

# Part 2

## Special Theme: Toward the Realization of a Symbiotic Networked Society

### Chapter 1

#### How has ICT Changed People's Lifestyles?

##### Section 1

### International Comparison of ICT Infrastructure and Utilization

As a prerequisite for reviewing the utilization and penetration rates of our nation's ICT infrastructure, here we will analyze Japan's ICT infrastructure and status of utilization in comparison with those of other countries.

#### 1. Evaluation method

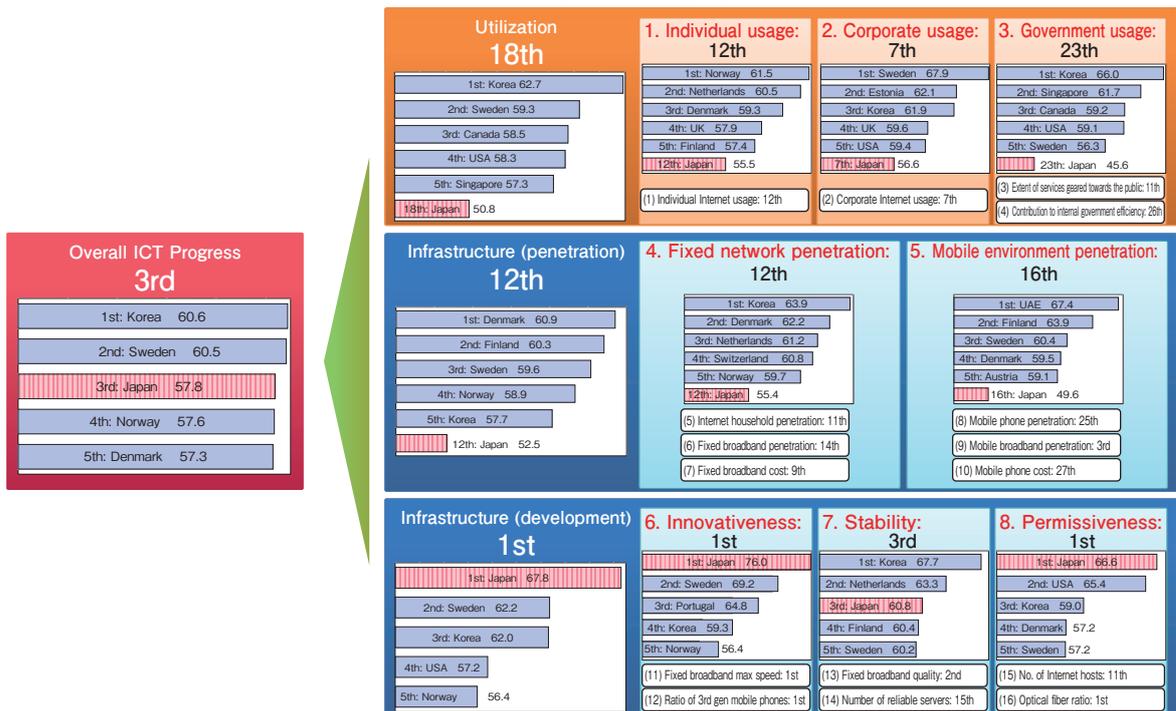
Part 1, Chapter 1, Section 1.3 of the 2010 White Paper on

Information and Communications in Japan, 25 countries including Japan are compared in terms of overall ICT progress, with further international rankings in eight areas employing 16 indicators, based on the levels of ICT penetration and progress in other countries. This year, the same indicators and methods are used, and the number of countries increased to 30<sup>7</sup>, with Eastern European and Middle Eastern nations, etc. added in the interest of regional balance.

#### 2. Overall evaluation and evaluation by area

The results of comparison are shown in Figure 2-1-1-1.

Figure 2-1-1-1 Overall ICT progress : rankings by area and indicator



\*Figures on graph are all deviation values (numbers from the second decimal place onward rounded up or down.) Only the top five countries are shown (however, six are shown in cases where Japan ranks sixth or below)

\*Deviation values for each area represent the average for all indicators in this area (deviation values)

\*Values for the categories "Utilization (overall)," "Infrastructure (penetration) (overall)" and "Infrastructure (improvement) (overall)" are the averages of deviation values for all areas in each category

\*The value for "Overall ICT Progress" is the average of the deviation values for all indicator

(Source) Ministry of Internal Affairs and Communications "International Comparative Survey on ICT Infrastructure" (2011)

7 With consideration for regional balance, availability of source data and continuity of data reporting, etc., to the 25 countries selected last year (1) Japan, (2) the US, (3) The UK, (4) South Korea, (5) Singapore, (6) Sweden, (7) Denmark, (8) Italy, (9) India, (10) Australia, (11) Austria, (12) The Netherlands, (13) Canada, (14) Switzerland, (15) Spain, (16) Germany, (17) New Zealand, (18) Finland, (19) Brazil, (20) France, (21) Belgium, (22) Portugal, (23) South Africa, (24) Russia, and (25) China) were added to five countries ((26) Norway, (27) the United Arab Emirate (UAE), (28) Estonia, (29) Malaysia, and (30) Chile).

In terms of the overall ranking (overall ICT progress) encompassing ICT infrastructure (improvement, penetration) and rate of utilization, South Korea came in first, Sweden second, and Japan third out of 30 countries, followed by Norway and Denmark.

In the “Infrastructure (improvement)” category, while Japan ranks third in “7. Stability,” it came in first in terms of “6. Advancement” and “8. Capability,” and it is safe to say that Japan is first in this category overall.

In terms of “Infrastructure (penetration),” Japan is 12th for area “4. Fixed network penetration” and 16th for area “5. Mobile environment penetration,” combined for a ranking of 12th worldwide. Compared with the first-place ranking for “Infrastructure (improvement),” this could be called quite a poor ranking.

In terms of Utilization the overall ranking is 18th, below the median (15th), a particularly low ranking in comparison to Infrastructure (both Development and Penetration.)

### 3. ICT status in high-ranking countries

Below, we will examine the characteristic features of the countries ranked in the overall top five, besides Japan, comparing by area and indicator.

- South Korea

South Korea ranks first out of 30 countries for “Utilization,” fifth for “Infrastructure (penetration),” and third for “Infrastructure (improvement),” and makes a very strong showing overall. In particular, it is the top country out of the 30 for indicator “3. Availability of online services for citizens” in area “3. Government utilization”; indicators “5. Internet penetration rate for households” and “7. Fixed broadband charges” in area “4. Fixed network penetration”; and indicator “13. Fixed broadband quality” in area “7. Stability.”

- Sweden

Rankings are high overall in terms of ICT infrastructure (improvement, penetration) and rate of utilization, and in particular, is ranked first out of 30 for the indicator “2. Corporate Internet usage” in area “2. Corporate utilization.”

- Norway

Norway is ranked first out of 30 for indicator “1. Individual Internet usage” and indicator “10. Cellular phone charges” in the area “5. Mobile environment penetration.”

- Denmark

Denmark is ranked first out of 30 for indicator “6. Penetration rate of fixed broadband” in area “4. Fixed network penetration,” and makes a strong showing in terms of “1. Individual Internet usage” and “10. Cellular phone

charges” as well.

## Section 2

### Changes in the ICT Infrastructure Environment

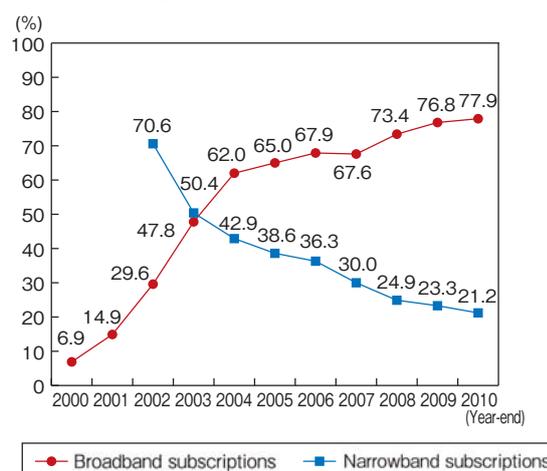
The broadband era in Japan began in 2001, and a decade down the road, Japan has access to the many blessings of the digital revolution. We would like to take this 10-year turning point as an opportunity to look back on the progress of the nation’s ICT infrastructure thus far. Previous White Papers on Information and Communications have compared Japan’s ICT infrastructure to those of other nations, and organized data on the degree of penetration of said infrastructure, but here we will take a long view, temporally speaking, and consider the trajectory of development over the past decade.

### 1. Internet penetration

#### (1) Broadband Internet penetration

In 2002, 70.6% of household PC Internet users had narrow-band access, but by 2004 the number of broadband users surpassed the number of narrow-band<sup>8</sup> users, and by 2010, broadband<sup>9</sup> access including DSL, FTTH and cable Internet accounted for 77.9% of subscriptions (Figure 2-1-2-1).

Figure 2-1-2-1 Change in household PC Internet access method



\* Narrow-band statistics kept since 2002

(Source) Ministry of Internal Affairs and Communications “Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens’ Lifestyles and the Social Environment” (2011)  
(prepared on the basis of MIC “Communications Usage Trend Survey”)

8 Indicates either dial-up, ISDN, cellular phone, or PHS connection

9 One of the following services: optical fiber (FTTH), cable TV (CATV subscription), DSL, 3G mobile phone, fixed wireless subscription (FWA), or BWA

**A. Growth through rapid spread of DSL**

DSL service was launched in 2000, with rules regarding fees and technical conditions for connection of unbundled<sup>10</sup> subscriber lines put in place in August of the same year, and various new providers putting affordable DSL services such as Yahoo!BB on the market in 2001. Fees gradually fell for all providers, including NTT East Japan, the first to offer DSL to consumers. Connection speeds progressively increased, and the number of subscribers rose dramatically, surpassing 10 million in 2003, three years after the start of service.

**B. Increasing use of cable Internet**

Cable Internet was introduced in 1996, earlier than DSL, and the number of subscribers has shown ongoing growth ever since. In terms of connection speed, service with speeds of up to 100Mbps was launched by JCOM in 2005, and services with maximum speeds of 160Mbps are now available. Both speed and bandwidth are continually increasing.

**C. Increasing use of, and shift to FTTH**

FTTH, which is capable of higher speeds than DSL, got a full-fledged start in 2001, and while it has grown in prevalence since then, it lagged behind the growth of DSL between 2001 and 2004 (Figure 2-1-2-2). However, as the price has fallen since service was launched, its growth in popularity has been continuous, and in 2008 the number of subscriptions surpassed that of DSL which had been declining since 2005. With the Internet era entering a new phase, there is an ongoing shift from DSL to FTTH, which can now be called the key means of broadband access.

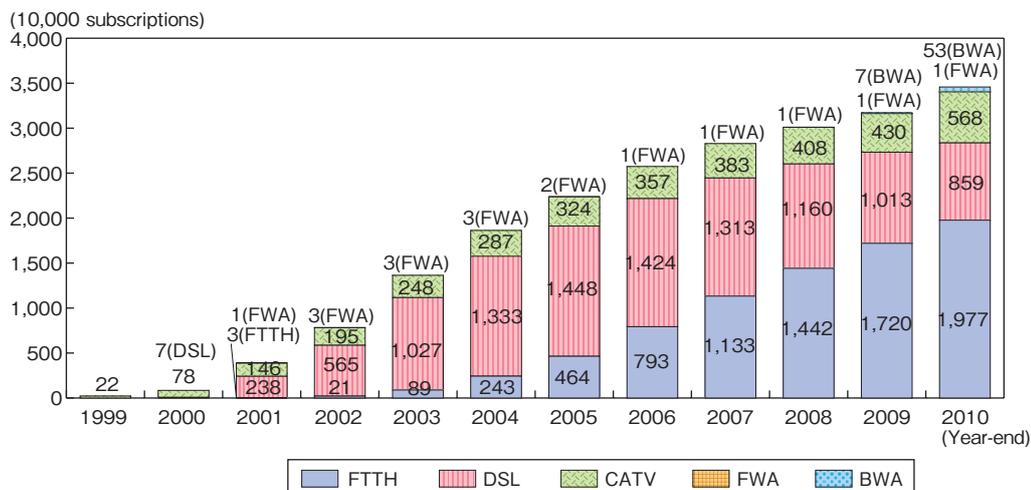
**2. Mobile Internet penetration**

The advent of mobile phone IP addresses that enable connection to the Internet using mobile phones made it possible to send and receive e-mail and browse mobile websites via mobile phone. This led to the rise of a new business model in which users register with content providers operating sites with attractive content or convenient services and pay monthly fees together with their phone bills, and led in turn to the appearance of a wide variety of mobile phone-oriented online content.

The percentage of people accessing the Internet via a mobile device such as a cellular phone, PHS phone or personal digital assistant (PDA) (Figure 2-1-2-3) rose dramatically between 2002 and 2005. This was due in part to the appearance of flat-rate price plans for mobile Internet packets, which mobile phone carriers began offering in 2003, and which allowed users to access the Internet by mobile phone without worrying about the cost. It can be said that this led to the personalization of Internet use by creating an environment in which individuals could connect to the Internet without having to use a shared device such as a home computer.

In 2001, second-generation (2G) mobile phones began to be replaced by third-generation (3G) phones capable of high-speed data transmission, and the shift continued to the point where 98.8% of mobile phones are 3G (Figure 2-1-2-4) as of the end of FY2010. As a result, not only has Internet access become more personalized, but mobile Internet access is increasingly faster and higher-capacity (richer.)

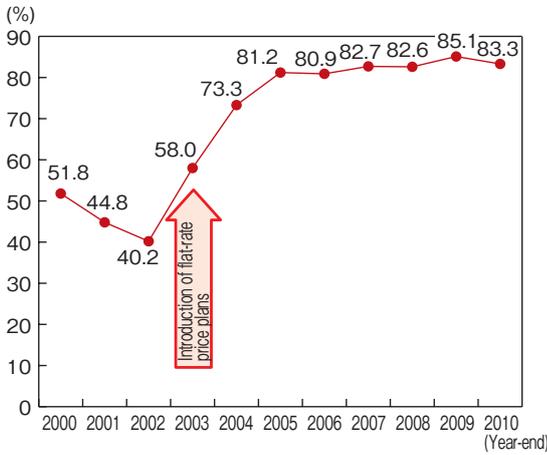
**Figure 2-1-2-2 Change in number of broadband subscribers by type of line**



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)

<sup>10</sup> Among functions pertaining to connection with Category I designated telecommunications facilities, "unbundled" are those required by other carriers which are subdivided and provided for use

**Figure 2-1-2-3 Percentage of people accessing the Internet via a mobile device**



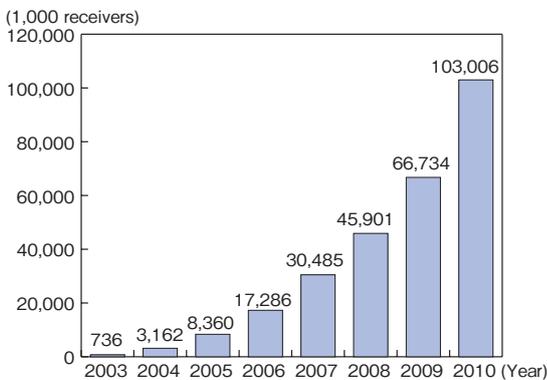
(Source) Ministry of Internal Affairs and Communications (MIC) "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011) (prepared on the basis of MIC "Communications Usage Trend Survey")

### 3. Digital broadcast penetration

#### (1) Digital terrestrial broadcast penetration

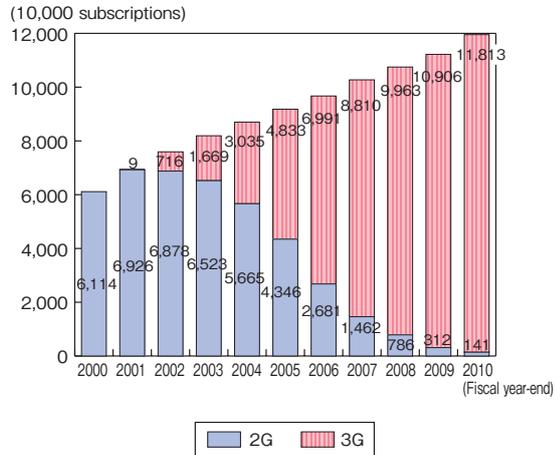
Digital terrestrial broadcasts began in December 2003 in the three major urban areas based around Kanto, Chukyo and Kinki, and gradually spread to other areas until broadcasts were taking place in all Japanese prefectural capitals and elsewhere. On July 24, 2011, analog broadcasts ceased and terrestrial broadcasts became fully digital except in the three prefectures (Iwate, Miyagi, Fukushima) severely affected by the Great East Japan Earthquake. With the widening of broadcast area, prevalence of digital receivers grew, with the number of receivers equipped to receive digital broadcasts topping 100 million in 2010 (Figure 2-1-2-5).

**Figure 2-1-2-5 Change in cumulative number of digital terrestrial receivers**



(Source) Ministry of Internal Affairs and Communications (MIC) "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011) (prepared on the basis of the Japan Electronics and Information Technology Industries Association "Shipments of Digital Terrestrial Television Receivers in Japan")

**Figure 2-1-2-4 Change in cumulative number of 2G and 3G mobile phone subscriptions**



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)

#### (2) Progress of multi-channel broadcasting

As satellite broadcasting becomes increasingly digitized, it has grown as a multi-channel medium. Looking at satellite broadcast subscriber figures for FY2009, we see that the number of subscribers to some satellite services decreased, but the number of subscribers to other services increased continuously. The number of households subscribing to cable TV has continued to grow as well, to 24.71 million in FY2009, a 2.6-fold increase over the decade since 1999. It is evident that multi-channel environments in which viewers can choose from a wide variety of content are becoming increasingly prevalent.

## Section 3 Changes in Lifestyles Triggered by ICT Services

Japan's ICT infrastructure is among the world's most advanced, and there is no doubt that Japanese lifestyles have changed considerably due to the use of ICT. Here we will analyze these changes according to age, etc., giving attention to communication, information-gathering, purchasing, labor and leisure behavior.

### 1. Changes in communication behavior

In recent years, social media such as blogs and SNS have become increasingly prevalent and the number of users is still on the rise. With this comes the trend, particularly among the young, toward diversification of communication methods, and in some cases toward an

affinity for cyber communications such as e-mail and text messaging rather than face-to-face communication. The following is an analysis of attitudes toward communication and the present-day realities of person-to-person relations and networks.

**(1) Metamorphosis of communication behavior**

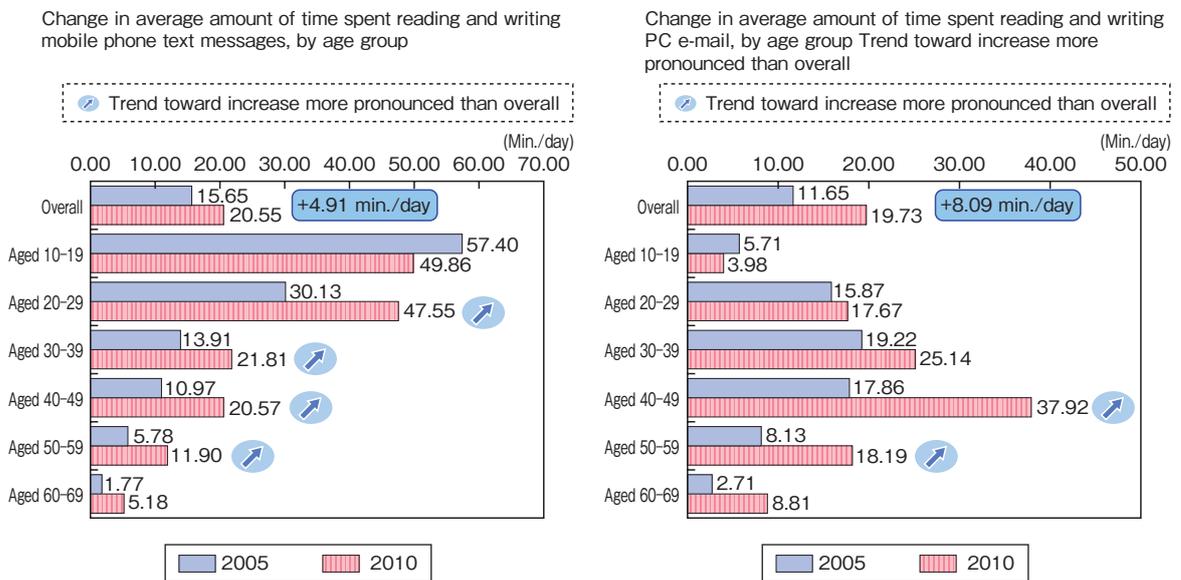
A comparison of amounts of time spent reading and writing e-mail and text messages in 2005 and 2010, by age

group, shows especially dramatic growth (+17.42 minutes a day) in mobile phone text messaging among the 20-29 age group. In both years, times spent were longer among the 10-19 and 20-29 age groups (Figure 2-1-3-1).

**A. Trends in online information consumption and production orientation**

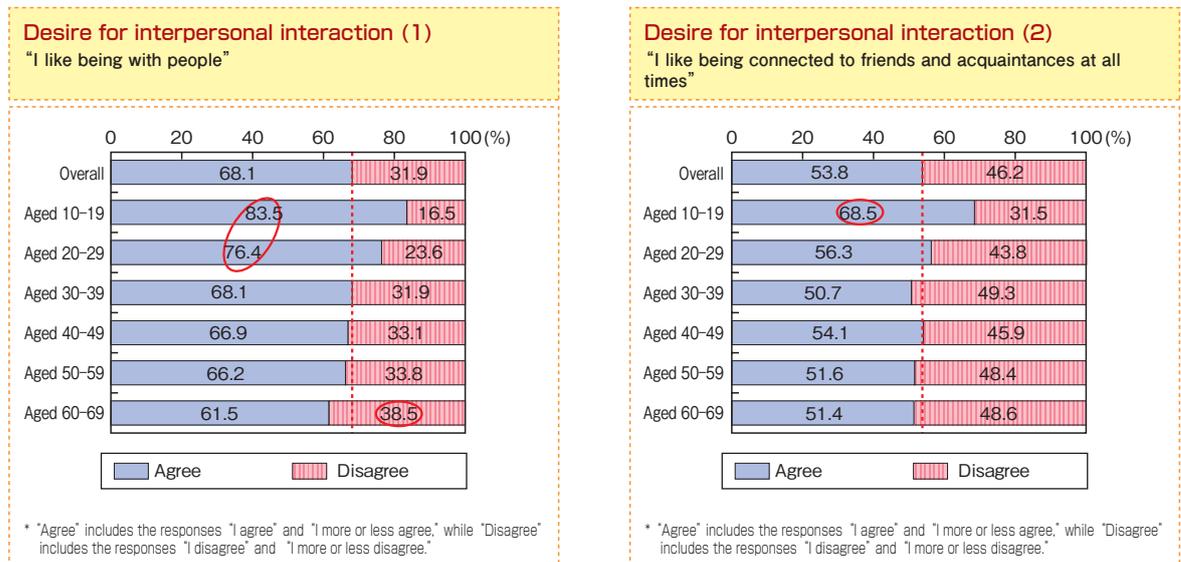
An examination of communication trends by age group and orientation shows that the 10-19 and 20-29 age groups are strongly oriented toward connection with

**Figure 2-1-3-1 Average amount of time spent reading and writing PC e-mail or mobile phone text messages, by age group, in all situations**



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)  
(prepared on the basis of "Information Behavior in Japan, 2005" and "Survey of Information Behavior in Japan, 2010")

**Figure 2-1-3-2 Desire for connectedness, by age group**



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)  
(prepared on the basis of "Survey of Information Behavior in Japan, 2010")

others, with more respondents saying they “like being with people” and “like the sense of constant connection with friends and acquaintances.” This trend is particularly noticeable among the 10-19 age group (Figure 2-1-3-2). It can be seen not only as a factor in the growing use of SNS, but also as an extension of the use of mobile phones through which users are always “connected.”

## 2. Changes in information-gathering behavior

With Internet utilization continually on the rise, there is an increase in the amount of information disseminated by consumers via social media, etc. that supplements the information provided by businesses, and both the volume and diversity of the information available on the Net are growing. There is also increasing diversification of formats in which information is provided, and drastic changes in methods of gathering and utilizing information. How are users currently making use of the multiple information sources available?

### (1) Websites as sources of useful information

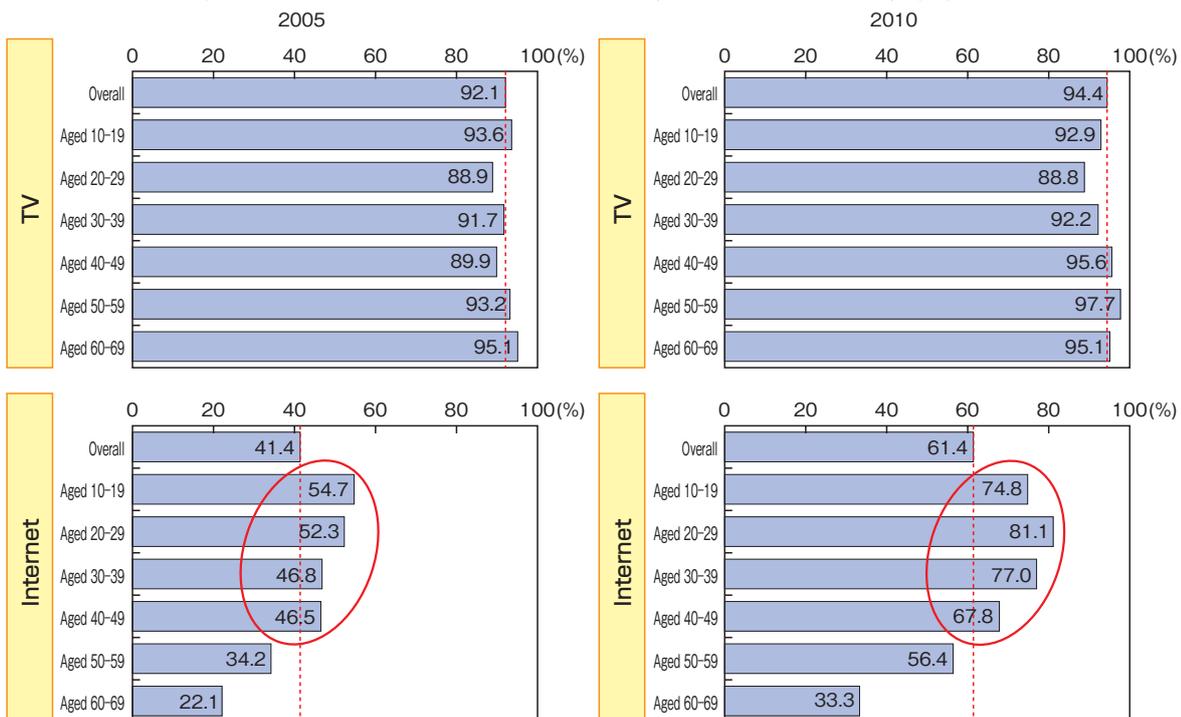
Examination of information sources by type of information reveals that in 2005, the utilization rate of “PC websites” was low across the board in 2005, but in 2010 it was the dominant source of “shopping and product in-

formation” and “travel and tourism information,” and the utilization rate had risen overall. Computers are among the top three information sources for the majority of categories, indicating their firm position as a key source of information.

### A. Changes in perceived importance and reliability of information sources

Measurement of the perceived importance of TV, newspapers and the Internet, three key means of obtaining information, shows that there is no major change in the perceived importance of the two conventional information sources, TV and newspapers. However, the percentage of people perceiving the Internet as “important” rose 20.0 percentage points between 2005 and 2010, to 61.4%. In terms of different age groups’ perceptions of the importance of TV and the Internet, there was no major change for TV between 2005 and 2010, with the vast majority regarding it as “important” across all age groups (Figure 2-1-3-3). Perceptions of the Internet, however, vary widely by age group. Already in 2005, there was strong recognition of its importance among the 10-49 age segment, and in 2010 more than 80% of the 20-29 age group regarded it as important, an indication that for certain age groups it is already on a par with TV as a vital information source.

Figure 2-1-3-3 Perceived importance and reliability of TV and the Internet by age group



(Source) Ministry of Internal Affairs and Communications “Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens’ Lifestyles and the Social Environment” (2011)  
 (prepared on the basis of “Information Behavior in Japan, 2005” and “Survey of Information Behavior in Japan, 2010”)

### 3. Changes in purchasing behavior

The growing prevalence of the Internet has led to a rise in the percentage of people who use it to purchase goods and services. There is a major difference between the purchasing behavior of conventional consumers and that of those who shop online. We have surveyed and analyzed the changes in shopping behavior and their impact, as outlined below.

#### (1) Changes in the purchasing process

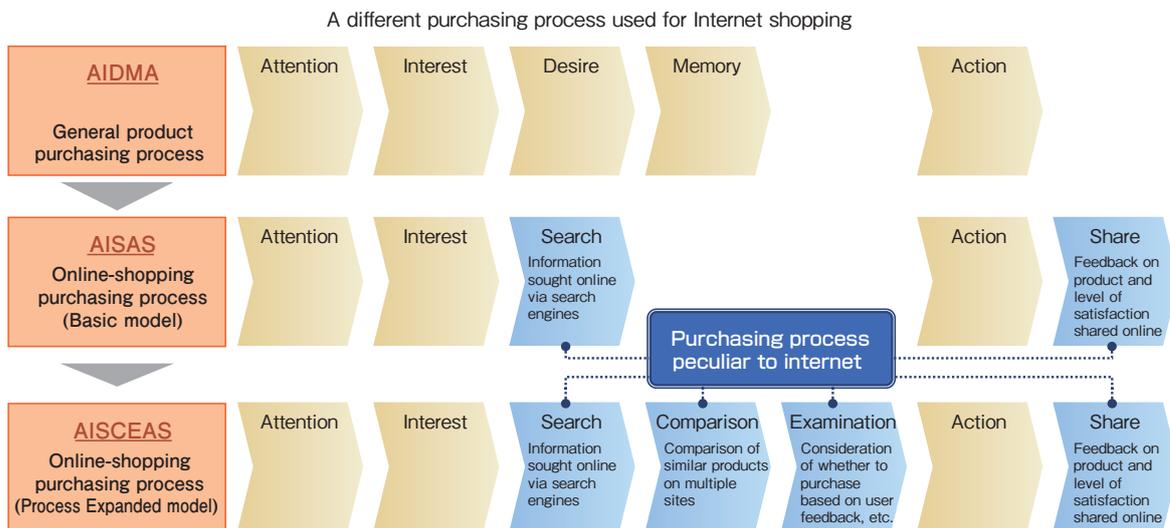
The rise of Internet shopping has driven a trend of businesses handling a wide range of products in small

quantities to meet niche demand. A uniquely Internet-oriented purchasing process, of first executing a search, then comparing multiple sites and weighing options based on buyer feedback available online, and finally making a purchase, has become predominant (Figure 2-1-3-4 and 2-1-3-5).

### 4. Changes in work behavior

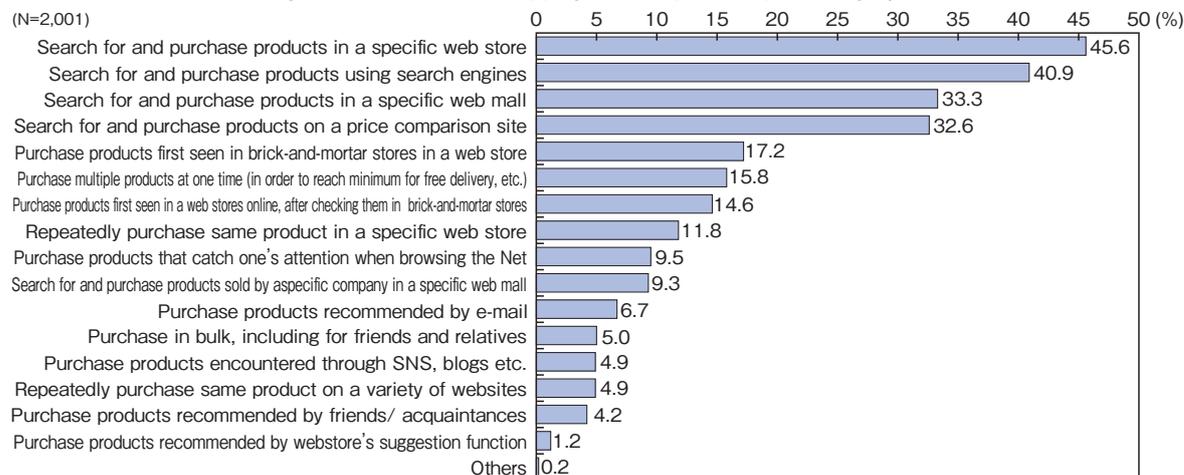
Changes in work behavior reflect changes in communication and information-gathering behavior which are particularly pronounced among the young. Here we shall analyze one highly relevant aspect, namely job hunting.

Figure 2-1-3-4 A different purchasing process used for online shopping



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)

Figure 2-1-3-5 Internet shopping behavior patterns (purchasing style)



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)

(prepared on the basis of METI "Survey on Actual Conditions and Market Size of Electronic Commerce")

### (1) Changes in the job-hunting process

Comparison of the information sources that newly hired employees had used to hunt for jobs in 2001 and 2010 shows that while in 2001, Internet-related sources were prevalent among university seniors, by 2010 “Internet sites of companies” and “job hunting-related Internet sites” were predominant among the general population as well, indicating that the Internet is an indispensable source of job-hunting information across the board (Figure 2-1-3-6).

## 5. Changes in leisure behavior

In recent years, Internet applications have been diversifying, and it is now a major communication and leisure medium as well as a means of shopping and obtaining information. Here we shall analyze the accompanying changes in use of leisure time.

### (1) Increasing use of computers during leisure hours

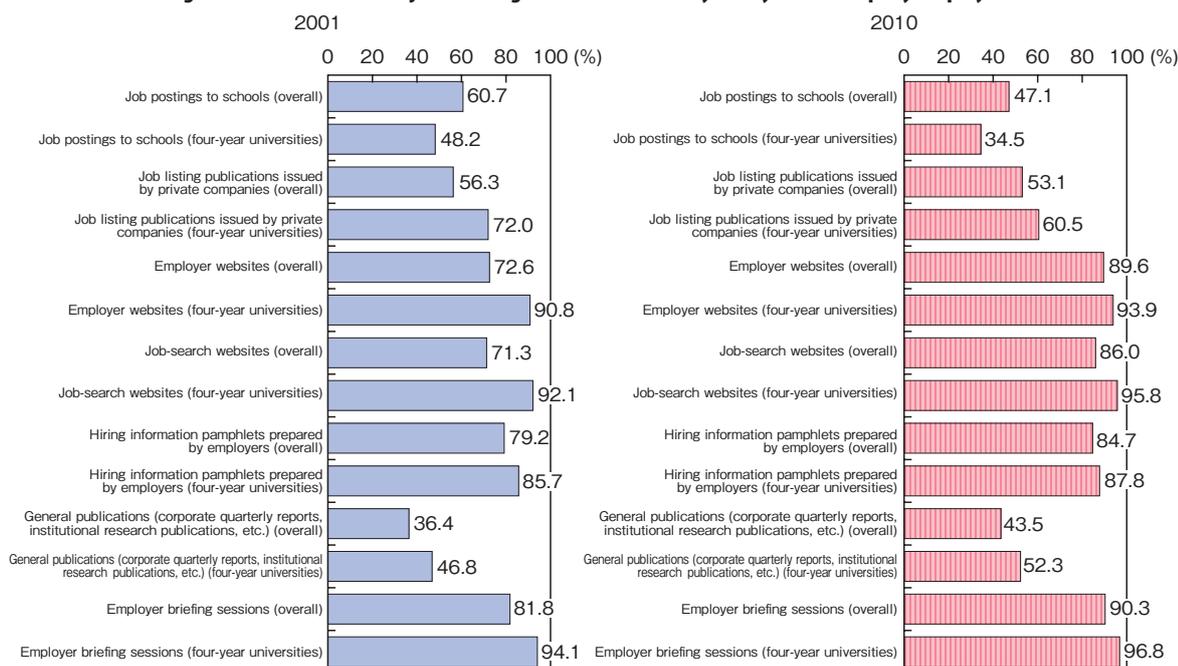
When one hears the phrase “leisure activities,” one generally thinks of dining out or traveling, etc., but growing use of the Internet is driving a shift in the way leisure hours are spent. According to the “White Paper on Leisure” (Figure 2-1-3-7), there is a wide variety of leisure activities that involve the use of information media, such as “watching videos” and “listening to music (on CD, records, tapes, FM radio, etc.),” but leading the group was “computers (computer games, hobbies, communica-

tions, etc.),” with 85.6 million people engaging in these activities in 2009. This surpasses the number of people engaging in traditional leisure activities such as driving, domestic travel, and dining out, and clearly indicates the degree to which “computers (computer games, hobbies, communications, etc.)” have gained prominence as a leisure activity.

### (2) Trends in usage of information media during leisure hours

We assessed the perceived importance of three types of information media as “means of obtaining enjoyment,” in other words as hobbies or pastimes. The results showed that the perceived importance of TV, a firmly established pastime, had not changed, and that of newspapers remained largely unchanged as well (Figure 2-1-3-8). The perceived importance of the Internet, however, had increased 17.4% between 2005 and 2010, with approximately 60% of respondents viewing it as an important “means of obtaining enjoyment,” second to TV. This illustrates the growing importance of the Internet as a hobby and leisure activity.

Figure 2-1-3-6 Sources of job-hunting information used by newly hired company employees

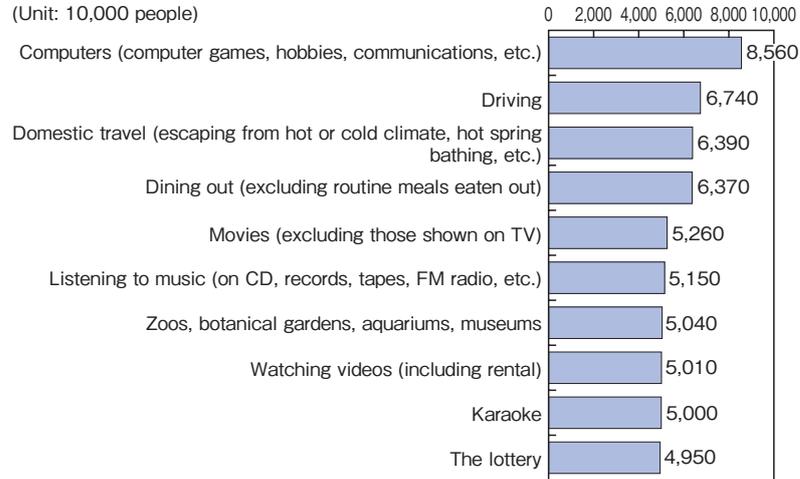


(Source) Ministry of Internal Affairs and Communications “Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens’ Lifestyles and the Social Environment” (2011)

(prepared on the basis of Japan Productivity Center “White Paper on the New Recruit’s Perception of Work”)

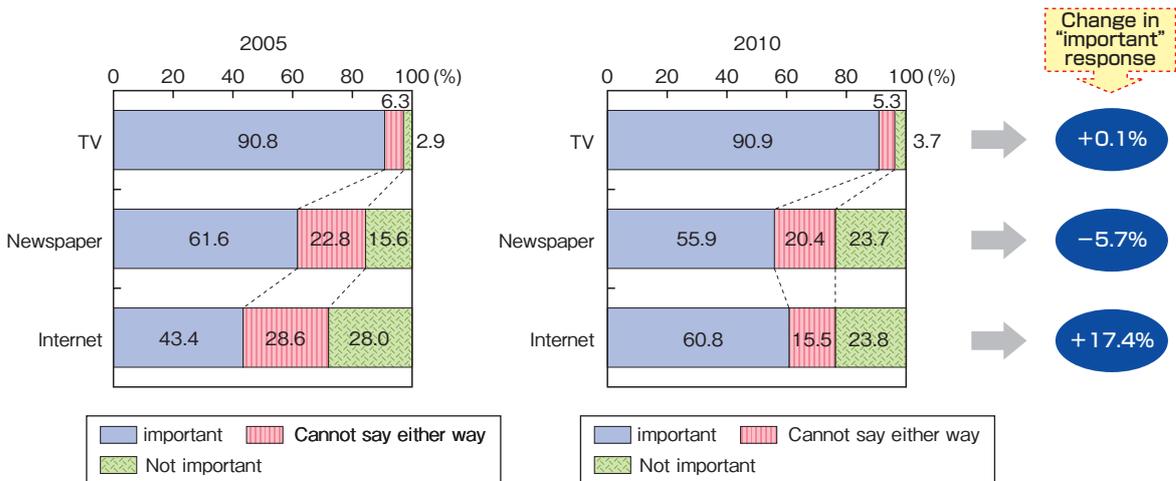
**Figure 2-1-3-7 Number of people engaging in leisure activities**

2009: Top 10 leisure activities



(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)  
 (prepared on the basis of Japan Productivity Center "White Paper on Leisure")

**Figure 2-1-3-8 Perceived importance of hobbies and leisure activities**



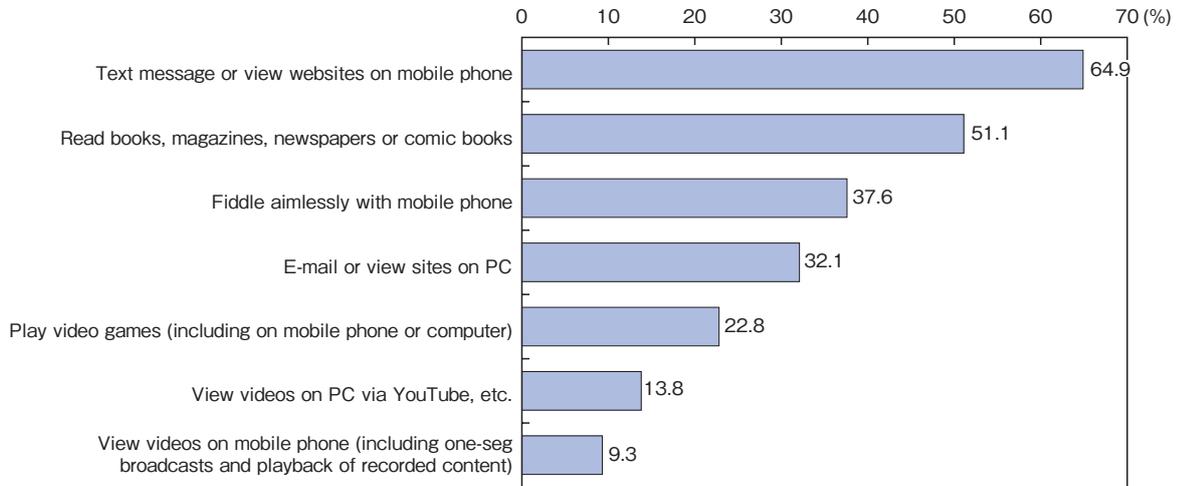
(Source) Ministry of Internal Affairs and Communications "Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens' Lifestyles and the Social Environment" (2011)  
 (prepared on the basis of "Information Behavior in Japan, 2005" and "Survey of Information Behavior in Japan, 2010")

## 6. The emergence of multi-tasking

The growing prevalence of multi-tasking behavior in recent years has been pointed out. A survey of 16- to 24-year-old male and female youth living in Tokyo showed that a great number text-message or browse websites on their mobile phones (64.9%) or fiddle aimlessly with their mobile phones (37.6%), indicating that this kind of multi-tasking with mobile phones while watching TV is becoming the norm among the generation known as "digital natives" (Figure 2-1-3-9). Increasing use of mobile phones to access the Internet has led

to personalization of online behavior as well as facilitating the simultaneous use of TV and Internet, which can be seen as a factor behind the emergence of multi-tasking behavior.

**Figure 2-1-3-9 Multi-tasking behavior while watching TV**



(Source) Ministry of Internal Affairs and Communications “Survey on the Impact and Reciprocal Relationship of ICT Infrastructure Progress and Citizens’ Lifestyles and the Social Environment” (2011)

(prepared on the basis of the Broadcasting Ethics & Program Improvement Organization “How Do Digital Natives Watch TV? A 300-Person Survey of TV Program Viewing Habits”)