate users of the Internet. This "accident" of economic crisis and over-supply boosted the emergence of new businesses such as the PC Bang.

1997 was also the year when telecommunications business competition was seriously introduced into the Korean market for the first time. Hanaro Communications, a government-backed new telco was established at that time. They almost had no choice but to offer "data communications services" first, instead of voice telephony, since it looked impossible to compete with Korea Telecom, the incumbent monopoly, in their lucrative local telephone market. Again, no one at Hanaro had clear ideas about how much they could grow in that market, but that was the strategic choice and risk they took.

According to official statistics, the number of Internet users in Korea was 731,000 in 1996 and 1,634,000 in 1997, just 1.6% and 3.6% of the population of 46 million respectively. For comparison, the number of Internet users in Japan was 5 million and 8 million, or 4% and 6% in 1996 and in 1997, and that of the US was 30 million and 45 million, 11% and 17% respectively. Even among the East Asian countries, Korea was one of the lowest countries in terms of Internet penetration before 1998. So when Hanaro decided to concentrate on data and Internet, there were not enough supporting factors from the market.

Grass-root entrepreneurs behind PC Bang

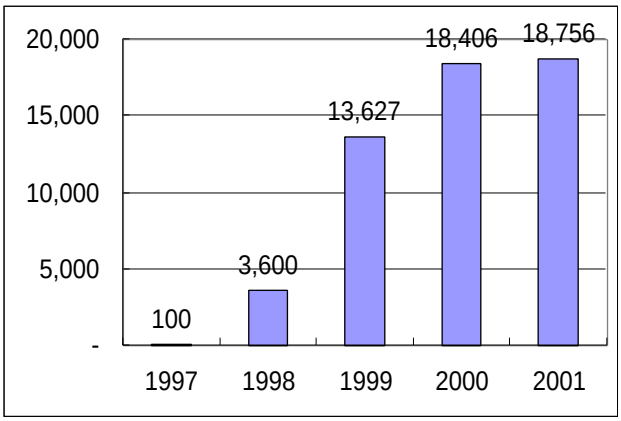
The first and real driver of the Korean Internet and its rapid transition to high-speed access is believed to be the proliferation of "PC Bang", an Internet café exclusively designed for Internet game services (Fig. 6). It was first introduced during the Asian economic crisis by employees laid off from major electronic companies or by the owners of small software companies whose businesses went bankrupt due to the sudden recession.

It is known that online games called MUDs (Multi User Dungeons) were very popular among Korean students since the late 1980s, putting Korea in third place after the US and UK in that game world[4]. With this background, high school and university students became addicted to the online combat and simulation games such as *Starcraft* from the US, and led talented people to develop their own games. The most popular online game today is LINEAGE developed in Korea with more than 10 million subscribers.

[4] Interview with Professor Kilnam Chon, Korean Advanced Institute of Science and Technology.

Fig 6 A typical PC Bang in Seoul

Fig. 7 Number of PC Bang in Korea



Source: *Broadband in Korea,* Rumi Iizuka, in Overseas Telecommunications Journal, Jan 2002, Research Institute of Telecommunications and Economics, Japan.

In 1997 there were only 100 PC Bangs in Korea, but they showed rapid growth during the economic crisis in 1998 and 1999 and have now reached saturation (Fig. 7). The PC Bangs eventually became more than game centers. Office workers use them to check private e-mail or web-sites during coffee breaks or after-work hours downtown, students use them for preparing homework on its high-speed services, or housewives buy stocks or other goods and services online.

Apartment Complex ideal for ADSL introduction

The high-speed access market was further expanded by the introduction of xDSL technology. ADSL, the first of the xDSL family, was first introduced by Hanaro communications in 1997. Unlike many other countries where introduction of ADSL was very much blocked by the incumbent local monopoly, the telcos, Koreans did not face

such a problem. DSL services usually require so-called "co-location" with the telcom facility. This means that any company that plans to offer DSL services must use conventional copper telephone lines owned by telecom operators to reach customers' homes. They also must install DSL modems or DSLAMs at the local telephone exchange facilities to interconnect the telephone wires with their up-stream high-speed lines.

This was not the case for most Korean homes. More than 40% of all Koreans live in high-rise flats, with usually a few hundred to a few thousand homes built in the same complex. The telephone facilities inside these complexes are not owned or operated by Korea Telecom, the national monopoly, but by the real estate developers or the communities themselves. All Hanaro had to do was to make a bulk contract with the community, bring in high-speed leased lines, coaxial or fiber from competitive providers such as PowerCom, a subsidiary of Korea Power company, and interconnect with DSLAM inside the complex. This unique structure made Korea Telecom unable to block the rapid introduction of ADSL by new competitors.

Hanaro led the DSL market, but Thrunet, another new entrant, was already offering high-speed Internet access with CATV modems. Both competed fiercely, but together they were more successful in creating a new market. Korea Telecom was late to enter the DSL market, but with its aggressive marketing and wide customer base, they have overtaken market share from Hanaro and Thrunet in 2000 and now hold more than half of the market, pushing the competitors towards the edge of their survival.

Mentality Counts

It is dangerous to look at the broadband explosion only from the provider's perspective. Why were people so quick to embrace this new technology? For this question you have to understand the mentality of the people in cultural and social context.

Korean people are often characterized by the word "*pari-pari*", a mentality that predisposes them not to waste any second; that is very impatient. This mentality led to the fierce competition among PC Bangs for higher speed access services. Many PC Bangs introduced TI (1.5M) high-speed digital leased lines to offer maximum performance for response-savvy customers. Since there was abundant supply of fiber optics in the market, with liberalized competition framework just introduced combined with the surge in demand, prices of leased line services dropped drastically. This is a very clear case of a positive spiral generated by real demand from the market.

Originally, the core users of PC Bang were young men. We have to remember that there still remains a conscription system in Korea under military pressure from North Korea. These young people who entered the services are trained in combat courses. This factor could explain the popularity of online combat games, too.

Parents also played a very significant role. Korean society is very keen on good education. Under the economic crisis, parents started to realize the potential threats and opportunities of globalization. It became a must for their children to acquire both English and Internet skills in order to survive in the globalization age. The government started to connect all the schools in Korea to the Internet, and teachers started to deliver homework using the Internet. Having high-speed access to the Internet at home, such as ADSL or CATV modems, became an advantage for their kids or a disadvantage if they did not have them. Parents would rather have their sons or daughters play and study at home rather than in PC Bang in the street. The always-on feature of broadband also stimulated real-time chatting among housewives in large apartment complexes, free of charges unlike telephony.

Netizens Played Key Role

Freedom of speech can be regarded as one of the key factors behind the expansion of broadband, too. The Korean political situation changed very rapidly during the last 15 years. It was only 1987 when the first real free and democratic election took place for the presidency. Until the mid 80s, there was no such a thing as freedom of speech or freedom of press under the military autocracy. Now, with the power of computer networking, Korean people became very active and aggressive in exercising their freedom online and offline, a long-awaited value, indeed. The current president Mr. Kim Dae-Jung made the first peaceful transfer of power to an opposition party in Korean history by winning the election in 1997. Now “Netizen” is the common word for Korean people, and online bulletin boards and online communities are very popular among ordinary citizens who want to speak up and communicate.

Other elements that contributed to the rapid and massive growth of broadband Korea includes a wide variety of services offered that take advantage of high-speed yet flat-rate connectivity. These include free or inexpensive Internet telephony, popular portal sites with auctions, online shopping or search engines, Internet TV and movie programs. Internet and broadband now really became part and parcel of daily life of average Korean people.

Based on these observations, the author would like to confirm that the explosion of broadband in Korea was made possible chiefly due to various bottom-up, grass root factors, rooted deeply in Korean society and its historical context, rather than just giving tribute to artificial government promotional policy.

5. Why Did Singapore Not Succeed, Why was Japan Lagging?

Singapore and Japan show clear contrast to Korea when it comes to broadband. Both countries led Internet penetration until 1998 or 1999. Compared to Korea, both countries have higher economic income and prosperous standards of living.

Strong Government Initiatives Being Reviewed

In the case of Singapore, the government has been pushing its pro high-tech policies since the mid 80s, making Singapore a "Smart Island". It is widely believed that this sound policy nurtured the electronics and semiconductor industry in Singapore, and thus made Singapore a high-tech center in South East Asia. Led by the wise founder of the small country, Senior Minister Lee Kuan Yew, the government of Singapore holds very tight economic policy, with state-owned industry groups strategically located in major sectors, which represents the economic miracle of Asian Tigers.

In December 2000, the Telecommunication Authority of Singapore, in charge of telecommunication policy and regulation, was merged with the National Computer Board (NCB) which took care of the computer industry and became the Information and Communication Development Authority (IDA).

It was part of the government's strategy to accelerate the liberalization of its telecom market two years ahead of the original plan. However, it is becoming more apparent that there is a limitation of the government-led economic policy implementations when it comes to the incubation of dot-com businesses and broadband development.

Immediately after the establishment of IDA, they announced a new ICT policy called Infocomm 21, a comprehensive policy package consisting of the following six elements:

1. Telecommunication Market Liberalization
2. Dot.Comming the People Sector: Helping Singaporeans Go Online

3. Manpower Development: Making Singapore a Infocomm Talent Capital with Net-Savvy Workforce
4. Infocomm Industry Development
5. Taking a Lead in e-Governance
6. Dot.Comming the Private Sector

Behind this new strategy was a review of traditional telecommunications policy: allowing oligopoly of local and international carriers, tight content regulation, and awareness of increasing global competition in the Internet and ICT sectors. Government officials have been emphasizing the importance of creativity, open competition and entrepreneurship as if to deny the conventional top-down approach, but the majority of the private sector remains unchanged in thinking and is still trying to follow the government policy framework in a very orderly and slow manner. For example, the government announced a target of 1,000 new entrepreneur companies to emerge in 2000, but even with a generous financial and other incentive package, only 160 new companies began under that scheme and few of them made real success.

The Failure of SingaporeONE

The broadband initiative called SingaporeONE was first announced in 1996 and was spearheaded by four government agencies -- The Telecommunication Authority of Singapore (TAS), the National Science & Technology Board (NSTB), the Economic Development Board (EDB) and the Singapore Broadcasting Authority (SBA). Under this program, a private-sector consortium was established to provide a nation-wide high-speed backbone infrastructure based on ATM technology. This consortium became a commercial company, 1-NET, and started to offer commercial broadband access services to business sectors in 1997. The shareholders of 1-NET at first were TAS with 40%, Singapore Telecom and Singapore Cable Vision (SCV) with 30% each, all of them actually owned by the state holding company.

When 1-NET was starting the high-speed access service, two Internet Service Providers, Pacific Internet and Cyberway[5] requested to participate and became 15% shareholders each, leaving TAS with only a 10% share. It was not clear at the time whether 1-NET would become a competitor to the existing ISPs (Singapore Telecom's SingNet, Pacific

[5] Cyberway was acquired by the second telecom provider, StarHub in 2000.

Internet and Cyberway) and that was the major reason why these ISPs joined the bandwagon in order to protect their turf. As all the major players of the Internet and telecom industry became owners of 1-NET, this effectively shut off the potential to offer real competition in the high-speed access market in Singapore.

1-NET did not build its own network infrastructure, however, but leased fiber optic trunk lines from Singapore Telecom and copper coaxial cable lines from SCV. The only facilities 1-NET owned and operated were high-speed ATM switches.

The original target for SingaporeONE and 1-NET was to cover the island entirely with broadband services within five years, to reach 900,000 households and obtain 400,000 subscribers by 2001. However, although the physical coverage of broadband services reached close to the original target, the number of actual users remained very low. IDA has been releasing detailed market data of the telecommunications sector, including the number of telephone users, mobile users and Internet dial-up users on their official website, but the numbers of ADSL and CATV modem users have never been disclosed on their website. At the Asian Internet Wave conference held in Fukuoka, Japan in May 2001, an IDA representative said that the actual number of broadband subscribers in Singapore reached 84,700 as of January 2001 and the number of more general users who have access to broadband reached 274,000 as of December 2000.

Technical Problem

Singapore is known for its tight information and media control by the government. Criticizing government policy in public is not encouraged at all. So it is very difficult for Singaporeans to make a negative comment on government projects in public, and SingaporeONE was no exception.

But according to several sources the author has met for the past five years, the use and popularity of SingaporeONE and its broadband applications and services remained very low. Various government agencies provided financial and other incentives in education, medicine, tourism, entertainment and other industry sectors to launch multimedia services that require high-speed connections, but few received much traffic from users. News-on-demand, for example, was much publicized and promoted, but there were few people who appreciated its value. By the end of 1999 it became apparent that SingaporeONE was a failure to many observers inside Singapore.

Recently, after the establishment of IDA and its review of ICT and broadband policy, however, there seems to be a new policy trend. Given the fact that the explosive growth of broadband in Korea became so clear, government officials are starting to admit that SingaporeONE did not achieve the original target as planned, and to reflect on where they made mistakes[6]. They think that the adoption of broadband technology with ATM in 1996 was too early in the technology cycle, which was proven by the new IP-based technology that boosted the Internet instead. Now they think that if they had waited for another year, maybe they would have seen a different, more positive result.

It is true that broadband technology was not matured enough around 1996. The technical problems they faced include that different PCs were using different operating systems, thus making it difficult to provide a common driver and platform for high-speed services. To resolve most of the technical problems, they worked with computer vendors to bundle modems together with PC purchases. Using ATM cards was another challenge; they were more expensive than standard Ethernet cards and technically more complicated.

Strategy and Marketing Problem

It was not a mere technical issue, but more of a strategy and marketing problem. For example, 1-NET tried to employ standard Ethernet, which could connect multiple PCs into one ADSL modem. But Singapore Telecom did not accept this idea of offering very cheap connectivity that allows many computers to use the same single line. For them, a contract should be limited to one individual customer and a PC. For end users, the value is totally opposite. They wanted to spend as little money and connect as many machines as possible. There was heavy criticism in the market from high-end users that this thinking was limited.

The second problem was a typical chicken-and-egg problem: content providers were not coming in because of low numbers of subscribers; subscribers did not increase because of the poor and limited quantity and quality of the contents. In other words, there was no "killer application" for SingaporeONE that took advantage of the high-speed connection. With little demand for traffic and a limited customer base, 1-NET had to modify their business plan and in 2001 diversified into a multi-service provider including operation of data centers for eGovernment websites and services.

[6] Interview with IDA officials in March, 2002.

Media Control Policy a Barrier for Broadband?

Thanks to tight media control by authorities, the TV and movie programs available in Singapore are very conservative and often dull. Sexy and violent scenes are restricted. News programs from the state-owned stations are mild at best. Satellite programs are only allowed to view via cable channels screened by the authorities before reaching the audience[7]. These elements make most programs in motion pictures in Singapore less exciting than in the rest of the world. Naturally, Singaporeans became not media-savvy or content-hungry in general. Finding strong incentives to sell content on broadband is, in this social context, not easy at best.

In fact, according to Mr. Ken-Thai Leong, acting Director General of IDA whom the author met in March 2002, the biggest challenge now facing IDA in the age of broadband is the convergence of content from conventional broadcasting services and from the new broadband services available via Internet. So far broadcast content has been governed by Singapore Broadcast Authority (SBA), but now both IDA and SBA are considering how to synthesize broadband and more conventional broadcast media policy in a single coherent policy framework.

Lack of Understanding of Netizens

The true reason of the failure of SingaporeONE is, the author believes, that the Singaporean authority failed to realize that the type of services that satisfies the real demands of users will be generated from grass roots Netizens from the ground up. In other words, they did not understand why the Internet became so popular and powerful unlike the conventional telecom services, and underestimated these new concepts.

Unlike Korea, where political speech is freely and aggressively pursued in public fora online, Singaporeans still remain very quiet and are afraid to make noises. Users are always regarded more in terms of passive consumers, or couch-potatoes, rather than emerging new types of communicative, socially active Netizens. Likewise, market competition among ISPs was kept minimal: only three ISPs were allowed to offer global connectivity services. 1-NET was not allowed to offer competitive prices in high-speed connection equivalent to leased line services offered by then-monopoly Singapore Telecom. It was these conservative practices and the top-down, one-way approach of

[7] This is not only due to strong government control, but Singapore society and people also have strong tendency to preserve the social order rooted in Confucius tradition, too.

pushing the stereo-typed policies from the government that led the failure of the first full-scale broadband commercialization attempt in the world.

Lessons Learned

Although these are all negative factors, the good news is that government officials and some major players in the ICT industry now seem to have learned important lessons from the struggle. The government is now trying to concentrate on their own business: offering public services online and e-Government, and letting the private sector and users choose kinds of services and contents. New policies such as Infocomm21 boast less push and campaigning than its predecessor, SingaporeONE. The telecommunications market was totally liberalized, at least in theory, and various red tapes were abolished or minimized. IDA is acting more like a private company than a bureaucratic agency. Some of the key officials of the ICT sector have even moved to the private sector and are trying to make money, not rules and policies.

6. Japan – Too Many Policy Initiatives, Too Little Entrepreneurship

The slow take-up of broadband in Japan is, despite what some critics suggest, not due to lack of government policy to promote broadband. The Japanese government was slow to seriously declare they were lagging behind Asian Tigers and thus set the ambitious target of getting at least 30 million households wired with high-speed Internet access by 2005 under the eJapan Strategy released in 2001[8]. eJapan also contains other comprehensive policy packages such as facilitation of electronic commerce and realization of electronic government services, to aim to expedite digitization of citizens and businesses widely and to nurture high-quality human resources in education sectors.

It should be noted, however, that the Japanese government has released its major policy package on information and communication sector, “Towards Advanced Information Society”, in 1995 and its subsequent mid-term plan and action plans were released in 1996 and 1998 respectively. How much their impacts and results had been evaluated and reflected in the new eJapan strategy are not known or shared widely at all. This gives serious doubt as to how much the new strategy could make a difference.

[8] www.kantei.go.jp/foreign/it/network/0626_e.html

Even though this eJapan strategy spelled out specific actors and a target schedule in detail, unusual for this kind of policy paper in the Japanese bureaucracy tradition, amid deep economic recession there is little entrepreneurship actually proliferating in the private sector and citizens. This may further amplify Japanese society's tendency to rely too much on authorities in a top-down manner even when it comes to the broadband and ICT industries.

Conclusion

In conclusion, the author believes that the important lesson taken from the Asian broadband experiences is that government policy to dictate market direction will lead nowhere. To find new markets with innovation, minimal intervention by government is required.

Though we have not analyzed it in detail, the fact that Hong Kong is now in second place in terms of broadband penetration in Asia and Japan is lagging far behind in terms of percentage to the population (if not by volume) indicates that this conclusion is on the right track. Hong Kong is known for its free market environment and strong competition in ICT markets even after its transition to the Chinese government. Pyramid Research recently published a report saying that Hong Kong will have the highest broadband penetration in Asia by 2006, yet it also predicts that this will only take place after a series of competitions and intense price wars take a toll on operator margins[9].

In the case of Korea, social and cultural factors such as the aggressive mentality of the Korean people, high awareness of the challenges of globalization, and political and historical context played the decisive role in its dynamic acceptance of the Internet and acceleration to broadband. But in Japan, the author observes that the private sector in established large corporations is still dominating the marketplace and leaving little room for real entrepreneurs to breath. Thus the exit from the economic "black hole" is yet to be seen.

An encouraging phenomenon lies in the market itself. Yahoo Broadband, led by entrepreneur Masayoshi Son broke into the ADSL market in Japan in 2001 with a very low pricing strategy. This assault was welcomed by users, criticized by the industry for cutting

[9] Internet.com International (www.internet.com)

margins razor thin, but acted to stimulate the market a great deal. In any case, many service providers responded to this price war and ADSL prices in Japan went down significantly: less than $20 per month for 8M bit services.

If the Japanese players can learn from the experiences of the Korean broadband market, and if Japanese users become well aware of the new social context and challenges of globalization in the worst economic situation in its recent history, just like the worst economic crisis in Korea a few years ago, then there will be some hope for explosive broadband growth in Japan, too. For that to happen, the author believes that this kind of comparative study and analysis will offer useful and valuable lessons.