

Chapter 1

**Feature: Building a “New,
Japan-Inspired IT Society”**

Introduction

The theme of this white paper is “Building a ‘New, Japan-Inspired IT Society’.” The objective is to study the direction of the new IT society that Japan should aim for by analyzing the current status of information and communications in Japan based on data. The new image of an IT society will not only be a goal for Japan, but the image of an IT society that Japan will introduce to the world.

Japan presently faces major problems both in economic and social aspects. In terms of the economy, Japan is suffering from a prolonged economic slump and marks the lowest-level economic growth rate among major developed countries. Japan’s international competitiveness ranking also dropped to 11th place in 2003 despite holding the top position for five consecutive years from 1989 in the ranking released by the International Institute for Management Development (IMD). In terms of society, the population is rapidly aging, and Japan is expected to become the country with the most aged population in the world by 2005.

On the other hand, Japan maintains high potential in educational standards and technological capabilities, and has fine culture and art. According to the OECD’s Program for International Student Assessment (PISA), Japanese students’ performance for mathematical and scientific literacy belongs to the highest-ranking group. Furthermore, over 80% of citizens hold the recognition that Japan has excellent culture and art (“Public Opinion Poll on Social Awareness 2000,” Cabinet Office).

In order for Japan to resolve the present problems by making use of these potentials, it is indispensable to reform the conventional social and economic structures, and information and communications can play a significant role in bringing about such structural reform.

In the past, the world of the Internet and other information and communications had been lead by the United States. However, some areas of the conventional IT industry and the PC-centered IT infrastructure are show-

ing their limits and presenting problems as represented by the collapse of the IT bubble economy and the digital divide issue.

In the meantime, Japan set up a goal to “become the world’s most advanced IT nation” by 2005 in the e-Japan Strategy formulated in January 2001, and strategic efforts have been made both by the public and private sectors. As a result, Japan has not only caught up with other IT-advanced countries in terms of developing the broadband user environment, but it has achieved providing low broadband rates and optical fiber services, while it has succeeded in leading the world in the mobile communications field, such as the mobile Internet. In this manner, Japan is in the process of shifting from a catch-up phase to a frontrunner phase.

In light of these circumstances, it would be necessary for Japan to realize a “New, Japan-Inspired IT Society” under the joint effort of the public and private sectors by making the most of Japan’s strengths, and overcome the economic and social problems the country faces.

Based on the above problem consciousness, this year’s white paper features analyses of the direction of a “New, Japan-Inspired IT Society” from the following aspects: the infrastructure aspect in Section 1; the economic/business aspects in Section 2; the lifestyle/social/administrative aspects in Section 3; the cultural/Internet content aspects in Section 4; and the information security aspect in Section 5. In particular, selective analysis is conducted through international comparison and quantitative analysis with regard to the characteristics of the information and communications field in Japan (advantages and problems), the role information and communications could play in developing the Japanese economy and society, and the problems impeding the actual use while the information and communications infrastructure is being developed.

Section 1

Development of the World's Highest-Level Network Infrastructure

1. Growth of Information and Communications

(1) The world's top-level broadband

(i) Increase in the broadband user population

The development and use of broadband has rapidly grown in Japan, almost reaching the world's highest level. The user population for broadband services (Fiber to the Home (FTTH), digital subscriber line (DSL), cable Internet, and wireless (fixed wireless access (FWA), etc.)) was estimated to be 19.55 million as of the end of 2002. Broadband users account for 28.2% of the 69.42 million Internet users, indicating that already one or more out of four Internet users are using broadband (Figure 1-1).

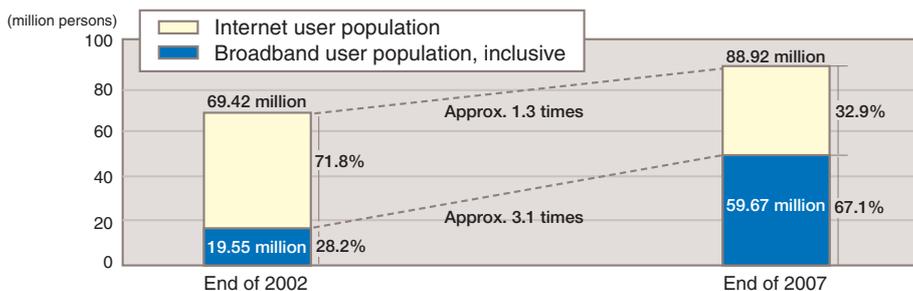
According to a prediction of the future broadband user population based on the transitions in the number of broadband subscribers and other data, the Internet user population is expected to become 88.92 million (penetration rate: 69.6%), among which 59.67 million (penetra-

tion rate: 46.7%) will be broadband users, in the next five years (by 2007). This would mean that 67.1% of the entire Internet user population will be using broadband, and the mainstream of Internet use will switch from narrowband to broadband (Figure 1-1).

(ii) Economic effect of broadband

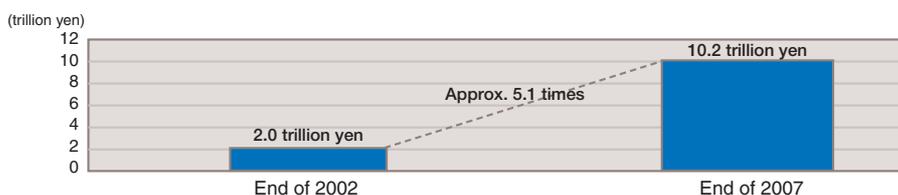
The diffusion of broadband has a large impact on the Japanese economy. As the broadband user population increases, the demand for broadband equipment and terminals will increase. In addition, due to an increase in the opportunity to conduct online shopping, broadband is expected to boost e-commerce transactions by individuals. Business operators will establish new systems and networks to deal with the increase in the broadband user population. Furthermore, broadband is expected to bring about new businesses that utilize the broadband quality that allows high-speed data communications.

Figure 1-1: Current Status and Prediction of the Broadband User Population



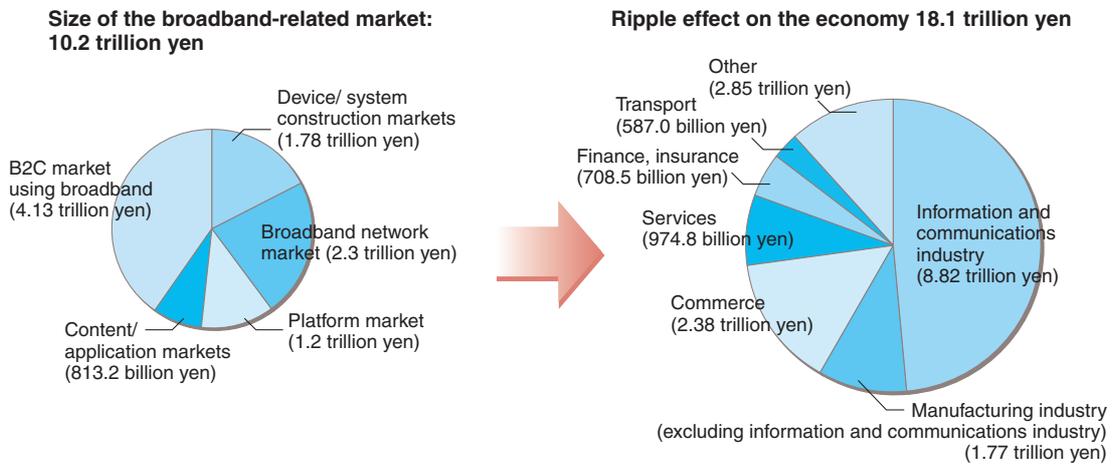
Source: "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-2: Current Status and Prediction of the Broadband Market Size



Source: "Survey on Utilization of IT in Business Management."

Figure 1-3: Ripple Effect of Broadband on the Economy (Value of production induced in the respective industries in 2007)



Source: "Survey on Utilization of IT in Business Management."

When such growth of demand pertaining to broadband diffusion is estimated by categorizing the broadband-related markets into (1) device/system construction markets, (2) network market, (3) platform market, (4) content/application markets, and (5) B2C e-commerce market, the size of the broadband-related markets is expected to increase from 2.0 trillion yen in 2002 to 10.2 trillion yen, which is about 5.1 times, in 2007. As for the production inducement effect of broadband diffusion on various industries, the ripple effect of broadband on overall industries is estimated to become 18.1 trillion yen in 2007 (Figures 1-2 and 1-3).

(iii) Trends in broadband rates

The continuing fall of broadband rates is one of the causes for the rapid broadband diffusion. When rates for DSL and cable Internet services in various countries are compared by converting them into rates per 100 kbps, the rates in Japan are found to be the lowest in the world (Figure 1-4).

(iv) International comparison of the status of broadband diffusion

In an international comparison of the status of broadband diffusion, Japan ranks third in terms of the number of subscribers, following 18.7 million subscribers in the United States and 9.86 million subscribers in the Republic of Korea, indicating the soaring number of subscribers in Japan (Figure 1-5).

(2) Full-fledged diffusion of IP telephones

Use of IP telephones has suddenly increased with the

diffusion of broadband. Following the launch of IP telephone services using dedicated IP networks as the relay networks in April 2001, IP telephone services that use broadband circuits as the access circuits began to be provided in full fledged in 2002 and 2003.

According to an intention survey of broadband users, the number of subscribers to IP telephones using broadband circuits was estimated to be approximately 2.27 million as of the end of 2002. The number of subscribers may exceed 20 million by 2007, growing by about 10 times to approximately 22.73 million persons (Figure 1-6).

(3) Steady diffusion of the Internet

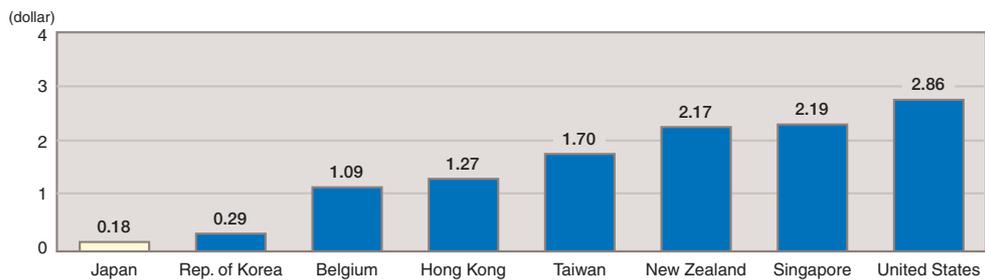
The Internet user population is constantly increasing in Japan. The Japanese Internet user population as of the end of 2002 was estimated to be 69.42 million (a 24.1% increase over the previous year), increasing by 13.49 million in one year. The Internet penetration rate exceeded half the population for the first time at 54.5%, indicating that at least one out of two persons in Japan is using the Internet (Figure 1-7).

(4) Development of the mobile Internet

The number of subscribers to the mobile Internet (Internet connection services using cell phones) in Japan exceeded 60 million in only four years from the start of the services in February 1999, reaching 62.46 million at the end of fiscal 2002 (Figure 1-8). The proportion of mobile Internet subscribers among the total number of cell phone subscribers was 82.6%, more than 80%, as of the end of fiscal 2002 (Figure 1-8).

Looking at the status of mobile Internet diffusion in

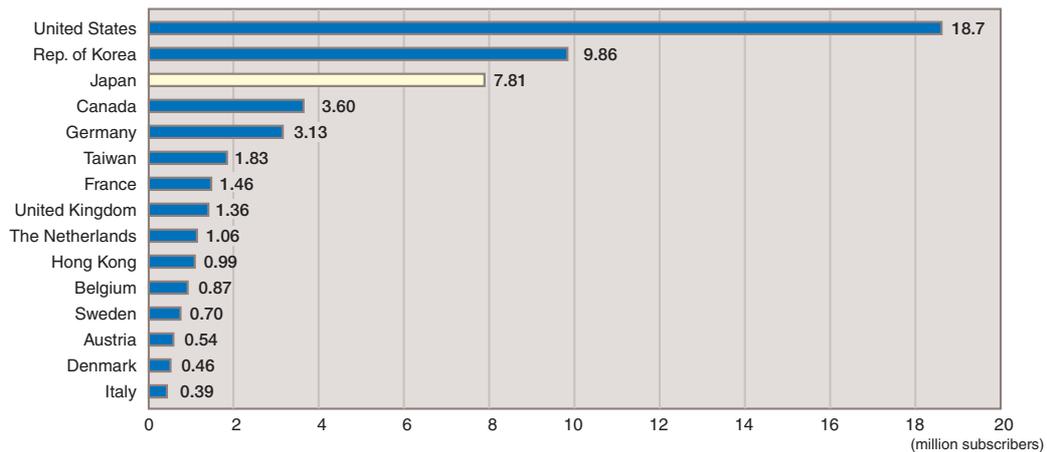
Figure 1-4: International Comparison of Broadband Rates (rates per 100 kbps; end of fiscal 2002)



Note: Comparison was made by deriving the rates for 100 kbps based on the speeds and rates of DSL and cable Internet services provided in the respective countries.

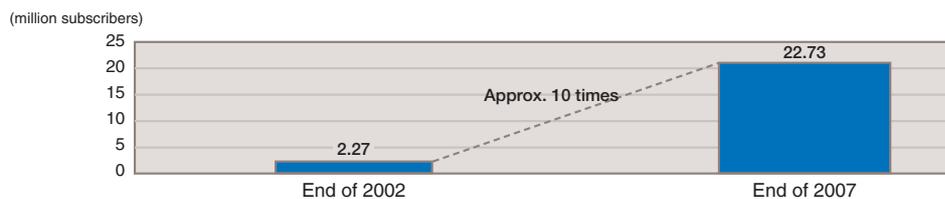
Source: Based on "Strategic Planning Workshop on Promoting Broadband Background Paper," ITU.

Figure 1-5: International Comparison of the Number of Broadband Subscribers (top 15 countries/regions; end of 2002)



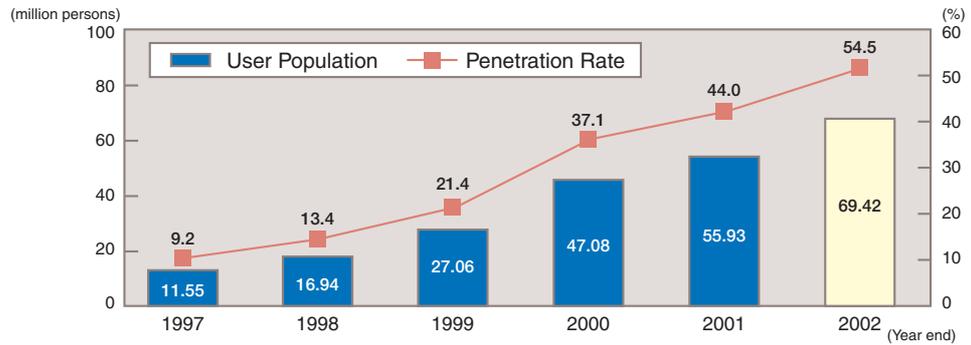
Source: Based on "Strategic Planning Workshop on Promoting Broadband Background Paper," ITU.

Figure 1-6: Current Status and Prediction of the Number of Subscribers to IP Telephones Using Broadband Circuits



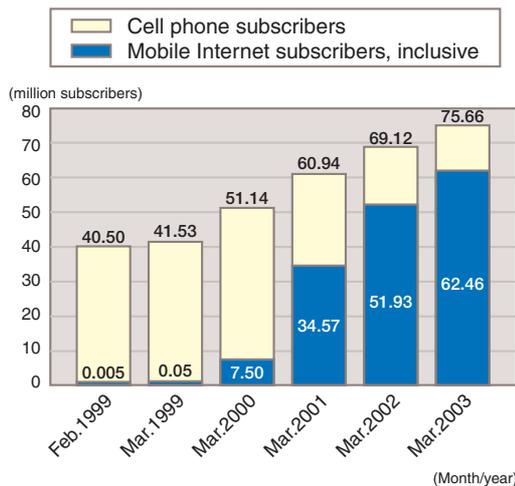
Source: "Survey on Information and Communications Infrastructure."

Figure 1-7: Transitions in the Internet User Population and Penetration Rate



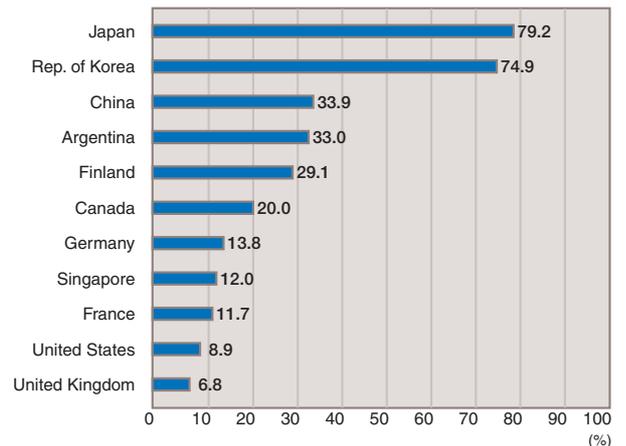
Source: "Communications Usage Trend Survey," MPHPT.

Figure 1-8: Transitions in the Number of Subscribers to Cell Phones and Mobile Internet



* The number of mobile Internet subscribers is the total number of subscribers to I-mode, EZweb (including former Ezaccess), and J-Sky services provided by cell phone carriers.

Figure 1-9: Cell Phone Internet Compatibility Rate in Major Countries (Proportion of mobile Internet subscribers among the total number of cell phone subscribers) (end of Sep. 2002)



* The figures show the proportion of mobile Internet subscribers among the total number of cell phone subscribers for major carriers in the respective countries.

Source: Based on "3G Mobile" materials.

various countries, the proportion of mobile Internet subscribers among the total number of cell phone subscribers for major carriers in the country is the highest for Japan with 79.2%, followed by the Republic of Korea and China. Thus, Asian nations are leading the diffusion of the mobile Internet (Figure 1-9).

(5) Spread of third-generation cell phones

The number of subscribers to third-generation telephones was 7.16 million at the end of fiscal 2002, showing a steady increase. The majority of these, specifically, 6.81 million subscribers are those for phones using the CDMA2000 technology adopted by the KDDI group

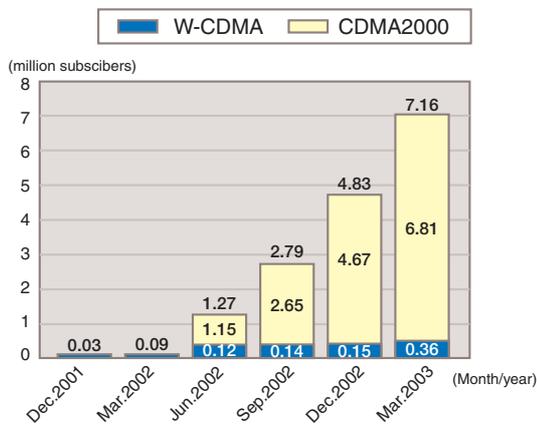
(Figure 1-10).

In terms of the number of subscribers, Japan, which provides services in both W-CDMA and CDMA2000 centering on the world's common spectrum, the 2GHz band, and the Republic of Korea, which provides services only in CDMA2000 in the 800 MHz band, command about a 60% share of the world's total subscribers of approximately 44 million (Figure 1-11).

(6) Digitization of broadcasting

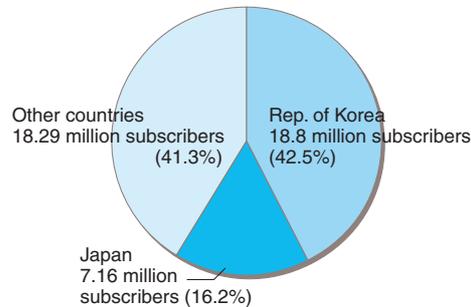
On December 1, 2003, terrestrial digital television broadcasting will be launched in the Kanto, Chukyo, and Kinki regions from Tokyo, Nagoya, and Osaka. With this,

Figure 1-10: Transitions in the Number of Subscribers to Third-Generation Cell Phones



Source: Based on materials of the Telecommunications Carriers Association (TCA)

Figure 1-11: Number of Subscribers to Third-Generation Cell Phones in the World (end of FY 2002)



Sources: Based on a survey by CDG, a survey by QUALCOMM, and materials of TCA.

digital broadcasting will be realized for all broadcasting media—terrestrial, satellite, and cable television broadcasting. Since television is diffused to almost all households in Japan, by promoting digitization of terrestrial television broadcasting, it will be possible to establish a “home infrastructure for supporting the IT Revolution” allowing all people to use advanced services easily through the widely penetrated television.

The first digital broadcasting in Japan started with the launch of CS digital broadcasting using a communication satellite (CS) in June 1996. In July 1998, digital broadcasting became available also on cable television in some areas. In December 2000, BS digital broadcasting using a broadcasting satellite (BS) commenced, and 110°E CS digital broadcasting started in March 2002. In fall of 2003, test broadcasting of terrestrial digital sound broadcasting is scheduled to start in Tokyo and Osaka for the purpose of understanding the demands and developing broadcasting services. In December 2003, terrestrial digital television broadcasting is planned to be launched in the three major regions.

The shift from analog broadcasting to digital broadcasting is also planned to be completed by 2011 except for terrestrial radio broadcasting. CS broadcasting has already mostly completed the shift to digital broadcasting. Of BS analog broadcasting, the shift will complete for analog Hi-Vision broadcasting by 2007 and for other broadcasting (NHK-1, 2, WOWOW) by 2011. Terrestrial analog television broadcasting is planned to be terminated in 2011. It is aimed that almost all cable televisions be also digitized by 2010.

2. Prospects and Problems of Next-Generation Information and Communications Networks

(1) Next-Generation Ubiquitous Networks

(i) Significance of ubiquitous networks

The information and communications networks that are anticipated to become the mainstream in the next generation are “networks that are usable anytime, anywhere, by anybody” (ubiquitous networks), which are the further developed form of the rapidly disseminating broadband, cellular phones, and digital broadcasting. Ubiquitous networks allow anybody to distribute any kind of information and content from any part of the globe at any time without any restrictions in terms of transmission speed, etc.

Conventional information and communications networks had various limitations, such as spatial/geographical restrictions, restrictions in the receiving devices, restrictions in the selectable networks/terminals/services/contents, restrictions in communication performance, and network risks. However, ubiquitous networks are able to overcome these limitations. The basic concept of ubiquitous networks can be summarized into the five points in **Figure 1-12**.

Moreover, ubiquitous networks will also be able to solve or reduce the economic and social problems Japan is currently facing. Ubiquitous networks will not only [1] make people’s daily lives richer in quality and more convenient, but also contribute to innovating social systems by [2] realizing secure societal life, [3] promoting social participation by the disabled and the elderly, and [4] responding to environmental problems. Furthermore, they will contribute to revitalizing the Japanese economy by [5] generat-

Figure 1-12: Basic Concept of Ubiquitous Networks

1. A network environment adaptable to any situation and circumstances (network accessible anywhere)
2. A highly convenient and diverse terminal environment (network accessible from any terminal)
3. An environment that enables the use of all kinds of services and applications (network for universal use)
4. An ultra high-speed network environment allowing concurrent access by a large number of users (network for stress-free access)
5. A secure information access environment (network with high level of security)

Source: "Report by the Study Group on Future Prospects of Ubiquitous Network Technology," MPHPT (June 2002).

ing industries that create new values.

(ii) Securing international competitiveness utilizing Japan's strong fields

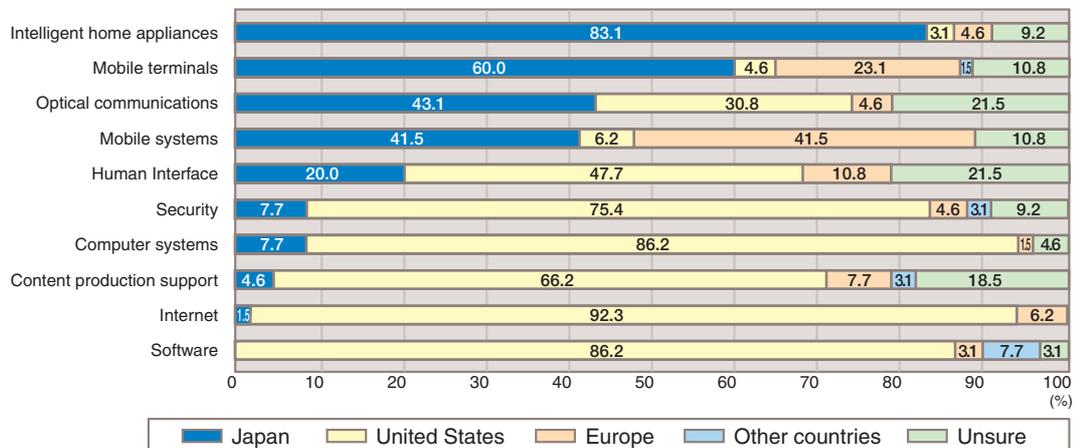
In order to realize ubiquitous networks, it is necessary to develop small, easily operable terminals that can be used for long hours, to change the modes of network services according to users, and to develop information and communications technologies for the networks.

When Japanese and overseas information communications researchers were surveyed on the superiority of Japan, the United States, and Europe in terms of information and communications technologies, an outstanding number of respondents answered that the United States was more advanced than the others in terms of software technology, Internet technology, content production support technology, computer system technology and security technology. On the other hand, many answered that Japan was more advanced than others in terms of intelligent home appli-

ances technology, mobile terminal technology, optical communications technology, and mobile system technology (Figure 1-13).

In this manner, the United States is superior both in market share and technological development in the area of the conventional PC-centered Internet and technologies of content production and security that are in extension to it. However, the central technologies for ubiquitous networks will be the mobile communications technology for overcoming the spatial and geographical restrictions, the terminal technology for overcoming the restrictions of the receiving devices and of terminals, and the optical technology for overcoming the communication performance. Japan has been promoting farsighted R&D of these technologies under the joint cooperation of the public and private sectors, so Japan has the edge in these fields. If Japan realizes ubiquitous networks ahead of other countries by utilizing these strong aspects, and introduces the model to the world, it would also have the effect of securing international com-

Figure 1-13: International Comparison of Superiority in Information and Communications Technologies



* Japanese and overseas researchers were asked to state which country/region was superior in the respective information and communications technologies.

Source: "Survey on Information and Communications Infrastructure."

petitiveness and making international contribution.

While ubiquitous networks hold enormous possibilities, expansion of networks may also present new problems such as privacy infringement. According to a survey on the intention of using the services and systems realized by ubiquitous networks, the top concern held against ubiquitous networks was “leakage of personal information,” indicated by an outstanding proportion, 81.5%, followed by “credibility of the networks” indicated by 52.2%. This indicates that concerns about privacy and information security need to be wiped out in order for ubiquitous networks to be accepted by society.

(2) Burgeoning of next-generation networks

Ubiquitous networks are expected to make dramatic progress until 2005 or 2010, but some burgeoning examples, such as home networks, high-speed wireless access services at “hot spots,” and navigational services have already started to penetrate in society.

Due to the trend of owning multiple PCs at home and the diffusion of broadband, more people have come to establish home networks (home LANs) that join the PCs at home either by wire or wireless connection. At the end of 2002, 25.7% of all households owned multiple PCs, and 35.5% of them had home networks. The installation rate of such home networks was 53.1% for broadband user households while it was 33.2% for narrowband user households, suggesting that many users established home networks when they subscribed to broadband services.

In addition, provision of high-speed Internet connection services using wireless LANs is making progress in facilities such as hotels and restaurants and public spaces such as airports and railway stations (these are called “hot spots”) to enable out-of-home, high-speed Internet access. In 2002, 8.8% of Internet users used wireless access services at hot spots.

Furthermore, the diffusion of out-of-home Internet access means and global positioning systems (GPS) have given rise to navigational services, which are services accessible anywhere that provide positional information and information on the neighborhood of the current position to give geographical directions for people and cars. Representative navigational services are the positional information services on cell phones as well as the telematics services. “Telematics,” which is a term that combines telecommunications and infomatics, is a next-generation information service for cars. Car navigation systems have already become widely diffused, used by 23.8%—nearly a quarter—of all households as of the end of 2002.

(3) Outlook for intelligent home appliances

Provision of intelligent home appliances is now shifting from an experimental phase to a phase of practical application.

When intelligent home appliances become available, the individually used home appliances will be connected to each other by networks, and by further connecting them to the Internet through gateways, it will be possible to operate the home appliances from outside and provide network services linked with hardware. For example, it will be possible to provide maintenance services, such as upgrading the software or failure diagnosis of intelligent home appliances, and to provide such data as cooking recipes and television program information for automatic video recording.

As of the end of 2002, households owning Internet-supported television sets were only 3.0% and those that owned other home appliances that could be connected to the Internet were 3.2%, indicating that the full-fledged diffusion of intelligent home appliances has yet to start (“Communications Usage Trend Survey in 2002,” MPHPT).

According to a survey on conditions for using intelligent home appliances, most respondents answered that they would “want to purchase if the intelligent home appliances were sold at the same prices as general home appliances” or “want to purchase if the price difference was within an additional 10%.”

In addition, questions on the priority conditions for using intelligent home appliances showed the result that it is necessary to eliminate people’s concerns about being linked with networks and to secure easy operations in order to diffuse intelligent home appliances.

(4) Wide utilization of wireless tags

A wireless tag is a tag consisting of an IC chip and an antenna, which allows the reading and writing of the identification data stored in the IC chip without touching by use of radio technology. Tags that do not have their own power source are processed by using the electric power of radio waves emitted from the network device, and the process results are transmitted by radio.

One example of widely used wireless tags is “Suica” issued by East Japan Railway Company as a traffic card for automatic ticket gates. The Suica service was launched in November 2001, and the number of users exceeded 6 million persons by April 2003. Wireless tags are also used in ID cards for managing entrance/exit to and from offices and at production sites, and the shipment values of wireless tags are increasing.

Wireless tags are expected to be applied to more extensive fields in the future, but attachment/management of numbers on wireless tags, lowering of unit costs, and the ensuring of privacy and information security have been pointed out as problems to be tackled.

(5) Shift to IPv6

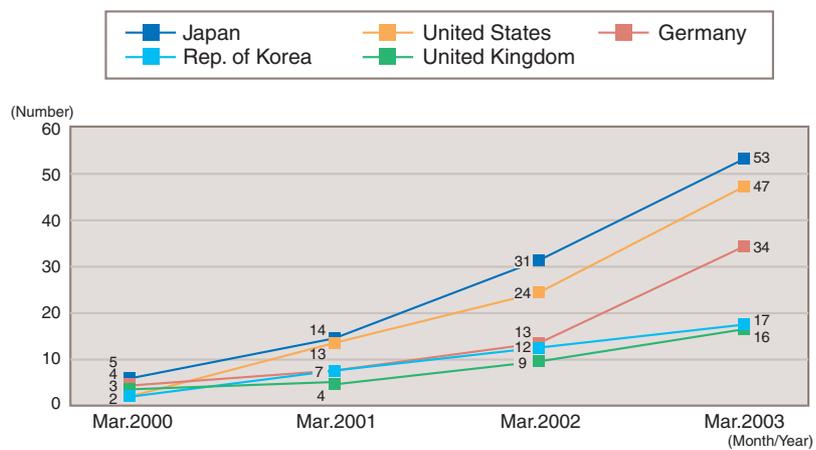
As ubiquitous networks make progress, access termi-

nals, such as intelligent home appliances and wireless tags, are expected to dramatically increase both in number and type. The Internet Protocol version 6 (IPv6) responds to such increase in the number of access terminals and greatly improves convenience for users, so early shift to IPv6 is anticipated.

Japan has conducted various demonstrative experiments toward practical application of IPv6 under the cooperation of

industry, universities, and the government. While the number of Japanese Internet service providers (ISPs) and other organizations allocated IPv6 addresses were only five at the end of 1999, the number reached 53 as of the end of fiscal 2002, boasting the largest number of organizations allocated IPv6 addresses in the world. Japan also continues to be a frontrunner in the area of practical application of IPv6 (Figure 1-14).

Figure 1-14: International Comparison of the Organizations Allocated IPv6 Addresses



Section 2

Strengthening Competitiveness of Companies and Developing Industry

1. Trends in Macro-Economy and the Information and Communications Industry

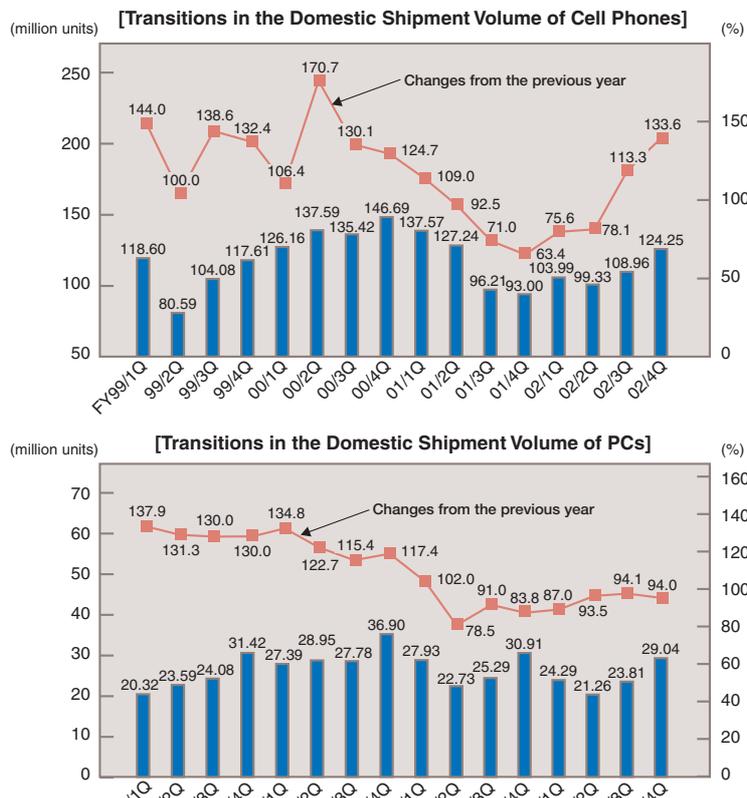
The Japanese information and communications industry expanded from 79 trillion yen to 123 trillion yen from 1995 to 2001, towing and supporting the Japanese economy that has been slumping since the collapse of the bubble economy.

However, similar to Europe and the United States, the businesses of information and communications companies deteriorated from 2000 to 2001 due to the round of demand for information and communications equipment and services, such as PCs and cell phones, being satisfied, the impact of the stagnation of the European and U.S. information and communications industries, and structural changes surrounding the industry. In particular, information and communications equipment manufacturers that were highly dependent on the United States received a great blow from the depression of the U.S. information

and communications industry. The businesses of major telecommunications carriers also declined due to the slowdown in the demand growth of cell phones that were towing the industry as well as the decreased demand for fixed-line telephones pertaining to the shift to IP telephones.

Part of the demand for information and communications equipment and services has begun to pick up in 2002 helped by the surge in the broadband demand and the increased demand for new equipment and services, such as camera-equipped cell phones. In the fourth quarter of fiscal 2002, the domestic shipment volume of cell phones made the first positive growth over the previous year in six quarters, and there are signs that the fall in the domestic shipment volume of PCs is also coming to an end (Figure 1-15). Since information and communications companies are actively engaging in structural reforms including corporate downsizing, the businesses of the Japanese information and communications industry are showing signs of recovery.

Figure 1-15: Transitions in the Shipment Volume of Information and Communications Equipment in Japan



Source: Japan Electronics and Information Technology Industries Association. (JEITA)

2. Trends in IT Investment and Companies' IT Utilization

As the Japanese economy has been slumping since the 1990s, companies have been limiting capital investment and conducting structural reforms. However, in order for companies to increase productivity and strengthen international competitiveness, accumulation of capital, which serves as the basis for production activities, is indispensable. Particularly, it is important to accumulate IT capital, which enables companies to conduct efficient production activities and provide high added-value services.

(1) Trends in IT investment

The value of IT investment in private companies was 25.0 trillion yen (a 10.9% increase over the previous year) in 2001, indicating that the level of IT investment value rose by about 1.7 times over five years. The proportion of IT investment value to total private capital investment has also continued to increase since 1997, reaching 29.4% (a 3.9 point increase over the previous year)—about 30% of the total private capital investment—in 2001 (Figure 1-16).

(2) Contribution of IT capital to the economic growth

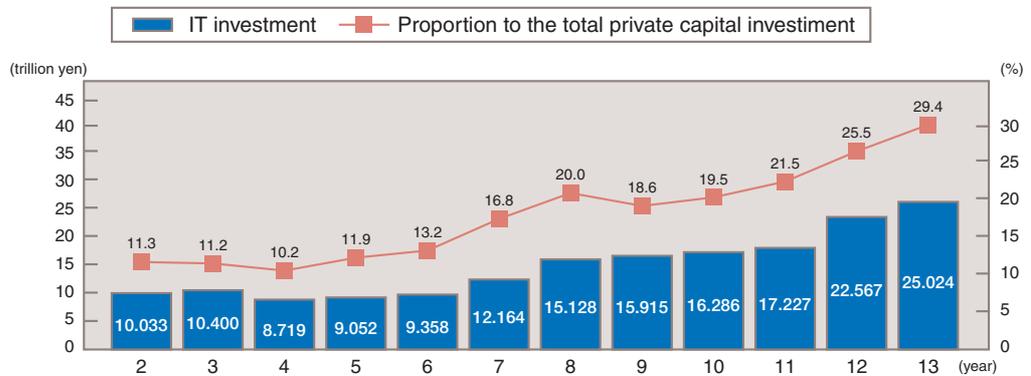
The extent of the contribution of three production factors—IT capital stock, general capital stock (excluding IT), labor—to the Japanese economic growth was analyzed by using production function. From 1985 to 1990, 2.92% of the 4.91% economic growth rate was achieved by IT capital, and from 1990 to 1995, IT capital contributed 0.51% of the 1.45% economic growth rate, showing that IT capital has played a significant role in the development of the economy.

From 1995 to 2001, IT capital contributed 1.73% for an overall economic growth rate of 1.21%, supporting the economic growth while labor and other factors were making negative contributions (Figure 1-17).

(3) IT introduction and the effect of IT investment in Japan and U.S. companies

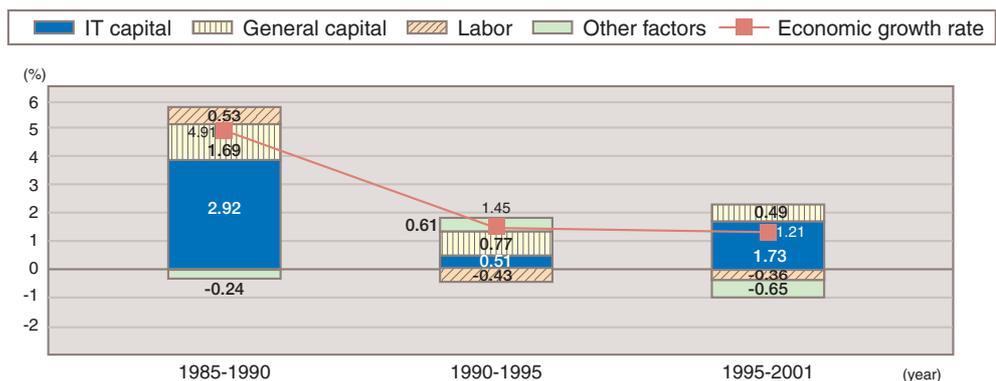
While the IT investment value in Japan was 25.0 trillion yen in 2001, that in the United States was about 2.7 times larger, at 549.9 billion dollars (approx. 66.6 trillion yen). In addition, while the proportion of IT investment value to the total private capital investment was 29.4% in Japan in 2001, that in the United States

Figure 1-16: Transitions in IT Investment in Japan



Source: "Survey on Economic Analysis of IT."

Figure 1-17: Transitions in Contribution Ratios of Various Production Factors to the Japanese Economic Growth



Source: "Survey on Economic Analysis of IT."

was 42.9% (Figure 1-18). Compared to the 2.5-times increase in Japanese IT investment from 1990 to 2001, that in the United States was 6.1 times, more than twice the increase rate in Japan (Figure 1-19). In this manner, the United States surpasses Japan both in the proportion of IT investment to total private capital investment and the increase rate in IT investment.

However, while the IT investment value in Japan for 2001 increased by 10.9% over the previous year, continuing to make positive growth, that in the United States turned to negative with minus 5.4%.

Although IT investment value is increasing both in Japan and the United States, IT investment is only meaningful when effects that are worth the investment are produced in companies. Therefore, the effects of IT investment in Japanese and U.S. companies were compared separately for the effects of reducing costs/increasing efficiency of operations and the effects of increasing sales/developing high added value.

With regard to the former, more Japanese companies answered that the IT investment was effective for “reduction in indirect costs” and “increase in efficiency of operations,” while more U.S. companies answered it was effective for “reduction in direct costs,” “decrease in parts inventory,” and “reduction in the unit cost of supplies.” This suggests that IT investment is generally having the same level of effects for Japanese and U.S. companies in the area of cost reduction and increasing efficiency of operations. However, regarding the latter type of effects including “increase in sales” and “winning new customers,” more U.S. companies answered that the IT investment was effective for all of the items compared to Japanese companies, and the gap is found to be quite large (Figure 1-20).

As a result, U.S. companies are considered to greatly exceed Japanese companies with respect to the effect of IT investment, particularly in increasing sales and developing high added value, which is likely to be the cause of

Figure 1-18: Amount of IT Investment in Japan and the United States

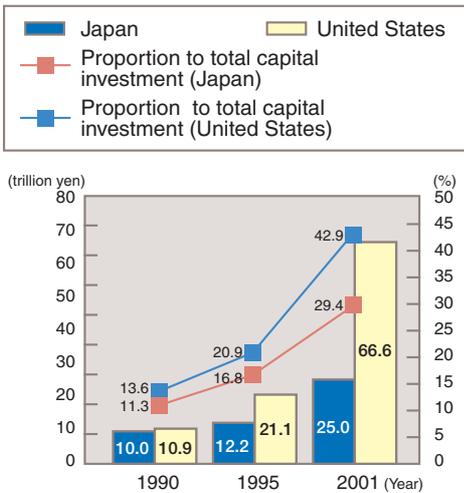
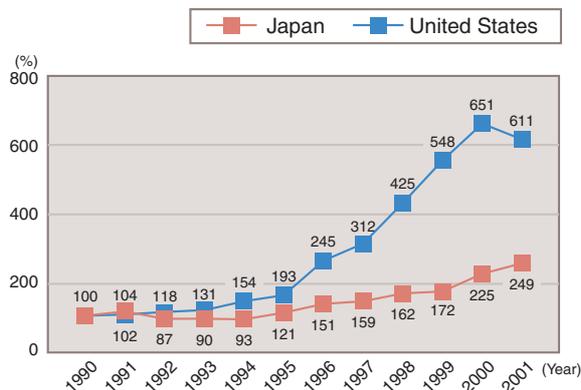
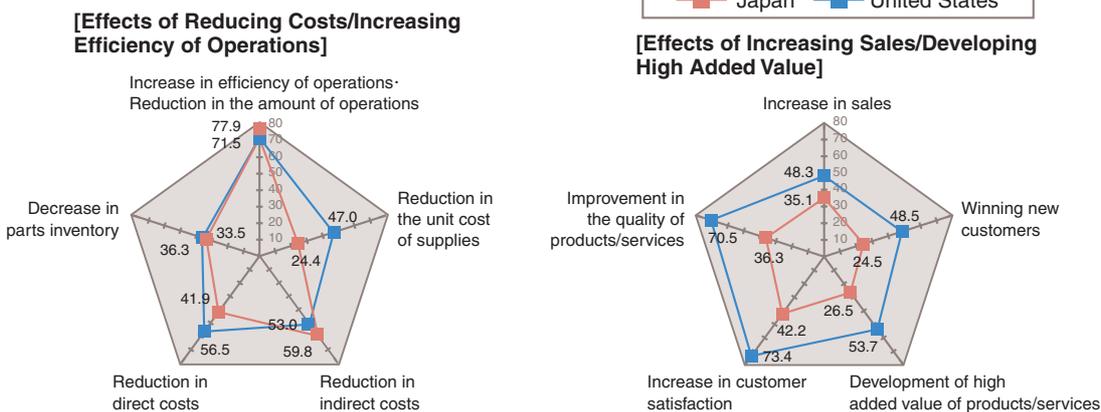


Figure 1-19: Transitions in IT Investment in Japan and the United States



Source (Figures 1-18&1-19): “Survey on Economic Analysis of IT.”

Figure 1-20: Proportions of Japanese and U.S. Companies That Found Their IT Investment Effective



Source: “Survey on Utilization of IT in Business Management.”

the strong competitiveness of U.S. companies.

(4) Causes for the difference in the effects of IT investment between Japanese and U.S. companies

IT investment in Japanese companies has limited effects compared to that in U.S. companies. Possible causes for this are the differences in three aspects: the awareness of objectives for the IT investment, the internal and external operational coordination of IT systems, and measures for enhancing the effectiveness.

When comparing the awareness of objectives for introducing IT systems between Japanese and U.S. companies, Japanese companies' main objective for IT investment is "reducing costs/improving efficiency of operations," while U.S. companies make that as well as "increasing sales/developing high added value" their objectives for IT investment. In other words, Japanese companies only view IT investment as a tool for improving efficiency of operations. On the other hand, U.S. companies consider IT investment not only as a means for

improving efficiency of operations, but also as the source of stronger competitiveness and corporate growth. This difference in the awareness of objectives is likely to be affecting the gap in the effects achieved by IT investment.

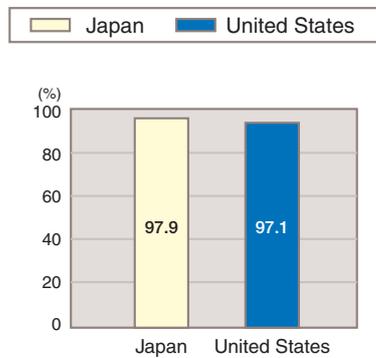
Moreover, in order to maximize the effect of investment, it is essential to look out over the respective fields of operations and introduce a cross-operational IT system rather than introducing an independent IT system for individual fields of operations. Also, considering that corporate activities are conducted in link with other companies in such processes as purchasing, production, distribution, and sales, it is important to introduce IT systems that allow coordination between companies. In short, whether or not a company has introduced an open IT system for overall optimization, allowing internal and external coordination, rather than closed IT systems for only optimizing one division or company is considered to be the key to achieving the effect of IT investment.

Installation rate of in-house networks (LANs, etc.) in Japanese companies is 97.9%, not so different from the

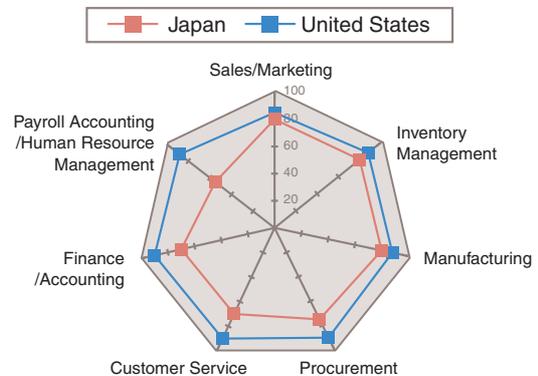
Figure 1-21: Status of Introduction of Information and Communications Networks in Japanese and U.S. Companies

<Status of Introduction of In-House Information and Communications Networks>

[Penetration Rate of In-House Communications Networks]

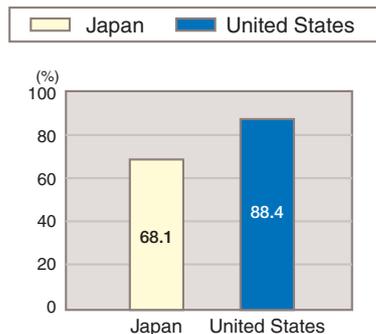


[Use of IT Systems for Operational Coordination within a Company]

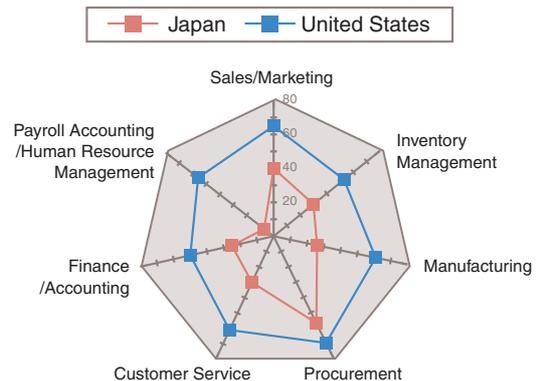


<Status of Introduction of Inter-Company Information and Communications Networks>

[Penetration Rate of Inter-Company Communications Networks]



[Use of IT Systems between Companies]



Sources: "Survey on Utilization of IT in Business Management"; "Communications Usage Trend Survey in 2002," MPHPT.

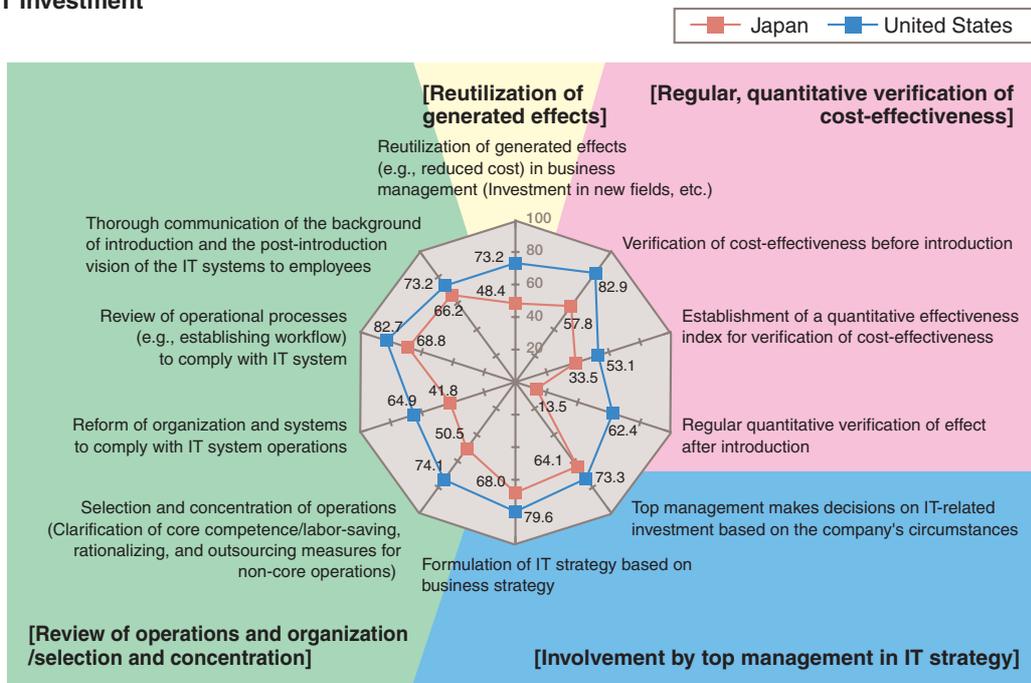
97.1% for U.S. companies, but the rate of coordination of IT systems between operations within a company is low compared to U.S. companies (Figure 1-21). At the same time, the installation rate of inter-corporate networks (WANs, etc.) among Japanese companies is 68.1%, which is lower than the 88.4% for U.S. companies. The Japan-U.S. gap with respect to coordination of IT systems between companies by type of operation is even larger than the rate of coordination within companies, with U.S. companies achieving double the coordination rate than Japanese companies in the areas of manufacturing, finance/accounting, payroll accounting/human resource management, and customer service. Such gap in the coordination of IT systems is also likely to be affecting the difference in the effect of IT investment between Japanese and U.S. companies.

Furthermore, in order for companies to bring out higher effects of IT investment, companies must not merely introduce IT systems, but take measures to enhance the effects of IT investment. An analysis of the correlation between measures for enhancing effects of IT investment and the actual effects of IT investment in companies shows that effects of IT investment are correlated with the following measures: [1] reutilization of the reduced cost/personnel in new fields of business; [2] reg-

ular quantitative verification of the cost-effectiveness of the investment before and after the introduction; [3] top management's strong involvement in the formulation of IT strategy, etc.; [4] review of operations, organization/systems, and selection/concentration measures. These measures also generally indicate high correlation with the effects of IT investment in U.S. companies and greatly contribute to enhancing the effects of IT investment.

The proportion of Japanese companies that have implemented these measures is lower than that of such U.S. companies. The implementation rate for Japanese companies is particularly low for the measure to conduct "regular quantitative verification of the cost-effectiveness of the investment." The rate is lower than one-fourth of U.S. companies with regard to "regular quantitative verification of the effect after the introduction." There are also gaps of 20% or more between Japanese and U.S. companies in the areas of "reutilization of generated effects (e.g., reduced cost)" and "reform of organization and systems to comply with IT system operations" (Figure 1-22).

Figure 1-22: Measures by Japanese and U.S. Companies Toward Optimizing the Effectiveness of IT Investment



* The figure shows the percentages of companies that answered either "fully implemented" or "somewhat implemented" for the respective measures.

Source: "Survey on Utilization of IT in Business Management."

3. Trends in Internet Business

More companies have come to use e-commerce for procurement and sales since transactions can be made more efficiently by receiving and placing orders electronically instead of using paper. At the same time, online shopping by individuals is increasing due to the easiness of buying products at home via the Internet and the increased usability pertaining to the diffusion of broadband.

With regard to the market size of the Japanese e-commerce market in 2002, the B2C (business to consumer) market in which individuals purchase home appliances and daily supplies via the Internet was 1.587 trillion yen (a 90.1% increase over the previous year), showing a dramatic increase (**Figure 1-23**). Meanwhile, the B2B (business to business) market in which companies purchase raw materials, PCs, and books from other companies via the Internet was 60.0 trillion yen (a 10.5% increase over the previous year) (**Figure 1-24**).

Figure 1-23: Transitions in the B2C E-Commerce Market

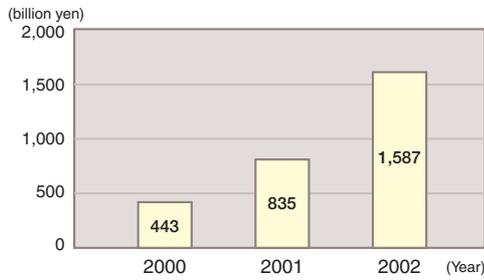
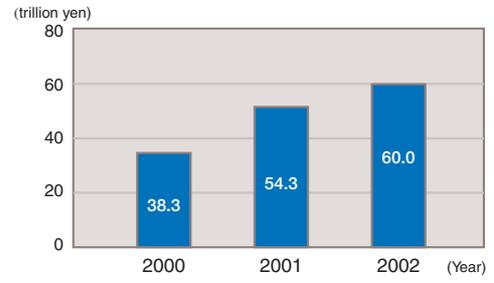


Figure 1-24: Transitions in the B2B E-Commerce Market



Source (Figures 1-23&1-24): "Survey on Economic Analysis of IT"

Section 3

Enriching National Life and Resolving Social Problems

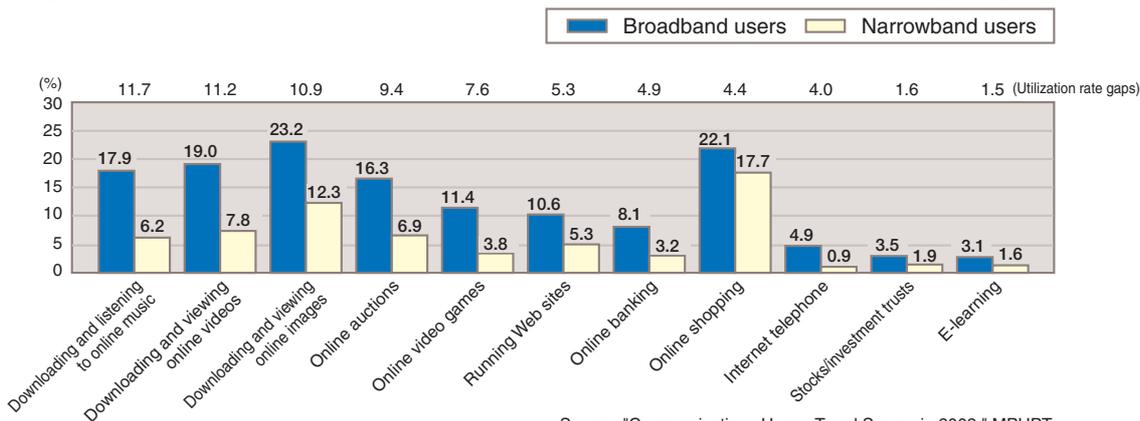
1. Advanced Use of the Internet

While broadband is rapidly diffusing in Japan, broadband users are found to be utilizing the Internet more than narrowband users in terms of purposes, frequency, and length of time. For example, broadband users mark higher utilization rates for all purposes of Internet use compared to narrowband users. In particular, their utilization rates are more than 10 points higher than those of narrowband users with respect to downloading and viewing/listening

to online music, videos, and images (Figure 1-25).

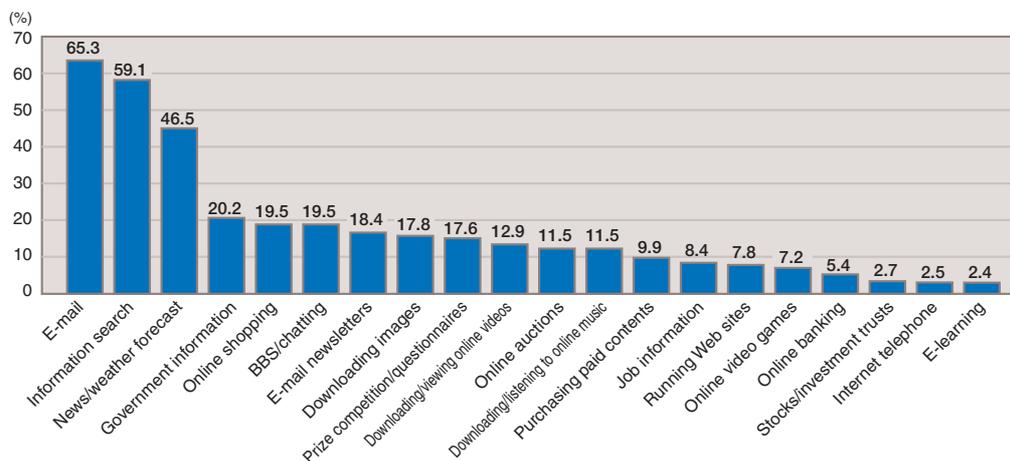
Looking at the utilization rate of the Internet accessed from home PCs by purpose, the rate is high for e-mail (65.3%), information search (59.1%), and news/weather forecasts (46.5%), indicating that e-mail and information gathering are the most popular forms of usage. Although the utilization rates for other purposes remain at about 20% or below, the Internet is being used for extremely diverse purposes (Figure 1-26).

Figure 1-25: Internet Utilization Rate of Broadband Users and Narrowband Users by Purpose



Source: "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-26: Purposes of Internet Use from PCs (multiple answers)



Source: "Communications Usage Trend Survey in 2002," MPHPT.

As for the purposes of Internet use from cell phones/PHS, use of “e-mail” (83.3%) was outstandingly high, followed by “downloading/listening to online music, such as ringer melodies” (45.8%) and “purchasing paid contents” (37.3%) (Figure 1-27).

2. Lifestyles Changing Through Use of the Internet

The fact that 59.1% of Internet users cite “information search” as the purpose of using the Internet shows that the Internet has undoubtedly become an important information gathering medium for users. When users were asked to name the two most frequently used information sources for gathering respective types of information, Internet Web pages were found to be a medium very frequently used in line with television and newspapers for acquiring various information. It can be said that the

Internet has become established as one type of information source for people (Figure 1-28).

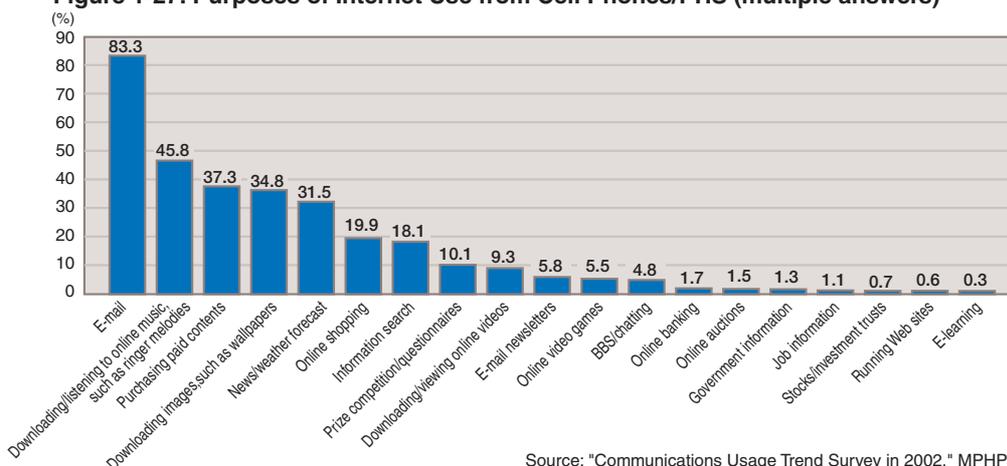
In the meantime, the utilization rate of online shopping by Internet users accessing from PCs is 19.5%. The top ranking items purchased through online shopping are books/CDs, PC-related products, and tickets, products of which content can be confirmed without looking at them first-hand, but many amusement products/sundries, fashion accessories, and jewelry are also frequently purchased (Figure 1-29).

3. Digital Divide and Its Resolution

(1) Current status of the gaps in use of the Internet/broadband

There are gaps in the Internet utilization rates according to generation, gender, city size, and householder’s income of the users. Although the utilization rate has

Figure 1-27: Purposes of Internet Use from Cell Phones/PHS (multiple answers)



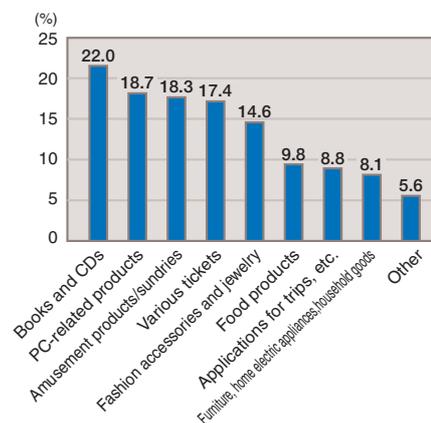
Source: “Communications Usage Trend Survey in 2002,” MPHPT.

Figure 1-28: Most Frequently Used Information Sources (up to two answers)

	1st	2nd	3rd	4th
General news	TV (89.5%)	Newspapers (57.7%)	Web pages (40.5%)	Radio (5.4%)
Details on social events	Newspapers (58.7%)	TV (57.0%)	Web pages (45.4%)	Magazines (11.9%)
Emergency information	TV (82.4%)	Web pages (55.0%)	Radio (21.0%)	Newspapers (12.2%)
Amusement products information	Web pages (83.3%)	Magazines (44.7%)	Books (16.9%)	TV (16.2%)
Information on illnesses	Web pages (61.8%)	TV (30.1%)	Books (29.9%)	Newspapers (16.8%)

Source: “Survey on Utilization of IT in National Life”.

Figure 1-29: Items Purchased Through Online Shopping (multiple answers)



Source: “Communications Usage Trend Survey in 2002,” MPHPT.

increased over the previous year for all of the attributes as of the end of 2002, the gaps still remain (Figure 1-30).

Such gaps based on the attributes of generation, gender, city size, and householder's income also exist in the broadband utilization rate (proportion of broadband users among all samples in the respective attributes). With regard to the proportion of broadband users among Internet users accessing from home PCs, the gap exists by gender, householder's income, and city size. Among these, the gap by city size is the most notable; the utilization rate in towns and villages is less than half of that in the 23 wards of Tokyo/government-designated cities/prefectural capitals. However, the gap by generation, which was found to be the widest with respect to use/non-use of the Internet, was insignificant among Internet users accessing from home PCs (Figure 1-31).

(2) Factor analysis of the gaps in the use of the Internet/broadband

There are gaps in the use of the Internet by generation, gender, city size, and householder's income. In order to compare the effect these four factors have on the use/non-use of the Internet, analysis was conducted by using Quantification Theory II.

As a result, "generation" had the most impact on the use/non-use of the Internet with the older population tending to use the Internet less (Figure 1-32).

In addition, as a result of conducting a similar analy-

sis to compare the effect of each attribute on the use of broadband among Internet users, the most influencing factor on the use of broadband was found to be city size. However, the generation factor, which had the most influence on the use/non-use of the Internet had little impact on the use/non-use of broadband among Internet users (Figure 1-33).

4. Information and Communications that Contribute to Resolving Social Problems

Today, Japan holds many social concerns and problems, such as concerns about the prolonged economic slump, the aging of the population, deterioration of the global environment, food and health, as well as public security. However, information and communications can be utilized to resolve or mitigate these social concerns and problems.

When a survey was conducted on the social, regional, and personal concerns and problems, which people saw a particular need to be addressed, many people cited the increasing bankruptcy/unemployment, the battered social systems pertaining to the aging of the society, global environment issues, food safety, their own health conditions with respect to lifestyle-related diseases, and the increasing burden of nursing care due to the aging of the population (Figure 1-34).

Figure 1-30: Transitions in Internet Utilization Rate by Attribute

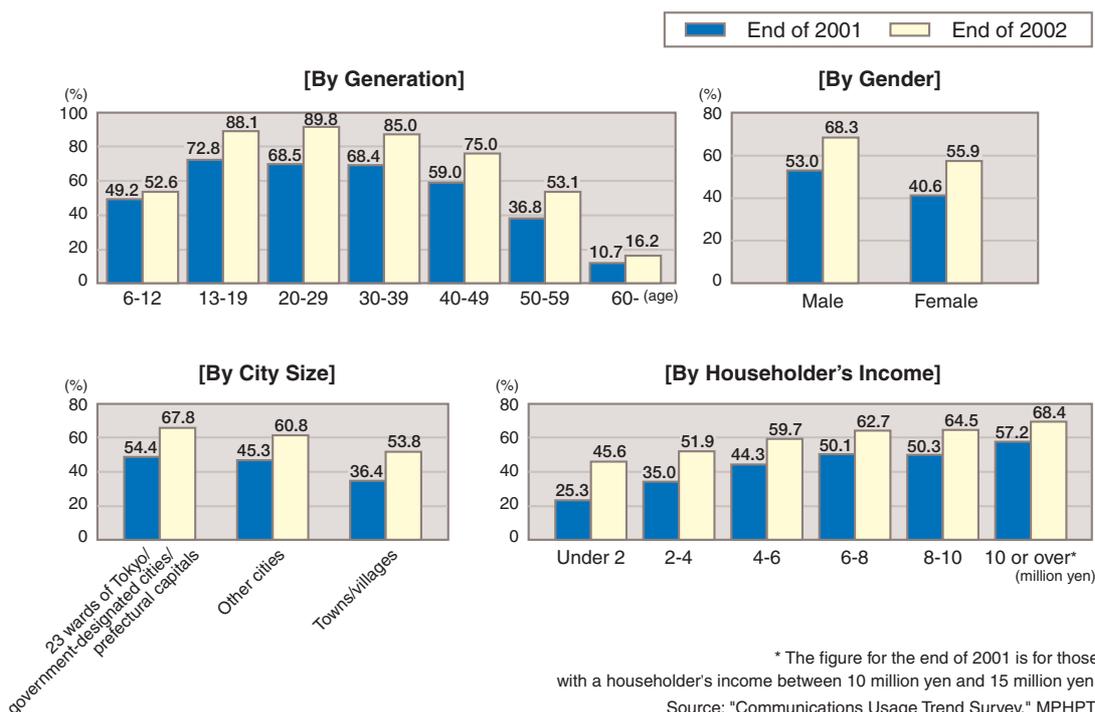
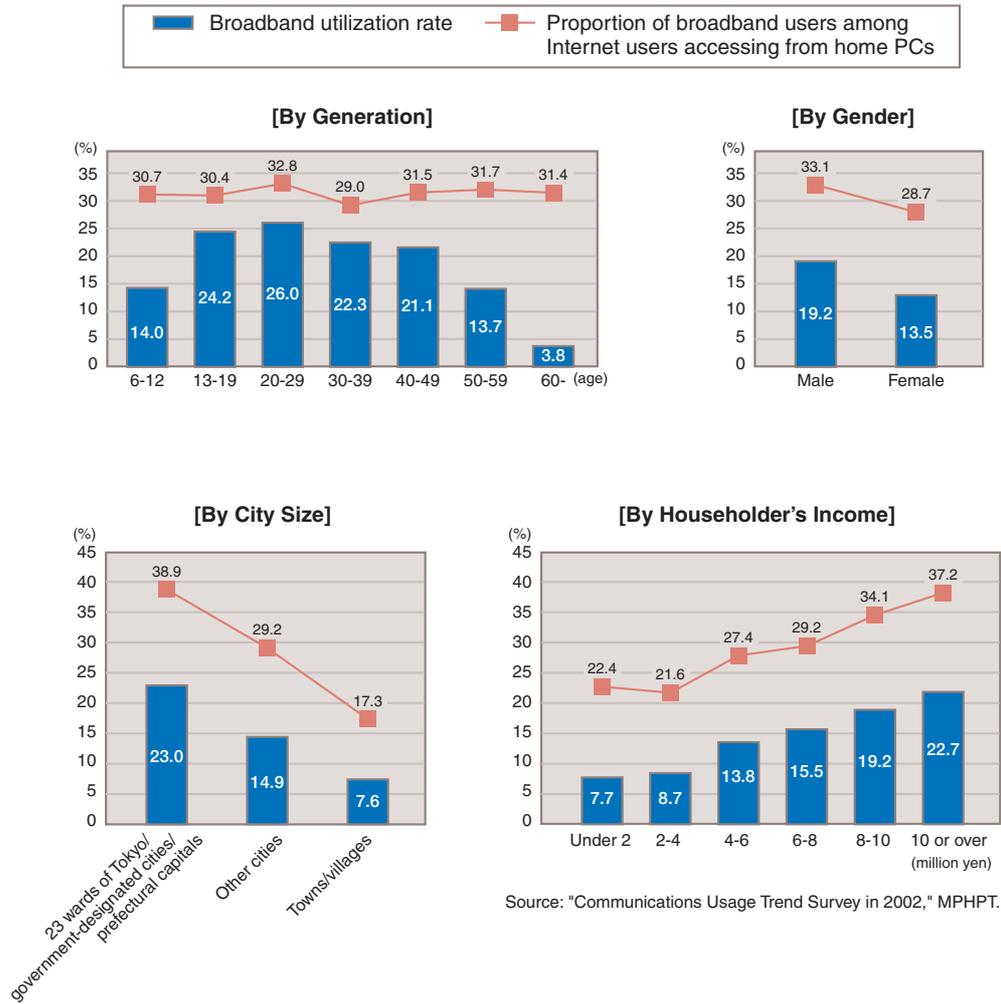


Figure 1-31: Broadband Utilization Rate by Attribute



Source: "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-32: Effect of Each Attribute on Internet Use

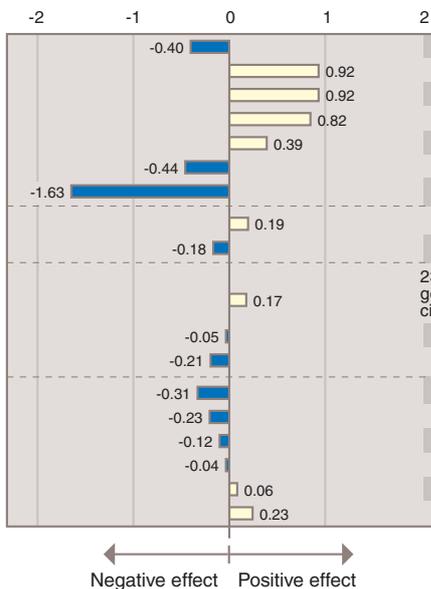
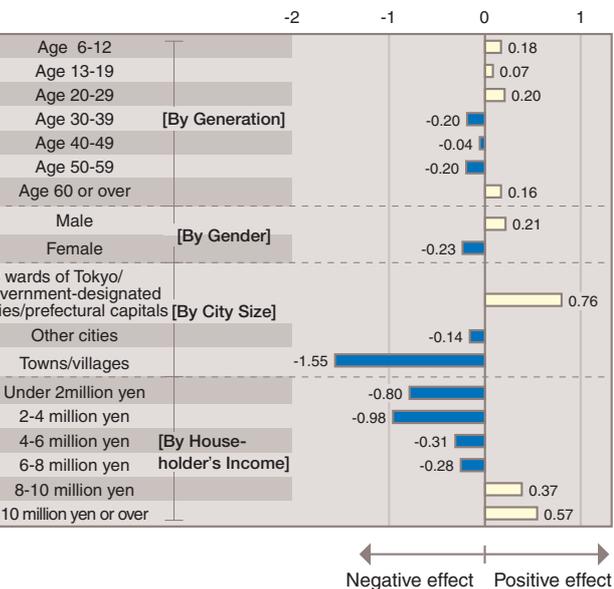
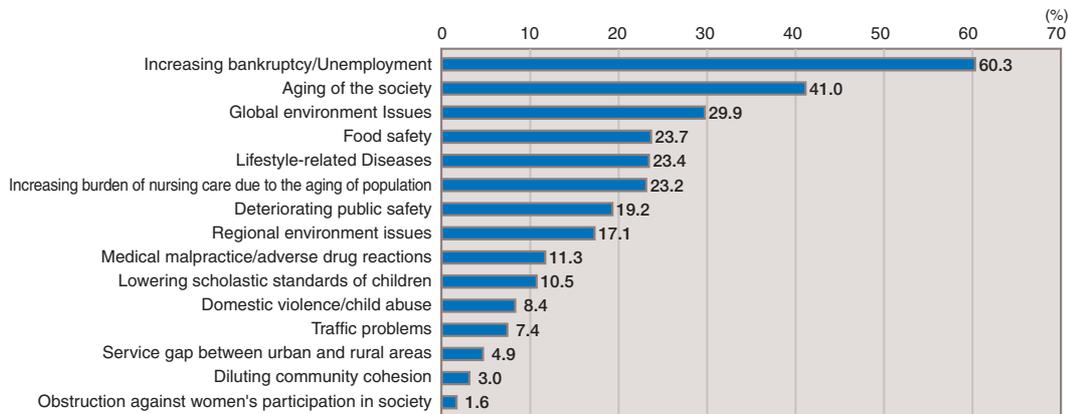


Figure 1-33: Effect of Each Attribute on Broadband Use among Internet Users



Source: "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-34: Japan's Concerns and Problems Particularly Needing to Be Addressed (up to three answers)



Source: "Survey on Utilization of IT in National Life."

(1) Food traceability systems

Problems that would undermine consumer confidence in food, such as food poisoning and tampering, have been occurring frequently in recent years.

To counter such problems, food traceability systems have been proposed to provide consumers with detailed information on individual food products and to make it easier to find the cause and recall problematic food products when an incident occurs. A food traceability system is a system of attaching an ID to individual food products in the production phase to allow anybody to trace the distribution route of those food products via the Internet based on the attached ID.

In a consumer intention survey on the food traceability system, 33.6% of respondents answered that they would buy food products using this system even for prices higher than ordinary food products. According to this result, the needs for food traceability systems are estimated to be worth 104.2 billion yen.

(2) Monitoring systems for energy conservation

The power consumption in the home sector has increased by about 1.9 times over the 16 years from 1985 to 2001. Today, further energy conservation efforts are required to respond to global environmental issues, such as resource depletion and global warming.

A monitoring system for energy conservation is a system that enables energy saving by monitoring the individual energy consumption amount and status for lighting, air-conditioning, audio/visual equipment, and other equipment at home and offices by using information and communications technology.

In an intention survey on the monitoring system for energy conservation, 36.7% of households accessible to the Internet from home PCs answered that they would like to use the system. If the system were diffused according to this intention, 4.6% (equivalent to 282.6 billion yen annually on an electric charge basis) of the power current-

ly consumed at home nationwide could be expected to be saved.

(3) Development of occupational skills through e-learning during times of unemployment

The unemployment rate reached 5.2% and the number of unemployed marked 3.49 million in February 2003 due to the stagnation of the economy. In the present job market, mismatches between the skills of job-seekers and the positions that are vacant are presenting a problem as a cause of delaying employment. In order to eliminate such mismatches and promote reemployment of the unemployed, more unemployed people need to receive occupational training and acquire the skills necessary for getting a job.

At present, public vocational training organizations and various entrusted organizations provide occupational training to the unemployed, but in addition to such conventional training that requires the trainees to visit the training sites, educational/training opportunities through e-learning have started to be provided mainly to people with physical restrictions, such as those who have jobs and the physically-challenged, allowing the trainees to learn at home.

In an intention survey on the system for developing occupational skills through e-learning on an assumption of losing one's job, 30.4% of the respondents answered that they would like to use such a system even if a fee was charged. According to the result of this survey, the number of potential users of the system for developing occupational skills through e-learning at times of unemployment (number of the unemployed) is estimated to be 1.29 million.

(4) E-learning for lifelong education via the Internet

In line with the aging of the population and maturation of society, and because the skills required at workplaces are rapidly changing due to digitization and global-

ization, there are growing needs for lifelong education, which is an independent learning activity conducted throughout one's life.

A remote learning system using information and communications (e-learning) is a system that allows people to study through the educational programs of a variety of Japanese and overseas educational institutions at home at anytime.

In an intention survey of Internet users on e-learning using the Internet, 18.2% of respondents indicated an intention to use such a system. According to this result, the number of potential Japanese users of e-learning via the Internet is estimated to be 6.84 million. E-learning via the Internet is expected to provide diverse learning opportunities and contribute to increasing the population engaged in lifelong education.

5. Promotion of e-Government and e-Local Governments

(1) Digitization status of procedures between citizens/companies and the government

E-government and e-local governments will enable all citizens and companies to enjoy administrative services

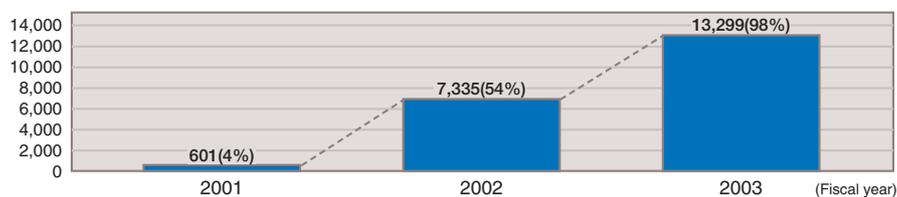
without being restricted by time or location and will realize pleasant and convenient national life and business activities. Coupled with reform of the operations and simplification/rationalization of the procedures, they will also contribute to simplifying as well as enhancing efficiency and transparency of administrative management. Up to now, the government has been making efforts to digitize administrative procedures and improve access to administrative information.

With regard to digitization of administrative procedures, all ministries and agencies have completed installation of the necessary systems including certification systems and general-purpose reception systems by the end of fiscal 2002. Among the procedures of national administrative organizations, 7,335 procedures (implementation rate: 54%) are scheduled to be digitized by the end of fiscal 2002 and 13,299 procedures (implementation rate: 98%) are scheduled to be digitized by the end of fiscal 2003 (Figure 1-35).

(2) Introduction of IT within administrative organs

The government has been developing its information and communications infrastructure, such as installation of LANs and PCs within ministries and establishment of

Figure 1-35: Number of Online Applications, Notifications, and Other Procedures Made Available by National Administrative Organizations (cumulative total)



Source: Based on "Action Plan 2002."

Figure 1-36: Transitions in the Installation of LANs in National Administrative Organizations

Category	FY 2001					FY 2002				
	Internal divisions	Facilities, etc.	Special organizations	Local branch offices	Total	Internal divisions	Facilities, etc.	Special organizations	Local branch offices	Total
Organizations subject to LANs installation	320	904	394	3,412	5,030	335	969	404	3,489	5,197
Organizations with LANs	320	865	215	1,702	3,102	335	965	273	2,047	3,620
Installation rate (%)	100.0	95.7	54.6	49.9	61.7	100.0	99.6	67.6	58.7	69.7
Organizations connected with the LAN of the main ministries/agencies		173	133	1,327	1,633		201	181	1,640	2,022
Connection rate (%)		20.0	61.9	78.0	58.7		20.8	66.3	80.1	61.6

*1 The "organizations subject to LAN installation" are those among the surveyed organizations for which LAN installation has been planned by ministries and agencies.

*2 The percentages for "installation rate" and "connection rate" are rounded off to the first decimal place.

*3 The "total" of the "connection rate (%)" shows the proportion to the total number of organizations with LANs excluding "internal divisions" (FY 2001: 2,782 organizations; FY 2002: 3,285 organizations).

networks between the main ministries/agencies and field agencies, from the viewpoint of speeding up and improving the efficiency of information transmission and information sharing.

As for LANs within ministries, LANs have been established in 69.7% of the overall national administrative organizations by fiscal 2002. The installation is nearly complete for internal divisions (100%) and facilities (99.6%). The introduction is also steadily making progress in special organizations (67.6%) and local branch offices (58.7%) (**Figure 1-36**).

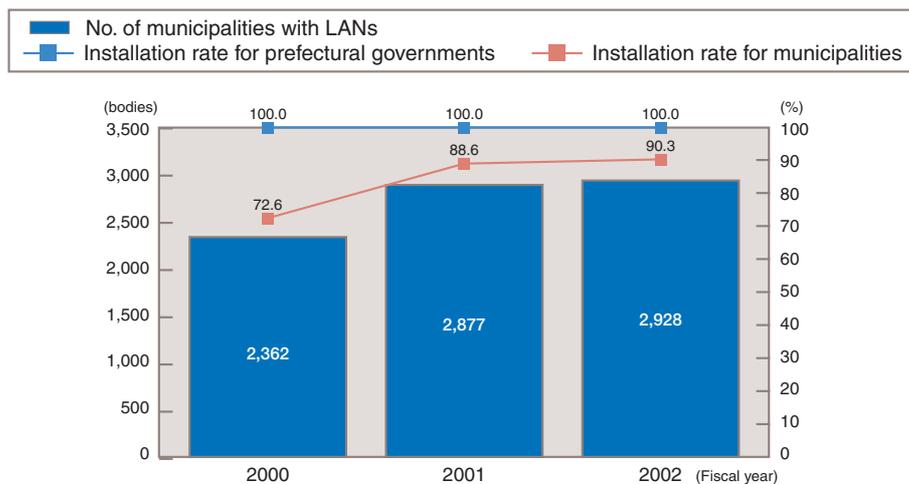
(3) Promotion of e-local governments

Local governments promote IT projects in an organized and comprehensive manner by clarifying a basic policy on IT promotion in the local area, and formulating a digitization plan for the local area (Local IT Plan), which systematically and exhaustively lists concrete measures.

By April 2002, 26.9% of local governments (a 3.6 point increase over the previous year) had formulated a Local IT Plan.

The number of PCs used in local governments in fiscal 2002 was 383,000 units in prefectural governments (a 19.7% increase over the previous year) and 744,000 units in municipalities (a 32.4% increase over the previous year). The installation rate of LANs within local governments was 100% for prefectural governments and 90.3% for municipalities, indicating rapid progress as in the case of PCs (**Figure 1-37**).

Figure 1-37: Transitions in the Installation Rate of LANs Within Local Governments



Source: Based on "Overview of Local Government Information Management."

Section 4

Developing Digital Network Culture and Distributing Contents

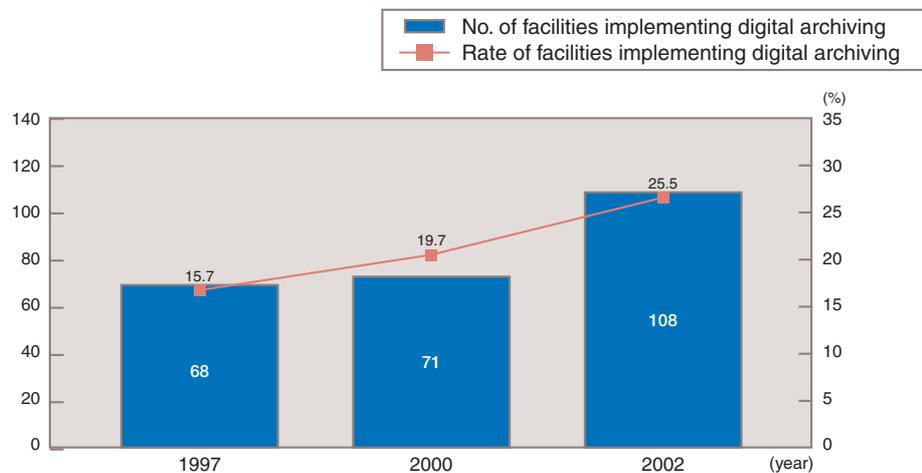
1. Significance of Information and Communications in Cultural Activities and in Sending Out Information to the World

A digital archive is a system to digitize and store the resources kept in museums, art galleries, public records offices, and libraries as well as other tangible and intangible cultural resources. The digitization process also makes it easy to repair, disclose, and allow network access to the cultural resources. The digital archives are playing a central function as the accumulation/dissemination bases of digital network culture. By developing digital archiving, it will be possible to realize “an environ-

ment that enables acquisition and use of information on various cultural assets, works of art, local culture, theatrical art, and historical materials including important public documents without geographical restrictions, responding to the heightening and diversification of citizens’ lust for culture” (e-Japan Priority Policy Program-2002).

According to a survey by the Japan Digital Archives Association (JDAA), 108 of the major art galleries and museums nationwide have already started digital archiving as of the end of 2002, and the implementation rate has increased from 15.7% in 1997 to 25.5% (Figure 1-38).

Figure 1-38: Transitions in the Number and Rate of Facilities Implementing Digital Archiving



Sources: “Digital Archive White Paper 2001” and “Digital Archive White Paper 2003,” Japan Digital Archives Association (JDAA).

Figure 1-39: Market Size of Content Business (FY 2001)



Source: “Survey on Content and Security.”

2. Distribution of Attractive Contents on the Internet

(1) Market size of content business

The content market can be categorized into: [1] the content market including printed publications and movies/broadcasting; [2] the digital content market that only includes contents that are digitized; [3] and the Internet content market that only includes digital contents that are distributed on the Internet.

The market size of content business in fiscal 2001 was approximately 10.84 trillion yen, in which the digital content business market was approximately 1.84 trillion yen, and the Internet content market was approximately 201.1 billion yen (Figure 1-39). The digital content market accounted for about 17% of the overall content market and the Internet content market only accounted for about 2%.

In 2002, the Internet content market expanded to 250.3 billion yen (a 24.5% increase over the previous year). This can further be broken down into the 167.5 bil-

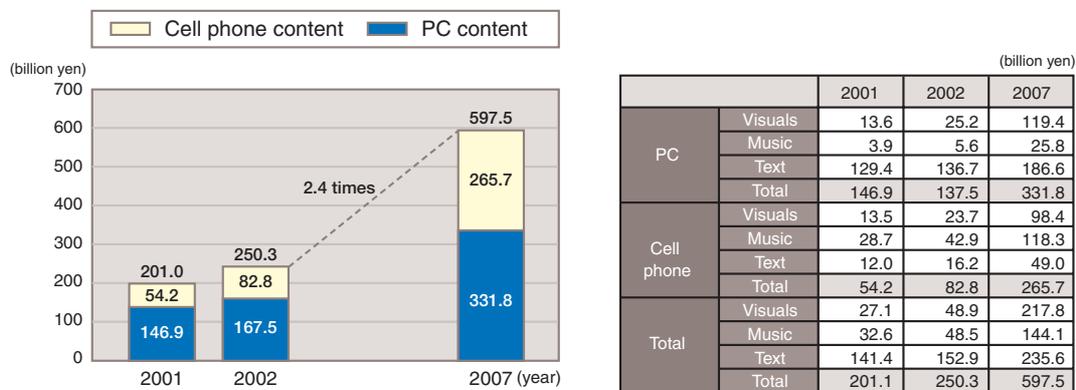
lion yen market for PCs and the 82.8 billion yen market for cell phones. As for the types of contents, visual contents account for 19.5% of the total at 48.9 billion yen, music contents for 19.4% at 48.5 billion yen, and text contents for 61.1% at 152.9 billion yen. According to predictions by content providers, the size of the Internet content market is likely to become 597.5 billion yen in 2007, growing about 2.4 times in size in 2002. With regard to the types of contents, visual contents are estimated to grow by about 4.5 times to 217.8 billion yen, commanding a 36.5% share of overall contents (Figure 1-40).

(2) Current status of use of paid contents

(i) Status of use of paid contents

In 2002, the proportion of Internet users accessing from PCs who used paid Internet contents was only 9.9%, less than one-tenth (Figure 1-41). By type of circuit, the utilization rate by broadband users was 12.6%, while that by narrowband users was 8.7%, indicating that the utilization rate of paid contents is higher for broadband users (Figure 1-42). With regard to the types of contents used,

Figure 1-40: Transitions and Prediction of the Market Size of Internet Content Business



Source: "Survey on Content and Security."

Figure 1-41: Status of Use of Paid Internet Contents by Terminal (for the past one year)

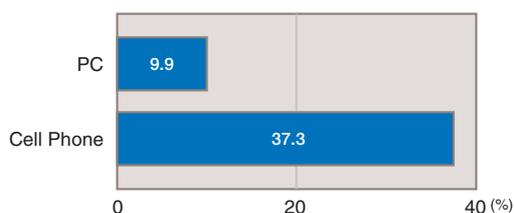
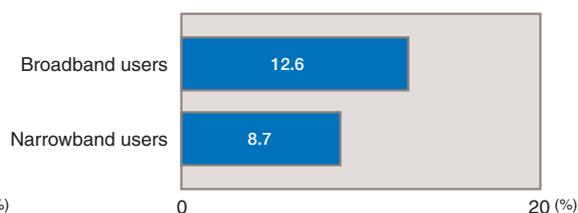


Figure 1-42: Status of Use of Paid Internet Contents by Circuit (for the past one year)



Source(Figures1-41&1-42): "Communications Usage Trend Survey in 2002,"MPHPT.

software accounted for 30.0% and music/visuals accounted for 22.7% (Figure 1-43). Meanwhile, the proportion of mobile Internet users who used paid Internet contents from cell phones was 37.3%. As for the types of contents used, games accounted for 81.2% and ringer melodies accounted for 50.8% (Figures 1-41 and 1-44).

(ii) Awareness of non-users of paid contents

For those who have never used paid contents from PCs, the top reason for non-use was “high fees” at 47.1%, followed by “lack of attractive contents” at 26.1%, and “unstable transmission” at 24.7% (Figure 1-45). Non-users of paid contents focus the most on the level of fees. Since only 17.8% of non-users gave “unwillingness to pay for Internet contents” as the reason, those who are determined to use free contents only are limited. Thus, a certain level of demand can be expected depending on the level of fees.

(iii) Reactions of content providers

When an awareness survey was also conducted to Internet content providers, the top factor given by the providers as inhibiting expansion of the Internet content market was the “lack of users’ willingness to pay for contents” at 58.0%, followed by “lack of attractive contents” at 36.0% (Figure 1-46). Similar to non-users of Internet contents, providers also consider the fee level of the contents and the lack of attractive contents to be the principal factors. These factors were followed by the “trouble of acquiring copyright licenses” at 30.0%, “insufficient diffusion of broadband” at 26.0%, and “lack of established fee charging systems” at 22.0%.

Figure 1-43: Types of Internet Contents Accessed from PCs (multiple answers)

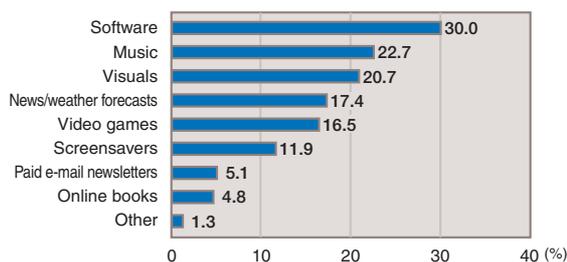
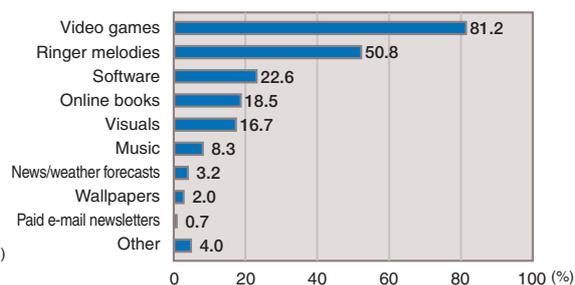
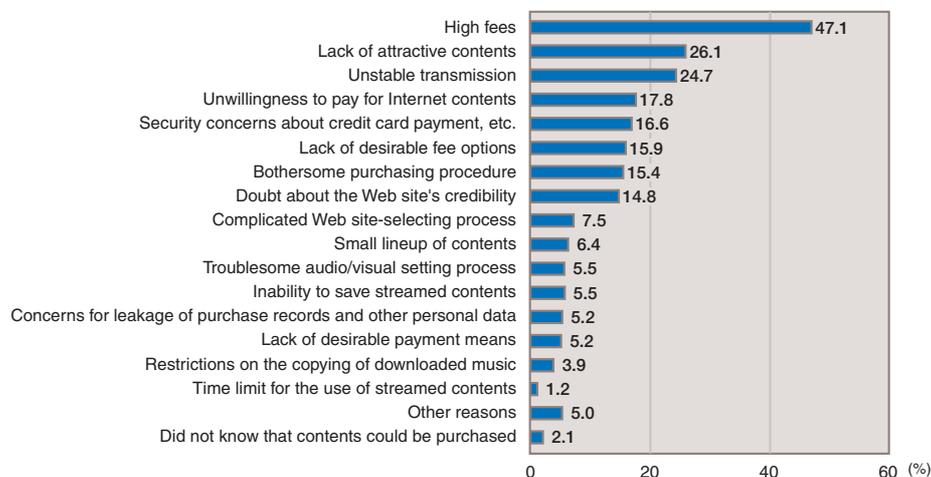


Figure 1-44: Types of Contents Accessed from Cell Phones (multiple answers)



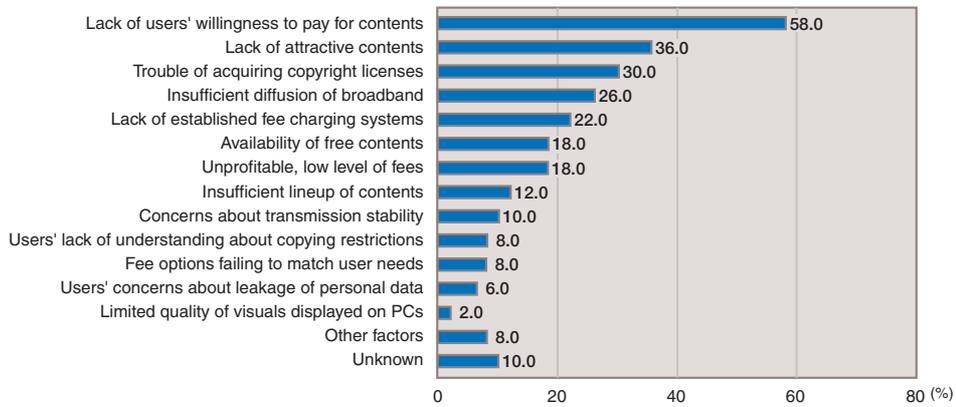
Source (Figures 1-43 & 1-44): "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-45: Reasons Given by Non-users of Paid Internet Contents for Non-use (up to three options)



Source: "Survey on Content and Security."

Figure 1-46: Factors Considered by Internet Content Providers to be Obstructing Expansion of the Internet Content Market (up to three options)



Source: "Survey on Content and Security"

Section 5

Ensuring Information Security and Building a Securer IT Society

1. Necessity of Ensuring Information Security

The diffusion of information and communications, such as the Internet and e-commerce, and advancement of information and communications, such as broadband and mobile work, not only enhance convenience, but also increase information security risks. Accordingly, security measures are now the top priority issue in using information and communications networks. Among individuals' concerns/dissatisfactions in using the Internet, the most cited concern was "privacy protection" (54.1%), followed by "virus infection" (41.4%) (Figure 1-47). Of the problems companies face in using information and communications networks, the most mentioned problem was the "difficulty of setting up security measures" (69.7%), followed by "concerns about virus infection" (63.6%) (Figure 1-48).

infection" (63.6%) (Figure 1-48).

With further progress of information and communications, the damages inflicted by information security infringements may become even greater. As the OECD recommends, there is a strong need to promptly establish "a Culture of Security" under which all people involved in information and communications recognize the need and measures for ensuring information security, assuming every possible risk.

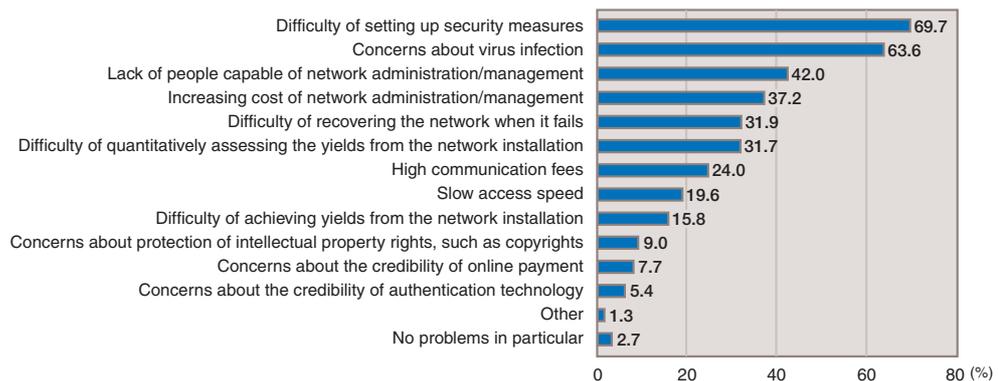
2. Trends in Information Security Infringements, etc.

Combining the reported number of virus incidents released by two companies aggregating such reports, the number has almost doubled from 37,622 cases in 2001 to

Figure 1-47: Individuals' Concerns/Dissatisfactions Related to Internet Use (multiple answers)



Figure 1-48: Problems Companies Face in Using Information and Communications Networks (multiple answers)



Source (Figures 1-47&1-48): "Communications Usage Trend Survey in 2002," MPHPT.

74,001 cases in 2002.

Also, according to the announcement by the National Public Safety Commission, the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), and the Ministry of Economy, Trade and Industry (METI), the number of unauthorized accesses recognized in 2002 totaled 329, making a dramatic decrease of 924 cases from 1,253 cases in 2001. Although attacks on security holes using Web page rewriting programs were observed in large numbers in 2001, the number is considered to have decreased in 2002 due to the recent publicity activities by public and private sectors and diffusion of security patches.

“Spam,” which is e-mail sent to a user without the user’s consent for the purpose of advertising, sales promotion, and solicitation, suddenly increased around June 2001, and the number of complaints and inquiries to cell phone carriers increased accordingly. In a survey conducted at the end of 2002, 58.0% of mobile Internet users and 15.5% of Internet users accessing from PCs received spam in the past one year; the occurrence of spam incidents is particularly high for the mobile Internet.

3. Status of Internet Security Incidents

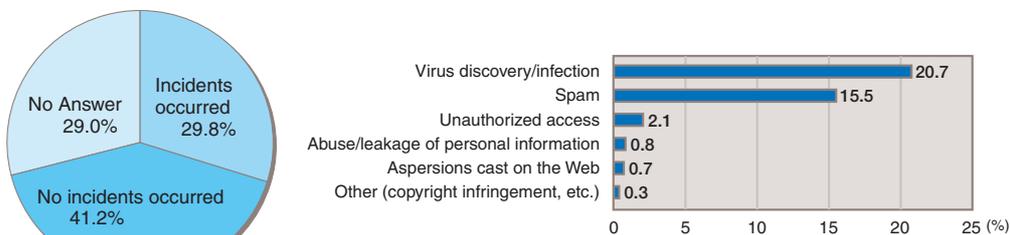
(1) Status of security incidents suffered by individuals

The proportion of those who suffered information security incidents during 2002 was 29.8%, almost 30%, of all Internet users accessing from PCs. The most reported incident was “virus discovery/infection,” suffered by 20.7% of the Internet users accessing from PCs. This was followed by “spam” suffered by 15.5% and “unauthorized access” suffered by 2.1%. “Abuse/leakage of personal information” was experienced by 0.8% (Figure 1-49). Those who not only discovered, but were actually infected by viruses accounted for 10.4%.

(2) Status of security incidents suffered by companies

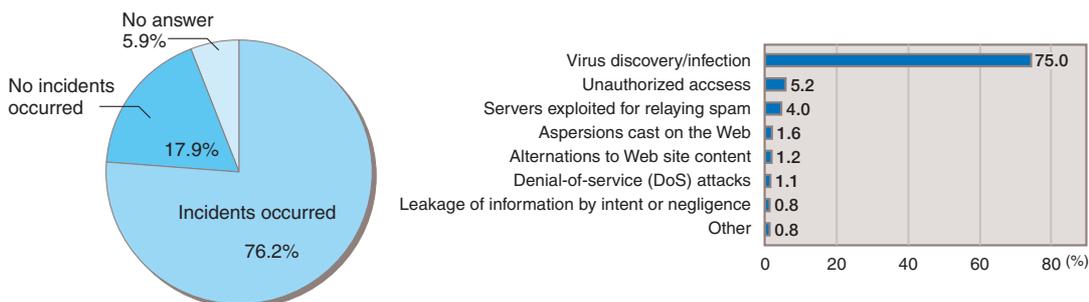
During 2002, 76.2%, approximately three-quarters, of companies suffered some kind of information security incident in using information and communications networks (the Internet and corporate communication networks). The top-ranking incident was “virus

Figure 1-49: Situation and Types of Security Incidents Suffered by Internet Users Accessing from PCs (multiple answers; for the past one year)



Source: "Communications Usage Trend Survey in 2002," MPHPT.

Figure 1-50: Situation and Types of Security Incidents on Information and Communications Networks Suffered by Companies in 2002 (multiple answers)



Source: "Communications Usage Trend Survey in 2002," MPHPT.

discovery/infection” suffered by 75.0% of all companies. This was followed by “unauthorized access” experienced by 5.2% and “servers exploited for relaying spam” suffered by 4.0% (Figure 1-50).

Companies that did not only discover, but were actually infected by viruses accounted for 43.5%.

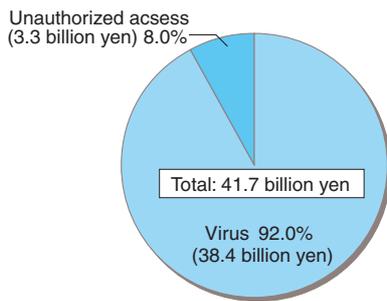
(3) Estimated amount of damages suffered by individuals and companies

(i) Estimated amount of damages suffered by individuals

According to a sample survey on the rates and amounts of damages suffered, the amount of damages suffered by individuals from virus incidents and unauthorized accesses in 2002 is estimated to be approximately 41.7 billion yen in total. Of this amount, damages from “virus incidents” accounted for about 38.4 billion yen and damages from “unauthorized accesses” accounted for about 3.3 billion yen (Figure 1-51).

This amount only totals the estimated amount of damages from virus incidents and unauthorized accesses related to PCs, and does not include such damages suffered from aspersions cast on the Web and spam sent to cell phones. This amount is solely the actual amount paid for repairing or replacing broken PCs, etc.

Figure 1-51: Estimated Amount of Damages from Information Security Incidents Suffered by Individuals in 2002



(ii) Estimated amount of damages suffered by companies

According to a sample survey on the rates and amounts of damages suffered, the amount of damages suffered by companies from information security incidents in 2002 is estimated to be approximately 346.5 billion yen. The largest damages were inflicted by “virus infection” at about 302.7 billion yen, followed by “system crashes, server failures” at about 40.8 billion yen, “alteration to Web site content” at about 1.9 billion yen, “aspersions cast on the Web” at about 700 million yen, and “stealing/leakage of customer information” at about 500 million yen (Figure 1-52).

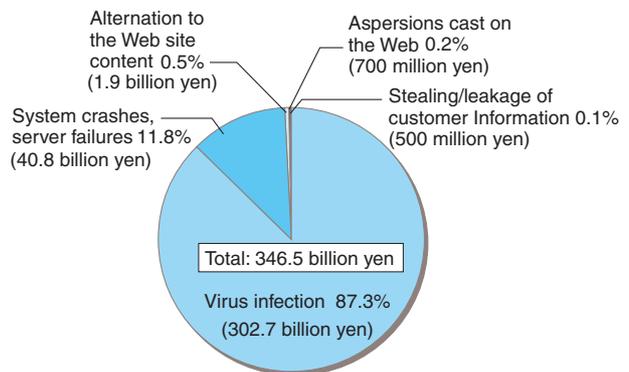
This amount only totals the estimated amount of investigation/restoration costs and lost earnings, and does not include such damages as collapse of credit resulting from harmful rumors.

4. Information Security Measures and Future Tasks

(1) Measures and future tasks of individuals

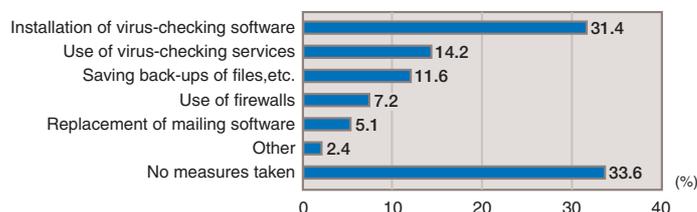
The top measure against viruses and unauthorized accesses taken by Internet users was “installation of

Figure 1-52: Estimated Amount of Damages from Information Security Incidents Suffered by Companies in 2002



Source (Figures 1-51&1-52): “Survey on Content and Security.”

Figure 1-53: Status of Information Security Measures Taken by Internet Users (multiple answers)



Source : “Survey on Content and Security.”

virus-checking software” at 31.4%, followed by “use of virus-checking services” at 14.2%, and “saving back-ups of files, etc.” at 11.6%. However, those who answered “no measures taken” accounted for 33.6%, approximately one-third of the total (Figure 1-53).

In this manner, there are a certain number of people who have not taken any information security measures. When they were asked the reason for not taking such measures, 86.5% of them answered that they had not taken any measures despite being aware of the need. Since 65.3% of those who had not taken any information security measures gave “lack of know-how of concrete security measures” as the reason, the future task in promoting information security measures among individuals would be to increase people’s knowledge of information security (Figure 1-54).

(2) Measures and future tasks of companies

(i) Status of information security measures

With regard to the status of information security measures taken by companies in 2002, the most taken measure was “installation of virus-checking software on PCs and other terminals” implemented by 83.8% of all

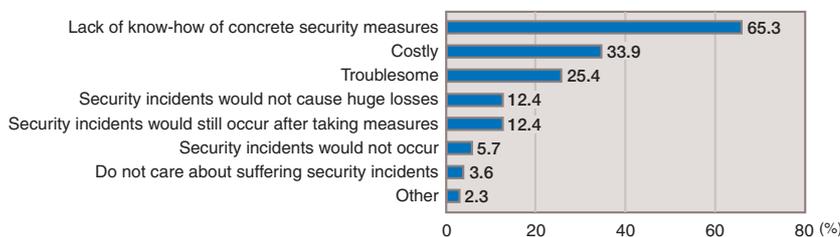
companies. “Use of firewalls” was implemented by 52.0%, about half of all companies. Companies that were “taking no measure in particular” were only 2.2%, indicating that most companies implemented some kind of measures (Figure 1-55).

(ii) Information security management

In order for companies to fully bring out the effect of information security measures, companies need to repeat the “PDCA cycle” consisting of [1] planning of security policies, etc. (PLAN), [2] implementation of measures (DO), [3] verification of the effects and efficacy of the measures (CHECK), and [4] review of the measures (ACTION), as information security management.

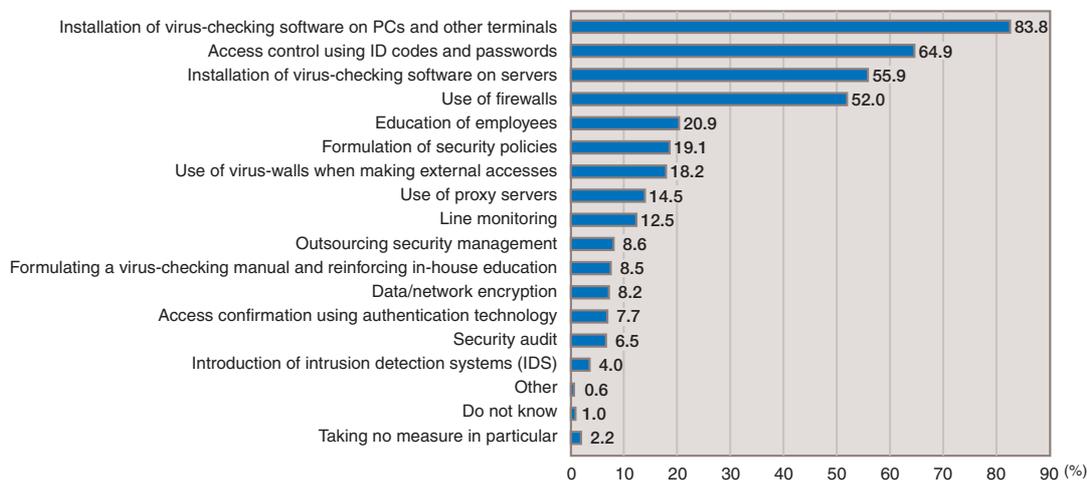
According to a survey on self-evaluation of the status of engagement in the respective phases of the cycle, the proportion of companies that answered “largely implemented” was relatively high for DO (41.4%) and PLAN (31.7%). However, the proportion was low for CHECK (19.3%) and ACTION (13.9%). The future task for enhancing information security measures in companies would be to make more efforts in verifying the effect of the measures and reviewing the measures.

Figure 1-54: Reasons for Not Taking Information Security Measures (multiple answers)



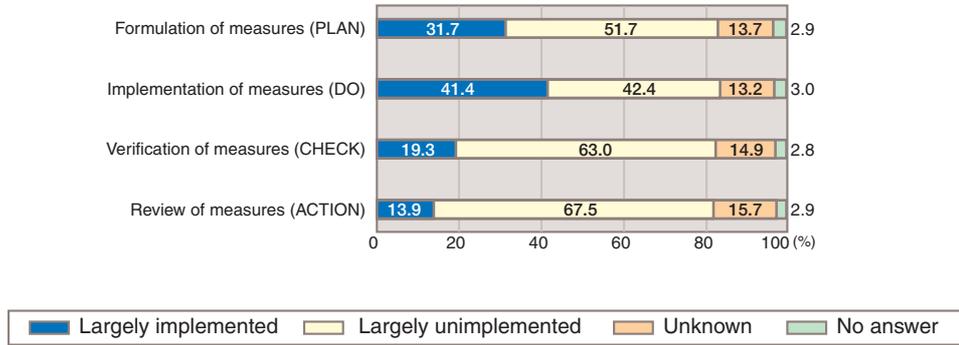
Source: “Survey on Content and Security.”

Figure 1-55: Status of Information Security Measures Taken by Companies (multiple answers)



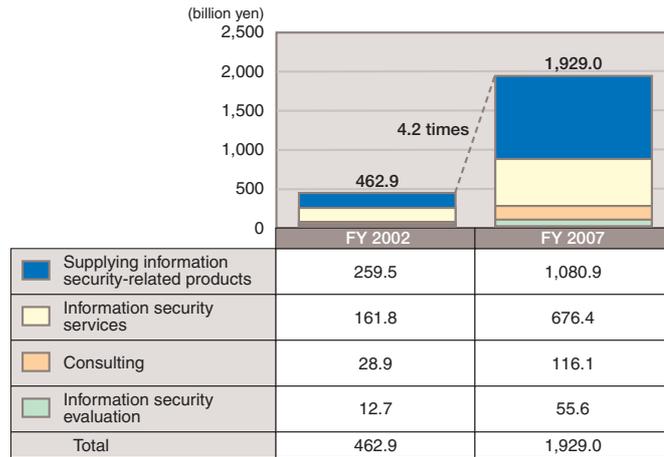
Source: “Communications Usage Trend Survey in 2002,” MPHPT.

Figure 1-56: Evaluation of Companies' Engagement in the Information Security Management Cycle



Source: "Survey on Content and Security."

Figure 1-57: Current Status and Prediction of the Market Size of Information Security Business



Source: "Survey on Content and Security."

5. Trends in Information Security Business

The estimated market size of information security business in fiscal 2002 is 462.9 billion yen. In the market, supply of information security-related equipment and software accounted for 259.5 billion yen, which is 56.1% of the total. This was followed by information security services accounting for 161.8 billion yen, 35.0% of the total. According to the predictions by security business operators, the market size of information security business is estimated to become 1.93 trillion yen in fiscal 2007, growing by 4.2 times the size in fiscal 2002 (Figure 1-57).

6. Safety and Reliability of the Information and Communications Networks

Recent years have seen the occurrence of not only security infringements of individuals and companies, but also infringements that threaten overall information and communications networks. Because the society and economy in general have come to depend increasingly on information and communications networks these days, if the safety and reliability of information and communications networks were undermined, the resulting damage could be enormous.

The safety and reliability of information and communications networks have been threatened many times in

the past by natural disasters, such as great earthquakes. However, in addition to such natural disasters, the safety and reliability of information and communications networks have actually been infringed by human-caused attacks, such as cyber terrorism, in recent years.

(1) Internet failure caused by the SQL Slammer

In January 2003, a worm virus called the SQL Slammer raged, causing the largest-ever Internet failure. Although Japan did not suffer notable damages except in part, the United States, the Republic of Korea, and China suffered great damages. In the Republic of Korea, in particular, the Internet stopped for about nine hours nationwide and caused social confusion.

(2) Attacks on route name servers

In October 2002, route name servers in 13 locations worldwide simultaneously received DDoS attacks (distributed denial of service: attacks of simultaneously sending massive quantities of data by using many relay servers with the aim of failing the target system). Although no actual damage was caused to general users, the processing power of route name servers in nine locations in Japan, the United States, etc. showed a slight decline.

(3) Functional disorders of telecommunications networks cause by "wangiri" calls

Incidents of "wangiri" calls suddenly increased from around November 2001. A "wangiri" call is a nuisance call abusing the number display function of cell phone

terminals, etc. It is an act of hanging up after only making a single call in order to have the user call back the number left in the call record and listen to paid voice services. In July 2002, NTT WEST suffered an incident in which a tremendous number of "wangiri" calls caused congestion in part of Osaka and Hyogo, and obstructed use of about five million telephone lines.

7. Measures Taken in Other Countries

In order to counter the risks against information security and information and communications networks, the Japanese government has been taking various measures by establishing the "IT Security Promotion Committee" and the "IT Security Expert Meeting in the IT Strategic Headquarters." The MPHPT has also taken such actions as amending the Wire Telecommunications Law, holding the "Study Group for Ensuring Important Telecommunications in the Telecommunications Business," and promoting related technological development. After the simultaneous terrorist attacks in the United States in September 11, 2001, the awareness of ensuring national security has risen and information security policies have been strengthened in international organizations, the United States, and the EU.