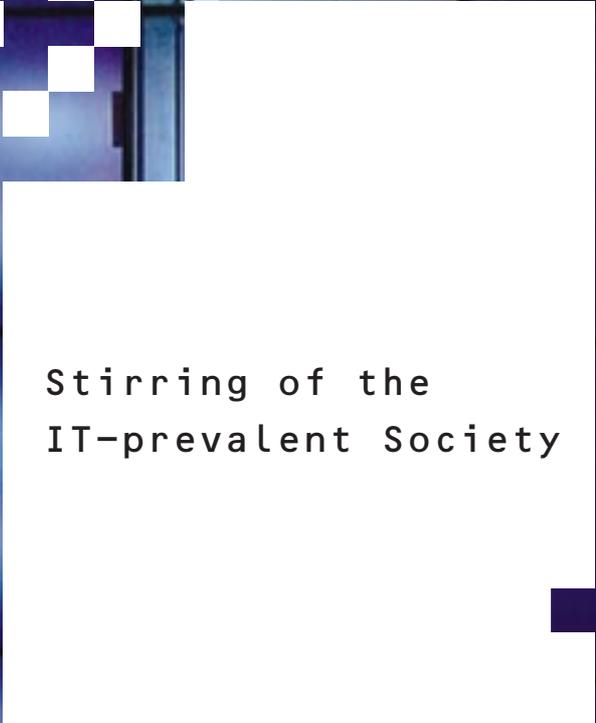**Ministry of Public Management, Home Affairs, Posts and Telecommunications, Japan**

Information and Communications in Japan

White Paper 2002

Stirring of the
IT-prevalent Society

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Chapter 3

TRENDS IN INFORMATION AND COMMUNICATIONS POLICY

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9. Utilization of the Post Office Network

Chapter 1
**FEATURE: STIRRING OF
THE IT-PREVALENT SOCIETY**

Various strategic measures introduced by the Japanese government to facilitate the information and communications technology (IT) revolution such as its e-Japan Strategy, which was launched by the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society in fiscal 2001, have resulted in the rapid penetration of information and communications services into all classes of the Japanese people and the formation of information and communications infrastructures such as that of broadband.

On the other hand, some people have blamed the sluggishness in the IT field, which was triggered by the burst of what had been known as the "net bubble" as the main cause for the current economic recession, and some others have even looked down upon the measures undertaken towards the IT revolution as *passé*. In addition, even those who have aggressively promoted these measures have come to pursue IT itself for their own aims.

Under the circumstances, it is necessary that we go back to the basics and revisit what IT really is and what we are trying to achieve through it. While it is true that IT has a significant impact on our lives, society, and even our ways of thinking, IT itself is merely technology. It goes without saying that technology per se will not become the goal of IT, and we should not allow technology to determine how human beings and society ought to behave. It is important that we take the initiative in determining the goals of IT and in achieving these goals through the employment of IT, which we call the "utilization" of IT.

What are the goals of the utilization of IT? In accordance with the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (2000, law number 144. Hereinafter referred to as the "IT Basic Law"), these goals are defined as "the promotion of economic structural reform and the enhancement of the international competitiveness of industry" (Article 4) from an economic perspective, "the realization of a national life that evokes feelings of comfort and affluence" (Article 5) in terms of people's lives, and

"the enhancement of convenience for the people" and "the simplification and improvement in the efficiency and transparency of administrative management" (Article 20). In other words, it can be said that the utilization of IT is aimed at the full achievement of the above goals through the use of IT.

Can we say that we are fully utilizing IT, which will be "one of the most potent forces in shaping the twenty-first century" ("Okinawa Charter on the Global Information Society" from the Kyushu-Okinawa Summit held in July 2001), in order to achieve the above mentioned goals? It seems that we are in fact far from the stage where we can say that IT is *passé*, and in reality we have only just reached the stage where we are beginning to utilize IT in earnest.

It is from an awareness of the issues discussed above that the feature section of this *Information and Communications in Japan White Paper* takes its theme, the "Stirring of the IT-prevalent Society." We will analyze the following; the status of the progress of the utilization of IT in each of the areas of business, public administration, and everyday life; the distribution of appealing Web content, the maintenance of information security, and the promotion of new services and technological development, which are cross-sectional themes in the development of IT utilization.

Rapid Popularization of the Internet in Japan

The number of Internet users in Japan has been rapidly on the rise over the past few years. According to the *Communications Usage Trend Survey* released by the Ministry of Public Management, Home Affairs, Posts and Telecommunications (hereinafter referred to as "MPHPT"), the number of Internet users at the end of 2001 was 55.93 million (an 18.8% increase over the previous year), and the penetration rate in the population as a whole was 44.0% (a 6.9 point increase over the previous year) (**Exhibit 1-1**). In addition, the penetration rate for households exceeded 60% of the total number of households for the first time at 60.5% (a 26.5 point increase over the previous year), indicating the rapid permeation of Internet usage in homes. Furthermore, the steady penetration of the Internet can be witnessed in the increases in the penetration rate in establishments, which was 68.0% (a 23.2 point increase over the previous year), and the penetration rate in enterprises, which was 97.6% (a 1.8 point increase over the previous year) (**Exhibit 1-2**).

Exhibit 1-1   Trends in Internet Penetration in Japan
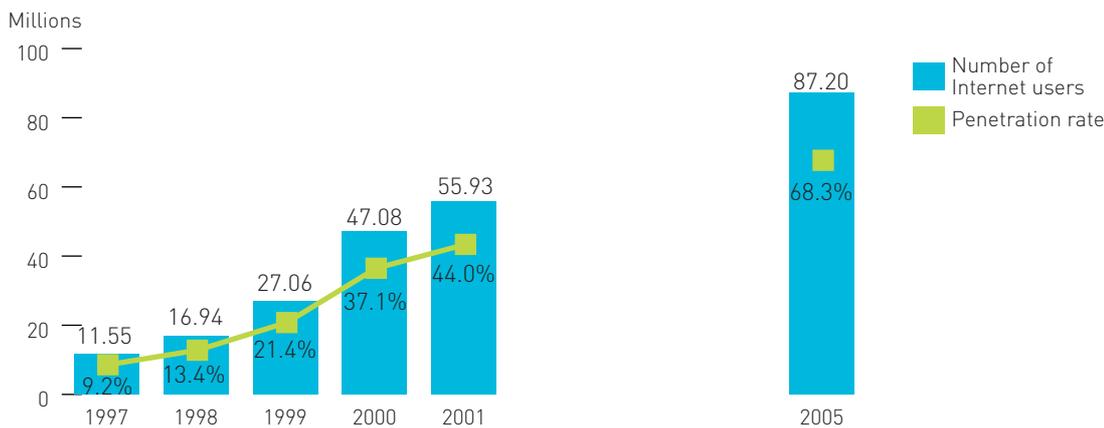
Note: The estimated figures for 2005 are based on the *Information and Communications in Japan White Paper 2001*.
Source: *Communications Usage Trend Survey*, MPHPT

Exhibit 1-2   Internet Penetration Rates in Households, Enterprises, and Establishments
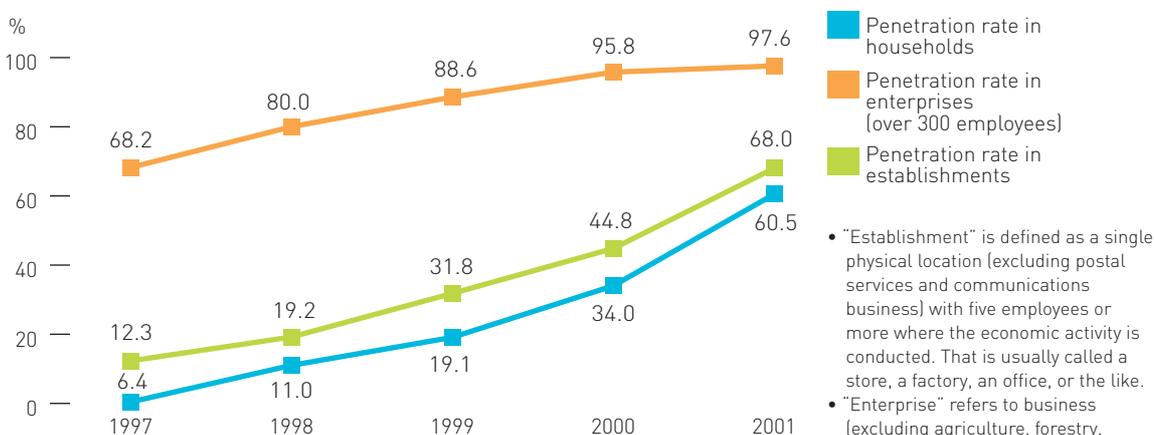
• "Establishment" is defined as a single physical location (excluding postal services and communications business) with five employees or more where the economic activity is conducted. That is usually called a store, a factory, an office, or the like.
• "Enterprise" refers to business (excluding agriculture, forestry, fisheries, and mining industries) with 300 employees or more.

Source: *Communications Usage Trend Survey,* MPHPT

In terms of the status of personal Internet usage according to the type of terminal used, 48.90 million people accessed the Internet via PCs, while 25.04 million people accessed the Internet via cell phones, PHS, and hand-held terminals. A further breakdown of the number of Internet users via PCs by the location of access shows that 36.81 million people accessed the Internet from their home and other similar places, followed by workplace with 27.16 million people and school with 11.30 million people.

Internet Penetration Around the World

With the respect to the Internet penetration rates around the world by country and region, a study by Nua.com indicates that Internet penetration is higher than 35% in 21 countries and regions (**Exhibit 1-3**). Among these countries and regions, the Internet penetration rate exceeds 60% in the top three countries, namely Sweden, Iceland, and Denmark, which suggests a higher usage of the Internet in northern Europe. Japan's Internet penetration rate of 44.0% ranked 16th in the world.

Exhibit 1-3   Countries and Regions with an Internet Penetration Rate of 35% or More

Country/Region	Penetration Rate (%)
Sweden	64.7
Iceland	60.8
Denmark	60.4
U.S.A.	59.8
Hong Kong	59.0
The Netherlands	58.1
U.K.	55.3
Norway	54.4
Australia	54.4
Canada	53.3
Taiwan	51.9
Singapore	50.8
New Zealand	49.9
Switzerland	46.8
Republic of Korea	46.4
Japan	44.0
Finland	43.9
Austria	43.5
Bermuda	39.7
Germany	36.4
Andorra	36.3
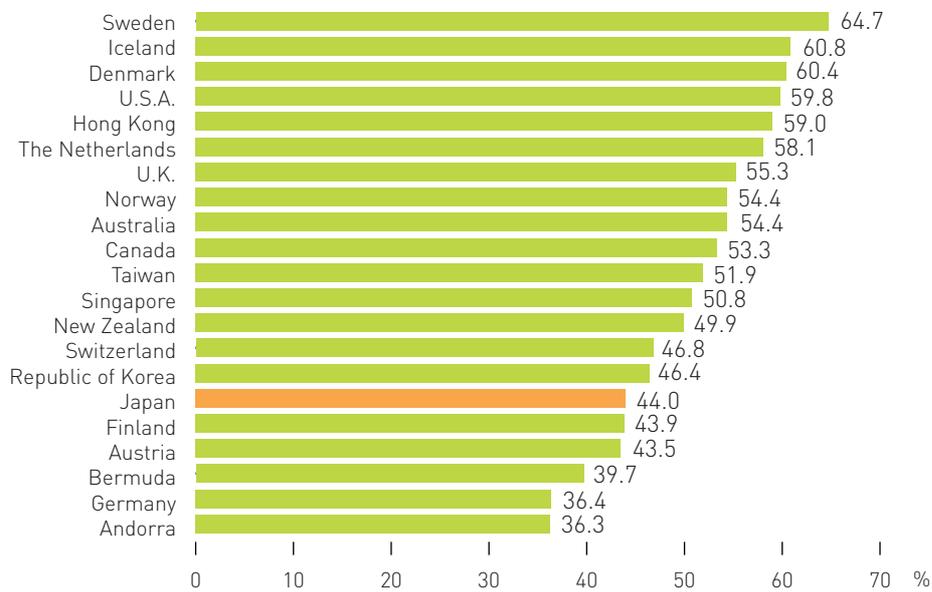
Source: *Communications Usage Trend Survey*, MPHPT, Survey by Nua.com (as of March 2002)

Exhibit 1-4   Top 10 Countries in Terms of Number of Internet Users

Country	Millions of people
U.S.A.	166.14
Japan	55.93
China	33.70
U.K.	33.00
Germany	30.20
Republic of Korea	22.23
Italy	19.25
Canada	16.99
France	15.65
Brazil	11.94
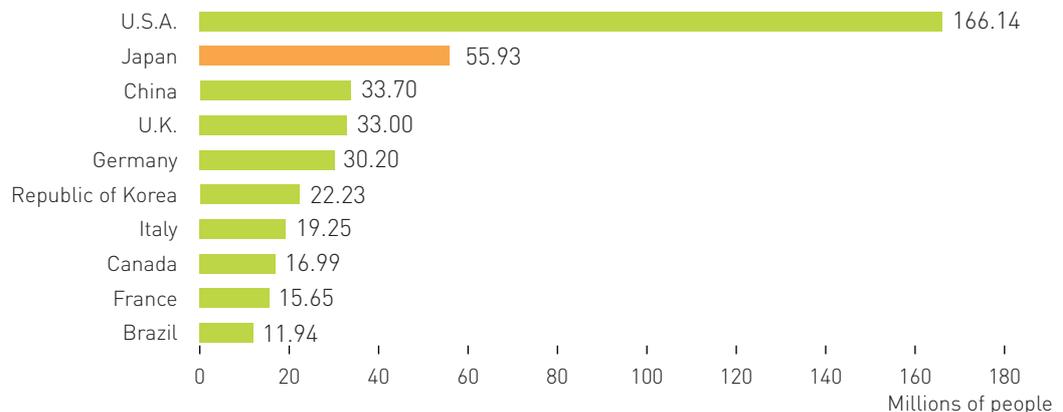
Source: *Communications Usage Trend Survey*, MPHPT, Survey by Nua.com (as of March 2002)

As in the case of Japan, the number of Internet users around the world has been increasing at a remarkable pace. Statistics compiled by Nua.com shows that the number of Internet users in the world was 544.2 million as of February 2002. A breakdown of this figures by region indicates that there were 181.23 million users in North America (33.3% of total users), followed by 171.35 million users in Europe (31.5% of total users) and 157.49 million users in the Asia-Pacific region (28.9% of total users). In addition, trends in Internet users by region show that the share to the world total has been declining in North America while Europe and the Asia-Pacific region have both seen an increase in their share, which suggests that Internet usage centered mainly in the United States has spread into other regions where the rate of growth has exceeded that of the United States. Furthermore, in terms of the number of Internet users by country and region, Japan ranked right behind the United States with 55.93 million users (**Exhibit 1-4**).

Dramatic Growth of Broadband

Since the "First Year of Broadband" was declared in the *Information and Communications in Japan White Paper 2001,* there has been a dramatic growth in the usage of broadband. The number of subscriptions to broadband circuits as of March 2002 amounted to 3.87 million, which shows a dramatic increase of nearly 4.5

times over the figure of the previous year (**Exhibit 1-5**). In particular, the number of subscriptions to DSL reached 2.38 million, increasing by an explosive 34 times over the figure of the previous year, thus playing the role as the engine of development of broadband in Japan. In addition, there were 1.46 million subscriptions to Internet connection services that utilize cable TV networks (hereinafter referred to as the "Cable Internet"), and 8,000 subscriptions to high-speed fixed wireless access to Internet. Furthermore, Japan has begun offering FTTH (fiber to the home) services utilizing fiber optic networks designed for general users, the first of its kind in the world. The development of this type of service, which had 26,400 subscriptions at the end of March 2002, can be witnessed in the launch of usen Corp. in March 2001 and the commencement of FTTH services by both NTT East and NTT West in August 2001. Also, competition has intensified in the FTTH field as a number of newcomers have made their entry into the FTTH market, including the Tokyo Electric Power Co., Inc. in March 2002.

According to the National Broadband Initiative set forth by the MPHPT, by the end of fiscal 2005 there will be approximately 20.0 million households in Japan which will be using broadband circuits, in aspect of estimated Internet penetration rate and user charges. In addition, it is projected that while DSL will account for the majority of broadband access for

Exhibit 1-5　Trends in the Number of Subscribers to Broadband Access Networks

Thousands of subscribers
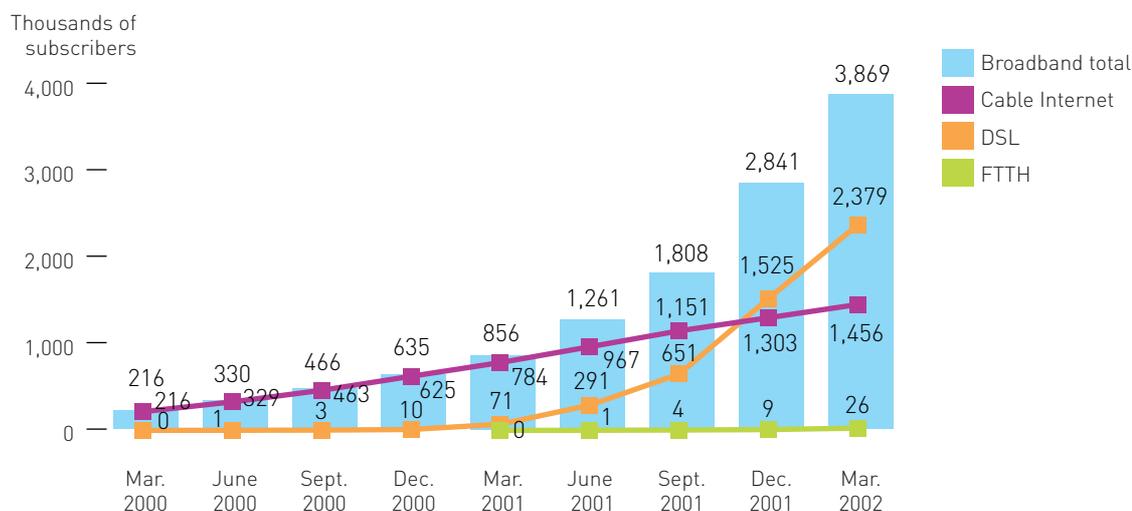
Note: "Broadband Total" includes the number of subscriptions to high-speed Internet access services that utilize wireless networks, in addition to Cable Internet, DSL, and FTTH.

Exhibit 1-6   International Comparison of Broadband Charges (DSL Charges)
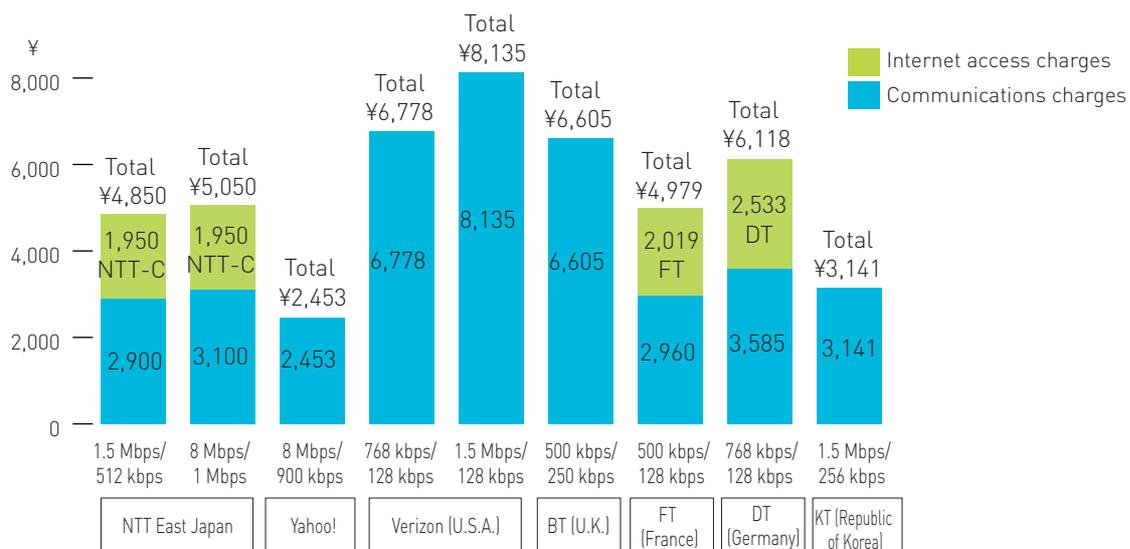
Notes: • On the assumption that the Internet connection is for 24 hours a day and there are 30 days in a month.
• Charges in foreign countries were as of February 2002, and have been converted by using the TTS rate as of February 1, 2002.

Exhibit 1-7   Broadband Access Penetration in Various Countries
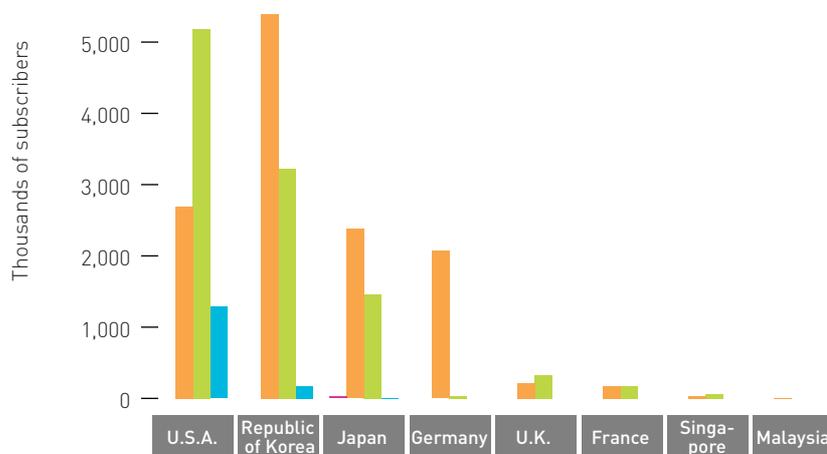
	U.S.A.	Republic of Korea	Japan	Germany	U.K.	France	Singapore	Malaysia
Fiber optics	0	0	26	0	0	0	0	0
DSL	2,694	5,394	2,379	2,070	211	177	37	0.3
Cable Internet	5,184	3,222	1,456	30	328	174	56	–
Others	1,283	173	8	–	–	–	–	–
Total	9,161	8,789	3,869	2,100	539	351	93	0.3
Total number of households (thousands of households)	106,500	15,512	47,031	38,124	25,085	23,900	964	5,280
Penetration rate in households (%)	8.60	56.66	8.23	5.51	2.15	1.47	9.65	0.01

Notes: • The number of contracts has been compiled on the basis of official data released by a research institution in each country, and as such the timing of the survey varies from one country to another. For this reason, the above comparison should be used strictly for reference purposes only. Sources for the data and the timing of each survey is as follows:
United States: FCC Report, June 30, 2001; Korea: KRNIC, March 31, 2002; Japan: MPHPT, March 31, 2002; Germany: Reg TP, December 31, 2001; United Kingdom: OFTEL, DSL (April 30, 2002), Cable Internet (February 28, 2002); France: OECD Report, June 30, 2001; Singapore, IDA, DSL (December 31, 2000), Cable Internet (June 30, 2001); Malaysia: the Ministry of Domestic Trade and Consumer Affairs, August 31, 2001.
• Others include satellite and FWA.
• "–" indicates that the data was not obtainable. It does not necessarily mean that the applicable service is not offered.
• The number of total households is as of 2000 according to the *Year Book of Statistics Telecommunication Services 1991—2000,* ITU.

a while longer, starting in fiscal 2003 there will be a rapid permeation of services that utilize fiber optic networks and this should surpass DSL in fiscal 2005.

The drive toward such a rapid growth of broadband is spurred on by the declining trend in charges which reflects the intensifying competition among telecommunications carriers. It used to be that communications charges related to Internet connection in Japan were relatively expensive in comparison to countries in Europe and the United States. They are now considered the lowest in the world (**Exhibit 1-6**).

The movement towards broadbanding has been progressing in full swing in a number of other countries. In the United States, an advanced country in the Internet field, the number of broadband contracts has exceeded 9.0 million, with cable Internet playing the key role in the development of broadband. In Asia, particularly in Korea, the development of broadband has been remarkable, with the number of contracts at 8.79 million, which is closing in on the United States. Even though the number of DSL contracts has surpassed 2.0 million in Germany, Europe as a whole has seen a relatively slow growth in the number of broadband contracts, with, for example, 539,000 in the United Kingdom and 351,000 in France. At present, the number of contracts in Japan, where a dramatic growth has been observed, ranks third behind the United States and Korea (**Exhibit 1-7**).

World-leading Mobile Internet

Japan is by far the largest provider in the world of Internet connection services via cell phones (hereinafter referred to as the "Mobile Internet"). It has been a mere three years since the launch of the mobile Internet in February 1999, and the number of subscribers has surpassed 50 million reaching 51.93 million as of the end of March 2002 (**Exhibit 1-8**). In addition, Mobile Internet subscribers account for 75.1% of the total number of subscribers to cell phones, which is fairly high in comparison with the other major countries and regions (**Exhibit 1-9**). Furthermore, the Mobile Internet allows users to access diversified content, and the purposes for using the Mobile Internet include obtaining information services such as news and entertainment information, purchasing tickets, engaging in commercial transactions such as bank transactions, and downloading music for signaling an incoming call and stand-by screens. Designed to enhance the ability to express such content, advanced moving image services and navigation services have been offered.

Launch of the Third-Generation Cell Phone

In October 2001 full-scale service for 2GHz-band third-generation mobile communications (hereinafter referred to as "IMT-2000") commenced in Japan, which was the first of its kind in the world. IMT-2000 (International Mobile

Exhibit 1-8   Trends in the Number of Subscriptions to Cell Phones and the Mobile Internet
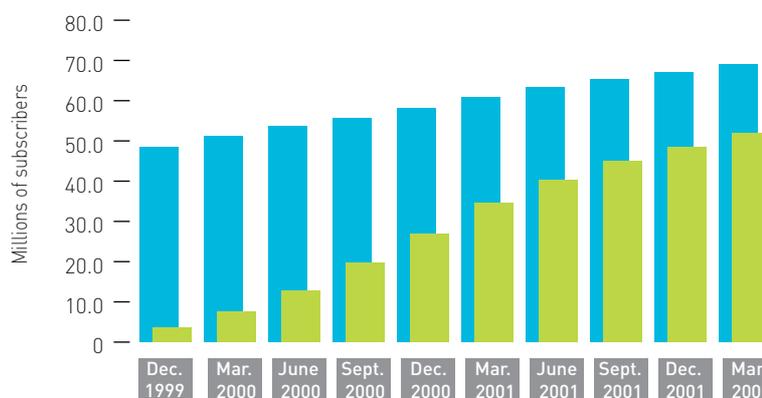
	Dec. 1999	Mar. 2000	June 2000	Sept. 2000	Dec. 2000	Mar. 2001	June 2001	Sept. 2001	Dec. 2001	Mar. 2002
Number of subscriptions	48.475	51.139	53.608	55.738	58.006	60.942	63.365	65.356	67.101	69.121
(Increase from the previous fiscal year)		(9.609)				(9.803)				(8.179)
(% increase from the previous fiscal year)		(23.1%)				(19.2%)				(13.4%)
(Of which) Number of subscriptions to Mobile Internet	3.673	7.499	12.723	19.679	26.866	34.567	40.375	44.937	48.495	51.925
Number of subscriptions to Mobile Internet/ Total subscriptions to cell phones	7.6%	14.7%	23.7%	35.3%	46.3%	56.7%	63.7%	68.8%	72.3%	75.1%
(% increase from the previous fiscal year)		(–)				(361.0%)				(50.2%)

Exhibit 1-9   Cell Phone Internet Compatibility Rate (Ratio of the Number of Subscribers to the Mobile Internet to the Number of Subscribers to Cell Phones) in the Major Countries and Regions (as of 2001)

Country/Region	Rate (%)
Japan	72.3
Republic of Korea	59.1
Finland	16.5
Canada	13.8
Singapore	9.4
U.S.A.	7.9
Germany	7.9
Italy	7.0
U.K.	6.9
Taiwan	6.6
France	5.6
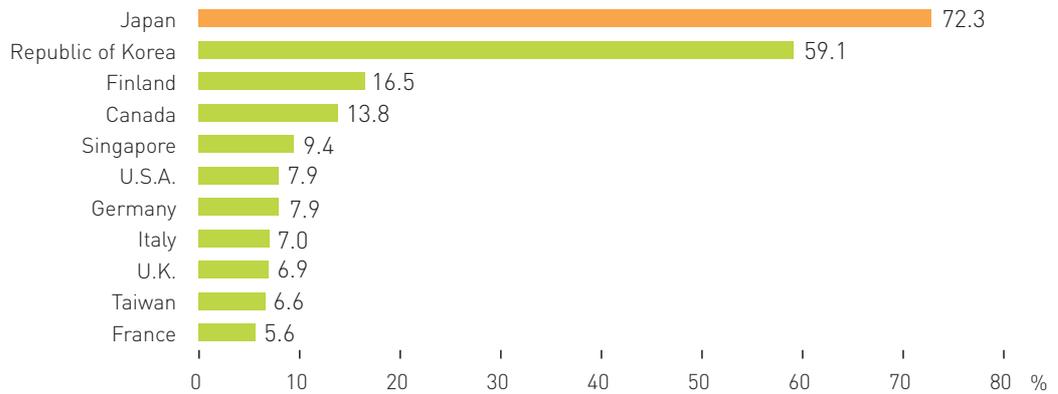
Telecommunications-2000) is a high-quality, digital new-generation mobile communications service which enables high-speed data communications on a global basis.

In October 2001 NTT DoCoMo began offering a full-scale IMT-2000 service, which had approximately 90,000 subscribers as of the end of March 2002. In addition, the KDDI Group launched its IMT-2000 service in April 2002, followed by J-Phone, which expects to begin its service in December 2002, leading to the beginning of competition among these three companies by the end of the year.

With respect to the desired functions and services for the third-generation cell phone, more than half the people surveyed would like to see a fast communication speed, and one-third would like to see a videophone function. Also, with cell phones most people would like to have a high-speed, large-capacity and easy to utilize communication usage environment, suggesting that there are high expectations for the further development of cell phones (**Exhibit 1-10**).

Promotion of the Digitization of Broadcasting

Digital broadcasting has advantages over analog broadcasting in that it: 1) provides high-quality visual and sound services and diversified channels; 2) enables advanced broadcasting services and services in partnership with communications networks; 3) provides a stable mobile reception and 4) an extensive lineup of services that are easy for the challenged and elderly to use such as the conversion of speeds

Exhibit 1-10   Desired Functions and Services in Third-Generation Cell Phone

Function/Service	Rate (%)
Fast communication speed	46.4
Videophone function	30.9
Clear speech quality	26.3
High quality service for delivery of graphics, etc.	18.8
Able to use the same service overseas	18.2
Function allowing for simultaneous use of the telephone and Internet	16.3
Image clipping service	5.6
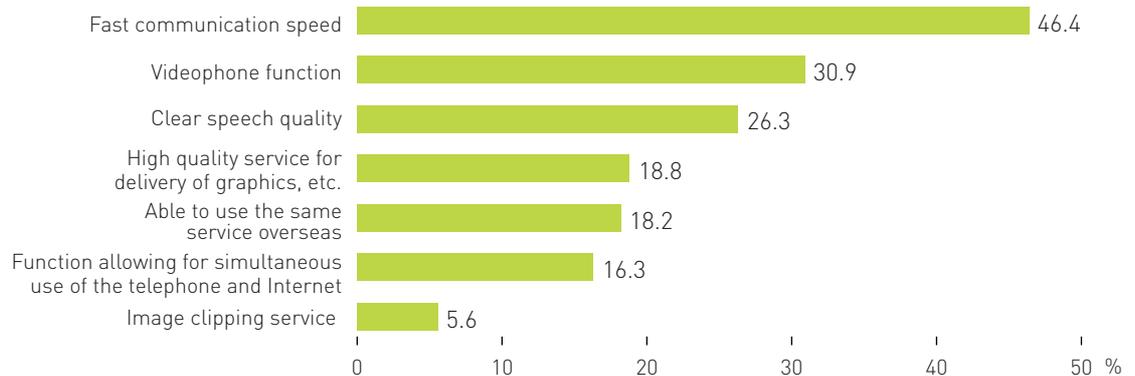
Source: *Survey and Analyses of IT and National Life*

of speech. In addition, digital broadcasting makes possible a server-type broadcasting, a new form of broadcasting which utilizes a receiver intended for digital broadcasting equipped with a communications network connectivity function and a large-capacity storage function (server-type receiver).

In the area of satellite broadcasting, a CS digital broadcasting service which uses a communication satellite (CS) was launched in June 1996 as the first digital broadcasting undertaken in Japan. In addition, commercial services were commenced for BS digital broadcasting using a broadcasting satellite (BS) in December 2000. As of the end of March 2002, the total volume of shipments of BS digital tuners and BS digital televisions reached about 1.14 million. When the number of receptions via cable TV (approx. 1.52 million households) is added to this figure, approximately 2.66 million households were able to receive satellite broadcasting. Furthermore, in March 2002 110 degrees longitude east CS digital broadcasting commenced services.

In the area of terrestrial television broadcasting, which is the basic form of broadcasting widely prevalent among the Japanese people, digital broadcasting is scheduled to be launched in three major regions, namely, Kanto, Kinki, and Chukyo, by the end of 2003, and in other regions by the end of 2006. By 2011 it is anticipated that broadcasting via analog waves will be terminated. The digitization of terrestrial broadcasting is aimed at replacing television receivers, which are disseminated in almost all households in Japan, with a simple advanced information and communications terminal that can be used at home, and as such it will play an important role as a gateway to an advanced information and communications network society. At the present time, in order to prepare for the facilitation of digital terrestrial broadcasting, NHK, commercial broadcasters, and the MPHPT have joined forces in setting up the Advisory Committee on Digital Terrestrial Broadcasting in each region across Japan.

In the area of cable television, digital broadcasting was launched in July 1998 in selected regions of Japan. With progress being made in the digitization of all broadcasting media including terrestrial broadcasting and BS and CS broadcasting, the goal has been set for the full digitization of practically all broadcasting media by 2010. In addition, with the penetration of cable televisions in households presently exceeding 20%, the digitization of cable television is expected to provide all of its anticipated merits to these viewers who currently receive television broadcasting via cable television.

IT Investment and the Macroeconomy

IT investment in Japan's private sector during 2000 increased significantly to ¥20.8 trillion (a 21.7% increase over the previous year), with the level of IT investment nearly doubling over the preceding 10 years. In addition, IT investment account for about a quarter of capital investment in the private sector at 23.5% (a 2.2 point increase over the previous year), suggesting the elevated position that information and communications capital has in corporations. The increase in IT investment can not only contribute to the revitalization of the information and communications industry but it also has a significant economic impact on other industries. An estimation of the ripple effect of IT investment on Japan's economy shows that IT investment has resulted in ¥38,615.9 billion of output stimulation and in employment creation of approximately 1.49 million people, which indicates that IT investment is able to contribute to growth in the output levels of various industries and employment (**Exhibit 1-11**).

Japan's information and communications capital stock in the private sector during 2000 rose to ¥44.0 trillion (a 13.3% increase over the previous year), increasing almost twice as much as the level seen 10 years earlier. In addition, the percentage of information and communications capital stock in the total private sector capital stock was 4.0% (a 0.3 point increase over the previous year), which indicates an increase of more than 1.0 point over the five year period 1995 to 2000. Such an increase in information and communications capital stock can contribute to efficient corporate management. It can also contribute to economic growth by allowing the offering of high value-added services. Furthermore, the extent to which each of the three main output factors, namely, information and communications capital, general capital (excluding information and communications capital), and labor, has contributed to Japan's economic growth has been estimated, these more generally known as each output's contribution ratio. For example, it has been estimated that information and communications capital contributed 1.1% to an overall economic growth rate of 1.4% over the period 1995 to 2000, which indicates that information and communications capital plays a key role in Japan's economic growth (**Exhibit 1-12**).

Exhibit 1-11   Ripple Effects of IT Investment on the Economy

IT Investment Amount in 2000

Investment Area	Investment Amount (¥ million)
Software (for computers)	5,296,171
Computers and accessory devices	9,180,141
Wired telecommunications devices	2,383,906
Wireless telecommunications devices	3,956,066
Total	20,816,285

Ripple Effects on Japanese Economy

Output stimulation (¥ million)	38,615,946
GDP stimulation (¥ million)	17,538,688
Employment creation (persons)	1,486,636

Source: *Survey of IT Economic Analyses*

Exhibit 1-12   Contribution Ratios of Various Factors to Japan's Economic Growth
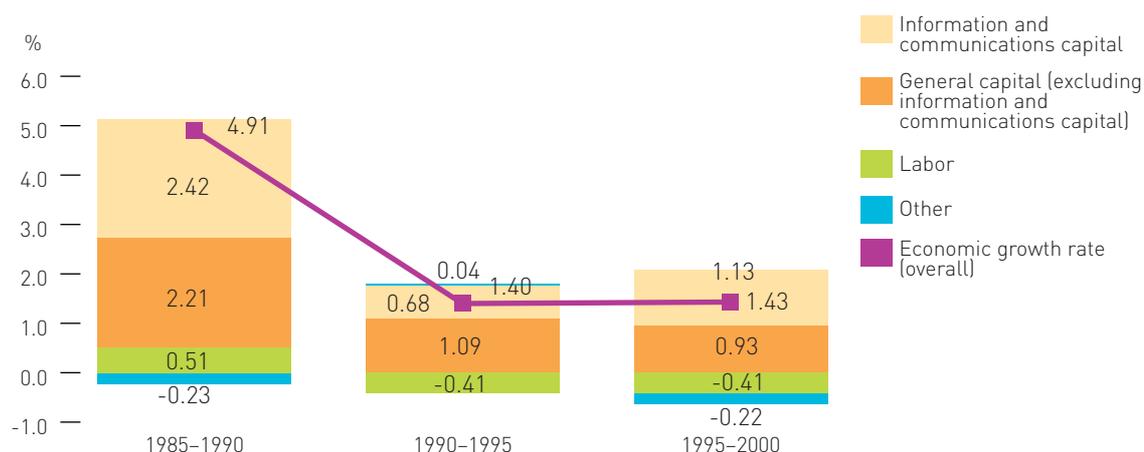
Source: *Survey of IT Economic Analyses*

IT Investment and Business Activity

The most common form of IT that has been implemented by listed companies in Japan is an infrastructure IT, which is aimed at laying the groundwork for an information and communications infrastructure within a company such as the installation of a PC for every employee. The next most common form of IT is a cost reduction IT, which is aimed at improving operating efficiencies in key operations such as finance and human resources. The third most common form of IT investment is a value-added creation IT, which is intended to explore new markets and to improve customer service and customer satisfaction.

In addition, it has been pointed out that, in order to ensure that the development of IT investment be reflected in improved operating efficiencies in information sharing and administrative and maintenance tasks and to benefit from such improvements, companies must take the initiative in reviewing their organizational structures and in enhancing their human resources. Factors that are considered critical by the companies surveyed in their attempt to fully achieve the effects of IT investment include the review of contents and flow of operation (83.7%), and a firm commitment of top management (61.5%) (**Exhibit 1-13**). Furthermore, with respect to making progress in the implementation of initiatives to improve operating efficiencies, over half of the listed companies have aggressively undertaken

internal measures such as the elimination of paper work within their company (52.9%) and the promotion of information sharing (45.7%). However, fewer companies have undertaken measures to review operations related to external transactions, such as the elimination of paper work in external transactions (15.3%) and the reviewing of the manner in which transactions are conducted. In addition, more than 40% of the companies provide IT education to their employees through internal IT-related educational and seminar programs (42.1%) and participation in external IT-related educational and seminar programs (41.1%).

With respect to the awareness of the effects of IT among listed companies, nearly 60% of the companies acknowledge that IT has been effective in terms of the related costs (58.6%), suggesting that most companies have a positive view of the effects of IT. In addition, in a breakdown of the effects of IT by the form of IT investment, the companies surveyed are most aware of the effects of infrastructure IT, followed by cost reduction IT and value-added creation IT (**Exhibit 1-14**). Going forward, in order to further pursue IT, it is important that companies implement restructuring measures that would be applied not only within the company but also to relations existing outside of the company, and create an environment in which the company can fully benefit from the effects of IT.

Growth of Internet Businesses

New types of businesses that utilize the Internet can be classified according to three layers, namely, a network infrastructure layer, a platform layer, and a content and application layer. Business in the network infrastructure layer, which forms the foundation among these three layers of businesses, has been rapidly growing as evidenced by the growing penetration of broadband services, and has had a significant impact on the development of businesses in the content and application layer and the platform layer. In this sub-section, we will provide an overview of the markets for electronic authentication

and PKI, data centers, ASP, e-learning, and e-commerce, all of which are viewed as possessing the potential to grow substantially in the future in the businesses in the platform layer and the content and application layer.

The electronic authentication business, which has emerged in recent years, is concerned with the operation of electronic signature and authentication services through the use of cryptographs as an effective method in verifying the identity of a counter-party on the Internet and dealing with information leakage and interpolation of information, in order to secure the authentication of documents containing information on certain business

Exhibit 1-13   Necessary Conditions for Achieving the Effects of IT Investment (multiple answers)

Review of contents and flow of operation	83.7
Firm commitment of top management	61.5
Employee education and training	51.9
Organizational and systematic restructuring	48.0
Resource concentration in core operations	7.7
Appointment of CIO (Chief Information Officer)	7.0
Budget priority	5.2
Outsourcing of non-core operations	4.6
Relocation of employees	2.4
Other	0.8
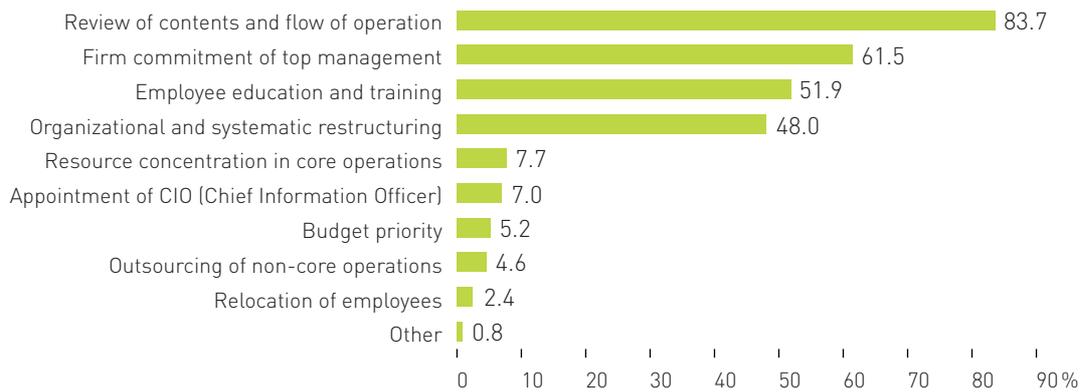
Source: *Survey on IT and Business Activity*

Exhibit 1-14   The Effects of IT Among Businesses (by purpose)

	Significant effect	Undetermined	Very little effect or no effect	
Marketing and sales support system	41.9	36.9	21.3	Value-added creation
Sales operation system	48.5	31.3	20.2	
Management and control operation system	46.6	36.0	17.5	Cost reduction
Key operation system	65.9	17.1	17.0	
Software infrastructure development	73.0	16.0	10.9	Infrastructure
Hardware infrastructure development	72.2	16.2	11.5	

Source: *Survey on IT and Business Activity*

transactions. At present, the market size of the electronic authentication business based on the most commonly used public key infrastructure (PKI) was estimated at approximately ¥6.34 billion in 2001 and this is projected to grow to nearly ¥41.95 billion by fiscal 2006.

Data centers provide a service that offers the following: 1) a facility (server room) equipped with a physical durability and security; 2) stable maintenance and operation of the server; and 3) a high-speed and secure Internet access directly to the stable and large-capacity backbone circuits. The market size for data centers in 2001 was estimated at ¥137.14 billion, and this is projected to nearly triple by 2006 to ¥431.72 billion.

An application service provider (ASP) offers a service which enables users to use applications such as packaged software offered by the ASP via the Internet without having to own the application itself. It is mainly used by businesses as part of their outsourcing of system operations and management. The market size for ASP in fiscal 2001 was estimated at ¥6.03 billion, and this is projected to reach ¥107.65 billion by fiscal 2006, growing almost 18 times over.

E-learning is a distance education service that utilizes networks. The market size for e-learning in fiscal 2001 was estimated at ¥29.0

billion, and this is projected to increase by as much as seven times in fiscal 2006 to ¥198.46 billion. A breakdown of the figure for fiscal 2001 shows that the market for school education was ¥2.06 billion, education within the company, ¥8.29 billion, and continuing education, ¥18.65 billion. (**Exhibit 1-15**)

E-commerce is used by about a quarter of Japanese companies in either their sales operations or their procurement operations, or both. E-commerce can be classified according to two distinct markets, namely, the final consumption goods market and the intermediate goods market. The final consumption goods market provides services for transactions dealing with final consumption goods, such as PCs and household appliances, and services such as fee-based network content. The intermediate goods market is engaged in transactions among corporations dealing with raw materials. The market size for e-commerce involving final consumption goods has been steadily expanding and reached at ¥1,221.8 billion in 2001 (a 96.0% increase over the previous year). A similar steady growth has been experienced in the market for e-commerce related to intermediate goods, which was estimated at ¥53,900 billion in 2001 (a 41.5% increase over the previous year).

Exhibit 1-15   Projection of Market Size for E-Learning

	FY 2001	2002	2003	2004	2005	2006
Continuing education market	18.65	30.88	43.33	56.00	68.89	82.00
Business education market	8.29	14.08	18.78	22.62	27.25	31.84
School education market	2.06	8.77	20.19	36.52	57.93	84.62
Total	29.00	53.73	82.30	115.14	154.07	198.46
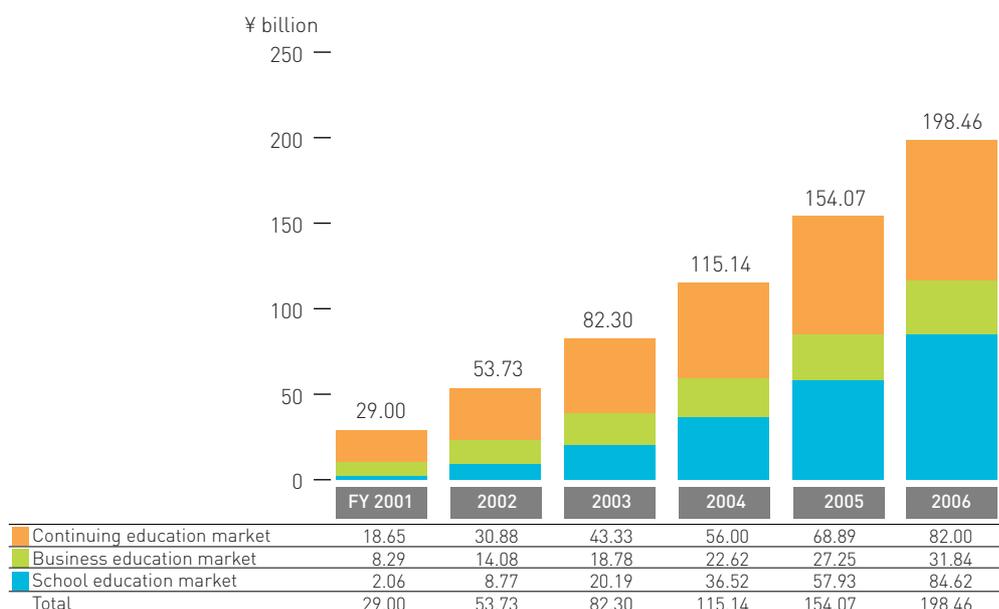
Source: *Survey of IT and Business Activity*

Entrepreneurial Environment for Information and Communications Venture Businesses

Amidst concerns over suppressed personal consumption and corporate capital investment as well as slumping industrial viability driven by continued corporate restructuring, there are high expectations for entrepreneurial opportunities, which are the source of dynamism in economic society and the driving force behind economic growth and employment creation. In particular, venture businesses that are based on unique technologies and business models have attracted much attention as possessing a strong potential to contribute to the revitalization of the economy.

The largest issue in the start-up phase of a venture business in both information and communications and non-information and communications is the raising of funds, followed by the securing of human resources and sales and marketing. The biggest challenge after the start-up of a venture business in both information and communications and non-information and communications is sales and marketing. The second biggest challenge for an information and communications venture business after the start-up period, however, is the securing of human resources followed by the raising of funds, while for a non-information

and communications venture business it is technological development and production, followed by the securing of human resources, as such the securing of human resources is one of the biggest issues in information and communications businesses. With regard to the sources for raising funds, which is the biggest challenge during the start-up phase, information and communications venture businesses tend to raise funds through public agencies, angels, and venture capital slightly more often than non-information and communications venture capital. In addition, in order to deal with sales and marketing, which is the biggest challenge after the start-up phase, information and communications venture businesses often rely on external networks such as alliances with other businesses. Furthermore, in response to the challenge of securing human resources, the majority of both information and communications and non-information and communications venture businesses adopt their own human resources training programs. Notwithstanding this, information and communications ventures have a tendency to respond to the human resources issue by utilizing management connections and employment seminars such as venture business job fairs, and outsourcing personnel

Exhibit 1-16   Measures to Strengthen Competitiveness of Venture Businesses
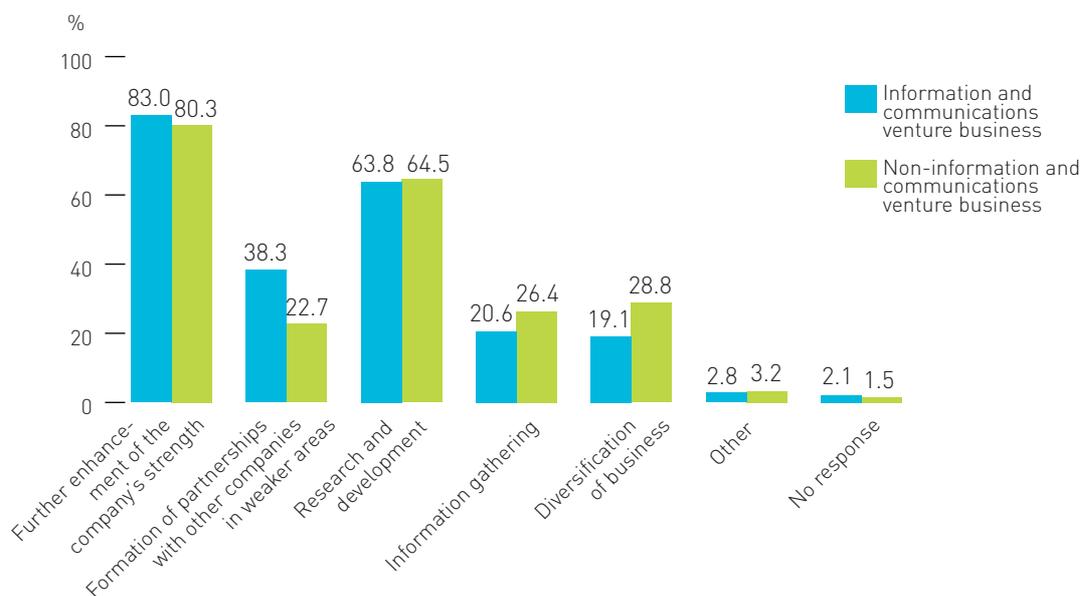
Source: *Survey of IT and Business Activity*

through temporary contracts and specialized agencies. In other words, they have a tendency to secure human resources by integrating external staff.

Once an information and communications venture business has overcome such issues as fund raising and sales and marketing, it will be crucial for it to strengthen its competitive edge by developing its own unique technology and business model in order to achieve a further expansion of its business. According to the *Survey of IT and Business Activity*, information and communications venture businesses tend to strengthen their competitiveness through partnerships with other companies and through utilizing networks among various other companies more frequently than do non-information and communications venture businesses (**Exhibit 1-16**). In reality, concentrations of venture businesses composed mainly of information and communications venture businesses are found across the nation. Many of these businesses are growing through their utilization of an incubation facility as their base, which provides them a network function.

Promotion of an E-Government and E-Municipalities

Against the backdrop of technological advancement in the globally expanding field of information and communications, Japan is beginning to implement structural reforms that will have an impact on all socioeconomic aspects. Under the circumstances, the government has been promoting various efforts in the field of public administration in order to realize an electronic government (e-government) and electronic municipalities (e-municipalities), which will enable people to obtain information related to public administration from homes and offices, and will allow administrative procedures, such as address and family registrations, filing for tax returns, and paying taxes, to be processed over the Internet (**Exhibit 1-17**).

A survey conducted with respect to the progress being made in the government's efforts to develop an e-government shows that the Cabinet Office and all 12 governmental ministries (including affiliated agencies of the ministries) now have their own Web sites. At the end of fiscal 2001 there were 1,310 homepages sponsored by public entities at all levels of the national government. In terms of electronic administrative procedures for processing applications and notices, there were 590 on-line applications and notices (a 5.3% digitization rate) at the end of fiscal 2001, and it is anticipated that by the end of fiscal 2002 there will be 3,895 on-line applications and notices (a 35.0% digitization rate), and by the end of fiscal 2003, 10,868 on-line applications and notices (a 97.7% digitization rate), completing the digitization of all administrative procedures. In addition, there was one PC available to each 1.2 employees in all national government agencies (excluding national universities under the Ministry of

Exhibit 1-17   Schematic Overview of E-Government—Creation of New Administrative Services
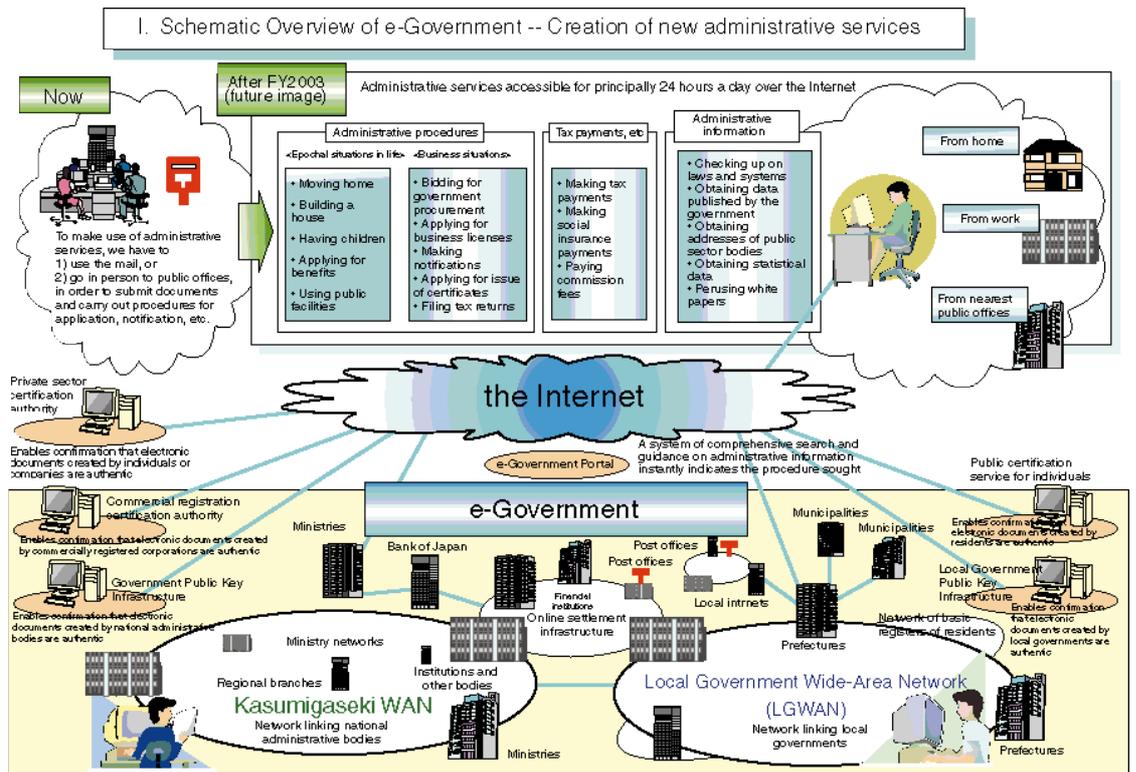
Education, Culture, Sports, Science and Technology), reflecting the government's effort to make one PC available for every employee. With respect to access to networks from PCs, nearly 80% of PCs were connected to networks, with 77.7% via LAN and 2.2% via hosts other than LAN.

In tandem with the development of an e-government at the national level, local governments and agencies have also implemented various measures by maximizing the advantages of advanced information and communications technologies in order to rationalize and advance administrative procedures, to improve services for residents, to develop local regions, and to rectify information differentials among regions. During fiscal 2001 a total of 2,751 public entities set up their own Web sites (a 25.5% increase over the previous year). In addition, there were 319,915 PCs available in prefectural governments (a 21.3% increase over the previous year) and 561,721 PCs in municipal (city, town, and villages) governments (a 45.0% increase over the previous year). The installation of LAN has been undertaken steadily. 100% of prefectural governments and 88.6% of municipal governments have now installed LAN. Furthermore, as part of the development of an environment for digitizing the processing of applications and notices in municipal governments and agencies, there were 55 on-line applications and notices (a 1.0% digitization rate) available in fiscal 2001. It is anticipated that by the end of fiscal 2002 there will be 3,055 on-line applications and notices (a 59.3% digitization rate), and by the

end of fiscal 2004, 4,914 on-line applications and notices (a 95.4% digitization rate), practically completing the digitization of all administrative procedures.

The Current Status of E-Municipalities

Local governments and agencies have been maximizing the benefits of advanced information and communications technologies while keeping in mind the actual situation of their respective localities such as the circumstances of the local residents and the structure of local industries. Given the foregoing, a number of measures have been implemented such as the offering of high-quality public administrative services that can properly meet the increasingly sophisticated and diversified needs of local residents and businesses, the revitalization of socioeconomic activities by laying the groundwork for an information and communications infrastructure, and the creation of a public administration that is simplified, rationalized, and transparent by reviewing overall administrative procedures.

A survey has shown that one of the benefits of having an e-municipality most desired by local residents and businesses is the speeding up of administrative procedures, followed by the enhanced convenience of public administration services and the reduced cost of public administration services. In addition, the survey has shown that local residents and businesses access the Web sites of municipalities and public agencies largely because they are accessible 24 hours a day, there is no need to visit

Exhibit 1-18 Local Governments' Self-Evaluation of Their E-Government Services
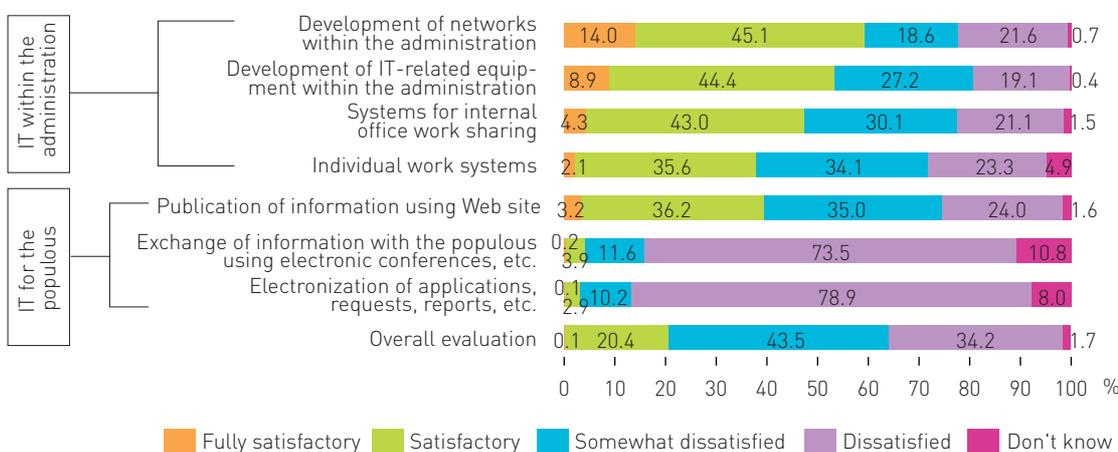
Source: *Survey of Administrative Information Intensification in Local Government*, MPHPT (2002)

government offices, they have user-friendly search functions, and they are able to provide up-to-date information. These results suggest that e-municipalities are being credited for their highly convenient features such as the ability of users to access their Web sites anytime and from anywhere, and their convenient search functions and very timely nature all of which are distinctive characteristics of the Internet.

In addition, in a self-assessment survey of the current status of the digitization of municipalities, a number of municipalities and public agencies felt that IT within public administrative agencies was either fully satisfactory or satisfactory. Only 0.1% of the respondents felt that IT within public administrative agencies and the digitization of the links between local public agencies, residents, and businesses were as a whole very satisfactory, while 20.4% feel that these were satisfactory (**Exhibit 1-18**).

With respect to the status of the measures related to the digitization of local public agencies such as the review of systems, organizations, and operation processes, the top two measures undertaken were the promotion of information disclosure (39.8%) and the promotion of information sharing (33.6%).

Furthermore, a self-assessment survey of the current status of e-municipalities (overall assessment) indicates that most local public agencies, which have undertaken the aforementioned two measure, tend to give themselves high marks, as most respondents feel that their present e-municipality is either very satisfactory or reasonably satisfactory.

In addition, in connection with how the digitization of municipalities has changed work for municipal employees, more than 40% of these employees felt that it has had either a very favorable impact or a favorable impact on their work in all areas including workload, quality of work, and speed of work. In particular, with respect to quality of work and speed of work, about 60% to 80% of the employees felt that digitization has had either a very favorable impact or a favorable impact. Given the foregoing, we can see that the promotion of the e-municipality has a positive effect on improving the quality of work and speeding up the work of municipal employees (**Exhibit 1-19**).

Necessary Conditions for the Realization of E-Municipalities

According to a survey, the conditions that are considered necessary by local public agencies for the digitization of municipalities include securing agency-wide financial resources, securing human resources with specialized knowledge, and improvements in the information literacy of employees (**Exhibit 1-20**). In order to secure agency-wide financial sources, which is considered the most necessary condition, local public agencies have been making efforts to improve the efficiency of electronic public administration. In particular, the utilization of off-the-shelf packages is the most commonly used measure (34.0%) for creating an infrastructure and design for public administration, followed by joint development in partnership with other agencies (13.2%), agency-wide

Exhibit 1-19   How the Promotion of E-Municipalities Has Changed the Work of Municipal Employees
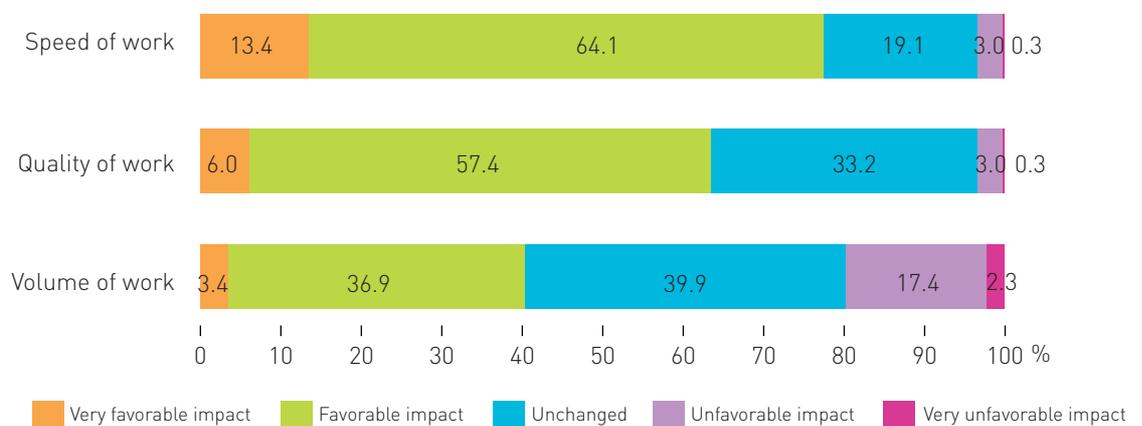
	Very favorable impact	Favorable impact	Unchanged	Unfavorable impact	Very unfavorable impact
Speed of work	13.4	64.1	19.1	3.0	0.3
Quality of work	6.0	57.4	33.2	3.0	0.3
Volume of work	3.4	36.9	39.9	17.4	2.3

Source: *Survey of Administrative Information Intensification in Local Government*, MPHPT

planning and development (13.1%), and integration and development of similar systems (11.8%). On the other hand, in terms of operations and control, the most common measure is the utilization of outsourcing to private sector businesses (33.4%), followed by the sharing of the use of systems with other agencies (13.7%) and the utilization of ASP (6.6%). In addition, with respect to the development of human resources with IT specialization, which is the second necessary condition after the securing of agency-wide financial sources, local public agencies have engaged in staff training in order to foster specialized knowledge by sending

employees to external seminars and conducting internal IT seminars (**Exhibit 1-21**). Furthermore, in tandem with the digitization of municipalities, the survey suggests that the main issue in medium- to long-term human resource development concerns the abilities demanded of municipal employees will likely shift from a document-writing ability and a work-execution ability to a project-management ability and an agenda-setting and hypothesis-formulating ability. As a result, there will be a need for new staff training programs.

The conditions that are considered necessary by local residents and businesses in order

Exhibit 1-20 Necessary Conditions for the Digitization of Local Governments
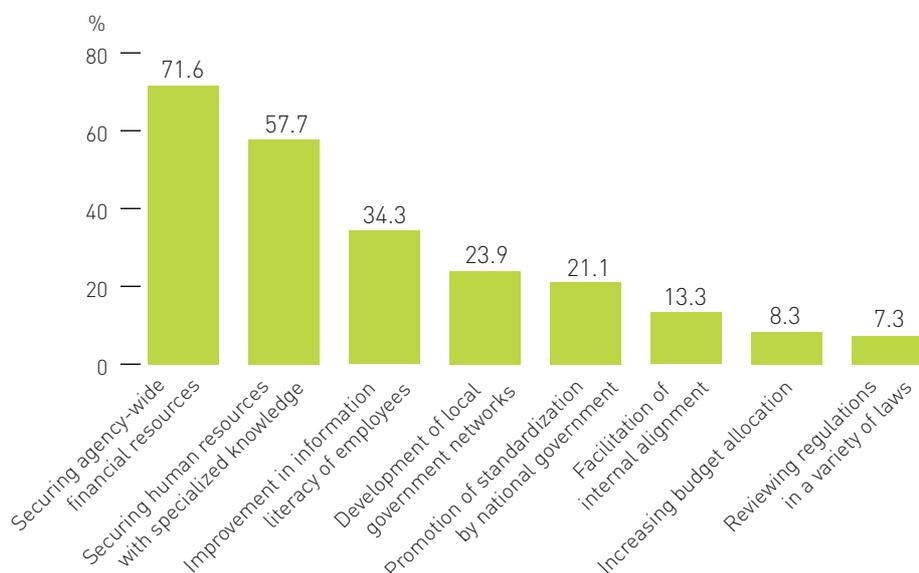
Source: *Survey of Administrative Information Intensification in Local Government*

Exhibit 1-21 Measures Undertaken by Local Governments for Human Resource Development Concerning IT Promotion
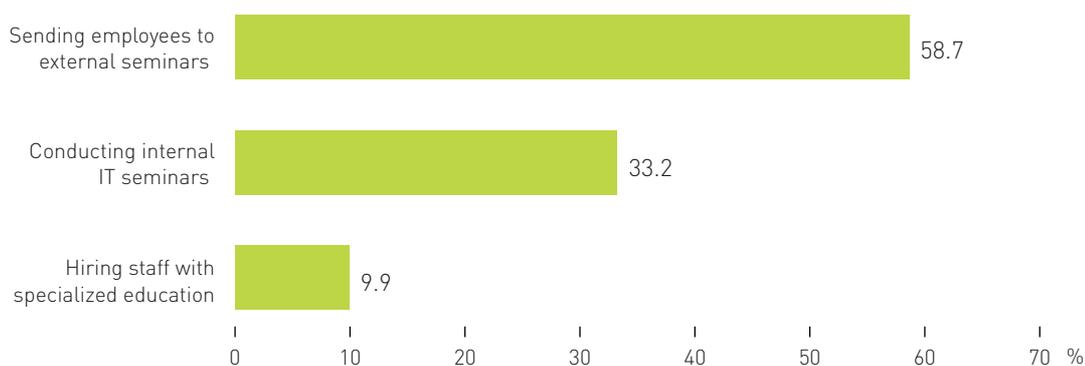
Source: *Survey of Administrative Information Intensification in Local Government*

to promote the usage of electronic public administration services include promoting the penetration of the Internet into households and businesses, understanding the needs of residents and businesses, creating a security infrastructure, and creating the infrastructure for a broadband network. With respect to the type of Internet connection terminals for using the electronic public administration services, residents in the age group 20 to 40 would like the creation of an environment that would allow them to effectively utilize existing Internet connection terminals such as PCs at home, PCs in schools and offices, cell phones, and PHS. On the other hand, in the age group 50 and over, particularly 60 and over, there is an increasing expectation for new types of Internet connection terminals such as kiosk terminals and easy-to-use information terminals. Furthermore, in the age group 60 and over there is a strong desire for the use of kiosk terminals in public facilities such as city halls and government offices. Also, with respect to how local governments keep themselves posted concerning the needs of residents and businesses related to the design of electronic municipalities, some local public agencies are conducting surveys in the form of questionnaires and are holding study groups and discussions. Going forward, it is desirable that other local organizations and groups likewise actively implement similar measures, which would contribute to the realization of

highly convenient electronic municipalities based on the local needs of residents and businesses.

Towards the Realization of User-Friendly E-Municipalities

According to a survey, the most desired area of public administration for which the earlier digitization of public services is anticipated by local residents is medical and health care (71.0%), which is intimately related to the daily lives of people, followed by welfare for the elderly and challenged, and pensions (60.2%), and resident personal data (60.8%) which affects every resident in some way. Furthermore, the area in which the highest priority should be placed is resident personal data (48.3%), which has garnered more than twice as much interest as other areas and as a result the earliest development in this area is anticipated. On the other hand, in contrast to the case of residents, differentials in the ranking of the areas of public administration by local businesses are relatively narrow, which suggests that they would prefer to see the promotion of electronic public administrative services in a wide variety of areas. In addition, in a survey on how residents and local businesses would like to receive public administrative services as a result of the realization of electronic municipalities, a number of residents would like to electronically receive public administration information in the areas of cultural assets,

Exhibit 1-22   Methods of Electronically Offering Desired Public Services by Areas of Public Administration (Respondents: Residents)

Legend:
- Electronic offering of public administration information
- Digitization of information exchange between residents and businesses
- Digitization of administrative procedures
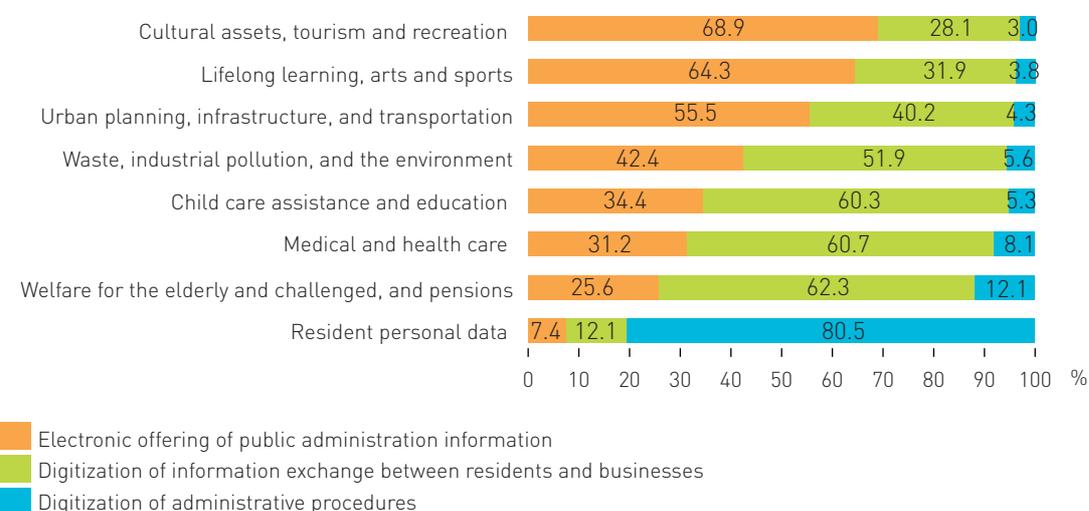
Source: *Survey of Administrative Information Intensification in Local Government*

tourism and recreation, lifelong learning, arts and sports, urban planning, infrastructure, and transportation. In the areas of waste, industrial pollution, and the environment, child care assistance and education, medical and health care, and pensions, an electronic exchange of information between residents and businesses is most desired, and in the area of resident personal data, the digitization of administrative procedures involving applications, notices and such is hoped for (**Exhibit 1-22**). On the other hand, as in the case of the ranking of the desired areas of public administration, differentials in the ranking of the most desired methods of receiving public information by local businesses are also relatively small.

In an analysis of the evaluations by residents and businesses of the Web sites of municipalities, which is an example of the electronic offering of public administration information, in terms of design, search-friendliness, updating frequency, and information volume, both residents and businesses are relatively highly satisfied with the design of the Web sites, while there is a low degree of satisfaction concerning search-friendliness, information volume, and updating frequency. Furthermore, with respect to the areas of the Web sites of municipalities which residents and businesses feel need to be improved, there is a strong need for more information related to administrative procedures and daily life and business. In addition, in terms of the desired updating frequency, more than 40% of the residents and businesses surveyed requested that homepages be updated about once a week (residents: 41.3%, businesses: 40.9%). With respect to the desired method for searching information, both residents and businesses would like to see a menu format which is comprised of different areas such as resident personal data and medial and health care (residents: 70.1%, businesses: 64.8%), and a free keyword search which would allow users to carry out a search by entering any word (residents: 55.1%, businesses: 59.3%). In addition, more than 50% of residents would also like to see a menu format comprised of various life scenarios, such as everyday living, business, and leisure. These results suggest that residents and businesses expect to see Web sites that would have a menu format comprised of a variety of areas. The Web sites would allow users to search for information under various

life scenarios on the first page and possess a supplementary search method whereby the user could search for information by typing in any key word. Furthermore, going forward both residents and businesses expressed their intention to make extensive use of the Web sites for downloading applications and other documents.

The survey also classified the electronic exchange of information between the residents and businesses into two categories, namely, the digitization of inquiries and answers via e-mail, and the digitization of opinion exchanges via electronic conference rooms, and analyzed which areas are of most importance to residents and businesses. The results of the survey have shown that residents have high expectations for the digitization of inquiries and answers in areas that are closely related to everyday life such as resident personal data, medical and health care, welfare for the elderly and challenged, and pensions. On the other hand, they are very much interested in the digitization of opinion exchanges in areas that are related to leisure and community building such as cultural assets, tourism and recreation, urban planning, infrastructure, and transportation, lifelong learning, and arts and sports. In addition, businesses carry high expectations regarding the digitization of inquiries and answers in the areas of support for industries and business activities, urban planning, infrastructure, and transportation, and with respect to the digitization of opinion exchanges their interests lie in the areas of employment assistance and unemployment policies, and business loans and subsidies.

With respect to the willingness to use electronic administrative procedures for processing applications and notices, the majority of the residents expressed a strong intention to use such services for all types of administrative procedure and therefore they have high expectations with regard to this. In addition, businesses have shown a similar intention to use such electronic services. In particular, more than 70% of the businesses surveyed expressed an intention to utilize electronic procedures related to internal administrative tasks such as social security, including pension and health insurance, and taxes, including business taxes. Furthermore, the majority of residents and businesses believed that in order that electronic administrative procedures for

Exhibit 1-23 Keys to the Realization of Electronic Administrative Procedures

	Residents		Businesses

Residents | | Businesses

	Residents	Category	Businesses
	73.7	No leaking of the contents of applications	71.7
	72.3	Verification of the identity of applicants	50.9
	47.9	Proper acceptance of applications	61.8
	38.4	Easy-to-use functions	43.0
	32.1	Correction of mistakes	24.9
	26.6	Simplified procedures and attachments	39.9

% 80   60   40   20   0   0   20   40   60   80 %
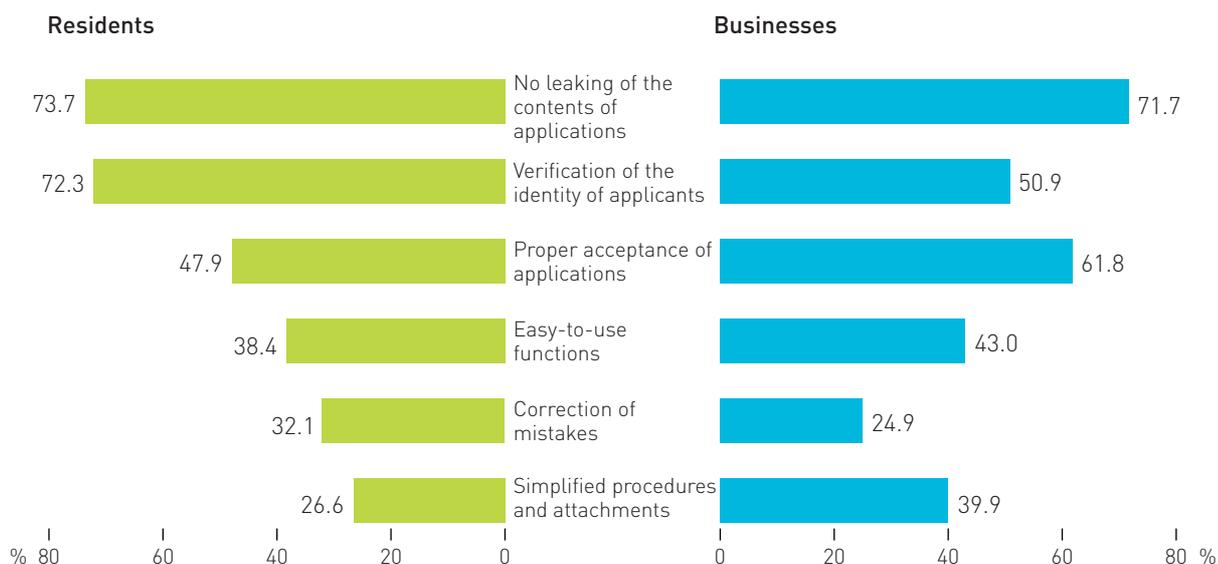
Source: *Survey of Administrative Information Intensification in Local Government*

processing applications and notices be realized it was important to ensure that the contents of applications will not be divulged and that the identity of applicants can be verified (**Exhibit 1-23**).

Trends Overseas

As in the case of Japan, other countries have been promoting measures towards the realization of electronic municipalities. For example, in Seattle, Washington, a public hearing via telephone, which is called Public Access Network (PAN), was held in December 1994, and in December 1995 "City of Seattle" (http://www.cityofseattle.net/), a Web site for the city operated by its IT department, was launched. The Web site makes available a city directory which allows the user to search for the e-mail addresses, names, and departments of all employees of the city, and it receives almost 100,000 e-mails from its residents in a month. In addition, the Web site not only allows its users to engage in various administrative procedures such as change of address and to make payments for fines for traffic violations, but it also makes available a live webcast of city council meetings and allows city residents to express

their opinions via e-mail during the meetings. In the area of services intended for businesses, Maryland has launched eMaryland M@rketplace (http://www.emarylandmarketplace.com/emm/index.cfm), which supports electronic delivery and cooperation between businesses.

Utilization of Information and Communications in Everyday Life

In a survey on the need for the Internet in everyday life two out of three Internet users felt that the Internet was absolute must in everyday life, suggesting that the Internet has become a basic necessity of life (**Exhibit 1-24**). Furthermore, with respect to the frequency of use of the Internet, the survey found that more than 30% of users access the Internet at least once a day.

In terms of how the Internet is used, the use of e-mail ranks as number one, which was the same as two years earlier. In addition, e-mail magazines and the gathering and searching for information have also become popular reasons for making use of the Internet. Furthermore, compared to two years earlier a relatively substantial growth has been seen in consumption related to the use of the Internet such as on-line shopping (a 37.8 point increase) and on-line auctions (a 25.6 point increase). Other than the above, the use of the Internet for the purpose of on-line games,

receiving and downloading moving images, and e-learning, all of which are compatible with broadband, has also increased, showing signs of the full-fledged penetration of these services. Also, it is clear from the increase in the number of purposes and uses for which the Internet is being engaged compared to two years earlier that Internet usage has become diversified (**Exhibit 1-25**).

It is believed that the use of the Internet can benefit users in many ways. With regard to the evaluation by users of the Internet on "improving convenience in national life," "promoting the diversification of lifestyles," and "expanding opportunities for consumers to make independent, rational selections," as stated in Article 5 of the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society, approximately 90% of Internet users surveyed gave a positive evaluation of the Internet with regard to how it has enhanced the convenience of their lives. In addition, 70% of those users felt that the Internet has enabled them to select a suitable lifestyle, while only

Exhibit 1-24 How the Internet is Perceived by Users in Everyday Life

Not sure **0.6%**　　Not necessary **0.2%**

Beneficial **32.7%**

Indispensable **66.5%**
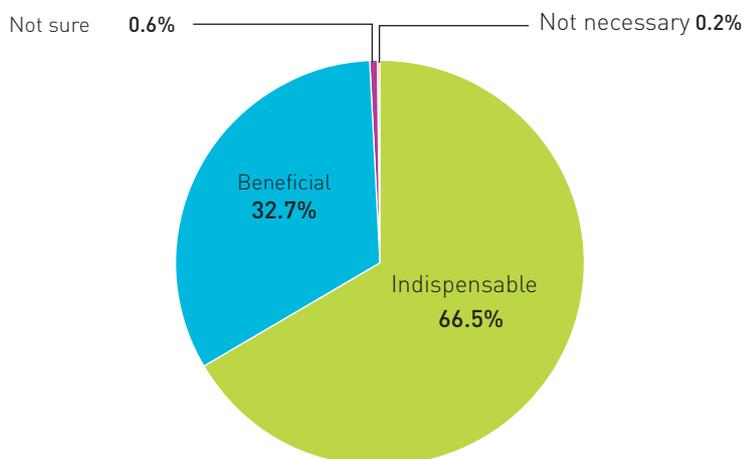
Source: *Survey and Analyses of IT and National Life*

Exhibit 1-25　Trends in Internet Usage by Purpose (multiple answers permitted, excerpts)

Present
Two years ago

E-mail: 87.8 / 96.4
E-mail magazines: 40.4 / 76.3
Information gathering and searching: 42.1 / 70.0
On-line shopping: 14.4 / 52.2
News viewing: 27.8 / 48.8
On-line auctions: 11.0 / 36.6
On-line games: 8.3 / 21.4
Booking and purchasing various tickets: 6.0 / 21.4
Receiving and downloading motion pictures: 6.2 / 26.1
Downloading images and music: 12.1 / 33.0
Internet telephone: 1.8 / 4.9
E-learning: 0.9 / 3.6
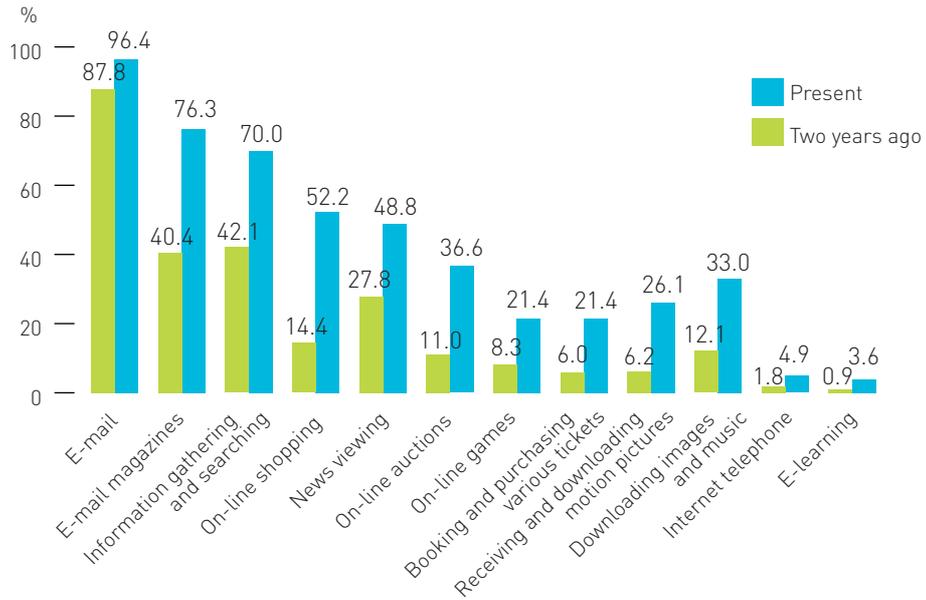
Source: *Survey and Analyses of IT and National Life*

slightly over 50% of users felt that the Internet has allowed them to better consume goods and services.

In terms of the specific effects of Internet usage on daily activities, many Internet users via PCs are pleased with the effect of advanced information gathering, which enables them to collect technical and hard-to-find information (94.1%) and to gather information quickly as compared to magazines and books (93.8%). In addition, roughly three out of four users are aware of the effect of freedom from time and spatial constraints, as they are now able to conduct their business without leaving home (77.3%) and to do so at anytime they choose (74.2%). Notwithstanding the foregoing, a relatively small number of users were impressed with the effect on the revitalization of their social activities, allowing them to send personal opinions to the public (63.1%) and create more opportunities for them to make friends (42.8%). On the other hand, with respect to the use of Internet via cell phones, most users were pleased with the freedom from time and spatial constraints, which is a unique feature provided by the cell phone.

In a comparison of the status of Internet usage in the United States, widely known as an advanced IT country, the penetration of Internet usage in Japan has been lagging behind the United States by almost one year. In addition, Japan shows a lower ratio of users for any purpose of the Internet use than does the United States.

Two areas of Internet service which Internet users would like to take advantage more of in the future on PCs are consumption related services such as the sales of goods that are not in use on on-line auctions and booking tickets for transportation and rooms at accommodation facilities, and leisure-related services such as downloading movies and music, and gathering information related to leisure. On the other hand, concerning cell phone Internet services, a number of users showed an interest in those services focused on mobility such as transferring information on transportation and map information.

Other than the above services, new types of services which utilize the Internet have begun to emerge, such as consumer-oriented product development, e-learning, and on-line career change support.

Improvement in Information Literacy

In a survey of Internet usage among students in elementary, middle, and high schools, it was found that 70% to 80% of these groups use the Internet for less than an hour per day. In terms of the frequency of usage, 34% of high school students surveyed use the Internet almost everyday. When this is combined with those who use it three or four times a week, almost 50% of all high school students use the Internet regularly. On the other hand, over 40% of middle school students and less than 20% of elementary school students use the Internet almost daily or three or four times a week. Even though this indicates that the younger the user the less frequently he or she uses the Internet, it is apparent that the Internet is beginning to penetrate into the everyday lives of children in elementary and middle schools. Furthermore, the Internet is most commonly used for games among all three age groups. In addition, 40% to 50% of these young people access homepages, while around 30% of them use e-mail. Also, it has been found that the Internet is used differently according to the stage of growth, such as coloring and drawing for elementary school students and word processing for high school students. Under the circumstances, it is necessary for young students to

acquire the ability to properly utilize the Internet and other methods of information and communications and actively select, process, and send information. At the same time, it is important for them to acquire the ability to understand information media, develop information morale, and to think about the responsibility for information. In reflecting upon the foregoing, the government has expanded the area of information education under the New Courses of Study which were launched in fiscal 2002. In addition, a study on worldwide Web content according to language indicates that even though a variety of languages can be found, English content accounts for the majority at 68.4% of the worldwide Web content (**Exhibit 1-26**). Going forward, it is essential that efforts be focused on improving foreign language ability including English in order to take advantage of the Internet, which is a global media, as a means of international interaction. For this reason, an expanded curriculum for foreign languages in elementary and middle education and beyond is desired for the future.

In order to effectively promote information education in the Japanese school system, the government has been developing the infrastructure for an environment that would enable computers and the Internet to be utilized in all

Exhibit 1-26 Ratio of Languages Used in Web Content

Language	Ratio
English	68.4%
Others	4.6%
Korean	1.3%
Portuguese	1.4%
Italian	1.6%
Russian	1.9%
Spanish	2.4%
French	3.0%
Chinese	3.9%
German	5.8%
Japanese	5.9%
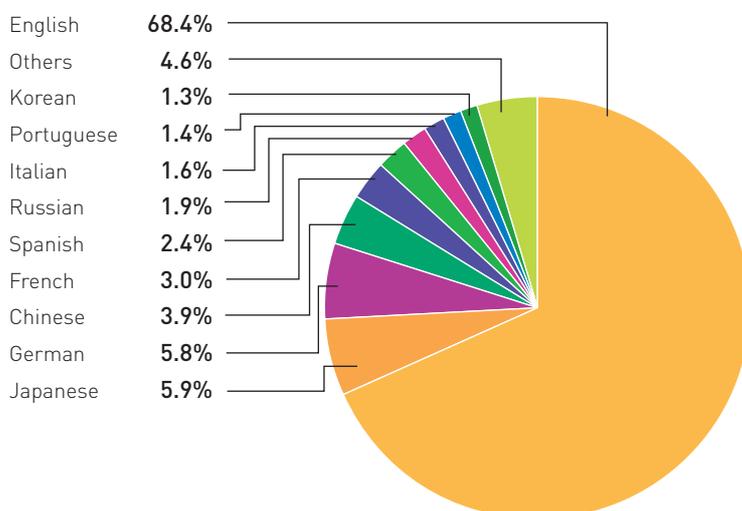
Source: Global Research Institute Inc.

classes in all grades by fiscal 2005. As of March 2001 computers were installed for student use in practically all public middle and high schools. In addition, 75.8% of all public schools have Internet connections (a 27.1 point increase over the previous fiscal year). While there has been a significant increase in the number of schools which have launched their own hompages, these schools accounted for 33.9% of all public schools with Internet connections, which is virtually unchanged from the previous fiscal year. Going forward, it is important for schools to utilize their homepages and promote the transmission of information which is a unique feature of the Internet.

With respect to Internet literacy concerning the ability of users to navigate the Internet, the overall average score has increased steadily to 6.5 at the present time from 4.8 two years ago. In addition, an improvement has been made in the ability to utilize the Internet in all aspects (**Exhibit 1-27**). Furthermore, in an analysis of Internet literacy by gender, age, and occupation, a wide gap was found in Internet literacy according to occupation, with housewives scoring low as compared to office workers and students.

This is perhaps explained by the fact that housewives have fewer opportunities to access the Internet than office workers and students. With respect to the ability to properly utilize the Internet, it is important to be aware of information security on the Internet and to improve Internet usage manners to avoid causing other users trouble. In terms of the awareness of information security, even though only a small number of people surveyed change passwords on a regular basis, nearly 80% were aware of the security issue. Also, in regard to Internet usage manners, about 40% of respondents did not attach a signature which would show their contact address and other information when sending e-mail, and 30% were not aware of copyrights on information and who were the recipients of an e-mail which had been sent via CC:.

In order to realize a society where every Japanese citizen will be able to receive the benefits of IT, it is important that people acquire the ability to utilize an advanced information and communications network in order to obtain, share, and transmit a wide variety of information and knowledge on a global scale. In fiscal

Exhibit 1-27   Changes in Internet Literacy
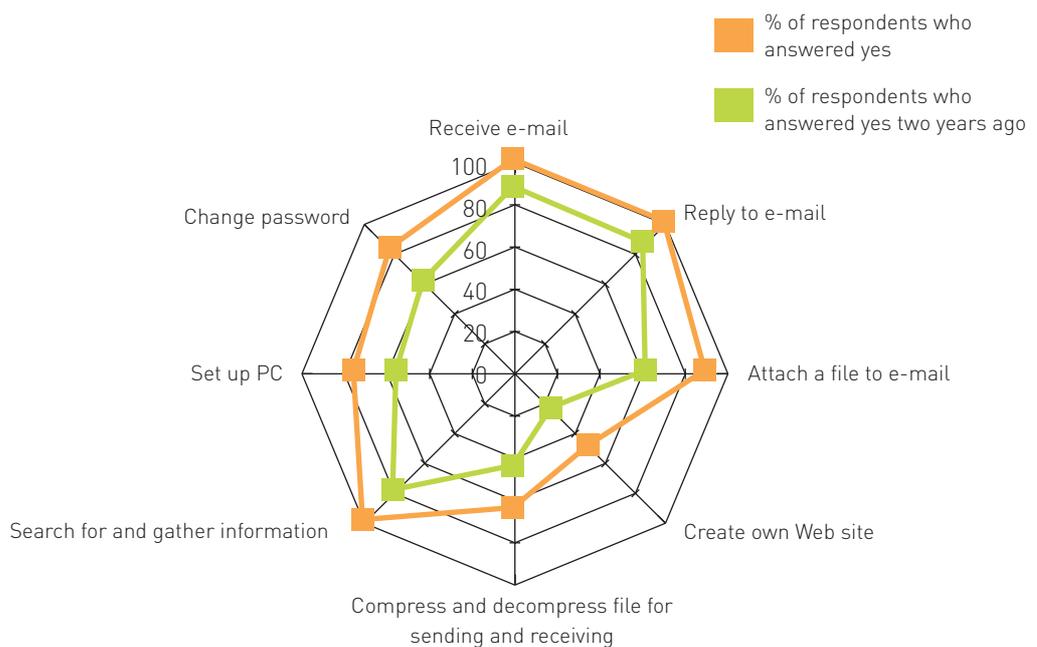
Source: *Survey and Analyses of IT and National Life*

2000, the Japanese government granted prefectures a subsidy (approx. ¥54.5 billion) to assist local municipalities and public agencies to teach their residents basic IT skills (basic operation of a PC, creation of documents, how to use the Internet, and how to send and receive e-mail) by sponsoring basic IT skills seminars. As of the end of fiscal 2001, approximately 5.5 million citizens (adults only) had attended these seminars.

In terms of the development of human resources to utilize IT, in addition to the development of the information literacy which is necessary in everyday life, it is also crucial to foster IT technicians who can make an important contribution to businesses by fully utilizing information and communications. A survey conducted on what kind of abilities businesses seek in people with specialized IT knowledge indicates that in the area of technology there has been an increase in the number of businesses that are focused on security-related abilities from three years earlier, while fewer businesses are now focused on abilities related to network, mainframe, and multi-purpose facilities. In addition, in the area of skills, there has been a shift of focus from technical ability related to information and communications to a designing and planning ability in order to generate high value-added services by utilizing information and communications and to stand out from competitors.

Seizing Digital Opportunities

A survey on Internet usage shows that teenagers has the largest rate of Internet usage of Internet users (72.8%), which is a reflection of the increased use of the Internet at school. In addition, a comparison of Internet usage according to age group between Japan and the United States shows that in the age group 14 to 49 Internet usage is roughly the same between the two countries, while in the age groups 10 to 13 and over 50 Internet usage is higher in the United States than in Japan. With respect to Internet usage by annual household income, the higher the annual household income, the higher Internet usage in both Japan and the United States. Furthermore, with respect to Internet usage by size of municipality, Internet usage is highest in government-designated cities and Tokyo 23 wards, and becomes lower as the size of the municipality becomes smaller from cities to town and villages. This trend is also seen in the

Exhibit 1-28   How Internet Usage Is Perceived by Housewives and the Elderly
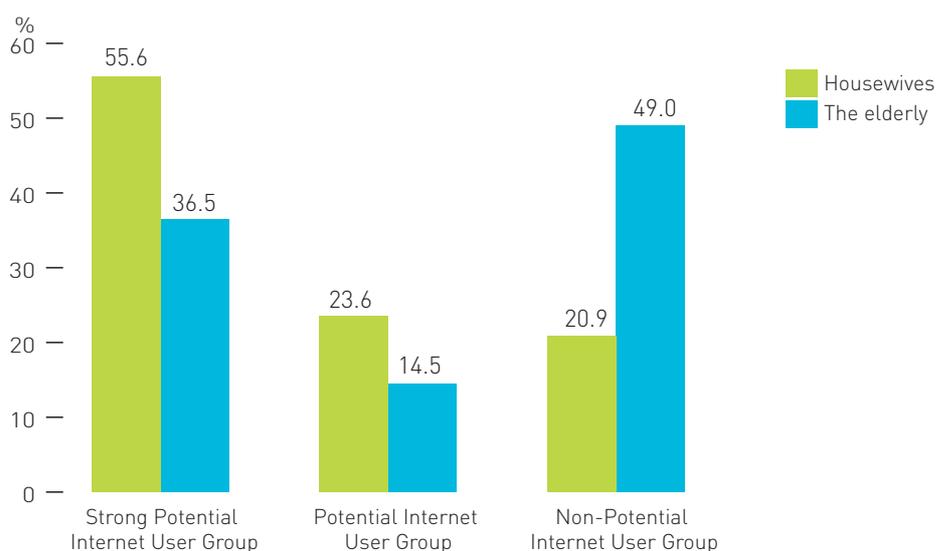
Notes:
1. Strong Potential Internet User Group: People who feel a need to use the Internet and would like to actually use the Internet
2. Potential Internet User Group: People who either feel a need to use the Internet or would like to actually use the Internet.
3. Non-Potential Internet User Group: People who do not feel a need to use the Internet and would not like to actually use the Internet.
Source: *Survey and Analyses on IT and National Life*

United States, even though differentials between the different sizes of municipalities are smaller in the United States than in Japan. In terms of Internet usage by gender, males tend to use the Internet more often than females. In the United States, however, there is no such gap between males and females in Internet usage.

With respect to the main reasons for not using the Internet, more than 30% of people who have never used the Internet responded that they have no need to use it, and that they can not use a PC, suggesting that there is a lack of both initial motive for using the Internet and the ability to use a computer. As a motive to use the Internet, more than 30% of these non-users would be interested in services that offer news and other information and in e-mail services, while over 20% listed on-line banking services and on-line shopping.

In order to alleviate obstacles faced by the elderly and challenged in using the Internet, it is possible to develop and put to practical use a specially designed PC and other hardware devices, or specially designed software. Nonetheless, the most common method at the present time is to use a regular PC that is supplemented by the use of software designed for the challenged. In addition, in response to the difficulties experienced by the challenged such as their inability to connect to the Internet and their difficulty in using a keyboard and mouse, measures have been undertaken across Japan such as seminars for the challenged and a home visit program to help them with using the Internet.

There is a tendency for housewives and the elderly to use the Internet less frequently than students and office workers. Going forward, in order to eliminate differentials in Internet usage in Japan, an important part of the agenda will be to promote Internet usage among housewives and the elderly who have never used it before. With respect to how the Internet is perceived by them, more than 50% of housewives and less than 40% of the elderly, who have never used the Internet before feel a need to use the Internet and would like to actually use it, suggesting a strong potential for increased usage of Internet among these people (**Exhibit 1-28**). In addition, among these potential Internet users, the most necessary condition for housewives to start using the Internet is lower Internet usage charges

(27.2%), less than ¥2,000 per month to be more specific, while the elderly would like someone living close by who could teach them how to use the Internet (18.5%), to be more specific they would like to attend a free seminar. These results show that economic conditions are more important to housewives, while the elderly are more focused on the availability of instructors. Notwithstanding the foregoing, both groups desire, in addition to further reductions in the cost of PCs and Internet usage charges, free seminars and voice input, which suggests further the high demand for measures such as IT seminars.

Current Status of Network Content

The total volume of content on Japan's Internet domain, the ".jp" domain, has grown sharply; in the three years starting August 1998, it grew by a factor of 6.7 (**Exhibit 1-29**). A look at the files by file type (HTML, still-image, video, sound, etc.) shows that the vast majority of these files are HTML and still-image files, with video and sound files making up just 0.1–0.2% of the total number. This proportion did not change greatly during the three years ending in August 2001. In terms of volume per 10,000 files, however, the proportion has changed dramatically: During the three years ending in August 2001, the volume of video data grew by a factor of 2.1 and the volume of voice data by about 200%. The volume of HTML data is now 7.2 GB per 10,000 files and that of still-image data is 4.8 GB per 10,000 files, while the volume of video data is 4,472.9 GB per 10,000 files and that of sound data is 556.1 GB per 10,000 files. While the increase in the unit volume of

video and sound files indicates growth in high-grade content, the fact that their share of the total number of files has remained constant suggests that these file types are underutilized. It would be desirable for the spread of broadband technology to spur an increase in use of this high-grade content, in turn leading to even more use of the Internet.

The media software content distribution market is worth a total of about ¥10.9 trillion, of which text software media has the largest share at 48.9%, followed by image software media at 41.9%. This market can be divided into the primary-use and secondary-use markets, and by media type. While terrestrial TV programming has the largest share of the primary-use market at 28.9%, its share of the secondary-use market is just 6.5%. As the spread of broadband generates more demand for image software content, an expansion of the market for distribution of image content, particularly terrestrial TV programming, would be desirable.

Exhibit 1-29 Trends in Internet Content Volume (with August 1998 assigned a value of 100)

	Aug. 1998	Aug. 1999	Aug. 2000	Aug. 2001	
Total servers	54,000	85,000	120,000	177,000	
Total pages	17.90	38.50	55.70	65.07	(millions)
Total files	36.48	85.74	132.04	167.00	(millions)
Total data volume	664	1,889	3,212	4,446	(GB)
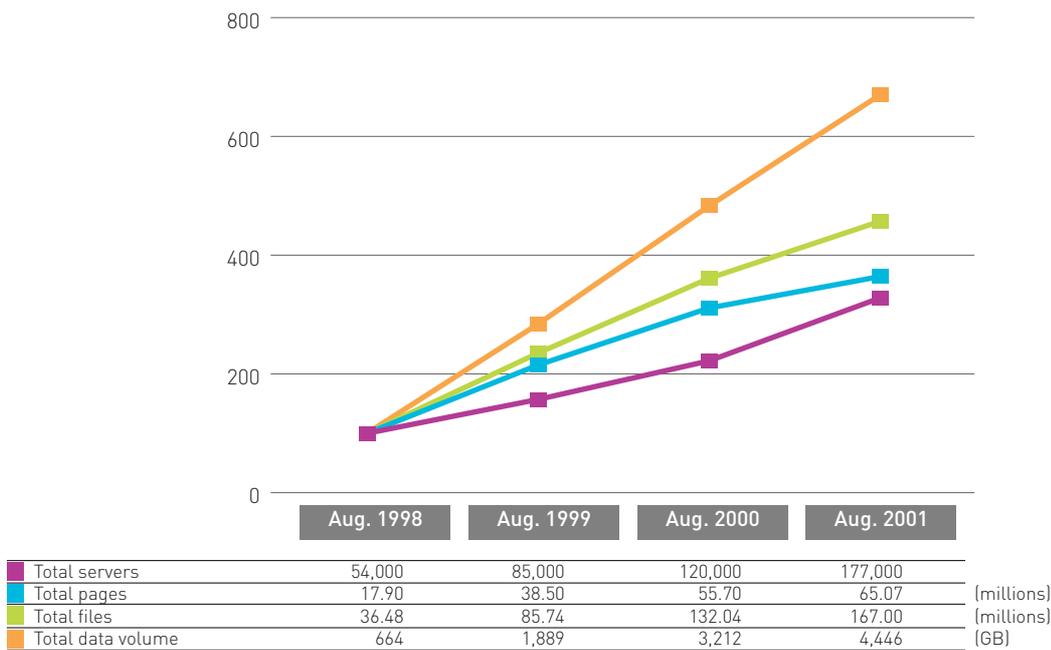
Source: *Research on a Statictical Technique for Internet Content*, Institute for Posts and Telecommunications Policy, MPHPT.

The sharp rise of broadband penetration rate has already led to the emergence of high-volume content distribution businesses; for example, some image and music content is now being distributed on a paid basis.

Users' Needs for Network Content

A look at users' needs regarding the services available via broadband reveals that these users intend to use all of these services to a greater extent in the future than they do now. Desire for entertainment-oriented services involving high-quality content is particularly strong; over 70% of users say they intend to use "services for downloading music, videos, etc., to be enjoyed at the user's convenience" and "services allowing users to enjoy, at their convenience, valuable content available only over the Internet." Intent to use paid video and music content is also strong; the majority say they would like to use such content if the price is equal to or less than the cost of renting videos or CDs (**Exhibit 1-30**). This attitude seems to reflect a perception of Internet content as something to be rented rather than purchased and saved.

To pay for content over the Internet, users say they prefer either the transaction means currently most often used in the e-commerce, such as postal or bank money transfers and credit cards, or methods such as Net Bank and proxy billing services provided by telecommunications carriers, which make it relatively simple to conduct small transactions. The main sources of anxiety or dissatisfaction surrounding the use of content are first, the speed of access lines, followed by "concerns that personal information might be leaked out" and "concerns that payment procedures might not be correct." About half of all users cited the latter two concerns, which suggests that the security of personal information is a user concern that-along with feelings of dissatisfaction about the time and effort required to make purchases and about the shortage of attractive content-merits attention. To promote further distribution of content over networks and make the network society more appealing, it is necessary not only to increase the amount of appealing content but also to establish systems and rules for content distribution that create a favorable environment for Internet use.

Exhibit 1-30   User Inclination to Pay for Image and Music Content Distributed over the Internet

Category	Image content	Sound content
Would like to use even if priced higher than content sold in stores	0.1	0.2
Would like to use if priced the same as content sold in stores	1.1	1.2
Would purchase even if more expensive than content rented from stores but not if more expensive than content sold in stores	7.7	10.2
Would like to use if priced the same as content rented from stores	26.5	27.3
Would like to use if priced lower than content rented from stores	30.3	30.1
Would like to use if available free	27.6	26.4
Would not use even if available free	6.6	4.7

Source: *Survey of Attitudes About Security and Illegal Activity on PCs and the Internet,* Institute for Posts and Telecommunications Policy, MPHPT

Protecting Intellectual Property Rights and Users' Awareness

Because digital content can readily be duplicated, and furthermore, almost nothing is lost in the copying process, issues such as copy protection have repeatedly come up for discussion. Increased Internet access and higher-performance computers, together with technologies allowing peer-to-peer (P to P) file-sharing and illegal copying of CDs, have brought copyright infringement issues to the forefront. One well-known case was the copyright infringement suit against Napster, operator of a peer-to-peer music file sharing system that attracted many users. In July 2000, a U.S. federal district court issued a preliminary injunction ordering Napster to cease operations. The company appealed the ruling, but in February 2001 a U.S. Federal Court of Appeals upheld the initial ruling in favor of the record companies and other plaintiffs that Napster's conduct had constituted a copyright infringement, and in March of the same year, a federal district court issued a provisional injunction ordering the company to cease providing its pertinent services. Both the plaintiffs and the defendant accepted this ruling.

While 40.3% of Internet users surveyed feel that "protection of copyright holders' rights should take priority," another 27.5% feel that "the convenience of users should take priority." This finding highlights the importance of deepening users' awareness of copyright issues, and of making rules that will allow content to be distributed in a manner that protects the interests of both copyright holders and users.

Network Content Trends Outside of Japan

Broadband access has become more widespread in Japan in recent years. However, this started happening in Korea and the United States before it did in Japan, and those countries have also been ahead of Japan in starting to develop content businesses premised on broadband technology.

Korea leads the world in terms of broadband Internet access. As of February 2002, some 57.3% of Korean households connected to the Internet had broadband connections—a much higher rate than in any other country, even the other economically advanced nations. A commensurately wide variety of broadband Internet services are available in Korea. One

popular service, which has been a major factor in promoting Internet use by that country's citizens, is one that combines communication and entertainment elements, allowing users to chat with friends while watching TV dramas via video-on-demand Web sites or to participate in network-based games that can simultaneously accommodate thousands of players.

In the leading Internet nation, the United States, broadband access is sharply rising; as of September 2001, 19.1% of households connected to the Internet were using broadband connections. Two paid music distribution services, Pressplay and MusicNet, commenced service in December 2001. Both of these services have mechanisms for copyright control and billing—two required elements for paid music distribution. Both companies are distributing music under the proper procedures, such as obtaining licenses from the record companies, and are billing users on a monthly basis.

Improving Copyright Protection and Enhancing User Convenience

To promote content distribution in a network society, it is necessary to provide adequately for both the protection of copyright holders and the convenience of users. To maximize the interests of both parties, maintaining balance between both, and promote the distribution of content, it is necessary to have appropriate mechanisms for managing rights between the holders and the content providers that are the users of copyrights, and to have secure, simple, and copyright-safe content distribution and payment collection mechanisms between content providers and general users.

Because the creation of image content involves multiple copyrighted items and multiple producers, issues related to rights are complicated. To distribute a broadcast program over the Internet, for example, various kinds of rights must be secured from multiple parties. It is necessary not only to secure rights from the program copyright holder, but also from the original author and the script writer, as well as the rights to use the melody and lyrics for the music used in the program, and adjoining rights from the performers and musicians. In response to the report of the Study Group on the Formation of Network Distribution Market of Digital Content, published in July 2001, the MPHPT investigated the concept of a rights

clearance system for the smooth handling of the necessary copyrights associated with on-line distribution of broadband content. In December 2001, the ministry published the findings of this investigation and solicited opinions on this issue. In light with these trends, rights holders and rights users has begun discussions pertaining to the desirable shape of a system for the clearance of rights between rights holders and rights users for on-line distribution of broadcast content. The ministry plans to use the conclusions reached in these discussions to develop a system that will smooth the process of managing rights for broadband content distribution on the network. The ministry plans to implement this rights clearance system on a trial basis starting in fiscal 2002.

To promote more distribution of network content, it will be necessary not only to ensure the reliability of billing and other systems, but also to make the process of obtaining content more convenient. Platforms for distributing high-quality content over the Internet—known as Content Delivery Networks (CDN)—not only distribute content but also provide for payment and user authentication and for copyright protection. More providers of these solution services are emerging in Japan as well as other countries, and are expected to promote further growth in the content distribution business.

The Importance of Guaranteeing Information Security

The Internet has become an essential piece of infrastructure permeating every aspect of society. The presence of e-commerce, e-government and electronic local government is an example of ways in which the Internet has made life more convenient for citizens, boosted their efficiency, and supported their creative endeavors. However, the availability of more and more information in digital form also increases the danger of this information's being used inappropriately. The recent rise of the Internet as social infrastructure has increased the likelihood of serious problems across the corporate, government, and private realms. Awareness and appropriate attitudes on the part of each and every Internet user will be instrumental in minimizing the potential for such damage-in keeping the network society operating safely.

Current State of Information Security Infringement

The sharp growth of the Internet and its increased use by private citizens has directly exposed all Internet users to an array of problems, including computer viruses, nuisance e-mail (spam), e-commerce fraud, and pornographic images and other undesirable content.

Computer viruses are a major security issue; about 60% of companies listed in the first and second sections of the Tokyo Stock Exchange reported having experienced infringements on their information security last year alone, with infection by computer viruses cited as the culprit in 96% of the cases (**Exhibit 1-31**). In 2001, a computer virus caused major damage by using e-mail attachments to replicate itself, and other viruses made use of security holes in e-mail software and Web browsers. In 2001, a computer virus targeting Web servers disrupted Internet operations worldwide. The virus known as Code Red caused problems all over the world, infecting nearly 300,000 servers throughout the United States alone in the space of 10 days.

Another security problem is unauthorized access, of which 1,253 known instances occurred in 2001. This was about 12 times the previous year's figure. Most of this unauthrized access was in the form of unauthorized overwriting of Web sites, of which 813 instances occurred. The second-largest source of unathorized access was by means of self-replicating programs (computer viruses) of which 94 instances occurred. The administrators controlling access to the computers affected by unauthorized access were companies other than Internet service providers in 429 cases;

Exhibit 1-31   Data Security Infringements at Private Companies

No response	**0.7%**
No security infringements have occurred	**39.0%**
Security infringements have occurred	**60.3%**
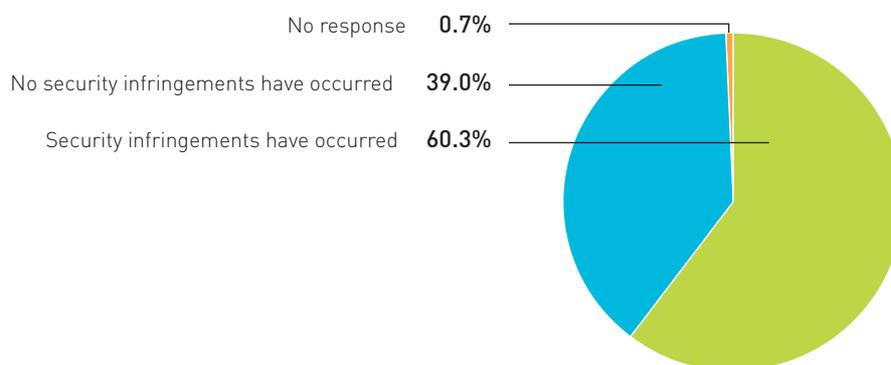
Source: *Survey On the Current State of Information Security Measures,* MPHPT

this figure far surpasses the number of cases in which the administrators were Internet service providers. This is believed to have happened because the viruses were targeting non-ISP companies, which were late to remedy their security holes. In 2001 the number of arrests related to Internet fraud grew sharply to 103—about double the previous year's figure. Of these arrests, about 60% were related to Internet auctions. In another problem area, spam (unwanted e-mail) to cell phones, the total number of complaints reached 140,000 in June 2001, but thanks to e-mail address changes and blocking features, this figure had dropped to about 60,000 by November of that year. Meanwhile, on Web-based bulletin boards, distribution of information that infringes on other users' rights (for example, libel) has become a problem. In one recent court case, a company applied for a provisional injunction to force a bulletin-board administrator to delete defamatory material that had been published about the company on the bulletin board, and in August 2001 the Tokyo District Court issued a judgment ordering the administrator to delete the material. Problems exist in other areas too. For example, there has been a succession of cases in which mistakes in companies' operations have resulted in leakages of client or employee data over the Internet. The situation calls for drastic remedial measures such as privacy policies.

Users' Needs for Security and Privacy

Though increasingly widespread use of the Internet is viewed as something that will make people's lives richer and more convenient, this progress could potentially be obstructed by citizens' anxieties and dissatisfactions, as well as their inadequate knowledge, about Internet use. The anxiety most often cited by Internet users about e-commerce is "Will my credit-card number or personal information be leaked to third parties?"; this concern was cited by 77.7% of users surveyed. The next most common concerns are "Will the product design and outer appearance really be the same as represented on the screen?" and "Will the product I have purchased arrive safely?"; the proportion of users citing these concerns added up to over 50%. These findings suggest that Internet users are still very anxious about sending personal data over electronic networks and about the reliability of on-line transactions. Computer viruses are also a major concern. About 70% of

survey respondents who use the Internet 20 hours a week or more said they had encountered computer viruses during 2001, and this proportion was about 50% even among people using the Internet less than 20 hours a week. Although many users say they take countermeasures against computer viruses by using untivirus software and updating their pattern files, 15.1% of survey respondents said they "don't do anything special" to guard against viruses; the Internet population is still believed to be at great risk for computer viruses. (**Exhibit 1-32**). Another source of user dissatisfaction is nuisance e-mail, also known as spam. Three out of four users report having received nuisance e-mail of some kind. The most frequently cited content of this mail is advertisements for on-line personal encounter sites.

Companies, having experienced the menace of unauthorized access, are believed to be addressing their security concerns in a variety of ways. Indeed, companies are more likely to add to the problems affecting Internet users than to be affected by these problems themselves. Care must be taken to ensure that company operations such as conducting e-commerce, using consumers' personal information, and advertising via e-mail do not cause problems for society at large. About 60% of companies engaged in on-line consumer business (including e-commerce) are taking measures of some kind to protect consumers' personal information. Specifically, the measures most often cited are "devising privacy policies," "designating employees to be responsible for managing personal information," "revamping systems and organizations," and "limiting personal data to the bare minimum needed." But although these accounted for a relatively large share of steps being taken by companies in this area, less than 30% of the companies surveyed are actually implementing them.

When companies and local government were surveyed to determine what kinds of countermeasures they were implementing to prevent unauthorized access, it was found that local public bodies lag behind companies in terms of implementing such measures. While implementation of anti-virus tools and firewalls has reached a high level, measures other than those are being implemented by only 30–40% of companies and only 10–20% of local governments. A particularly weak area for local governments is security policies; while 43.3% of

companies surveyed report having imple-
mented, or being in the process of implement-
ing, such policies, only 7.3% of local
governments report that they have done or are
doing so.

Tasks and Issues Related to Guaranteeing a Sound Network Environment

To foster a sound network environment that
offers the guarantee of information security, it is
urgent that technologies and services be devel-
oped to address the aforementioned problems.
A look at the current state of development of
such technologies reveals that two main kinds
of technologies are currently being imple-
mented: Technologies for foiling unauthorized
access; and technologies for guaranteeing a
sound network environment.

In the first category, technologies for pre-
venting unauthorized access, one tool is fire-
walls, which control access to private networks.
In addition to gateway firewalls, the most com-
mon type of firewall currently in use, a new kind
of firewall known as a host-base firewall, which
is integrated into the server, is now catching on.
Some network operators are combining these
two types of firewalls to boost effectiveness.
Another means of preventing unauthorized
access is tools for detecting and destroying
computer viruses; services and technologies for
integrated management of this task are cur-
rently being developed. Research concerning
tools for the detection of unknown viruses is
also in progress. Yet another tool for preventing

unauthorized access is Intrusion Detection
System (IDS), which monitor host access and
network communication and issue warnings
when they detect unauthorized access. Stealth
connections protect a system by assigning it an
IP address that is hidden from intruders;
researchers are currently working on bringing
stealth connections into practical use and devis-
ing standards to evaluate their performance.
R&D into IP address pack technology, which
makes it possible to trace the origin of unathor-
ized access by allowing designation of inter-
packet transmission origins, is now under way.

The second category of technologies for
addressing Internet users' concerns is tech-
nologies for guaranteeing a sound network envi-
ronment. Biometrics, a means of identifying
individuals via biological data such as finger-
prints, the brightness of the pupil of the eye,
voiceprints, and handwriting, is coming into
practical use as a means of controlling access
to rooms and of authenticating network logins.
Another technology for promoting a sound net-
work environment is content filtering, which
involves creating a list of sites and other content
unsuitable for children and limiting access when
appropriate, based on the nature and extremity
of the content. In this area, technologies for
automatically analyzing text and images and
omitting unsuitable content are sparking high
hopes.

Although a variety of technologies and ser-
vices are being developed to provide a sound
network environment, what is ultimately most

Exhibit 1-32 Computer Virus Countermeasures Currently Implemented
(individual users)
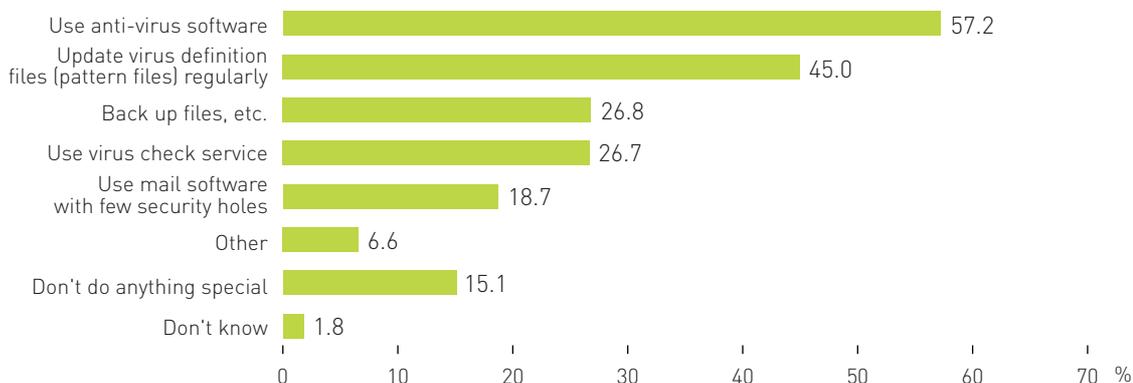
Source: *Survey Concerning Safety and Future Technologies in the Field of Information and Communications*

important is that users recognize their role in this process and heighten their awareness accordingly. When information systems operators at companies were asked what they considered to be their task for the future, two out of three cited "catching up with increasingly advanced and complex security technologies." When asked if they considered e-mail-based advertising a nuisance, 36.0% of companies surveyed said that they consider it either "an extreme nuisance" or "somewhat of a nuisance." However, the proportion of the general Internet user population that feels this way is three out of four. This finding highlights a perceptual gap between the senders and the receivers of e-mail ads. Tasks for building a sound network society include not only developing the appropriate technologies and services, but also cultivating network technicians to operate this network society effectively and devising rules to remedy the sources of user anxiety and dissatisfaction.

Establishing the Systems for a Sound Network Society

To guarantee information security, it has become necessary not only to implement technological measures but also to establish new systems and rules for the network society. Following are some of the main steps now being taken to put these systems in place.

To give electronic signatures the same legal authority as handwritten signatures or the impressions created by name seals, the government passed the Bill on Electronic Signature and Electronic Certification Operation in April 2001.

Another new law establishes standards under which users whose rights have been infringed by the electronic distribution of material can petition for the disclosure of information that designated telecommunication providers have about the originators of that material. The law also sets limits on the responsibilities of telecommunication providers to compensate wronged parties for damages in such situations. This law concerning the limitation on liability for damages by the designated telecommunications services providers and the disclosure of sender information went into effect in May 2002.

To protect personal information in the possession of public organizations and private companies, provision of a certain law comes up for discussion at the Diet. Telecommunication

carries are taking various steps to address the problem of nuisance e-mail. However, no fundamental solution to the problem of spam has yet been reached. The 154th ordinary session of the Diet passed a proposal for a law on topics of the appropriateness of sending certain designated e-mail.

To take a step toward the presence of electronic government by 2003, in October 2001 the Information Security Countermeasures Promotion Council within IT Strategic Headquarters devised an action plan for guaranteeing information security of electronic government, which sets forth detailed seven concrete measures and schedule for implementing extensive measures to guarantee the security of such information; the plan also provides for international cooperation and for cooperation with local governments in this effort.

Changes in Network Services and Trends in Technological Development

With the explosion in Internet users, the Internet environment is changing qualitatively, and new services and technologies are coming into use that will result in a "ubiquitous network society." These changes in the Internet environment can be seen in the communications network, which is getting faster and being used in more different ways; the increasing diversity in Internet-access devices; and the increasing sophistication of data management and access management. The most obvious change in our network environment has been the spread of fast or super-fast constant-connection, but in the future other kinds of changes can be expected: proliferating "hotspots" for wireless access, and the seamless integration of networking into everyday objects, as with smartcards that communicate wirelessly. The hardware at the edge of the network—today, mostly personal computers and cell phones—will likewise diversify to include devices that previously had functions completely unrelated to the network: televisions, telephones, household appliances, and even cars. As these trends progress, the companies that are involved in information communications will develop new services to keep pace. This will not just take the shape of today's data centers, which are an outsourcing service for data management, with a client-server model; but rather, data will be shared on a peer-to-peer (P to P) basis, with bits of data and services residing on a variety of servers all being tied together on a web-services model.

These changes in the Internet's landscape can be expected to bring about a network-services future, a ubiquitous network society, where the network is available anywhere, anytime; where personal and corporate users will both be able to use it in ways that most suit them, in any situation. Personal users can be expected to want remote monitoring and operation of appliances in their homes, but wireless access via hotspots, communication with other users, etc, will all remain important uses. Corporate users will need access in a variety of business situations—during sales calls, while performing maintenance, and during meetings—so the scope of the network can be expected to be expanded to accommodate them.

Communication Services and Technologies for the Network Society

In the past, most individual Internet users got on-line using analog phone lines or ISDN lines. More recently, though, the number of users with broadband access has skyrocketed. The emergence of wireless communication protocols, such as wireless LANs and Bluetooth™, and the wireless access systems that support them, are a portent of the coming ubiquitous networking environment "usable anywhere, anytime, by anyone, with any terminal." One reason wireless networking is attracting attention as a technology for ubiquitous networking is because of its potential as a service: hotels, restaurants, shops, airports, train stations, etc. can install base stations for wireless networking to provide high-speed Internet access as a service. Locations with these wireless base stations—often called "hotspots"—make it possible for a user to simply walk up with a properly equipped personal computer (PC), personal digital assistance (PDA), or the like, and instantly start surfing the Internet at 10 Mbps or faster. These types of service are now being offered on a commercial basis, and are a step towards ubiquitous computing. In the future, it can be expected that the number of hotspots will rise and information equipment with wireless LAN cards will proliferate, fee-based systems and business models will appear, and seamless access-control technology will be developed.

There has also been a revolution in miniaturization for the IC chips used in wireless smartcards. This allows everyday objects to be "tagged," making it possible to identify and acquire information about them, which in turn has led some to look for ways to provide network services that tie in with tagged objects. These services could allow e-commerce that would work by acquiring information about products from their ID tags; that information could likewise be collected and centralized. ID tags attached to publicity material could provide richer content (music, video, etc.), for an entirely new type of service. In short, the future will not

be limited by the past's hardware: All objects will be networkable, making the network an invisible part of everyday life.

Information Appliances Running IPv6

When one considers how people will want to use the Internet—what kind of hardware they will want to use, it can be imagined that people will want appliances and televisions to join PCs, cell phones, and PDAs, as networked devices, so that their appliances can be remotely operated (**Exhibit 1-33**). With the emergence of ubiquitous networking, it is possible to look forward to a society seamlessly connected through all types of devices, everywhere. One of the stumbling blocks to achieving this, however, is that the current Internet Protocol version 4 (IPv4) has only 223 possible addresses (about 4.3 billion). As many as this is, it is not enough to give every device a unique IP number for connecting to the Internet. This is one reason public and private organizations are promoting a transition to the successor, Internet Protocol version 6 (IPv6) solves the address-shortage problem and offers enhanced security as well. This is why the e-Japan Strategy sets "to promote a transition to IPv6 equipped Internet" as one of its objectives.

Japan is in the forefront of R&D related to IPv6 implementation, and is at the point of conducting extensive testing. In October 2000, the IPv6 Promotion Council was founded, and the MPHPT has taken part in it as an observer. The Council set up an IPv6 Trial Network, built to comprehensively test every aspect of an IPv6 network, from terminal equipment using IPv6 to the overall network structure, which

includes normal households. This is the first such large-scale test of IPv6 in the world.

A communications protocol used for ubiquitous network in the home, such as this is, can be expected to work with a variety of transmission media—wireless LANs and Bluetooth™ as well as power lines. Bluetooth™ is a very short-range wireless communication protocol, and power-line transmission piggybacks a data signal on the electrical wiring that already runs through homes. Both can be expected to be popular options, as neither requires any new wiring in the home to hook up information appliances. Bluetooth is already being used in products that network appliances in the home, in fact, while similar products based on power-line transmission are currently under consideration for near-term commercialization.

Developing New Services for Network Management of Distributed Data

To extract the full value from a ubiquitous network, the desired data must be instantly accessible anytime, anywhere. Corporations already come to use data centers that permit data management over the Internet. With the spread of broadband access, personal users as well will want to be able to call up data from their home PCs, and indeed, Web services that provide sophisticated services in a way that is readily accessible to the user, linking together various services that are available over the Internet, already provide an integrated interface to personal information over the network, and this new development is gathering considerable attention. Communications protocols like SOAP, that tie together applications, UDDI, for regis-

Exhibit 1-33 Network Devices that Internet Users Would Like to Be Able to Use
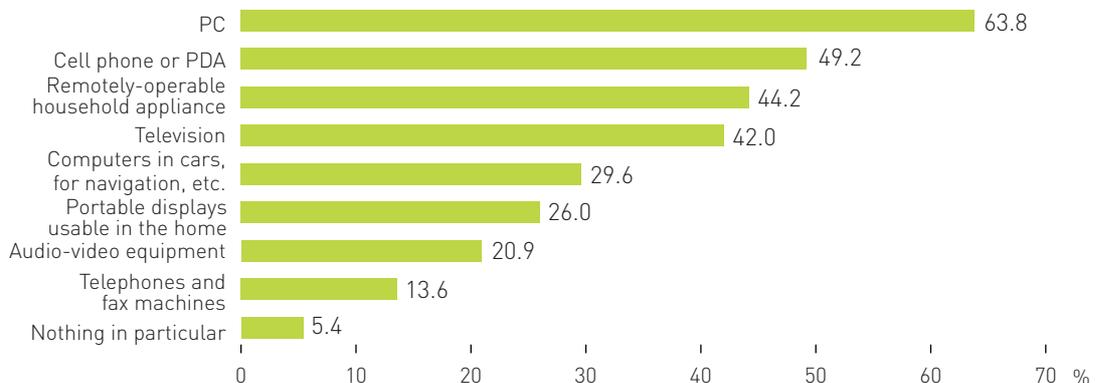
Device	%
PC	63.8
Cell phone or PDA	49.2
Remotely-operable household appliance	44.2
Television	42.0
Computers in cars, for navigation, etc.	29.6
Portable displays usable in the home	26.0
Audio-video equipment	20.9
Telephones and fax machines	13.6
Nothing in particular	5.4

Source: *Survey Concerning Safety and Future Technologies in the Field of Information and Communications*

tering and discovering application capabilities as services, and WSDL, a language for describing Web services, have all made some progress towards implementing Web services.

But when personal Internet users were asked their requirements for these ID-management type services, the main concerns cited were privacy protection and low-cost network fees; in addition, over half of users surveyed cited information security, indicating that safety is going to be a key issue in the further spread of these kinds of services.

Technology Development Strategies in the United States, Europe, and Japan

Advanced nations including the United States and Europe all aggressively pursue R&D in the IT sector. In the United States, a little under 50% of the budget for IT R&D was spent on advanced computing, enhancing the investment in long-term computing. In the European Union, with framework programs being implemented, 3.6 billion euro was spent on the "User Friendly Information Society" (IST).

When researchers in the IT field were asked what country or region they expected would lead research in the future, more than 85% answered U.S.A. for basic research, more than 70% for applied research. When asked to compare the level of R&D in the United States and Japan, the technologies where Japan was cited as having a lead were wireless handsets, information appliances, supercomputers, voice synthesis, language processing, and electronic and optical materials (**Exhibit 1-34**). When comparing the number of patents issued to the U.S.A. and Japan, the United States had a vast lead in terms of Internet-related patents, by a factor of 4.6, although looking at the long-term trend, the difference in the number of Internet-related patents has been shrinking.

While the United States has been the leader in Internet-related technology developments, the trend towards ubiquitous network, which will broaden the demographics of Internet users, is a promising one for Japan, which will be able to make its mark in the world by leading in areas that will grow more important: mobile communications, information appliances, human interface technology. Research and development on other technologies that will be important for creating a ubiquitous network environment—service discovery and structuring, access control—are also areas where progress is being made, and which will be necessary to create an environment with a rich level of services that is uniformly available.

Exhibit 1-34 Network Devices that Internet Users Would Like to Be Able to Use

Technology			Japanese technical strength relative to the U.S.
Network	Mobile communications	Base stations, switches	Poor
		Handsets	Good
	Internet		Poor
	Optical communications		OK
	Intelligent appliances		Good
Computing	Computer systems		Poor
	Supercomputers		Good
	Information management (massive databases)		Poor
Human factors	Voice processing	Speech recognition	Poor
		Speech synthesis	Good
	Language processing (machine translation, etc.)		Good
	Image processing		OK
	Intelligent systems (artificial intelligence)		OK
Components	Electronic devices		OK
	Electronic and optical materials		Good
	Sensors		OK
	Major components (displays, hard drives)		OK
Software	Programming languages		Poor
	Systems		Poor

Notes: "Good" indicates an advantage for Japan.
　　　　 "OK" indicates parity between Japan and the United States.
　　　　 "Poor" indicates an advantage for the United States.
Source: *State of Science and Technology in the Communications and Information Sector,*
　　　　 Council for Science and Technology Policy (May 2001).

Information and Communications in Japan
White Paper 2002

2
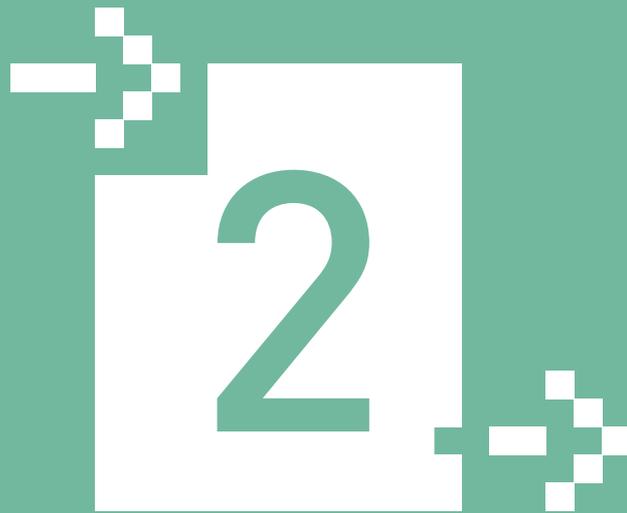
Chapter 2
**CURRENT STATUS OF
INFORMATION AND COMMUNICATIONS**

Market Size

The market size for Japan's information and communications industry in 2000 was an estimated ¥113.8 trillion (a 6.5% increase over the previous year). It has been consistently increasing since 1995 and continues to grow steadily amid the sluggish economic activity that continues to prevail in Japan (**Exhibit 2-1**). In addition, a comparison with the other major industries has shown that in 1996 the information and communications industry surpassed the construction industry in terms of size to become the largest industry, accounting for 11.6% of the total market size for all industries (a 0.5 point increase over the previous year).

Value Added

The real gross domestic product (GDP) of Japan's information and communications industry has continued to show growth, reaching ¥58.644 trillion in 2000, a 6.9% increase over the previous year. In addition, while Japan's real GDP has grown annually at an average rate of 1.43% over the period 1995 to 2000, the information and communications industry has achieved remarkably

high growth in its real GDP with an average annual growth rate of 9.17% over the same period.

Economic Analysis of Information and Communications

An estimation of the contribution made by the information and communications industry, which measures how much of an impact the growth of the information and communications industry has had on the overall rate of economic growth indicates that in 2000 the information and communications industry contributed 0.7% to an overall rate of economic growth that was 2.36%. A further look at this figure reveals that as far as the percentage of the contribution made by the information and communications industry to the overall rate of economic growth is concerned the information and communications industry contributed 30% to overall economic growth, which clearly indicates that the industry has become the backbone of Japan's economic growth (**Exhibit 2-2**).

Employment

The number of people employed in Japan's

Exhibit 2-1. **Market Size for the Information and Communications Industry in Comparison with All Industries**
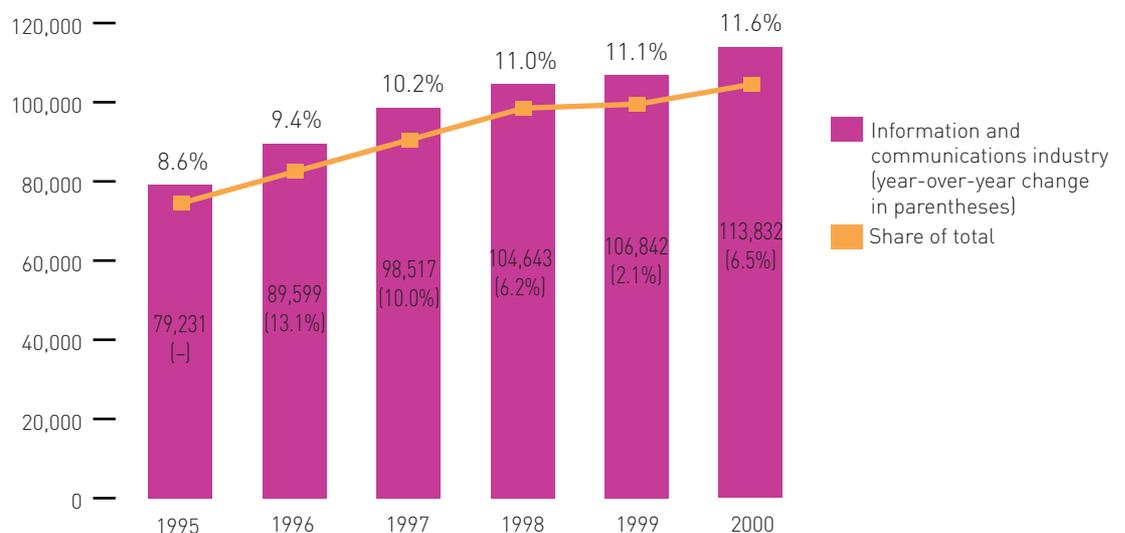
Source: Survey of IT Economic Analyses

information and communications industry in 2000 was 3,820,000 people, which accounted for 7.1% of the total employment in all industries. In addition, when individual industries are examined the information and communications industry is shown to be the third largest employer behind the 6,300,000 employees working in the retail industry and the 5,300,000 employees working in the construction industry.

Productivity

The annual rate of increase in total factor productivity for the information and communications industry over the period 1995 to 2000 was 3.45%, which is the highest rate among all industries. In addition, the average annual rate of increase in labor productivity for the information and communications industry over the period 1995 to 2000 was 8.34%, which is the second largest rate after the electrical machinery industry (not including the information and communications equipment sector).

Capital Investment

The amount of capital investment spent in fiscal 2000 in the telecommunications and broadcasting industry increased over the previous year, rising to ¥4,264.9 billion, a 4.3% increase over the previous year. In addition, despite the general expectation that capital investment will decline for all industries, the telecommunications and broadcasting industry is anticipating an increase in planned capital investment in fiscal 2001 to ¥4,337.8 billion (a 1.7% increase over the previous year), spurred on by an aggressive investment of capital by the mobile telecommunications carriers in response to the rising demand which followed a growth in cell phone subscribers and the start of the IMT-2000 service.

Sector Reorganization

With regard to sector reorganization in the fixed-line telecommunications market in Japan, in May 2001 KDDI, Japan Telecom, and NTT Communications made a foray into the local telecommunications market. In addition, the Tokyo Electric Power Company commenced its FTTH business in March 2002 after obtaining a Type I telecommunications business permission at the parent level in February 2002.

On the other hand, as far as sector reorganization on a global scale is concerned, in the international telecommunications market Concert, a joint venture between AT&T (U.S.A.) and British Telecommunications (BT, Britain), was dissolved in April 2002. In addition, the recent activities of telecommunications carriers in different countries includes the spinning-off into separate companies of the cell phone businesses of both AT&T, in July 2001, and subsequently BT in November 2001.

Exhibit 2-2.   Contribution to the Overall Rate of Economic Growth (2000)

Information and communications — 30.9%
Electrical machinery — 27.3%
Iron and steel — 5.9%
Construction — -8.6%
Wholesale — -12.8%
Transportation — 1.9%
Carrying machinery — 2.2%
Retail — 5.7%
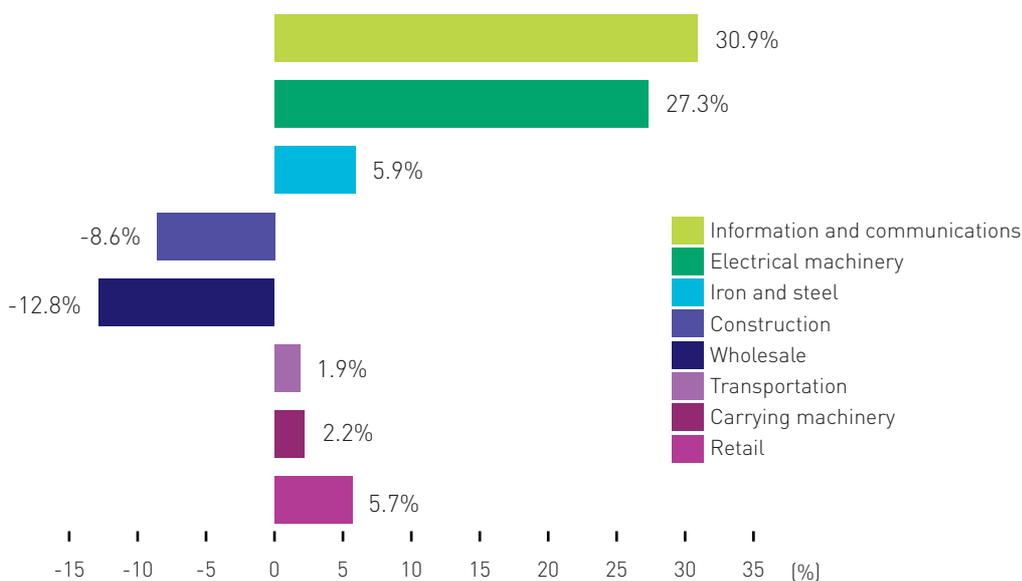
Source: Survey of IT Economic Analyses

Telecommunications Carrier

At the end of fiscal 2001 the number of telecommunications carriers in Japan surpassed the 10,000 mark, reaching 10,520 companies (**Exhibit 2-3**). In addition, among all the telecommunications carriers the number of carriers offering Internet connection services continued to rise to 6,741 companies.

A breakdown of the total operating revenues of the telecommunications carriers in fiscal 2000 indicates that the Type I telecommunications carriers earned ¥16,982.6 billion, a 9.0% increase over the previous fiscal year while the Type II telecommunications carriers earned ¥1,375.1 billion, a 49.7% increase over the previous fiscal year.

Telecommunications Services

Telecommunications services in Japan have become more and more diversified in terms of services offered, a fact which can be witnessed in the rapidly growing popularity in recent years

of those telecommunications services that are able to accommodate high-speed, large capacity data communications. These services consist primarily of DSL, cable Internet, IMT-2000. An overview of the number of contracts for the main telecommunications services at the end of fiscal 2001 is as follows:

The number of fixed-line telephone contracts was 50,740,000 (an 2.6% decline over the previous fiscal year) in fiscal 2001, marking the fifth consecutive decline. The current status of the telephone company advanced registration system (MYLINE), which was launched in May 2001, is such that as of March 31, 2002 around 70% of all domestic telephone users had already registered for MYLINE, and the total market share of NTT had surpassed that of new common carriers (NCCs) in each of the following areas: local communications, long-distance communications (within the same prefecture), and long-distance communications (outside of prefecture) (**Exhibit

Exhibit 2-3. Trends in the Number of Telecommunications Carriers

Fiscal Year End	1995	1996	1997	1998	1999	2000	2001	Year-over-year change
Type I telecommunications carriers	126	138	153	178	249	344	383	+39
NTT	1	1	1	1	3	3	3	±0
NTT DoCoMo and others	9	9	9	9	9	9	9	±0
NCCs	116	128	143	168	237	332	371	+39
Long distance/International carriers	6	6	7	13	22	32	35	+3
Local carriers	16	28	47	77	159	275	318	+43
Satellite carriers	4	4	5	6	5	5	5	±0
Mobile carriers	90	90	84	72	51	20	13	-7
Type II telecommunications carriers	3,134	4,588	5,871	6,602	7,651	9,006	10,137	+1,131
General	3,084	4,510	5,776	6,514	7,550	8,893	10,025	+1,132
Special (of which special Type II international)	50 (37)	78 (56)	95 (67)	88 (84)	101 (96)	113 (108)	112 (106)	-1 (-2)
Total	3,260	4,726	6,024	6,780	7,900	9,350	10,520	+1,170

Note: Figures at the end of fiscal 2000 have been revised following the release of the preliminary figures in the *Information and Communications in Japan White Paper 2001.*

2-4). The number of subscribers to ISDN in fiscal 2001 exceeded the 10 million mark for the first time and reached 10,330,000 (an 6.5% increase over the previous fiscal year) thanks to the rapid penetration of the Internet. In addition, the rate of increase in the number of subscription contracts for cell phones, which was 69,120,000 (an 13.4% increase over the previous fiscal year), slowed down slightly in fiscal 2001.

Telecommunications Charges

With respect to Japan's telecommunications charges in 2001, the Corporate Service Price Index (using 1995 as the base year), which was released by the Bank of Japan, indicates that in the area of fixed communications the charges for domestic telephone calls and ISDN showed a substantial decline, which is a reflection of an intensified competition driven largely by the launch of the telephone company advanced registration system (MYLINE). A substantial decline can also be seen in the charges for international leased circuits, which is a result of the lower pricing of the charges for international leased circuits to the United States. This lower pricing was driven by

the increased number of companies that have entered the market following the rush in recent years in the industry to install undersea cable networks across the Pacific Ocean. Meanwhile, there has been a similar consistent downward trend in the charges prevailing in the area of mobile communications as well. As compared with the rates charged in March 1993 when the 800-MHz digital cell phone service was launched, basic rates and charges for calls as of April 1, 2002 had fallen by up to 75% and 73%, respectively (**Exhibit 2-5**).

In addition, a comparison of the communications charges prevailing among the major cities in different countries reveals that Japan has shown either a substantial or an average decline in the level of rates charged for each of domestic calls, domestic leased circuits, and cell phones over the period fiscal 1996 through fiscal 2000 .

Status of the Usage of Telecommunications Media

A breakdown of the volume of calls in fiscal 2000 shows that the percentage of the volume of calls made between mobile communications

Exhibit 2-4. Market Share of MYLINE in Domestic Calls (as of March 31, 2002)

	NTT total	NCCs	Non-registered
Local calls	56.6	20.1	23.4
Long-distance calls (within the same prefecture)	51.8	25.3	22.9
Long-distance calls (outside of prefecture)	37.7	28.1	34.2
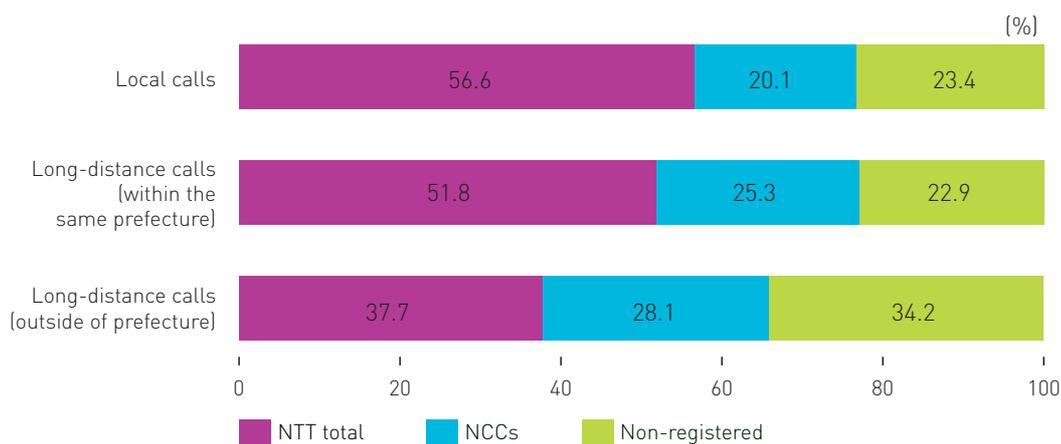
Note: Figures include both MYLINE and MYLINE PLUS registrations. The NTT total is comprised of NTT East, NTT West, and NTT Communications, Long-distance calls (outside of prefecture) excludes NTT East and NTT West.
Source: MYLINE Carriers Association

Exhibit 2-5. Downward Trend in Cell Phone Charges

Basic rates (Monthly rate)

¥17,000	

18,000 –
16,000 –
14,000 –
12,000 –
10,000 –
8,000 –
6,000 –
4,000 –
2,000 –
0 –

Reduction by approx. 73% to 75%

¥4,300 to ¥4,600

¥4,500

March 1993
NTT rate

As of April 1, 2002
NTT DoCoMo rate   NCC rate

Charges for calls*

¥260

300 –
250 –
200 –
150 –
100 –
50 –
0 –

Reduction by approx. 62% to 73%

¥80 to ¥100

¥70

March 1993
NTT rate

As of April 1, 2002
NTT DoCoMo rate   NCC rate

* Between cell phone and fixed-line telephone for a 3 minute call within the same prefecture during a weekday

terminals rose to 22.4% (a 4.2 point increase over the previous fiscal year), while the volume of calls which was accounted for by communications between fixed communications terminals declined to 59.5% (a 4.4 point decline over the previous fiscal year), which is a reflection of the shift from fixed communications to mobile communications. The total volume of calls in fiscal 2000 was 144.75 billion calls (a 7.7% increase over the previous fiscal year), and the total calling time was 7.03 billion hours (a 14.3% increase over the previous fiscal year). A further breakdown of these figures according to the type of communications terminal making the outgoing call shows that the rate of increase in the total calling time originating from fixed communications terminals and PHS was substantially higher than the rate of change in the frequency of calls made from these terminals, so that the calling time per single call has been on the rise. All of this suggests that a shift in the demand for communications is occurring rapidly from voice communications via the telephone to data communications via the Internet and other such media.

Broadcasters

At the end of fiscal 2001 there were 348 ordinary terrestrial broadcasters (of which 152 were community broadcasters), 146 ordinary satellite broadcasters, and 669 cable TV companies offering original programs (**Exhibit 2-6**) in Japan. In addition, following the implementation of the Law Concerning Broadcast on Telecommunications Services in January 2002, a new system has been in place to regulate broadcasting on telecommunications circuits such as communications satellites and fiber optics.

Operating revenues for broadcasters for fiscal 2000 rose over the previous year. Commercial terrestrial broadcasters earned ¥2,646.6 billion, a 6.6% increase over the previous fiscal year, commercial satellite broadcasters ¥189.1 billion a 17.7% increase over the previous fiscal year, and cable TV companies ¥246.3 billion, a 9.8% increase over the previous fiscal year.

In addition, NHK (Japan Broadcasting Corporation) was engaged in terrestrial broadcasting operations with its domestic broadcasting which consisted of a total of five television and radio channels, and in satellite broadcasting operations with its broadcasting satellite (BS) broadcasting with a total of six channels, including Television 1, Television 2, and High Vision.

Other than the above, the University of the Air was established in order to respond to Japanese citizens' request for opportunity to study university courses and is also aimed at promoting and developing broadcasting programs for university education. At the present time, the programs of the University of the Air are aired through terrestrial TV broadcasting, super shortwave broadcasting, and CS digital broadcasting. The programs on terrestrial TV broadcasting and CS digital broadcasting are repeated via cable TV. These programs can be seen across Japan.

Broadcasting Services

The number of commercial terrestrial television broadcasting stations in operation at the end of fiscal 2001 was 127, and approximately 90% of households in Japan were able to obtain at least 4

Exhibit 2-6.   Number of Broadcasters at the End of Fiscal 2001
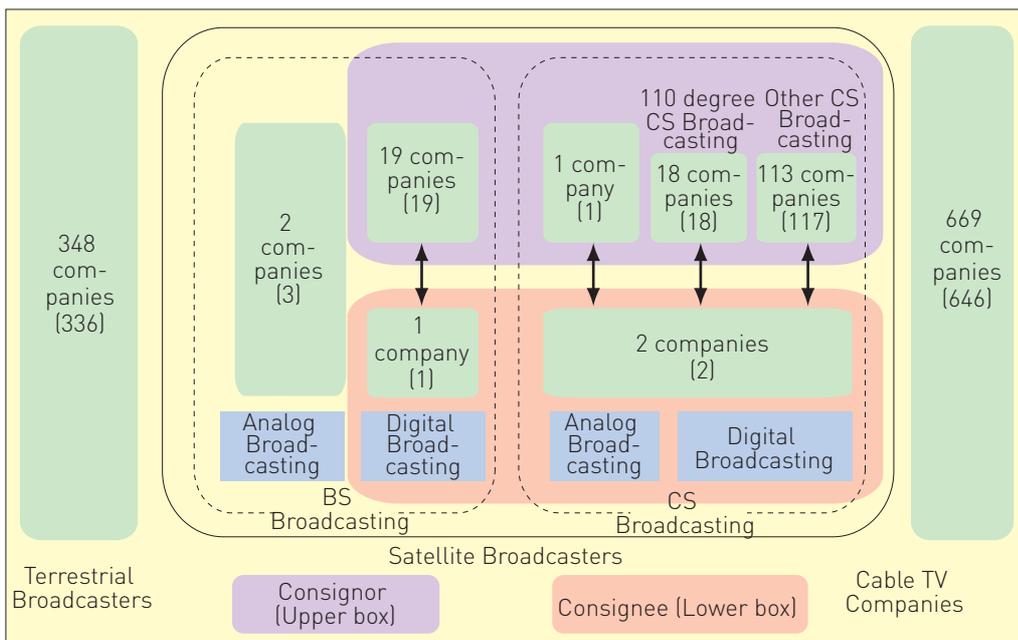
Notes: • Figures in parentheses represent numbers for fiscal 2000.
       • Figures do not include NHK and the University of the Air.
       • Cable TV operators are those offering original programs.

channels. With respect to satellite broadcasting, BS broadcasting commenced operations with analog broadcasting in June 1989 and digital broadcasting in December 2000, while CS broadcasting debuted with analog broadcasting in April 1992 followed by digital broadcasting in June 1996. In addition, consignor broadcasters for Plat-One and SKY Perfect Communications commenced broadcasting services in March 2002 and May 2002, respectively, using the N-SAT-110 satellite that was launched in October 2000 and is positioned at 110 degrees longitude east, which is the same as that for BS broadcasting. Even though cable TV was originally launched as a supplementary broadcasting media which was to be primarily focused on repeating already aired programs because of the reception difficulties experienced by viewers of terrestrial television broadcasting, its broadcasting programs have become diversified in recent years due to repeat broadcasts via satellite broadcasting and an increase in the number of original programs. In addition, NHK has been engaged in international broadcasting which is aimed at overseas reception, and both NHK and commercial broadcasters have been airing programs that are designed for foreign viewers overseas.

Broadcasting Fees

An examination of the structure of the reception fees and charges for both terrestrial and satellite broadcasting services shows that reception fees constitute the main source of revenue for NHK, while commercial broadcasters rely heavily on advertising revenues and pay-TV charges as their main source. In the case of BS digital broadcasting, which commenced service in December 2000, NHK so far has not established a reception fee classification specifically for this service, thus allowing its viewers with the existing satellite color contracts to receive this new service without any additional fee. In addition, fees for the BS digital broadcasting service contracts provided by commercial broadcasters have remained at about the same level as those for the BS analog broadcasting service, a move aimed at promoting the faster penetration of BS digital broadcasting.

Status of the Usage of Broadcasting Media

According to the Nationwide Survey on Individual Audience Ratings (June 2001), which is released by the NHK Broadcasting Culture Research Institute, television broadcasting viewing time in Japan is such that the average time of television broadcasting viewing per day (weekly average) in 2001 was 3 hours 51 minutes, which was the longest average time seen in 10 years and 30 minutes longer than the average time of viewing in 1992 (**Exhibit 2-7**). In addition, audience ratings on television broadcasting by time shows that the peak viewing times occur between 7:00 and 8:00 in the morning, between 12:00 and 13:00 in the afternoon, and after the early evening.

Exhibit 2-7.   Changes in the Average Time of Television Broadcasting Viewing per Day (weekly average)

	FY1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Commercial broadcasters total	2:27	2:30	2:35	2:41	2:34	2:30	2:40	2:35	2:41	2:45
NHK total	0:54	1:02	0:52	1:04	1:00	1:04	1:02	1:00	1:04	1:06
TV total	3:21	3:32	3:27	3:45	3:34	3:34	3:42	3:35	3:45	3:51
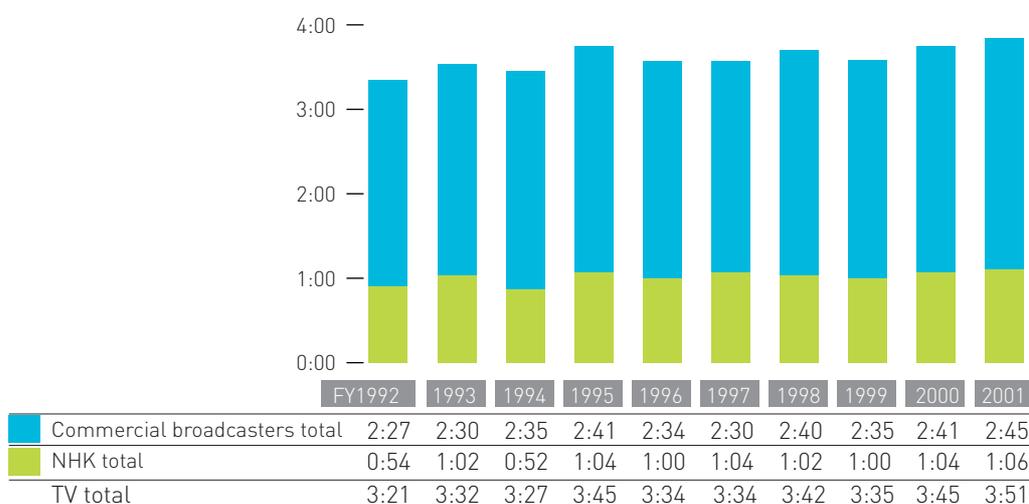
Source: *The Nationwide Survey on Individual Audience Ratings,*
NHK Broadcasting Culture Research Institute (June 2001)

Overview

The postal service incurred a net loss of ¥10 billion in fiscal 2000, which was a ¥45.3 billion improvement from the net loss in fiscal 1999 thanks to managerial efforts that included cutting back on the cost of personnel and supplies in order to reflect dwindling postal service revenues. Cumulative profits at the end of fiscal 2000 were ¥122.6 billion.

Mail Volume

As in fiscal 2000, the postal service continued to process a record high total volume of mail (a sum of the number of domestic mail volume and the number of international mail processed) in fiscal 2001, processing 26.7 billion items, a 0.7% increase over the previous fiscal year. In addition, a comparison of the total volume of mail processed by different countries in fiscal 2000 shows that Japan ranked third in the world after the United States and France. In terms of the annual volume of mail per capita in fiscal 2000, however, Japan ranked 18th, accounting for approx. 28.2% of the annual volume of mail per capita in the United States, which ranked first.

Services

Efforts are made for the improvement of various postal services in order to cater to the changes occurring in the social economy arising from the utilization of IT, the need for a total service which can consolidate logistics, information, and payment settlement functions, and the increasing and diversified needs of users for other diverse services. The Postal Service continues to develop new services, such as a service that will consolidate logistics, information, and payment settlement functions.

Postage Rates

Domestic postal rates, which are based on a financially self-supporting system, are determined in accordance with the principal of the equalization of income and expenditure. Postage rates for ordinary mail are based on a characteristic system of flat rates that are applicable nationwide. Inexpensive postage rates have been set for third-class mail and fourth-class mail in view of specific social policies in Japan. On the other hand, postage rates for parcel post are determined according to the applicable zone of destination and the weight of the parcel. In addition, as in the case of ordinary mail, postage rates for booklet parcel post for the mentally and physically challenged and other similar items have been set at a low level in light of certain social policies.

High-Speed and Ultra High-Speed Networks

Subscription-based networks that connect subscribers to the reception stations of telecommunications carriers used to be largely based on fixed-line telephones via metallic cables or ISDN. In recent years, however, they have rapidly become diversified through the advancing development of fiber optic cables, which reflects the increasing needs demanded by high-speed and large capacity data communications. The development of fiber optic networks has been undertaken steadily so that by the end of fiscal 2000 the coverage of the development of fiber optic cable networks in Japan was 43%, a 7.0 point increase over the previous fiscal year based on the hub points of telecommunications carriers (**Exhibit 2-8**). In addition, the progress being made in the wide-banding of transmission capacities as well as in the conversion to fiber optics within the backbone of the cable TV networks has gone a long way in coping with the broad-banding of the Internet, etc.

The development of domestic relay networks has been enhanced by the installation of fiber optics, and almost 100% of the relay networks that link exchange stations have been converted into fiber optics. In terms of the length of cables, 89% of the total length of cables, which amounted to approximately 270,000 km as at the end of fiscal 2000, have been converted into fiber optics. In addition, fiber optics has been used in the development of international undersea cable networks, allowing for high-speed and large capacity communications.

Moreover, in the area of Internet exchange (IX) there has been a movement toward the decentralization of IX into data centers in which the circuits for the Internet Service Providers (ISPs) are concentrated, and new IXs are being installed in the major urban areas.

Radio Stations

At the end of fiscal 2001 there were 74,345,634 radio stations, an 11.7% increase over the previous fiscal year. A breakdown of this figure shows that the increase in the total number of radio stations was primarily due to the significant growth in the number of land mobile stations including cell phone terminals, which stood at 71,709,278, a 12.4% increase over the previous fiscal year, due to the rapid penetration of cell phones. In addition, despite the fact that the number of base stations continued to decline for the second consecutive year to 793,860 stations (a 3.4% decline from the previous fiscal year), there was a dramatic growth in the number of base stations for IMT-2000, which stood at 8,119, a 4,042.3% increase over the previous fiscal year. This reflects the aggressive capital investment being undertaken by mobile telecommunications carriers in preparation for the full-scale launch of the IMT-2000 service.

Postal Network

In Japan, post offices are found in every municipality and offer equitable service across the country. As of the end of fiscal 2001 there were 24,773 post offices (no change from the previous fiscal year), 151,722 postage stamp retail agencies and revenue stamp retail agencies (preliminary figure) (a 0.1% decrease over the previous fiscal year), 78,939 Yu-pack (parcel post) agencies (preliminary figure) (a 4.3% decrease over the previous fiscal year), and approximately 177,000 mail boxes (preliminary figure), a 0.1% increase over the previous fiscal year.

Exhibit 2-8. Status of the Development of Fiber Optic Networks by Size of City

Classification / Fiscal year		Coverage 1994	1995	1996	1997	1998	1999	2000
Government designated cities and prefectural capital cities and equivalent	All areas	16%	21%	28%	34%	44%	56%	61%
	Main areas (Business areas)	32%	47%	74%	89%	92%	93%	94%
Cities with a population of more than 100,000 people	All areas	8%	11%	11%	13%	22%	31%	40%
	Main areas (Business areas)	6%	23%	48%	59%	69%	72%	72%
Other		2%	3%	5%	6%	8%	14%	22%
National average		10%	13%	16%	19%	27%	36%	43%

Note: Figures are as of March 31. Main areas refer to those areas in which business customers account for more than 50% of the subscribers.
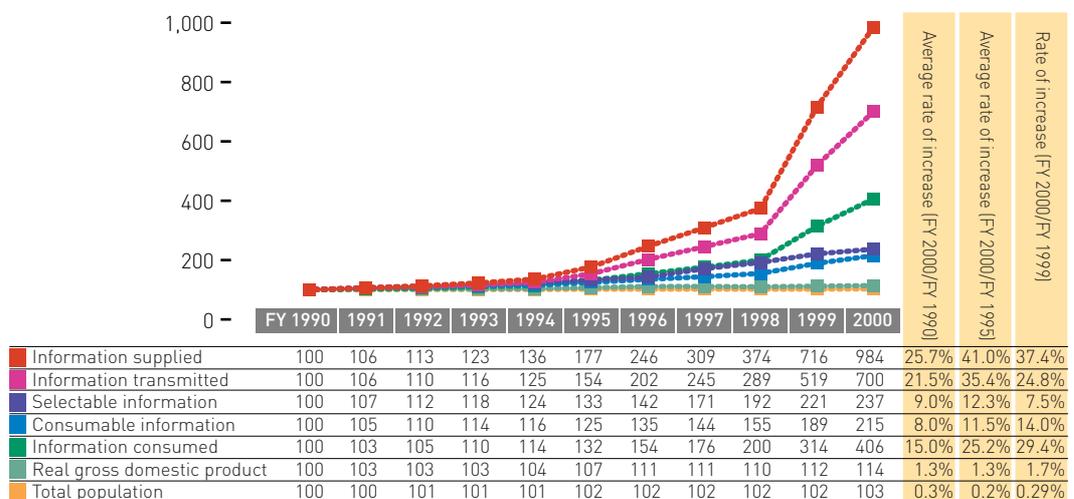
Information Flow in Japan

The Ministry of Public Management, Home Affairs, Posts and Telecommunications conducts the Census of Information Flow survey on a regular basis in order to get a comprehensive and quantitative grasp on the wide variety of information flows that form the information environment. According to the said survey, the volume for every category of information surveyed has consistently increased over the past 10 years, with a more significant growth seen in recent years (**Exhibit 2-9**). In addition, the survey has shown that the rate of growth in the volume of information flow in both "dedicated service (data transmission)" and "ISDN (data transmission)" has increased at an accelerating pace due to and in tandem with the digitalization of information and the development of networks, and that the volume of information for each of the above categories has also increased at an accelerating rate.

Regional Information Flows

A breakdown of the share of information transmitted in fiscal 2000 by prefecture shows that Tokyo had the largest share with 16.9%, leading the second largest share held by Osaka Prefecture (6.8%) and others by a large margin. As in the category of information transmitted, Tokyo had the largest share in selectable information with 12.6%, once again leading second place Osaka Prefecture (8.5%) but with a slightly narrower margin than in the former category. In addition, in the category of information consumed the share of Tokyo (11.5%) continued to lead second place Osaka Prefecture (6.9%), with the gap between the two being similar to the margin observed in the category of selectable information. All of the above suggests that even though the regional gap in information flows is large as far as the transmitting of information is concerned, such a regional gap has relatively narrowed when it comes to the consumption of information.

Exhibit 2-9.   Changes in the Volume of Information in Japan (1990 average = 100)

	FY 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average rate of increase (FY 2000/FY 1990)	Average rate of increase (FY 2000/FY 1995)	Rate of increase (FY 2000/FY 1999)
Information supplied	100	106	113	123	136	177	246	309	374	716	984	25.7%	41.0%	37.4%
Information transmitted	100	106	110	116	125	154	202	245	289	519	700	21.5%	35.4%	24.8%
Selectable information	100	107	112	118	124	133	142	171	192	221	237	9.0%	12.3%	7.5%
Consumable information	100	105	110	114	116	125	135	144	155	189	215	8.0%	11.5%	14.0%
Information consumed	100	103	105	110	114	132	154	176	200	314	406	15.0%	25.2%	29.4%
Real gross domestic product	100	103	103	103	104	107	111	111	110	112	114	1.3%	1.3%	1.7%
Total population	100	100	101	101	101	102	102	102	102	102	103	0.3%	0.2%	0.29%

Source: *Census of Information Flow*

The United States

The United States has undertaken major national projects in the IT-related field, which the government has been promoting from a nationalistic perspective, projects such as the research and development concerning the infrastructure for the next generation of ultra-high-speed Internet (Information Technology for the 21st Century (IT²), the design of an electronic government (E-Government Project), the development of human resources (strategic proposal by the President's Council on the 21st Century Workforce in accordance with Workforce Investment Act), the strengthening of national and public security (the establishment of a council on cyber-security based on an executive order, Infrastructure Protection in the Information Age).

In addition, the FCC has been studying the implementation of various policies that would ensure the growth of broadband and the creation of appropriate investment incentives as well as promote an increasingly active deployment of broadband services.

EU

In June 2000, the Council of European Union approved the eEurope 2002 Action Plan with the aim of positioning the EU as the most dynamic knowledge economy in the world by 2010. In addition, the Council of European Union released in February 2002 the eEurope Benchmarking Report, which evaluated the progress of eEurope-2002 based on data from its member countries.

Furthermore, on April 24, 2002 a new regulatory framework for electronic communications infrastructure and associated services was proclaimed and put into enforcement. This package is aimed at reviewing the existing regulatory framework in the telecommunications field and at further promoting competition in the telecommunications industry, which plays an important role in the European economy. As a result, all EU member countries have been obligated to legislate the above mentioned package under their respective laws by July 24, 2003.

Asia

After officially joining the WTO in December 2001, China has been undertaking the enhancement of its legal system while opening up its telecommunications market. In September 2000 the Chinese government enacted the Telecommunications Ordinance, which defined the telecommunications business as falling into two categories, namely, "basic telecommunications services" and "value-added telecommunications services." The new law effectively opened up the market to foreign capital in that it allows an up to 49% foreign ownership in the basic telecommunications services category, while there are no restrictions on foreign ownership in the value-added telecommunications services category. In May 2001, Hong Kong announced its IT strategy, called Digital 21, which is aimed at making Hong Kong a leading e-commerce community and a digital city in the globally linked cyber-world. Korea announced in January 2000 its plan to accelerate its plan for national digitization, which is part of Cyber Korea 21, in order to create an environment where by 2005 almost all households in Korea would be able to use a domestic high-speed Internet infrastructure. In India, the National Telecommunications Policy of 1994 was announced in 1994 to accommodate reforms such as the deregulation of telecommunications services and the privatization of state owned businesses, and to date all areas of telecommunications services, including international telecommunications which became deregulated in April 2002, have already been opened up to the private sector. During 2000, Singapore announced its Information Communications Technology 21 (ICT 21) Masterplan, which is a 10-year national plan commencing in 2001 covering the IT field, with the view to making Singapore a world-renown dynamic and vital information and communications center. With its Vision 2020 initiative, which was announced in 1991, Malaysia aims to join the league of developed countries by 2020. Malaysia is driving forward with government-initiated efforts aimed at promoting IT as a key area for national development with the objective of, among other things, enabling the country to thrive on the basis of an expertise in the fields of science and technology.

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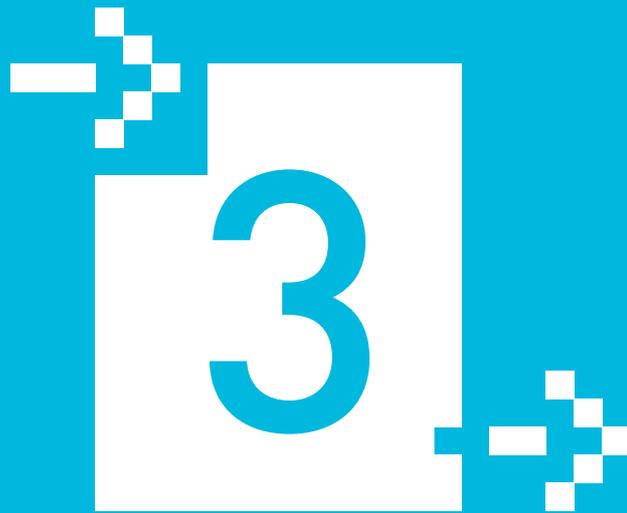
Chapter 3
**TRENDS IN INFORMATION AND
COMMUNICATIONS POLICY**

Promotion of a National IT Strategy

In an effort to properly adapt to the changes in socioeconomic structures that have been taking place on a global basis as a result of the utilization of information and communications technologies (IT), the Basic Law on the Formation of an Advanced Information and Communications Network Society (IT Basic Law) was submitted by the government at the 150th extraordinary session of the Diet, passed in November 2000, and came into effect in January 2001. IT Strategic Headquarters, which has been set up within the government in accordance with the aforesaid law, has established an e-Japan Strategy, which is aimed at making Japan the most advanced IT nation in the world within the next five years. In addition, the e-Japan Priority Policy Program was launched in March 2001 with the aim of executing the aforementioned strategy, followed by the e-Japan 2002 Program, an annual program which was created in June 2001 and incorporated the preceding e-Japan Priority Policy Program into national policy for fiscal 2002.

In addition, in accordance with the Basic Policies for Macroeconomic Management and Structural Reform of the Japanese Economy (the so-called "muscular policies"), which were approved at the Cabinet meeting in June 2001, the Reform Schedule and Advanced Reform Program were created at the Council on Economic and Fiscal Policy in September 2001 and October 2001, respectively. Meanwhile, IT Strategy Headquarters has been studying important and urgently needed IT-related policies, and put together the Acceleration and Advancement of e-Japan Priority Policy Program and e-Japan 2002 Program, which was incorporated into the Reform Schedule as well as the Advanced Reform Program.

Lastly, as we are about to enter the interim phase toward the goals set for the year 2005, the government plans to undertake an overall review of the e-Japan Priority Policy Program and plot out a new program, the e-Japan Priority Policy Program 2002, in June 2002, which will include more than 300 measures.

e-Japan-related Budget

The government prepared a budget for fiscal 2002 in order to surely pursue the e-Japan 2002 Program, which was submitted and approved at the 154th session of the Diet. The total amount of the budget for fiscal 2002 related to the e-Japan Priority Policy Program was ¥1,954.5 billion, which represented an increase of ¥34.1 billion from the previous fiscal year. In addition, the government separately approved two supplementary budgets in fiscal 2001, the first of which was for a total amount of ¥84.1 billion and the second of which was for ¥390.8 billion, each one representing budgets in connection with the formation of an advanced information and communications network society.

Competition Policy of the Telecommunications Industry for the Promotion of the IT Revolution

In July 2000, the Ministry of Posts and Telecommunications (MPT; now the Ministry of Public Management, Home Affairs, Posts and Telecommunications or MPHPT) consulted the Telecommunications Council with respect to the implementation of a competition policy for the promotion of the IT revolution aimed at, among other things, the creation of conditions ensuring fair competition in the telecommunications industry. In December 2000, the Telecommunications Council compiled its first report on this subject. Based on this report, the MPHPT submitted to the 151st ordinary session of the Diet a proposal for the partial revision of the Telecommunications Business Law, which was passed and issued in June 2001 and subsequently came into effect in November 2001. The principal revisions made to the aforesaid law include the following: 1) the provision of asymmetrical regulations; 2) the development of a system for wholesale telecommunications services; 3) the setting up of a telecommunications business dispute settlement commission; 4) the development of a system for ensuring the offering of universal services (basic telecommunications services); and 5) the expansion of the scope of businesses in order to allow more freedom in the management of NTT East and NTT West.

Provision of Asymmetrical Regulations

In view of the fact that the telecommunications business is of a highly public nature and is the foundation for people's lives and socioeconomic activities, the MPHPT submitted to the 151st session of the Diet a proposal for the partial revision of the Telecommunications Business Law which was aimed at introducing, in addition to the existing regulations mainly focused on bottleneck facilities, minimal rules to ensure the continuous prevention and elimination of monopoly abuse of the market. The proposed revision was passed on June 15, 2001 and came into effect on November 30, 2001. At the same time, the MPHPT created a mandatory ministerial ordinance in order to, among other things, define a standard of dominant telecommunications carriers in the mobile telecommunications market as those possessing more than a 25% market share in terms of revenue in a certain operating area.

Creation of a Telecommunications Business Dispute Settlement Commission

In the telecommunications sector 1) business disputes of an intricate nature involving network connections among telecommunications carriers have been on the rise, and as a result 2) there has emerged a need for strengthening the conflict resolution function to provide for the quick and efficient resolution of business disputes, which are becoming more complex in nature and occurring more frequently. Under the circumstances, the MPHPT submitted to the 151st session of the Diet a proposal for the partial revision of the Telecommunications Business Law aimed at strengthening the system of resolving disputes in the telecommunications industry. This law was passed in June 2001 and came into effect in November 2001. As a consequence, the Telecommunications Business Dispute Settlement Commission was created.

Implementation of a Universal Service Fund

In March 2002 the MPHPT submitted to the Telecommunications Council a ministerial ordinance related to the introduction of a system for a universal services fund. The scope of the basic telecommunications services that are applicable under the ordinance include fixed-line telephones, public pay phones, and emergency messages. Grants to be issued by the fund are calculated by using the earning cost offsetting method whereby losses in unprofitable areas are offset by profits in profitable areas in order to derive a true cost that is in effect the portion of losses that have not been offset by profits. The above mentioned partial revision and the related ministerial ordinance are expected to come into effect along with the fund system which is to be implemented in June 2002.

Development of a Competitive Environment in the Telecommunications Sector

Since August 2001 the MPHPT has held a study group on the development of a competitive environment and business model in the new information and communications era for which an interim report was prepared in January 2002. The study group plans to continue examining the development of a competitive environment in a full IP era and to put together a final report in June 2002.

Review of the Long Run Incremental Cost Model

In September 2000 the MPT (now the MPHPT) once again held a study group on the long run incremental cost model. Items that had been outstanding from the previous study group and items that were suggested by means of public participation were discussed, and a report was subsequently prepared in March 2002.

Approach to the Development of Broadcasting

In order to promote Japan's IT revolution, it is important to properly pursue policies for the broadcasting industry with insight into the developments in technological reforms and the broadbanding of networks. Under the circumstances, the MPHPT has convened various round table conferences such as the conference on the future outlook for broadcasting in the broadband era, a study group on broadcasting policies, an investigative commission on the role of cable TV in the broadband era, and an investigative commission on the role of satellite broadcasting.

Promotion of Policies for the Effective Utilization of Radio Waves

In order to meet the stringent conditions concerning radio waves, the MPHPT, in its efforts to ensure further transparency in the administration of radio waves, submitted to the 154th session of the Diet a proposal for the partial revision of the Radio Law, which is aimed at the enhancement of a system for investigating, evaluating, and publicly announcing the usage status of radio waves and a system for offering information related to radio stations. The above proposal was unanimously approved and passed, and publicly announced in May 2002. In addition, the MPHPT has held the Study Group on Policies concerning the Effective Radio Spectrum Use since January 2002 in order to

study, among other things, measures to smoothly execute the real location of radio waves, promote technological reform, and effectively utilize radio waves.

Development and Promotion of Network Infrastructure

In October 2001 the MPHPT publicly released the National Broadband Initiative, which is aimed at a nation-wide dissemination of high-speed and ultra-high-speed Internet through clearly stating its schedule to realize its plan by fiscal 2005, the allocation of public and private sector roles, the projected actual usage of the broadband Internet access, and expected changes in social life.

In addition, the MPHPT consulted the Telecommunications Council in February 2001 on the role of Internet policies in the twenty-first century in order to develop early on a high-speed and low-cost yet safe Internet infrastructure which would become the foundation for an advanced information and communications network society. In July 2001 the MPHPT received an interim report in response to the above consultation with respect to both advances in Internet use and advances in the Internet base. Furthermore, the MPHPT hosted a study group on IP network technology in light of the rapid shift from the existing network that is based mainly on telephone lines to an IP network, and prepared a report in February 2002 on this subject. The ministry has also aggressively promoted third- as well as fourth-generation mobile communications systems, and data communications via radio access networks. In February 2002 the MPHPT revised the ministerial ordinance concerning 2.4 GHz and 25 GHz in order to introduce and upgrade wireless LAN. In addition, the MPHPT has promoted measures in connection with Internet governance, the further spread of ITS, and the rectification of differentials among regions in cell phone services and the broadcasting sector.

Promotion of Advances in Broadcasting

The digitization of broadcasting leads to many merits for audiences and allows for a drastic saving in the number of frequencies used as compared to analog broadcasting, making it possible to respond to the need for new frequencies such as is required for mobile communications. A similar digitization of broadcasting has been promoted in a number of countries in the world including Japan, where digital broadcasting has already been launched in CS broadcasting, BS broadcasting, and cable TV. Meanwhile, the MPHPT allocated nearly ¥12.3 billion in its budget for fiscal 2001 followed by approx. ¥12.2 billion in its budget for fiscal 2002 to the necessary expenses that will be required to modify the frequencies of existing analog broadcasting (known as "analog-analog conversion") as part of the shift towards the digitization of terrestrial television broadcasting. In order for the government to fund these expenses by means of radio utilization fees, the Radio Law was partially revised in July 2001.

Convergence of Communications and Broadcasting

The need for new services that allow the convergence of communications and broadcasting has been on the rise, as digital broadcasting possesses a high affinity with the Internet, and it has become more and more easy to distribute the contents of digital broadcasting to various forms of media other than broadcasting by combining digital broadcasting with the Internet equipped with IPv6. The MPHPT submitted to the 151st session of the Diet a proposed law, which came into effect in November 2001, dealing with promoting technological development towards the convergence of communications and broadcasting, providing support for the developers of technology related to converging communications, and accommodating the promotion and acceleration of the development of services. In addition, in response to the progress being made in the convergence between transmission lines in communications and broadcasting, the MPHPT submitted to the 151st session the Laws Concerning Broadcast on Telecommunications Services, which came into effect in January 2002 and are aimed at systemizing that broadcasting which employs telecommunications services.

Formation of a New Content Distribution Market Toward the Broadband Network Era

In order to achieve the goal of the e-Japan Strategy, which is the realization of the most advanced IT nation in the world, it is essential to increase network content of good quality and create an optimal cycle for the development of infrastructure and the enhancement of content. As a consequence, the MPHPT has been promoting a wide range of policies towards the formation of a new content distribution market that would be able to accommodate the broadband network era. For example, as part of the research and development for a creative information and communications system, the ministry has consigned Telecommunications Advancement Organizations of Japan (TAO) a research and development project over the period fiscal 1998 to 2001 concerning a content distribution system that would promote the use of highly functional broadband content by utilizing such digital technologies as interactive functions and data storage functions.

Promotion of Telework and SOHO

Telework and SOHO (small office/home office) are forms of remote work that utilize information and communications technology. These forms of work offer a variety of benefits including the alleviation of the burden of commuting, the promotion of a greater compatibility between work, childcare, and nursing care for the elderly, creating more opportunities for women, the elderly, and the mentally or physically challenged to work, and the reduction of burdens on the global environment. In order to promote the widespread adoption of Telework and SOHO, the MPHPT has been promoting the development of local facilities and designs and R&D for the information and communications system.

Promotion of New Information and Communications Businesses

In order to promote new businesses in the information and communications field, the MPHPT has implemented a number of measures including financial support through the Telecom Venture Investment Partnership Fund, support for venturing upon new businesses based on innovative technologies through the Advanced Technical Research and Development Subsidy Fund System (telecom incubation), support for new businesses through the Information and Communications Venture Subsidy Fund System, and the establishment of the Information and Communications Venture Support Center.

Development of Human Resources

An extremely important issue in school education today concerns the development of the qualifications and abilities of young students, who will be living in the advanced information and communications society of the future, in order that they be independently compatible with on-going digitization. In fiscal 2001, all public schools in Japan had an environment that allowed for Internet connection, and in fiscal 2002 a new curriculum has recently been added to bolster information education. In addition, since the information and communications field has been rapidly growing due to advanced technologies, securing advanced IT technicians and researchers is a must in order to maintain and strengthen international competitiveness in the existing industries by utilizing IT. Under these circumstances, the MPHPT implemented in fiscal 2001 the Information and Communications Personnel Training Support System, which is expected to help Japan become a leading resource country for IT personnel by training people who possess technical knowledge as well as skills in the rapidly advancing information and communications field.

Promotion of Local Digitization

The MPHPT has been promoting comprehensive digitization in local areas with the view to improving education, welfare, and other services for residents, improving the efficiency of public administration, and rectifying the digital divide. To be more specific, in order to promote advances in local education, public administration, welfare, medical services, and disaster control with the goal of realizing a nation-wide development of local shared networks by fiscal 2005, the ministry as a whole has been supporting local public bodies. For example, the ministry has been focusing on supplementary projects such as a development project for local intranet infrastructure facilities, while utilizing independent local projects. It has also implemented appropriate local financial measures for both supplementary and independent projects.

Online Administrative Procedures and Laying the Groundwork for Public Certifications

The MPHPT plans to submit to the Diet a proposed law on the usage of information and communications technology related to administrative procedures. The proposed law will stipulate clauses that are aimed at improving convenience for citizens, simplifying administrative work, and increasing efficiency in public administration, by allowing applications, notices, and all other forms of administrative procedure to be processed online as a rule. In addition, in response to the need for a framework (certification system) that will verify the persons (applicant or public agency) who prepared the information on applications, forms, permits, and approval notices or confirm whether the information has been interpolated or not, the MPHPT in fiscal 2001 launched the operation of a Bridge Certificate Authority, to go along with the certificate authorities which were also launched by the MPHPT, the Ministry of Economy, Trade, and Industry (METI), and the Ministry of Land, Infrastructure and Transport.

    Furthermore, in order to enable applications, report, and other procedures to local governments available on the Internet, the

MPHPT plans to develop a certification infrastructure for organizations that is compatible with the Government Public Key Infrastructure (GPKI), and is also conducting investigations into a systematic framework of the construction of a public certification infrastructure for individuals.

Development of Public Systems

The TAO has been conducting research and development on a telecommunications system that would be used for public works (designated Joint Operation Initiative dealing with Network Technology) such as a model system for public individual certification infrastructure, combining communications and broadcasting technologies with the technologies in designated public areas on commission by the MPHPT and other related ministries in accordance with the Laws Regarding the Promotion of Research and Development on Designated Joint Operation Initiatives Dealing with Network Technology. In addition, in order to enhance the convenience to residents and to help rationalize public administration for national and local governments, the MPHPT is constructing a Residents Basic Registers Network System, in accordance with the Partial Revision to the Law of the Basic Resident Registers which was issued in 1999, as a structure to process matters concerning basic resident registers that go beyond the region of a city or village and to provide personal identification information to public agencies (national and local governments).

Local Government Wide Area Network

The Local Government Wide Area Network (LGWAN) is a network exclusively used for public administration that connects various local governments. The government has connected the LGWAN with the Kasumigaseki WAN in April 2002 in accordance with the e-Japan Priority Policy Program.

Digitization of Processing Applications and Notices at Local Governments

With respect to the general processing system used by local public bodies, a 3-year Electronic

Government Promotion Pilot Project was launched in 2001 in accordance with the e-Japan Priority Policy Program. In March 2002 a basic specification for the project was created based on the actual results of the project in fiscal 2001 at a meeting of the national government's Inter-Ministerial Council for Promoting the Digitization of Public Administration. Going forward, the council plans to investigate during 2002 the project's compatibility with the public personal authentication service, the LGPKI, the multi-payment network (MPN), and other such systems as the documentation management system and the system for processing individual work from other ministries. In fiscal 2003 the council will investigate the project's compatibility with the system for processing individual work from other ministries.

Measures Toward the Design of a Geographic Information System (GIS)

In fiscal 2000 the MPHPT compiled the Comprehensive GIS Shared Space Database Specification in order to promote the implementation of a comprehensive geographic information system (GIS), which is equipped with a database that can be shared among the different departments of local governments. In fiscal 2001 the ministry conducted a demonstrative test to put this specification into actual use, probed suggested operating techniques and uses of the database, and has just completed preparing a manual based on the test.

Promotion of the Digital Museum Concept

The MPHPT is currently promoting the Digital Museum Concept, which will allow anyone to access via network digital information the cultural assets accumulated in local cultural facilities (such art galleries and museums). In fiscal 2000 the MPHPT classified the development of systems for the Digital Museum Concept under the Local Information and Communications Infrastructure Development Project, and also implemented financial measures in the form of tax allocated to local governments for the production of digital content whose main theme is culture in local public bodies.

Local Development Through IT

In April 2002 the Okinawa Development Special Measures Law came into effect with the aim of implementing the necessary measures for promoting development in Okinawa.

This law positions the development of information and communications as the key to the development of Okinawa, and incorporates measures such as the creation of an information and communications industry special district system as well as an information and communications industry development plan.

In addition, the MPHPT implemented in fiscal 2001 an investigative analysis on the promotion of the Okinawa International Information Special Section Concept, the development of a server farm in Ginoza Village (collaborative work with the METI), the promotion of a multimedia facility plan in Kadena Town, the development of online travel guide operation for the Yaeyama area, and research in relation to the design of a northern wide-area network.

Development of the Telecommunications Usage Environment

In May 2002 a law concerning the limitation on liability for damages by the designated telecommunications service providers and the disclosure of sender information came into effect. This law set forth the necessary provisions articulating the liability of such telecommunication service providers as Internet service providers, allowing them to respond quickly and appropriately to cases involving the violation of rights of other parties in connection with information posted to Web pages and electronic message boards on the Internet. In addition, the MPHPT hosted a study group to address methods of dealing with nuisance e-mail, on which a report was compiled in January 2002. The study group discussed technical and systematic measures for controlling and preventing the distribution of nuisance mail. Subsequently, a proposal for a law on topics including the appropriateness of sending certain designated e-mail was submitted to the 154th session of the Diet, which was then approved. Furthermore, the development of a necessary legal framework with respect to individual information protection, and of electronic signatures and certification businesses has been undertaken. The MPHPT has established the Telecommunication Consumer Consultation Center, which deals with complaints and concerns related to telecommunications services from its users. It has also set up the Telecommunications Service Monitoring Institution.

Improvement of Safety and Reliability and Promotion of Crisis Management Measures

The Bill to Prohibit and Take Measures against Unauthorized Access (commonly known as the Bill to Prohibit Unauthorized Access) came into effect in February 2000 (July 2000 for some parts of the bill) under the authority of the National Police Agency, the MPT (now the MPHPT), and the Ministry of International Trade and Industry (now the Ministry of Economy, Trade and Industry). In addition, in October 2001 the government put together a communication and cooperation system between public and private sectors concerning measures against cyber terrorism in accordance with Special Action Plan on Countermeasures to Cyber Terrorism of Critical Infrastructure, which stipulates matters related to a communication system between the government and private sector in the event of cyber-terrorism. The MPHPT has added new criterion to the Guidelines for Information and Communications Network Safety and Reliability in order to improve the safety and reliability of a third-generation mobile communications system. In addition, the MPHPT has developed in collaboration with an independent public corporation Communication Research Laboratory (CRL), the Safety and Reliability Guidelines for Info-communications Networks, which was utilized during the United Stated terrorist attack incidents that occurred in September 2001.

Development of a Barrier-Free Information Environment

In order to eliminate the digital divide in relation to the elderly and mentally or physically challenged, the MPHPT has implemented a variety of measures designed to create a communications and broadcasting system that responds to the range of obstacles confronting the elderly and the mentally or physically challenged. In fiscal 2001 the MPHPT granted subsidies to eight business projects for research and development related to communications and broadcasting services designed for the elderly and the mentally or physically challenged. In addition, the ministry is implementing programming production support measures in order to provide closed captioning broadcasts for the visually and hearing impaired. In April Study Group on the Next-Generation Closed Caption was held and a report was prepared.

Development of the Radio Wave Usage Environment

In order to maintain a sound radio wave usage environment, the MPHPT has been aggressively promoting the appropriate use of radio waves by implementing measures such as that of imposing radio wave usage fees to prevent problems

of unwanted radio waves and illegal and unauthorized radio stations. In response to concerns that radio waves used on wireless telecommunications have a detrimental effect on human health, the ministry has adopted radio wave protection standards and is conducting on-going research related to this matter. On June 1, 2002, a partial provision is expected to be applied under the Regulations Concerning Radio Facilities and Regulations Concerning Technical Standards Compliance of Designated Radio Facilities whereby a maximum allowable value will be defined for the rate of radio waves that can be absorbed by humans from the use of cell phones and similar devices which are being placed on the side of head, and will legally require manufacturers of cell phones and wireless devices to rigorously ensure that this maximum allowable value not be exceeded.

Improvement of Media Literacy

Media literacy is defined as the organic convergence of following three abilities: 1) the ability to independently read and understand media; 2) the ability to access and utilize media; and 3) the ability to engage in communication through media, in particular, the interactive communication ability with readers of the information. The MPHPT has developed educational materials for the improvement of media literacy and began loaning it out to the public in July 2001 at telecommunications bureaus across Japan to improve nation's media literacy.

Development of Promotional Strategies in the Information and Communications Field by the Council for Science and Technology Policy

In accordance with the Second Basic Plan for Science and Technology, which was approved by the Cabinet in March 2001, four areas in the science and technology field including information and communications were given priority in the allocation of R&D resources due to their significant contribution to intellectual assets and their economic and social impact. Furthermore, in September 2001 promotional strategies for each of these four important areas were mapped out to further R&D in each field. Based on the area-specific promotional strategies, the MPHPT will clearly identify those areas that should be given priority in the ensuing fiscal year and this will be the basis for creating budgets and policies for allocating resources such as budget and human resources related to science and technology. The ministry will work together as called for with the budgeting authority to ensure that the policies will be reflected in the budgets. In addition, the area-specific promotional strategies will be actively and flexibly reviewed every year.

Support for R&D through Competitive Funds

In order to enhance the quality of R&D in the field of information and communications technology, as well as to further advance the capabilities of researchers by means of creating a competitive research environment that would result in the output of world-class intellectual assets, the MPHPT established in fiscal 2002 the strategic information and communications R&D promotion system. This system will enable the ministry to aggressively promote a creative and innovative R&D that complements important strategic issues.

System of R&D and Evaluation of R&D

With the establishment of a committee on the R&D system within the Information Communications Technology Branch of the Telecommunications Council, in January 2001, the MPHPT has been studying the status of the

R&D system in the information and communications field in Japan. The ministry has also been studying the evaluation of R&D in the information and communications field through the establishment of a committee on the evaluation of R&D within the Special Interest Group on Information and Communications Technology of the Telecommunications Council. After the ministry received the report in March 2002 on the Nature of Research Evaluation Pertaining to Information and Communications Technology, it created the MPHPT Guidelines for Evaluating Research and Development on Information and Communications. The ministry has started in fiscal 2002 to conduct a full-scale evaluation of research as part of its policy evaluation.

Development of Broadband DSL Network

In order to allow constant connection to a high-speed Internet network in areas where it is not possible to install broadband lines into each home by wiring an additional line such as a fiber optic line due to structural issues or opposition from other residents in the area, a hybrid method through the use of a broadband DSL (VDSL) has been gaining a lot of attention as a promising alternative. With this method, existing telephone lines will be used within the house, which will then be connected via optic fibers to the collective residential area. In response to the growing popularity of this new method, the MPHPT since fiscal 2001 has been engaged in R&D on a broadband DSL through commissioned research undertaken by the TAO.

R&D on the Next-Generation Internet

In order to promote the sound permeation and development of business applications on the Internet, the MPHPT has been engaged in research, thorough the TAO, on technologies related to the next-generation Internet, which will be highly secure and reliable and allow for ultra-high-speed and large-capacity networks. Areas of R&D that have been focused upon up until fiscal 2001 include producing ultra-high-speed and large-capacity, digital watermark, and authenticity verification of homepages. In fiscal 2002, which is the final year of this R&D

program, the ministry will continue to study intelligent information agent and cyber space (3D images) communication methods.

R&D on the Gigabit Network Technology

With the goal of realizing an ultra-high-speed network at the beginning of this century, the TAO mapped out a gigabit network for R&D purposes (JGN: Japan Gigabit Network) as an open test on a nation-wide basis. In fiscal 2001, by using the same facility, the organization conducted the expansion and strengthening of the aforesaid R&D gigabit network (adding compatibility with IPv6, etc.), R&D on the utilization of the gigabit network, and R&D on gigabit network technologies.

Development of Terabit-Class Super Network

The e-Japan Priority Policy Program includes the realization of the Super Internet which would possess a processing speed that is 10,000 times as fast and a connecting capacity that is 30,000 times as large as the existing Internet. Starting in fiscal 2002 the MPHPT has been promoting the development of a terabit-class super network. The ministry has been engaged in R&D on technologies for controlling and managing a terabit-class traffic via the securest and most appropriate route, and for quickly processing connections from various systems such as IPs and mobiles that have a variety of transmission quality and speeds.

R&D on Ultra-High-Speed Photonic Network Technologies

The realization of an ultra-high-speed network in an advanced information and communications society requires not only a backbone and access networks but high quality and efficient technologies that will process the transmission of information via optic signals on all nodes on the Internet. A network system created with these technologies is known as a photonic network. Since fiscal 2000 the MPHPT has conducted R&D through the TAO on such themes as technologies related to a higher-speed and wider-band backbone network, optic switching, technologies related to the operation of an optical network, and routing technologies within optic range. In addition, starting in fiscal 2001 the ministry has been engaged in R&D on a backbone photonic network technology, an accessline photonic network technology, and an Internet node full fiber optic technology.

Next-Generation Information and Communications Technologies Utilizing New Principles and Technologies Such as Quantum Engineering and Nano Technology

Quantum information and communications technologies, and technologies that apply nano technology and bio-technology to information communications are a focus of attention as revolutionary technologies that have the potential to make possible networks equipped with such superior features as cipher communications with guaranteed high security, ultra-high-speed communications that surpass optical communications, and the self-assembly and repair of a living organism. In February 2000 the MPHPT received a report, the Information and Communications Research and Development Basic Plan, from the Telecommunications Technology Council, and since fiscal 2001 it has been engaged in R&D, through the TAO of Japan in alliance with academic, business and governmental circles, on quantum cipher technologies which are expected to become available for practical use in the relatively near future. In addition, since fiscal 1998 the ministry has been conducting Information and Communications Breakthrough Basic Research 21, which is a project for promoting basic and interdisciplinary research that could result in a breakthrough, rather than an extension of existing technologies.

Measures Towards the Realization of Super Internet

The MPHPT is working towards making possible the establishment of basic technology that would realize the smooth distribution of various Web contents through the utilization of home information appliances and the Internet, and enabling every Japanese citizen to receive a wide range of Internet services at "any time" and "any place" through the production of electronic devices that will be equipped with Internet connectivity. In order to achieve the above, the ministry is currently engaged in R&D on home information appliances Internet (a comprehensive R&D on converting home information appliances into IPv6) and R&D on a Super Internet.

Outlook for Ubiquitous Network Technologies

As the speed of networks will continue to become faster and faster, and as ways to access networks will become further diversified, the arrival of a "ubiquitous network society" where

one will be able to use large-capacity applications is anticipated for the future. In order to clarify a future image for such ubiquitous network technology, and to study its social and economic impact, as well as R&D themes that should be undertaken, and the necessary promotion measures for the realization of such a society, the MPHPT since November 2001 has held an investigative study group on the outlook for ubiquitous network technologies, and expects to put together the outcome of said study in June 2002. Going forward, based on the outcome of this investigative study, the ministry plans to promote R&D on technologies that will be necessary for the realization of a ubiquitous network society.

Development of the Groundwork for Network Security Technologies

At present a wide range of problems are occurring such as the invasion of computers by hackers and computer viruses, resulting in a heightened need for measures related to information security. In order to promote R&D on basic technologies related to information security, the MPHPT has since fiscal 2001 engaged in R&D on basic technologies for network security focusing on four areas, namely: 1) network security technology; 2) access security technology; 3) distributed information (contents) security technology; and 4) common security element technology, and evaluation and inspection for such.

R&D on Stratospheric Platforms

Stratosphere platforms enable the usage of ultra-high-speed and multimedia mobile communications anywhere in Japan with the help of automatically operated airships equipped with communications devices suspended in the stratosphere at an altitude of approx. 20 km from the ground in relatively favorable weather. As a consequence, it has garnered a lot of attention as the new communications infrastructure and use of it in the near future is anticipated. The MPHPT and the Ministry of Education, Culture, Sports, Science and Technology have jointly conducted R&D since fiscal 1998 in alliance with academic, business and governmental circles, with the goal of a rapid realization of such stratospheric platforms. To be more specific, the MPHPT has been responsible for R&D on a communications and broadcasting mission and tracking control

system technology under the direct authority of the TAO.

R&D for the Realization of a Maritime Transportation System (Maritime ITS)

In order to further improve navigational safety, alleviate maritime traffic congestion, and reduce maritime transportation costs, a need has arisen for R&D related to the implementation of an advanced maritime information and communications system which would utilize information and communications technologies. In response to this need, since fiscal 2001 the MPHPT has engaged in R&D on the digitalization of maritime communications, with the goal of designing an advanced maritime transportation system in cooperation with the Ministry of Land, Infrastructure and Transport.

Advances in Space Communications

Space communication has many favorable features such as the capability of providing consistent service throughout the nation, simultaneous broadcasting capability, and being disaster-proof in nature, and as a result it has been widely used in areas such as communications, broadcasting, and astrometrics, contributing to the improvement of people's lives. In order to clarify the role of space communications in the information and communications infrastructure which is expected to be rapidly developed and advanced in the future, and to study technological issues and the approaches that will be necessary for the realization of space communication, since May 2001 the MPHPT has held a study group on the role of space communication towards the formation of an advanced information and communications network society, for which a report was prepared in February 2002.

R&D on Information and Communications Technologies for the Design of GIS

In fiscal 1999 the MPT (now the MPHPT) commenced R&D on information and communications technologies needed for the design of a three dimensional GIS as a four-year program ending in fiscal 2002. It is expected that the use of the three dimensional GIS will prove effective, due to its realistic visual expressions, for the creation of view simulations in urban planning, marketing evaluations in the course of business activity, and the design of disaster prevention information systems.

Standard Time Delivery and Time Authentication Services

Since January 2002 the MPHPT has held a study group on R&D related to standard time delivery and time authentication services. The study group has focused on the following areas, for which a report was prepared in June 2002: 1) domestic and international trends in the time stamping business; 2) future images for the time stamping business and their utilization; 3) selection of R&D themes and issues related to the standardization of time stamping technology; 4) social and economic effects of the time stamping business; and 5) promotional measures related to the time stamping business.

R&D on Moving Picture Natural Vision

As a leader in R&D on communications and broadcasting technologies, the TAO has been conducting R&D on the Natural Vision, which is able to recreate colors as close to their natural state as possible. With the goal of recreating an object as close to its actual state as possible in terms of its color, texture, stereoscopic effect, and glossiness, the TAO is working towards the development of a next-generation image display and transmission system based on multiple primary colors that will surpass the current color display system, the three RGB primary colors.

R&D Activities of the Communications Research Laboratory

On April 1, 2001 the Communications Research Laboratory (CRL) saw a new beginning as an independent administrative agency. As the only public R&D institution in the information and communications field, it is expected by many to fulfill its duties by utilizing a collection of research accomplishments from its previous existence as a national research institution, and maximizing the advantages it possesses from its efficient and active research conducting system as an independent administrative agency. The CRL has mapped out a medium-term plan designed to achieve the medium-term goals (from fiscal 2001 through fiscal 2005) designated by MPHPT Minister and has engaged in cutting-edge R&D that is considered too risky and difficult to be undertaken by the private sector, in order to enrich people's lives by strengthening the competitiveness of the information and communications industry in Japan and utilizing cutting-edge IT technology.

Promotion of International Policies

With respect to recent trends at the G8 summits, a report concerning an action plan to eliminate the international digital divide (the Geneva Action Plan) was submitted by the Digital Opportunity Task Force, which was supported at the Geneva Summit held in July, 2001 with an agreement to review the progress status of the Geneva Action Plan at the Kananaskis Summit (Canada), which will be held in June 2002. In addition, in order to resolve international economic issues in the information and communications field, Japan has been actively working to promote international mutual understanding and international cooperation through a variety of meetings between two or more countries. In terms of the trends in international satellite communications, INTELSAT and INMARSAT have implemented organizational reforms in private sector companies offering services and in the governmental agencies overseeing these private sector companies as a result of the intensified competition that is due to the entry into the market of private sector companies and the diversification of services.

Promotion of International Cooperation

The MPHPT has been providing assistance for the development of human resources in the IT field, the creation of IT policies and systems in developing countries via communication with the responsible information and communications authorities, the development of an information and communications groundwork by conducting international joint tests, and for international and regional institutions promoting global cooperation in order to resolve the international digital divide. At the same time, in cooperation with the Ministry of Foreign Affairs, the Japan International Cooperation Agency (JICA), and the Japanese Bank of International Cooperation (JBIC), the MPHPT has made contributions to the continuous development of the information and communications fields in developing countries mainly through Official Development Assistance (ODA).

Promotion of Activities Towards International Standardization

The International Telecommunication Union (ITU) plays a central role in international standardization in the information and communications field. Within the ITU, the Telecommunications Standardization Sector (ITU-T) and the Radio Communications Sector (ITU-R) engage in standardization activities.

Response to Development of the International Distribution of Telecommunication Devices

The MPHPT has consistently promoted mutual recognition between the countries of the world. For example, the Agreement on Mutual Recognition between Japan and the European Community was signed in April 2001 and came into effect in January 2002, enforcing mutual recognition in four areas, namely, telecommunications devices, electronic products, chemical products, and pharmaceutical products. As a result of this agreement, the MPHPT has been promoting mutual recognition with the European Union and has enacted and enforced the Law for Implementation of the Mutual Recognition between Japan and the European Community in Relation to Conformity Assessment of Specified Equipment, which is designed to facilitate the export and import of telecommunications devices, and cabinet orders.

Partial Privatization of the Postal Services and the Entry into Postal Operations by the Private Sector

In order to freely exchange opinions with influential individuals on the partial privatization of the postal services and the entry into postal operations by the private sector, a study group on the partial privatization of the postal service, sponsored by the minister of MPHPT, has been held since August 2001 and an interim report was prepared in December 2001. Based on this interim report, the MPHPT has just recently submitted to the 154th session of the Diet a draft law on the partial privatization of the Japanese postal service, a draft bill on the enforcement of the law related to the nationalization of the Japanese postal service, a proposed law concerning the delivery of letters by private sector carriers, and a proposed law concerning the development of laws related to the enforcement of the law concerning the delivery of letters by private sector carriers.

Promotion of One-Stop Service at Post Offices

A proposed law concerning processing designated administrative functions of local public bodies at post offices was submitted to the 151st session of the Diet, passed at the 152nd extraordinary session of the Diet, and came into effect on December 1, 2001. The said law is designed to enable post offices to process the administrative work required for the issuance of copies of the Resident Register and other such things in order to enhance convenience for residents and to contribute to the rationalization of the organization and operations of local public bodies.

Liberalization of the Postal Network

In order to improve the delivery of parcels that need refrigeration, which is becoming popular these days, the post office has begun handling the delivery of these parcels, which are consigned to the post office by private sector transporting companies, to any place in the country by utilizing the postal network. This will result in further improvements for customer convenience through a continued liberalization of the postal network, which is a significant infrastructure in the every day life of Japanese people, and an increase in the number of access points where customers can send parcels that need refrigeration via the existing network of private sector transporting companies.

Enhancement of Postal Savings Network Services

In order to increase the convenience for users of postal savings, the MPHPT has implemented a number of measures that enable various services to be utilized without the need to go to the post office, such as ATM services linked to the banks and reciprocal fund transfer services between post offices and banks, debit card services, and postal savings Internet home services.

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