SOCIOLOGICAL ANALYSIS OF 2002 DIGITAL FORMATION OF SOUTH KOREA

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Newspaper and magazine articles have documented the rapid and successful growth of S. Korea in the diffusion of the ITs. One of the most recent one was on Financial Time on August 5, 2002. The article, "South Korea upwardly mobile in telecomm" makes a strong case for S. Korea by contrasting it with profiles of digital economy in the US and Europe. It must have been such a flattering experience for so many Koreans to be praised vis-a-vis the performances of the leading economies. A government office even released an official commentary on the article, saying the report is confirmation of what S. Korea has shown to the World regarding its high standing in the ITs during the 2002 World Cup. (Not all is overwhelmed as the article is mainly about profit increase of the big telecom companies, excluding the part speculating its underlying reasons, and it's been sometime people joining with civil rights' associations in protesting against too high service fees charged by the companies.)

The following lists some of recent accounts of S. Korea regarding its success.

- OECD report released in June, 2001 listed five top nations in broadband access per 100 persons: Korea was the top with 13.9, followed by 6.22 of Canada, 4.52 of Sweden, 3.24 of the US, and .9 of Japan.
- Newsbytes reported on April 16 2002 that among DSL subscribers, Asia occupies 44% of the total, and Korea tops with 4 million (2001) in Asia.
- Korea Times reports on May 13, 2002 of 89.2% of increase of on-line sales between Q1 of 2001 and 2002 in Korea which amount to USD 1.04 billion.
- NetValue reported on June 20 2002 that during the month of April 2002, monthly Internet users were 18.5 millions in Korea, 6.3M in Taiwan, 1.4M in Hong Kong, and 9.7M in Singapore. Average hours online was 23.5 in Korea, 20.9 in Hong Kong, 15.4 in Taiwan, and 13.4 in Singapore.
- Yunhap News Agency reported on July 24, 2002 quoting a report by Nomura Research Group that Internet access has reached 53.9% in the US, 51.5% in Korea, 39.3% in Hong Kong. Achievement of Korea is impressive considering a mere 6.7% in 1998. It was 23.4% in 1999, and 40.3% in 2000. Percentages of broadband access reached 48.4% in Korea, followed by 29.4% of Hong Kong, 18% of Singapore, 17.9% of Taiwan, 7.4% of the US, and 6.4% of Japan.
- Hankyorae Newspaper reported July 31, 2002 several statistics from a report released by the Hyundai Institute of Economic Research. If the US is 100 in average Internet speed, Korea is equivalent to 408.9, Japan, 22.2, and UK 4.0. The mobile phone users in every 100 persons are 78.3 in UK, 60.8 in Korea, 57.2 in Japan, and 44 in the US. The number of PC per 1,000 persons is 639 for the US 639, 492 for UK 492, 430 for Japan, and 399 for Korea.

Great though these numbers, they also indicate a large proportion of people who are not connected to the Internet, and do not tell us who and how much do not know and

have access to computer and the Internet, and what they do online once connected.

In July 2002, the Korea National Statistical Office released the 2002 report on the Computer and Internet Use Survey (CIUS). The CIUS is conducted since 2001 to about 80,000 persons aged 6 and over, members of a representative national sample of 30,000 households. The items included in the survey are about demographics of people and household, and adoption, usage, training, and attitudes about computer and Internet.

This paper presents a sociological analysis of the most recent digital profile of Korea, based on reconstructed tables using data contained in the reports (NSO, 2001 & 2002). Included in the analysis are most widely used indices of digital formation of a society, knowledge, use and access sorted by socioeconomic indicators of people and household. Percentage differences between the lowest and highest groups are analyzed as a way of presenting an easiest and yet precise mapping of any digital cleavages among different groups of people.

Data from 2001 survey report are compared, whenever relevant, in order to relay some idea on the direction of change, and speed of widening or closing any gaps. Although not enough to discern any stable tendency, changes in one year can tell very much when it comes to a discussion of the ITs and especially for a country where related changes have received worldwide attention.

A precaution should be forward in comparing income-related data between 2001 and 2002. For 2001 data, income was ranged from less than 1 million to over 4.5 million Korean won (KRW) with category interval of .5 million, while it is to KRW 5 million and over with the interval of KRW 1 million in 2002. Thus, a direct comparison between corresponding categories is not possible. Moreover, distributions for the highest income group of 2001 data probably rounded off any acuteness of the top income group more than 2002 data.

I. Individual data

1. Ability to use computer

Table I show 63.0% of the respondents knows how to use computer, 4.3%p increase from those in 2001. In general, urban, male, more educated, more affluent, more professional, and younger people know how to use PC more compared to their counterparts. Gaps are observed in ability to use PC along age (94.2%p), occupation (75.8%p), income (45.6%p), educational level (43.1%p), urban-rural difference (20.3%p), gender (13.1%p), and among students (4.3%p).

The second column in the Table I-1 shows the gaps are generally reduced except for 7.7%p increase for income compared to 2001. As noted above, the big increase for income should not be taken at its face value because it might be an outcome of different grouping of income between the two surveys. The most notable closing of the gap in ability to use PC is among students of different school levels, from 11.0%p to 4.3%p within a year. It is mainly due to an increase of primary school students from 88.0% to 95.0%.

(Table I, I-1 about here)

2. Ability to use the Internet.

Ability to use the Internet is closely related to ability to use PC. They are actually used almost interchangeably in media and among people in Korea. The third column of Table I shows the percentages of people aged six or over who know how to use the Internet.

94.3% of those with ability to use computer also know how to use the Internet. This

is equivalent to 59.4% of the total, 6.5%p increase from 2001. Comparing to PC ability for year 2001 and 2002, there was a higher increase of people who learned the Internet than who did PC, as PC ability increased 4.3%p.

More urban, male, more educated, more affluent, more professional, and younger people know how to use the Internet. The 2002 row of the fourth column of the Table I-2 shows gaps along these variables. They are almost identical with the pattern in ability to use PC except for students and gender: age (94.7%p), occupation (79.0%p), educational level (45.6%p), income (45.1%p), urban-rural difference (19.1%p), students of different school levels (14.5%p), and gender (12.9%p).

Compared to 2001, the gaps are generally reduced except again for 7.7%p increase for income group. Next statistical reports should be the judging rod to determine whether the increasing gaps among different income groups is a measuring matter or reality. Internet ability gap is most reduced among students, from 33.5%p to 14.8%p within a year. It is mainly from an increase by primary school students from 65.0% to 84.7%. Regarding age, ability to use the Internet is increased

Table I. Selected Indices of Digital Formation: Individual, 2002

(Unit : %, hours)

		Ability to use PC[1]	Ability to use Internet[2]	Internet users[3]	place of Internet use[4]			time online[5]
					home	school/work	PC-bang	
whole country	2001	58.7	52.9	45.3	64.9	36.3	25.1	10.2
	2002	63.0	59.4	52.4	76.1	44.7	18.1	12.2
Urban		67.0	63.2	56.1	76.8	44.5	17.8	12.3
Rural		46.7	44.1	37.2	72.2	45.8	20.0	11.1
Male		69.6	66.0	59.0	74.1	48.5	22.3	13.5
Female		56.5	53.1	46.0	78.7	39.8	12.8	10.5
primary school and less		47.0	42.7	39.9	87.1	38.9	20.5	9.5
middle school graduate		47.1	44.5	39.5	81.5	35.0	27.7	10.5
high school graduate		69.9	65.8	55.1	72.5	39.9	20.0	12.4
college and more		90.1	88.3	79.8	69.1	60.7	9.3	14.9
primary school student		95.0	84.7	78.9	86.5	41.4	17.4	8.9
middle school student		99.6	99.2	96.8	89.5	38.1	27.0	11.0
high school student		99.6	99.5	95.6	84.4	40.7	28.9	10.9
college/university student		99.3	99.2	97.0	78.2	53.8	28.5	15.4
6 ~ 9		90.2	74.0	67.8	85.3	36.8	12.6	8.0
10 ~ 14		99.6	98.4	94.9	89.0	41.3	24.8	10.5
15 ~ 19		99.2	99.1	95.3	82.0	40.2	31.2	12.5
20 ~ 29		94.1	92.7	84.4	66.1	48.2	26.4	15.5
30 ~ 39		74.7	70.1	57.9	71.2	48.4	7.6	12.0
40 ~ 49		48.2	43.8	34.7	78.3	45.9	2.2	10.4
50 ~ 59		21.3	18.4	14.1	72.1	48.5	2.1	10.1
60 and more		5.4	4.4	2.8	75.9	27.7	1.9	9.1
Profession/tech/managerial		90.0	88.1	80.8	66.2	74.2	6.9	15.5
Clerks		92.1	90.9	84.7	59.1	81.1	8.2	16.5
Service/sales workers		49.8	45.9	36.9	68.0	36.8	18.0	10.7
Agricultural/fishery workers		14.2	11.9	8.0	79.1	12.1	12.5	8.7
Craft/operator/assembler		46.3	42.0	32.6	70.8	34.3	19.0	10.0
Less than 1 million[6]		36.1	33.8	28.9	58.4	39.4	34.3	2.0
1~2 million		61.8	57.3	48.9	72.3	41.5	21.8	11.7
2~3 million		70.8	67.1	60.1	80.4	45.2	15.2	12.0
3~4 million		75.5	72.8	66.0	80.9	48.7	12.3	12.6
4~5 million		78.7	76.5	71.1	83.8	52.6	10.2	13.4
5 million and over		81.7	78.9	73.1	84.6	51.7	7.5	13.2

source: compiled from NSO, 2002 Report on the Computer and Internet Use Survey

note 1) among people aged 6 or over

2) those able to use the Internet among people aged 6 and over, and can be calculated by subtracting those who do not know how to use the Internet from those able to use PC

3) Internet users are those who used at least one hour a month, and percentages are among people aged six or over. Internet users equal to those able to use the Internet subtracted by those who know how to but did not use the Internet

4) multiple choices by Internet users

5) hours online per week of Internet users

6) The unit of the monthly household income is Korean Won (KRW). KRW 1 million is roughly equivalent to 800 USD in March 2002, the survey period.

Table I-1. Percentage Differences for Selected Indices by Year

(Unit : %p)

	Year	ability to use PC	ability to use Internet	place of Internet use		
				home	school/work	PC-bang
Urban/Rural	2001	19.5	19.6	8.7	-1.3	-5.7
	2002	20.3	19.1	4.6	-1.3	-2.2
Gender	2001	14.1	13.4	-4.7	6.6	8.3
	2002	13.1	12.9	-4.6	8.7	9.5
Educational level	2001	43.8	49.1	-16.0	39.8	-22.8
	2002	43.1	45.6	-18.0	25.7	-18.4
Students of different school levels	2001	11.0	33.5	-14.2	31.9	17.8
	2002	4.3	14.8	-11.3	15.7	11.5
Age	2001	94.1	94.3	27.0	-33.7	38.7
	2002	94.2	94.7	22.9	-20.8	29.3
Occupation	2001	76.1	78.6	-12.1	79.0	-15.3
	2002	75.8	79.0	-20.0	69.0	-12.1
Income	2001	37.9	38.0	33.2	10.4	-32.5
	2002	45.6	45.1	26.2	13.2	-26.8

source: compiled from NSO, 2001 and 2002 Report on the Computer and Internet Use Survey

note: Values in the cells are the differences in percentages between the lowest and highest group. Minus signs mean the direction opposite from the generally assumed: i.e. urban, men, higher Education, occupation, and income, and younger users tend to use and know PC and the Internet more.

remarkably for 6-9 age group with 42.1%p, followed by 30-39 age group with 11.5%p, and 8.3%p of 40-49 group. These age groups excelled also in increase in the ability to use PC.

3. Internet Users

The fourth column of Table I shows the percentages of Internet users defined as people aged six or over who access the Internet at least for one hour a month. Internet users defined as such can not be separated for each variable from 2001 data, so discussion is limited to 2002 data and Table I-1 does not carry relevant data.

Overall, 52.4% of Korean are Internet users in 2002, 7.1%p increase from the previous year. The general pattern of a higher usage of new technology by urban, male, more educated, more affluent, more professional, and younger people reveals also for Internet users. Gaps in Internet use are along age (93.5%p), occupation (72.8%p), income (45.6%p), educational level (40.3%p), urban-rural difference (18.9%p), among students (18.1%p), and gender (13.0%p).

However, these variables and Internet use is not always linearly associated as shown in the distribution by age and by occupation in Table I. 95 some percentage of people aged 10 and 19 use the Internet, followed by 84.4% users of 20-29 group, and 67.8% users of 6-9

group. This is echoed by more than 95% of students of middle schools and higher using the Internet. The percentages of Internet users drop almost half as people age more than 40: 34.7% for 40-49, 14.1% for 50-59, and a mere 2.8% from people aged 60 or more. As to occupation, more than 80% of professional and white collar use the Internet, a mere 8.0% for people in farming and fishery, and 32.6% and 36.9% users for people of the remaining occupation categories.

4. Place of Internet use.

Place of Internet use matters in general, because of issues involved with at-home Internet access; provision of Internet access complementary to home and the digitalization of education in case of school use; and office and production digitalization, for workplace use. Regional Tele-centers come under attention when discussing regional gaps of Internet access. This is the story of countries of most developed formation of the ITs.

Cyber Cafe or PC-bang, its Korean version, has been considered to play a significant role in countries of newly developing digital formations of the ITs. The first of its kind is said to have appeared in Bengal, India in 1995, and be still in business.[1] Webworld News of UNESCO reporting Cyber Cafes in Africa on June 13 (UNESCO, 2002), directs our attention to possibilities of innovative ways of Internet connectedness and usage among people in digitally developing regions of the world. According to the NetSense study, over 48% of school going Indians access Internet at Cyber Cafes.[2] Internet users in China recently numbered 45.8 million ranking third, world wide, after the US and Japan as of June 2002.[3] The number is far beyond the total number of Internet-connected computers in China, 16.1 million, the report continues, because users use the Internet mainly at universities and Cyber Cafes. The total number of Cyber Cafes in China can only be guessed from 150 thousand illegal cafes to be closed with a stricter rule after a fire that killed 25 in July 2002.

Bang is a Korean word for a room, and is used for shops where customers actively engage in activities, mostly leisurely ones. For example, Norae [song]-bang is where you sing Norae, game-bang is to play games online or off-line, video-bang is to watch video, Naksi [fishing]-bang is for fishing on a small inside artificial pond, and so on. Because of the connotation of Bang as a leisurely place, sometimes associated with illegal obscene business, parents take precautions when their children oft for particular PC-bang and for a longer hours.

The most recent number of PC-bang in Korea is 23,032 as of June 2001 according to Ministry of Culture and Tourism, which mandates registration of PC-bang by law. PC-bang has been highly valued by outside visitors, overseas and domestic alike. It is available for 24 hours--some use PC-bang as a place to spend nights; almost everywhere in downtown and around universities; very reasonable, charging less than USD 1 for an hour and half-priced during slow time; and equipped with the fastest and most up-dated Internet PCs.

It first appeared toward the end of 1996 and exploded in numbers during the economic crisis of 1997 and 1998 in Korea, as financially capable laid-off workers favored it as a viable model of self-operating business. Another driving force was the popularity of Starcrafts, the online game. (Huh & Kim 1999, M. Kim et al 2001, Yoon 2001). PC-bang is almost synonymous to game-bang. That is, the emerge and spread of PC-bang is totally on a commercial drive and for games and entertainment purposes in Korea, while it served its role of reducing gaps in Internet access. It is witnessed as a very successful business model with a rapid spread of PC-bang overseas where a sizeable Korean community is established, near Silicon Valley, London or Vietnam. PC-bang thrives in the big cities because it is cheaper than in hotels and in poor countries because not enough Internet PCs are available to accommodate

[1] TV lecture by E. Rogers in Korea on Aug, 2002
[2] May 22, 2002 from NUA website
[3] CNNIC Report, July 2002 provided by NCA mail service

the demand.

The distribution of PC-bang by administrative cities and provinces shows exactly the same ranking with their population size in Korea: 26% are located in Seoul, followed by 16% of Kyonggi province (NIC website), both of which contain nearly 50% of Korea population. All the remaining 14 administrative units have 1 to 9 percentages of PC-bang respectively as of July 2000. The concepts of PC-bang and regional technology centers of digitally advanced countries are merged in Korea as Internet Plaza stationed in post offices, agricultural extension offices and village centers. That is, private sectors operate PC-bang, and Tele-centers or Internet Plaza as public facilities in Korea. The CUIS survey contains data on public facilities as a choice in places of Internet use, but it is limited to 2 to 3%.

1) **Choice of home.** The three columns under the title of place of Internet use in Table I show distribution of multiple choices given by Internet users. The percentage of choice of home is 76.1%, 11.2%p increase respectively compared to 2001. In general, urban, younger, more affluent, students of lower-level schools, female, less educated, and less professional users choose at-home Internet use more than their counterparts. This deviation from the customary pattern of usage and access can be understood by workings of two social facts with contradictory social standings: one, having an at-home Internet access, and the other, staying at home. The former demands a higher standing of socioeconomic status such as urban and more affluent, while the latter is associated with a lower social standing of an individual such as younger, female, less educated and with occupation of no office space. According to percentage differences, whether or not choose at-home Internet is influenced by income (26.2%p), age (22.9%p), occupation (20.0%p), and educational level (18.0%p). Thus, the higher representation of less educated for at-home choice can be explained away by higher choices among younger and students of lower level schools.

2) Choice of school/work. 44.7% of Internet users chose school/work for their Internet use, an increase of 8.4%p from 2001. Here, the general pattern of higher use by urban, male, more educated, more affluent, more professional users is observed, except for age. Age can not have a gradual association with attending school/work, because virtually all the younger attends school and not workplace, while the old has no contacts to both school and workplace. Thus, a higher choice of school/work for Internet use is distributed almost evenly among different age groups across from 20 to 59.

According to percentage differences in Table I-1, the choice of school/work is influenced by occupation (69.1%p), educational level (25.7%p), age (20.8%p), students of different school levels (15.7%p), income (13.2%p), and gender (8.7%p).

When compared to 2001 data, the choice of school/work is invariably increased in 2002 throughout the categories of all demographics. Table I-1 also shows a larger closing of gaps among students (15.2%p), educational level (14.1%p), and age (12.9%p). It all comes from students of high school or lower using the Internet at schools about 20% more in average than in 2001.

3) Choice of PC-bang. It is reduced from 25.1% to 18.1%. Generally speaking, rural, male, less educated, younger, less professional, less affluent and students of upper-level schools choose PC-bang as the place of Internet use. This is a reversal from the general pattern found in ability and use of the Internet, except for male users and younger users.

Gaps in the choice of PC-bang in 2002 are most salient along age (29.3%p), income (26.8%p), educational level (18.4%p), occupation (12.1%p), among students (11.5%p), and

gender (9.5%p), as shown in Table I-1. Minus signs show a difference in the direction opposite to customary assumptions as described above. The ordering and size of percentage differences tell us that older, more affluent, and more educated users do not use PC-bang. It must be primarily so because these users have an easier access at home and work. However, home and school/work on the one hand, and PC-bang on the other are not mutually exclusive choices because many of younger users and students go to PC-bang despite their Internet access at home and/or school. It is not only because of a faster connection but in order to play online games with their friends and competitors conforming to their game playing culture (Yoon, 2001), and as pastime activities with their peers. More choices by male users seem also to be related to the association of PC-bang as a game-playing site.

When compared to 2001 data, the choice of PC-bang is invariably reduced in 2002 throughout the categories of all demographics, which is summed as 7.0%p decrease nationwide. Even students of different school levels choose PC-bang less: 20.4% to 38.2% in 2001, compared to 17.4% to 28.9% in 2002 (Table I). The decrease is also notable between urban and rural areas: from 24.4% to 17.8% for urban area, compared to 30.1% to 20.0% for rural areas.

5. Time online

The last column of Table I show the number of hours Internet users on-lined a week. Korean Internet users spend 12.2 hours a week on average in 2002, two hours longer than 2001. Urban (1.2 hrs+), male (3.0 hrs+), more educated (5.4 hrs+), more affluent (11.4 hrs+), and more professional users (7.8 hrs+) stayed longer on-line. However, the association of age and time online shows almost a normal curve, peaking at 15.5 hours a week among those 20 to 29 years of age. 6.4% of this group spends 42 hours or more online.

6. What people do on-line

Table I-2 shows percentage distributions of multiple choices of Internet users' online activities. Games/entertainment and e-mail take high priority in Internet activities among Korean users in 2002. Information search, education, hobbies/leisure, and work/business follow them. The ordering of activities are the same for the 2001 survey, but percentages are increased for all categories, which suggests increased hours on-line. Compared to the 2001 survey, users marked for games/entertainment, and e-mail increased the most.

(Table I-2 about here)

Table I-2. Internet Activities of Users [1] (unit : %)

		games/ entertainment	e-mail	information search	education	hobbies/leisure	work/ business	buying /reservation	chat	job search
whole country	2001	55.7	53.9	52.2	-	25.9	19.8	10.0	17.5	3.4
	2002	60.6	59.5	34.6	28.3	27.7	21.8	14.0	12.4	5.0
Urban		59.6	59.8	34.7	28.0	27.9	22.3	14.6	12.4	5.2
Rural		67.0	57.3	33.7	30.1	26.2	18.9	10.3	12.3	3.6
Male		66.2	56.7	35.7	25.4	23.1	26.5	13.1	11.4	5.2
Female		53.6	63.0	33.3	32.0	33.4	16.1	15.1	13.5	4.7
primary school and less		92.0	49.0	9.6	65.4	19.5	0.5	0.5	15.3	0.2
middle school graduate		74.5	61.8	25.2	42.0	33.3	3.4	4.9	23.2	2.5
high school graduate		57.1	58.7	43.0	16.4	32.6	21.2	15.7	12.0	6.9
college and more		32.1	68.8	48.4	7.2	25.3	49.3	27.1	5.7	7.5
primary school student		96.0	41.9	7.3	69.8	15.5	-	0.1	11.7	-
middle school student		86.3	66.1	10.9	65.2	28.0	-	0.3	23.3	-
high school student		75.5	69.1	18.4	54.5	35.2	0.5	1.6	27.0	0.8
college/university student		53.2	79.0	31.7	47.5	37.3	7.8	7.9	16.7	5.4
6 ~ 9		97.7	30.3	7.2	62.6	13.3	-	0.1	7.5	-
10 ~ 14		90.1	60.7	9.0	70.7	22.9	-	0.2	20.1	-
15 ~ 19		72.9	71.1	20.5	48.0	37.1	1.8	2.8	25.9	2.1
20 ~ 29		52.4	73.0	38.9	14.2	34.6	26.9	14.9	12.9	9.4
30 ~ 39		43.5	54.7	51.0	9.0	27.2	38.5	25.2	5.5	6.2
40 ~ 49		41.8	47.7	54.4	5.1	21.1	40.5	27.0	4.2	6.0
50 ~ 59		35.7	45.2	58.3	3.0	17.1	42.4	28.9	3.6	4.4
60 and over		36.0	51.2	57.0	1.8	14.4	26.9	18.7	2.9	6.8
Profession/tech/managerial		28.1	69.0	47.1	7.4	22.2	61.6	25.4	5.4	4.4
Clerks		32.5	67.0	45.9	5.1	23.6	64.6	24.0	6.9	5.1
Service/sales workers		56.4	54.1	45.6	6.9	29.0	27.1	18.9	11.3	7.1
Agricultural/fishery workers		64.3	42.8	60.3	2.8	24.6	12.6	11.0	8.1	3.6
Craft/operator/assembler		68.2	44.8	47.8	4.0	28.6	23.1	16.5	9.4	7.0
Less than 1 million		67.6	60.0	30.4	32.4	28.9	9.5	8.1	15.7	8.7
1 ~ 2 million		66.4	56.3	34.0	28.6	29.3	17.1	10.8	12.7	5.9
2 ~ 3 million		59.5	59.7	35.4	28.0	27.7	23.4	14.4	12.4	4.7
3 ~ 4 million		54.3	62.9	36.6	25.8	25.4	29.0	18.3	10.7	3.0
4 ~ 5 million		50.4	62.3	34.3	27.6	25.3	32.6	21.8	10.8	2.6
5 million and over [2]		43.8	66.1	36.0	29.4	23.3	34.1	22.1	9.9	2.2

source: compiled from NSO, 2002 Report on the Computer and Internet Use Survey

note: 1) whether or not use e-commerce during the past six month from Sep 1, 2001 to Feb 28, 2002 among those aged 15 or over and who used the Internet at least one hour a month
2) multiple choices by those aged 6 or over and who used the Internet at least one hour a month
3) monthly HH income

Rural, male, less educated, more junior students, younger, less professional and less affluent use the Internet for games/entertainment more than their counterparts, and their associations are pretty stable and linear. Although not so strong in their degree of associations, e-mail users are more urban, female, more educated, more senior students, more professional and more affluent. It is almost a complete reversal from the direction of association from game/entertainment users except for age. Users aged 20-29 peak as e-mail users, while older and younger age groups use e-mail less.

Information search is more favored by more educated, more senior students and older users. Educational purposes are reported more frequently by female, less educated, more junior students, and younger users, while hobbies/leisure, by female, more senior students users, and users aged 15-29. Chatting is the activity predominated by teenagers. Internet use for job search is not so much frequented except by a small percentage of college students, and service and sales workers and less affluent users. On the other hand, male, more senior students, older until aged 59, more professional, and more affluent use the Internet more to do work/business. Male, more senior students, older until aged 59, more professional and more affluent users, also favor buying and making reservations more.

Comparing columns in Table I-2 has produced an interesting profile of the Internet activities. Users of games/entertainment are contrasted with e-mail users. More users with socially more privileged status in gender, education, age, occupation and income choose work/business and buying/reservation for their Internet activities. Education is chosen by female, less educated and younger users; hobbies/entertainment, by female and users aged 15 to 29 Finally, chatting and job search are almost age-specific activities.

Analyzing percentage distributions of choices of Internet activities by socioeconomic variables also reveals contrasts. First of all, income does not work as a universal divider of users' Internet activities, except more affluent using more work/business and buying/reservation, and less games/entertainment and job search. Occupation is not a strong indicator of types of activities that users engage in the Internet, although the less professional use more games/entertainment and less e-mail, work/business and buying/reservation. Service and sales workers distinguish among others in chatting and job search. Urban/rural residence distinguishes less use of game/entertainment, and works very weakly in dividing the use of work/business and buying/reservation.

On the other hand, gender, educational level, students' school level and age are the strong predictors of what users do in the Internet. Workings of the three variables other than gender could actually be different faces of the same group: adolescents. They are the ones who use the Internet for the longest other than users aged 20-29 (Table I). Among these groups what they do for the pastime and during hours on-lined form such a strong indicator of age-specific and also cool/plain subculture. Thus what they do in the Internet leaves strong footprints in related variables of educational level, age, and levels of school attending. More senior students use the Internet less for games/entertainment and education, more for e-mail, hobbies/leisure, information search, work/business, buying/reservation and job search, and more junior students show the opposite. Compared to the three variables, gender is not a sharp divider of what users do in the Internet although one can easily discern female user do less games/entertainment, and work/business, and more e-male, education, and hobbies/leisure.

II. Household Data

Table II presents percentage distributions of households with PC, Internet, and broadband Internet access. These are most often found indices of access in related literature. Considering the importance of the indices, data for both 2001 and 2002 are shown in the table for a direct comparison. As these are measured at household level, demographics in the table are about head of households except for income, which is monthly household income. That is,

gender, age, educational level, and occupation refer to those of household heads. A precaution is need, thus, especially when interpreting gender differences from the table. As explained earlier, income was classified differently in 2001 from 2002, so only the comparable figures appear for 2001 income in the table.

(Table II about here)

1. Household with PC

The first and second columns of Table II show percentages of household owning at least a computer: 60.1% for 2002 and 6.3%p increase from 2001. More affluent (69.6%p), more professional (56.0%p), more educated (56.4%p), urban (28.4%p), and male-headed (25.2%p) households own PC more than their counterparts.

Age shows an inverted U-shape association with ownership of PC. 78.7% of household heads aged between 40 and 49 own PC, while less younger and older household heads own PC. This pattern of a higher percentage by group aged 40-49 persists for Internet access and broadband Internet access. This must be related to the fact that they are generally parents of school going children. The second largest age group who own PC is 30-39, who would also be parents of primary schoolers.

Compared to 2001 data, gaps along all the socioeconomic variables persist if not slightly inflated. Among all the categories of various demographics, highest increases of household with PC are observed for group aged 20-29 with 11.2%p and group aged 30-39 with 10.0%p increase. This can be explained by the recent trend of adding Internet PC to dowry items in Korea.

2. Households with Internet access

Table II. Selected Indices of Digital Formation: Household [1], 2001-2002

(unit : %)

	HH with PC		HH with Internet access[2]		HH with broad band Internet access[3]	
whole country	2002	2001	2002	2001	2002	2001
	60.1	53.8	85.4	74.1	76.6	53.4
Urban	65.7	59.0	86.1	75.2	78.0	56.5
Rural	37.3	33.8	80.5	66.2	65.7	32.8
	28.4p	**25.2p**	**5.6p**	**9.0p**	**12.3p**	**23.7p**
Male	66.1	59.2	85.9	74.5	77.2	53.8
Female	40.9	35.7	83.2	71.8	73.3	51.1
	25.2p	**23.5p**	**2.7p**	**2.7p**	**3.9p**	**2.7p**
primary school and less	26.5	24.0	77.9	64.3	67.1	41.2
middle school graduate	54.3	48.2	83.8	69.5	75.0	49.9
high school graduate	67.0	58.6	85.8	72.5	77.4	53.8
college and more	82.9	77.8	87.8	80.7	78.8	57.9
	56.4p	**53.8p**	**9.9p**	**16.4p**	**11.7p**	**16.7p**
15 ~ 19	43.6	35.9	86.0	77.2	82.4	59.0
20 ~ 29	60.0	48.8	83.2	73.4	74.8	49.9
30 ~ 39	70.9	60.9	82.4	70.5	72.1	46.8
40 ~ 49	78.7	73.3	90.8	78.8	83.7	61.8
50 ~ 59	60.4	56.2	83.9	72.2	74.3	51.7
60 and over	22.8	19.3	76.6	68.6	64.9	43.6
	55.9p	**54.0p**	**14.2p**	**10.2p**	**18.8p**	**18.2p**
Profession/tech/managerial	85.2	80.1	89.8	82.9	80.6	61.8
Clerks	81.6	75.0	87.1	74.6	77.4	51.6
Service/sales workers	61.6	54.7	85.6	75.1	76.9	56.4
Agricultural/fishery workers	29.2	26.7	72.7	58.5	54.6	25.8
Craft/operator/assembler	62.8	54.4	84.3	69.4	76.7	50.4
	56.0p	**53.4p**	**17.1p**	**24.4p**	**36.0p**	**36.0p**
Less than 1 million	23.7	21.0	76.2	61.7	67.1	43.2
1 ~ 2 million	60.8		81.6		71.8	
2 ~ 3 million	81.3		87.8		79.1	
3 ~ 4 million	87.0		90.7		83.0	
4 ~ 5 million	90.6		94.7		86.7	
5 million and over	93.3		96.7		91.1	
	69.6p	**66.2p**	**20.5p**	**26.5p**	**24.0p**	**26.8p**

source: compiled from NSO, 2002 Report on the Computer and Internet Use Survey

note: 1) All the demographic variables are about heads of household (HH), except for monthly income.
2) HH with Internet access among HH with PC
3) multiple choices among broadband, dial-up, others by HH with Internet access
4) monthly HH income. Values for 2001 income categories are not listed because they are different from those of 2002. The values for the lowest income, the only identical category, and % difference between the highest and lowest are listed for 2001.

The figures for household with Internet access are percentages among HH with PC. 85.4% among those with PC has access to the Internet in 2002, while it was 74.1% in 2001, 11.3%p increase. This can be translated to 51.3% of the total households with Internet access

in 2002 and 39.8% in 2001.

The gaps between the highest and lowest categories of each demographic variable are considerably lower for Internet access, compared to those for PC-owning. It can be interpreted that once a household can afford a PC, it is highly likely to buy Internet-connected PC. Since the percentages are computed among those who already have PC, any gaps existed along demographics must have been mitigated. Still, the gap persists: more affluent (20.5%p), more professional (17.1%p), more educated (9.9%p), and urban (5.6%p) households have Internet access more.

The association between household Internet access and age of household heads peaks at two instances, one at 40-49 age group with 90.8% and the other, 15-19 with 86.0%. Household heads aged between 15 and 19 can not buy PC so easily as shown by the low 43.6% in the second column of household with PC. But once they can with their own money or parents', they definitely buy PC for Internet use. It is likely that household heads in these two groups have Internet access either for their children or for themselves. That is, providing at-home PC and Internet access must be primarily for students.

Gaps along socioeconomic variables are reduced considerably from 2001 across urban and rural regions, educational level, occupation, and income of heads of household. The closing is most impressive in case of occupation: all the occupational groups increased well beyond 10%p in Internet access within a year, while the professionals recording only 6.9%p increase. However, the gap between the highest and lowest among age group is increased considerably from 10.2%p to 24.2%p, more than doubled within a year. It reflects a higher increase of 22.0%p for 40-49 age group, and a mere 8.0%p increase for the group aged 60 and over.

3. Households with broadband Internet access

Percentages of household with broadband Internet access in Table II are computed from multiple choices given by household with Internet access among broadband, dial-up and other methods of Internet access. That is, although 76.6% of HH with Internet access has actually chosen broadband as the method of Internet access, it is accurate to say 89.7% of HH with Internet access has broadband access. 89.7% is from the above 76.6% divided by 85.4%, percentage of HH with Internet access. Calculated as such the sum will be over 100% anyway, misleading interpretation. Thus, the value of 76.7% will be used for comparison.

Households with broadband Internet access has increased from 53.4% in 2001, showing a remarkable 23.2%p increase. In general, more professional (36.0%p), more affluent (24.0%p), urban (12.3%p), more educated (11.7%p), and male-headed (3.9%p) households chose broadband Internet access, more than their counterparts. That is, occupation, income, site of residence and educational level are the major dividers between those with broadband access and those without.

The association between broadband Internet access and age of household heads peaks also at two instances: one at 40-49 age group with 83.7% and the other, 15-19 with 82.4%. Like in the case for Internet access and age, the fact that they are all household heads and that they are among those who already have a computer explain the high percentage of broadband Internet access by the group aged 15-19.

Compared to 2001 data, gaps remain the same for most of socioeconomic variables, except for urban/rural difference and educational level. Less educated has leaped for broadband Internet access more than more educated: 25.9%p increase for the former, and 20.9%p for the latter. The decrease between urban and rural is remarkable for a year's change: from 23.7%p to 12.3%p. It is impressive because the decrease is achieved despite the 22.5%p more urban households accessing broadband than a year ago. This must be highly related to

policy priorities placed on rural areas in providing the infrastructure for the past one year in Korea.

III. Summary and Discussions

Tables S-1 and S-2 summarize previous tables. Table S-1 shows gaps along demographics for major indices of digitalization of 2002, measured by percentage differences; and figures in Table S-2 are changes in the gaps within one year from 2002.

(Table S-1 about here)

1. Digital gaps and their changes: Summary

1) Ability and use. Ability to use PC and the Internet, and Internet use show the widest gap for age: more than 93%p between the highest and lowest, and far above the national average. Gaps for occupation, income and educational level are also substantial in PC and Internet abilities and the Internet use. The three indices show almost identical patterns of gaps along different demographics except for students. The fair amount of difference between PC and the Internet abilities come from fewer primary school students with Internet ability.

The configuration of figures in Table S-1 shows that a future policy consideration of training and educating of PC and the Internet should be directed to older, people of lower occupational standings, less affluent, less educated, rural people, and women. Although almost identical with each other in profiles, policy concerns toward increasing Internet use is not only different but more complex than those for increasing ability. The latter is more of a matter of educating and training people, but the

Summary Table S-I. Gaps in Selected Indices in 2002 (Unit: %p)

	ability to use PC	ability to use Internet	Internet users	HH with PC	HH with Internet access	HH with broadband access
whole country(%)	63.0	59.4	52.4	60.1	85.4	76.6
Urban/Rural	20.3	19.1	18.9	28.4	5.6	12.3
Gender	13.1	12.9	13.0	25.2	2.7	3.9
Educational level	43.1	45.6	40.3	56.4	9.9	11.7
Students of different school levels	4.3	14.8	18.1	-	-	-
Age	94.2	94.7	93.5	55.9	14.2	18.8
Occupation	75.8	79.0	72.8	56.0	17.1	36.0
Income	45.6	45.1	45.6	69.6	20.5	24.0

See notes under previous tables for explanation of each index and variable.

Summary Table S-II Change of Gaps in Selected Indices, 2001-2002

(Unit: %p)

	ability to use PC	ability to use Internet	HH With PC	HH with Internet access	HH with broadband access
whole country	4.3	6.5	6.3	11.3	23.2
Urban/Rural	.8	-.5	3.2	-3.4	-11.4
Gender	-1.1	-.5	1.7	0.0	1.2
Educational level	-.7	-4.5	2.6	-6.5	-5.0
Students of different school levels	-6.7	-19.7	-	-	-
Age	.1	.4	1.9	4.0	.6
Occupation	-.3	.4	2.6	-7.3	0
Income	7.7	7.0	3.4	-6.0	-2.8

See notes under previous tables for explanation of each index and variable.

use is a broader issue to include the matters of universal access and service, lowering Internet-PC price and connection fees, and contents. For example, different policy considerations are necessary to approach the most backward in age and occupation, along which Internet users show the largest gaps. Since age has more to do with life stages of people, Internet use for those aged 60 or over should be approached with concerns with general life patterns of the aged. Whereas, including people of farming and fishery to Internet use has more to do with digitalizing the industry itself and rural area, which involve completely different policy concerns.

2) PC-bang. The choice of PC-band as the place of Internet use is reduced from 25.1% to 18.1%. Generally speaking, rural, male, less educated, younger, less professional, less affluent and students of upper-level schools choose PC-bang. This is a reversal from the general pattern found in ability and use of the Internet, except for male users and younger users.

Although understandable with the social organization of PC-bang use in Korea, as described earlier, the decrease of PC-bang choice is meaningful by itself and also in relation to the general 7.1%p increase of Internet users. Studies were conducted in order to find ways to utilize PC-bang not only as an information but cultural community center in Korea (M. Kim et al 2001, Huh 2001), but they were not pursued yet. Instead, the recent trend is toward commercially franchising of PC-bang nationwide, or toward high-class club operation aiming for professional and intellectuals.It might as well be that the serving of PC-bang in Korea and that of Cyber Cafes in less advanced regions are not the same, although their operating business concepts are the same.

3) Access. Figures in column 5 to 7 in Table S-1 are gaps in access to at-home PC, Internet access and broadband connection. Gaps are larger along income, occupation, age, and education, while regional gap is also substantial. Gender gap must be aggravated in this case because these women are heads of households, generally poorer than women with male heads

of households.

Comparing households with PC and those with Internet access, gaps are much bigger for the former across all demographics. Digital gaps in Internet access and in broadband access are not so remarkable as in households with PC, that is to say. It is likely because those households once affordable to buy PC are also able to afford Internet access, and broadband access. Still, gaps among households exist in the three indices along several demographic variables, such as age, educational level and occupation of household heads, and household income.

As discussed earlier, age works differently in household data. The group aged between 40 and 49 shows the highest possession of at-home PC, Internet access and broadband Internet access. It is speculated to having to do with their life stage of parenting school attending children. On the other hand, household heads aged 15-19 are relatively low in their possession of PC, but one of the highest among PC owners with Internet access and broadband Internet access. It will be interesting to have a closer analysis of the latter group as to its socioeconomic status, but can be safely assumed that they also buy Internet connection once they buy PC. Also mentioned regarding age was the recent inclusion of the Internet PC as a dowry item, which contributed to a rather rapid increase of households with PC headed by people aged 20 to 39.

Digital gaps are found most salient along educational level and occupation of household heads and household income. The indices under consideration show largest gaps along the three variables: 56.4%p, 56.0%p, and 69.6% for households with PC; 9.9%p, 17.1%p, and 20.5%p for those with Internet access; and 11.7%p, 36.0%p, and 24.0% for those with broadband access, as shown in Table S-1. These three variables are, in general, all strongly correlated as to form a cluster, together, which is most often used as a measure of class. The distinction of class as the dividing axis is manifested more strongly between those with and without at-home PC than for the other two indices. It is because percentages of households with Internet access and with broadband Internet access are calculated among PC-owning households. That is, any class differentials must have been mitigated in case for households with Internet access.

4) Change of gaps. Table S-2 is prepared to show changes of gaps in selected indices of digitalization within the past one year. Sampling errors of each measure allow percentage differences above 3 or 4 only as meaningful changes applicable to Korea as a whole. Also, the different grouping of income in 2001 limits the validity of differentials computed between 2001 and 2002. Finally, positive signs for the row for whole country mean more ability and higher access among people and households. On the other hand, positive signs in the remaining rows for demographics mean increase of gaps, and minus signs, decrease of gaps.

(Table S-2 about here)

All being considered, all the plus signs and the size of numbers for the national average are impressive. The increase of households with broadband Internet access is most remarkable with 23.2%p increase in a year. Households with Internet access must also be increased with the boost of broadband access.

Regarding abilities of PC and the Internet, what is noteworthy is the change of gaps among students and between gender. Overall gender gaps in PC and the Internet abilities are not so big as witnessed in the 4th row of Table S-1. However, when contrasted with changes of gaps as in Table S-2, gaps among students are reduced remarkably within a year with 6.7%p and 19.7%p decreases, while those remain virtually untouched for gender. It must be a reflection of a lower societal and policy priority placed on women vis-a-vis students in digital

update.

Decrease of digital gaps can be observed most significantly for households with Internet access and broadband Internet access. This is attributable to active roles government played in providing public funds to install infrastructure and aggressive marketing strategies of telecom companies. Note also the fact that the increase is among households already with PC. As pointed earlier, economic burdens are more serious when deciding to buy PC for home than adding Internet access to at-home PC.

It all adds to the significant increase of rural households with broadband Internet access resulting in 11.4%p decrease of gaps within a year. Seeming unrelated, but 7.3%p decrease of gaps for occupation in Internet access is also an outcome of the boost. The relatively large change is resulted from 14.2%p increase of Internet access among households of which heads are agricultural and fishery workers. These households are more than doubled in broadband Internet access within a year from 25.8%p to 54.6%p, although Table S-2 does not contain these details.

Among the remaining, changes of gaps within one year occurred mostly along educational level, students of different school levels, and age. As was discussed in activities of Internet users, impact of these three variables is the result of adolescents' Internet behavior. They are one of the longest Internet users in hours a week, and what they do during the hours form age-specific activities. That is, what they do in the Internet is leaving strong footprints in related variables of educational level, age, and levels of school attending.

5) Internet activities Games/entertainment and e-mail take high priority in Internet activities among Korean users and information search, education, hobbies/leisure, and work/business followed. The ordering of activities are the same for the 2001 survey, but users chosen games/entertainment, and e-mail increased the most. Rural, male, less educated, more junior students, younger, less professional and less affluent use the Internet for games/entertainment more than their counterparts, and their associations are pretty stable and linear.

2. Issues emerged from the analysis

1) Factors contributing to strong IT-Korea. Not a serious attempt has been made so far to identify factors attributable to the current digital profile of Korea. However, no one would disagree to list strong commitments by the government as by far the most important factor.

Secondly, the physical fact of being one of the most-densely populated countries is said to lower the cost of providing essential infrastructure; and residential culture of living in high-rise apartment complex is similar and related factor. It is an irony of information society that physical space becomes more relevant as the ITs enable overcoming distances and boundaries.

Third, the appetite for new technology was noted by the Financial Times quoted earlier. Related facts are abundant to make the claim plausible. It has to be documented with more anthropologically oriented comparative studies to identify whether and how it is more to do with social, economic and political factors, workings beneath so-called Korean mentality.

Fourth, Korean being a Confucian society plays significant roles in many ways. Most important is related to its emphasis of education and obtaining a respectable status. PC or Internet is not one of the many technologies or innovations to many parents. It was strongly associated as a medium of education, and parents were happy as long as their children did something with PC. Also, with the government's emphasis on digitalization, earning expertise with PC or Internet has been considered as a basic step for a better future.

2) Digital gaps/divides or social inequalities. Digital gaps or divides are found to be more distinguished along the socioeconomic variables that have long been used as a measure of class. And once the effect of class is controlled, the remaining gaps and divides are substantially subdued. This leads to a debate regarding the understanding, and values of using the term, digital divides or gaps vis-a-vis information inequalities and social inequalities. Of course, variables like urban/rural, gender, and age have also been discussed widely as axes of social inequalities. However, the differences we can draw between class on the one hand, and region, gender, and age on the other is significant in terms of political and economic ramifications. That is, rural, female, and younger and older people are more likely to receive political and/or economic attention compared to people of lower class.

An important theoretical question related to the issue is why we are concerned with digital divide. Governments and markets along with scholars of optimistic views approach digital divides as barriers to information age. As digital divides close and shrink, the more people can enjoy what ICT and digital economy can offer, becoming a member of information societies. An opposite view regards digital divide as only the beginning of information inequality, which could be the most devastating of all forms of social inequalities so far, existed. In principle, we agree that these should not be taken as either/or positions, but how we do it in actual commitments as academician or administrator. This becomes more serious in dealing with the digitalization of a society and worldwide, because the scope and speed of innovations are unprecedented.

3) What if the gaps are significantly reduced. It is important to note that the real problem rises once gaps or divides are reduced to a certain extent. When the gaps are wide, not only governments but also private sectors intervene in order to include more people in the network. Government, for the purpose of effective mobilization and usage of resources and information for its administrative and governing conveniences, and of resulting economic stability conducive to political stability; and the private sectors, for continually reproducing and expanding its market for more and stable profit realization. In the course of this boost, concerns for digital gaps or divides, and for their closure will be favored not only as political and administrative maneuvering, but also by private industries as an appealing way of wrapping their profit-seeking expansion as acts of serving public interest.

What if an extended plateau is reached in the so-called perpendicular S curve of diffusion of ITs. It may never happen because new technologies and items with a slightest change can always be introduced as new innovations in the market. Still possible is abandoning those latest in adopting major ITs. Shrinking divide could be a real problem because governments and markets will no longer pay attention to those minorities without access. For example, public phones are much harder to find and not well maintained in Korea as a majority has mobile phones. It would be worse with networked Internet, because once left out from the network it is almost like an outcast or hermit even when physical location is shared.

4) What do we do with it. Games/entertainment and e-mail were predominant Internet activities among Korean users. Whereas, Haythornthwaite (2001: 368-369) quotes various studies which report e-mail as the top Internet activity in the US, UK, and Canada. Games/entertainment occupied 10th rank among the 10 most popular activities, or 9th among 17 categories. It is interesting in this context that the Financial Times, quoted in the beginning, emphasized the absorption of Korean Internet users to games as an important factor contributing to a stable and thriving advance of digitalization and economy in Korea.

What is it to have game players all around us? Is it "productive" or is it necessary to ask the kind of question any more? Or what's the definition of productive activities? It goes back to the question of use value and exchange value. What makes money must be valuable and thus productive in market-driven economy.

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