Chapter 1

Featured Topic: Ubiquitous Economy

General Remarks

Ubiquitous networks are information and communications networks through which users can freely use networks, terminals, and digital contents with a sense of security anytime and anywhere without being aware of the presence of the networks. They enable "person-to-person," "person-to-goods," and "goods-to-goods" communications at any place and realize seamless and universal communications.

Ubiquitous network society where ubiquitous networks have fully diffused has the potential to integrate dispersed social components through the networks, because ICT will penetrate all social and economic activities. Thus, an advance of ubiquitous networks is expected to contribute to promoting an accumulation of knowledge and technology in all social and economic aspects, to changing the existing social and economic systems, and to accelerating technological progress which is the source of economic dynamism.

This White Paper features "ubiquitous economy,"— or the social and economic characteristics which are brought by the development of ubiquitous networks toward achieving ubiquitous network society (u-Japan) by 2010. It examines the mechanisms by which an advance of ubiquitous networks changes Japan's social and economic systems and creates economic dynamism from the following two viewpoints: "economic performance toward achieving ubiquitous network society" and "an impact of ubiquitous networks on social and economic activities."

1 Economic performance toward achieving ubiquitous network society

The current situation of ICT industries suggests that, although the industries experienced a business recession with the collapse of the ICT bubble, the process of "creative destruction" is still ongoing, based on the technological innovations in the ICT field including the emergence of new businesses using the Internet.

At the same time, ICT use has also been spreading among individuals and households with the development of ubiquitous networks, but obvious improvements in productivity have yet been observed at the macro level. Impacts from the development of ubiquitous networks are expected to emerge in the following social and economic activities at the micro level first, rather than at the macro level.

2 Impact of ubiquitous networks on social and economic activities

Unlike in the 1990s when the development of ICT and networks were observed mainly in businesses and industries, it will be in all fields, including individuals and households in ubiquitous network society. This will have a possibility of creating new direct contact points between businesses and individuals or between suppliers and consumers, which may have great impacts on social and economic activities as well as mutual relationships, such as (1) an achievement of diverse information distribution societies, (2) an elimination of information mismatching, and (3) an improvement in productivity and human capital.

(1) Achievement of diverse information distribution societies

It is expected that user needs will expand with the advance of convergence between communications and broadcasting. Also, "the Long Tail phenomenon" (achieving sales of products with low and diverse demand) will emerge in network transactions between suppliers and consumers due to new trends including Web 2.0, which will cultivate niche markets and satisfy diverse user needs. Furthermore, with the rise of consumer-generated media (CGM) such as blogs and social networking services (SNS), knowledge and various opinions will be increasingly provided or returned to the society as all types of entities will become able to send out information at a low cost.

(2) Elimination of information mismatching

With the decrease of users' information search costs due to the development of Internet personal ads, portal sites, and search engines, as well as the implementation of effective marketing by using these tools of companies, attempts will be made to eliminate mismatching between information suppliers and information seekers. This is expected to contribute to greater user satisfaction, stronger business competitiveness, more efficient markets, and globalization of transactions.

(3) Improvement in productivity and human capital

As observed from the development of open-source, the advance of networks has the potential for facilitating knowledge accumulation and consequent collaborations, and for significantly improving knowledge productivity in the entire society.

In addition, a diverse labor supply is expected to become available in the labor market through flexible working environments including telework. Furthermore, in line with the increase of ICT use in businesses, emphasis will be placed on knowledge and human resources as the source of the competitive advantage, and labor demand will increase for specialists who can have originality and scarcity value. Such increased focuses on specialists will promote the concentration of management resources into the core operations and increase outsourcing.

Section 1

Trends of the ICT Industry

1 Trends of the ICT Industry

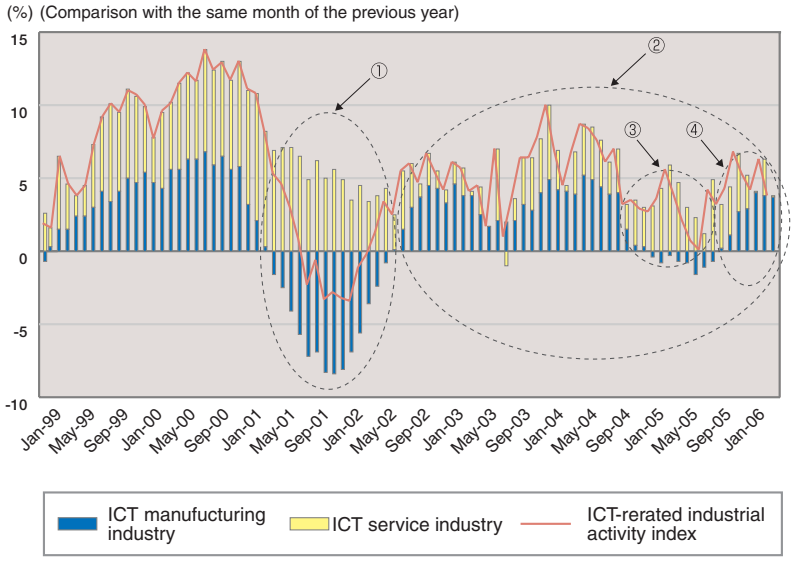
The Index of the ICT industry Activity indicates that, whereas the ICT manufacturing industry fell drastically by the economic recession starting in November 2000, the decline in the ICT industry as a whole was kept small, supported by the ICT service industry **(Figure 1-1-1 ①)**.

Since 2002, the Index of the ICT industry had been on a gradual rise caused by the recovery of the ICT manufacturing industry **(Figure 1-1-1 ②)**. From the second half of 2004 to the first half of 2005, the ICT industry saw a temporary slowdown in their overall recovery because the ICT manufacturing industry declined due to the global inventory adjustments of ICT–related goods **(Figure 1-1-1 ③)**. However, since mid-2005, when a round of adjustment was completed, the industry has been gaining its recovery power **(Figure 1-1-1 ④)**.

(1) ICT manufacturing industry

Since 2002, as influenced by demands overseas for semiconductors, the Index of ICT manufacturing industry Activity has been on a rise by mainly ICT-related production goods. Even though this industry saw a temporary stagnation in the second half of 2004 due to a domestic inventory increase after the Athens Olympics

Figure 1-1-1 Transition in the Index of ICT Industry Activity



Produced from METI, "Indices of All Industry Activity," "Indices of Industry Production," and "Indices of Tertiary Industry Activity"

and the global inventory adjustment of ICT-related goods, recovery began in the summer of 2005 when a round of this adjustment was completed **(Figure 1-1-2)**. This recent recovery has largely been caused by an increase of semiconductor production.

(2) ICT service industry

The ICT service industry has been consistently expanding at a slow pace, and growing firmly. Particularly, the growths are significant in the contracts of system-management and operation, leasing of ICT equipment, and mobile telecommunications **(Figure 1-1-3)**.

The growth of contracts in system-management and operation is considered to reflect the increased demand for management and security by the widespread use of intranets. In light of the recent increase in the needs for information security, it is expected to continue to grow.

Further, as companies shift their information-related investment to leasing, the lease of ICT-related equipment expands. Incidentally, the mobile communications industry which grew steadily with the spread of cell-phone use has flattened out since the last half of 2003.

2 Status of the ICT industry

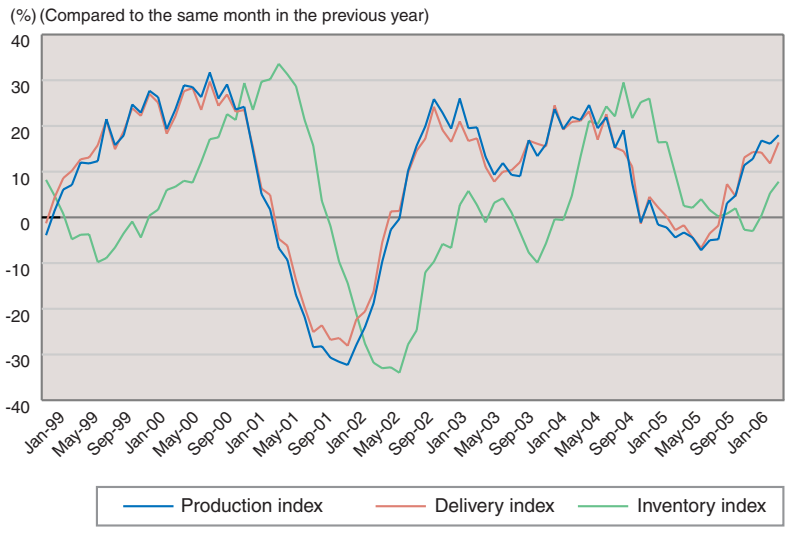
The real domestic product of the ICT industry in 2004 was 115 trillion yen, an increase of 3.8% over the previous year. It was 11.8% of all the industries, and the average annual growth rate between 1995 and 2004 was 5.5% **(Figure 1-1-4)**. As far as the rate of change over the previous year is concerned, particularly high rates were observed in ICT-related manufacturing (4.1% increase) and the ICT-related service industry (9.8% increase).

The real GDP (value added) of 2004 was 62 trillion yen, an increase of 9.2% over the previous year. It was 11.7% of all the industries, and the average annual growth rate between 1995 and 2004 was 7.3% **(Figure 1-1-5)**. As far as the rate of change over the previous year is concerned, particularly high rates were observed in ICT-related manufacturing (31.9% increase) and the ICT-related service industry (17.7% increase).

The number of employees in the ICT industry had been declining since 2001, but it rose in 2004, increasing by 0.9% over the previous year to 3.8 million which was 6.8% of all the industries. The average annual growth rate between 1995 and 2004 was 0.5% **(Figure 1-1-6)**.

The rate of change over the previous year depends on the industry: ICT-related manufacturing industry (6.46% decrease), ICT-related service industry (2.26% decrease), broadcasting (5.92% decrease), and telecommunications (0.73% decrease) saw negative growth, whereas information service industry (5.64% increase), image/sound/text information production industry (5.26% increase), ICT-related construction industry (2.64% increase), and research (3.05% increase) were areas where the number of employees increased.

Figure 1-1-2 Production, Shipments, and inventory status in the ICT manufacturing industry



Produced from METI, "Indices of Industrial Production"

Figure 1-1-3 Activity status of the ICT service industry

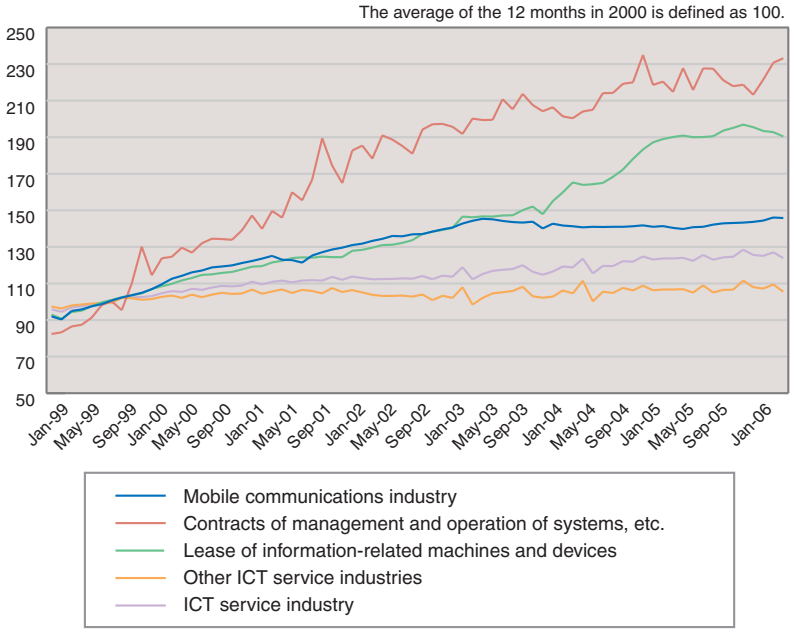


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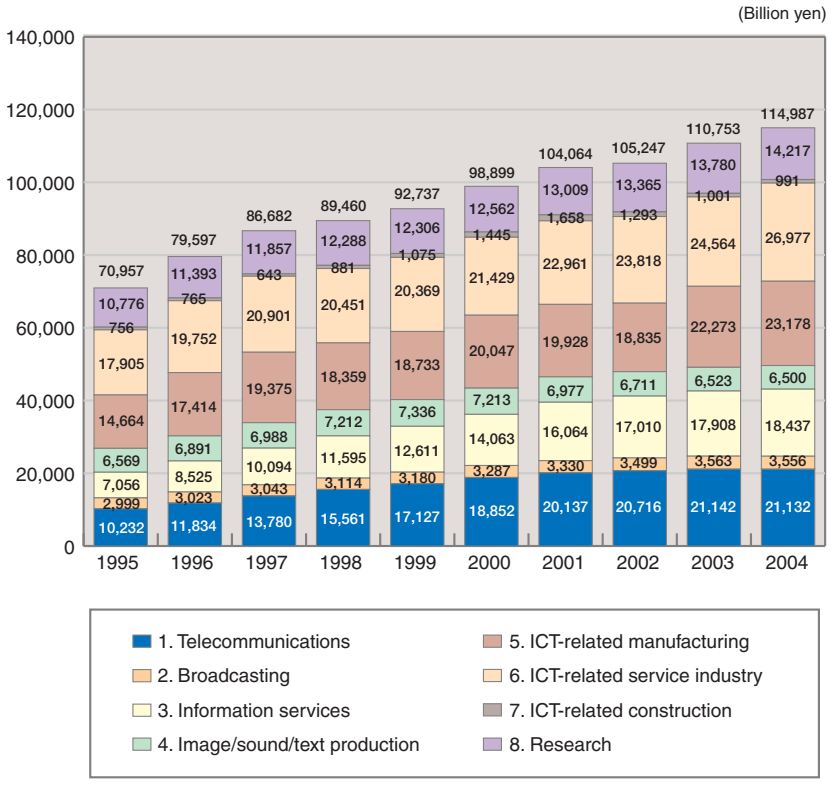
Figure 1-1-4 Transition of real domestic output in the ICT industry



(Source: "Survey on Economic Analysis of ICT")

Figure 1-1-5 Transition of real GDP in the ICT industry

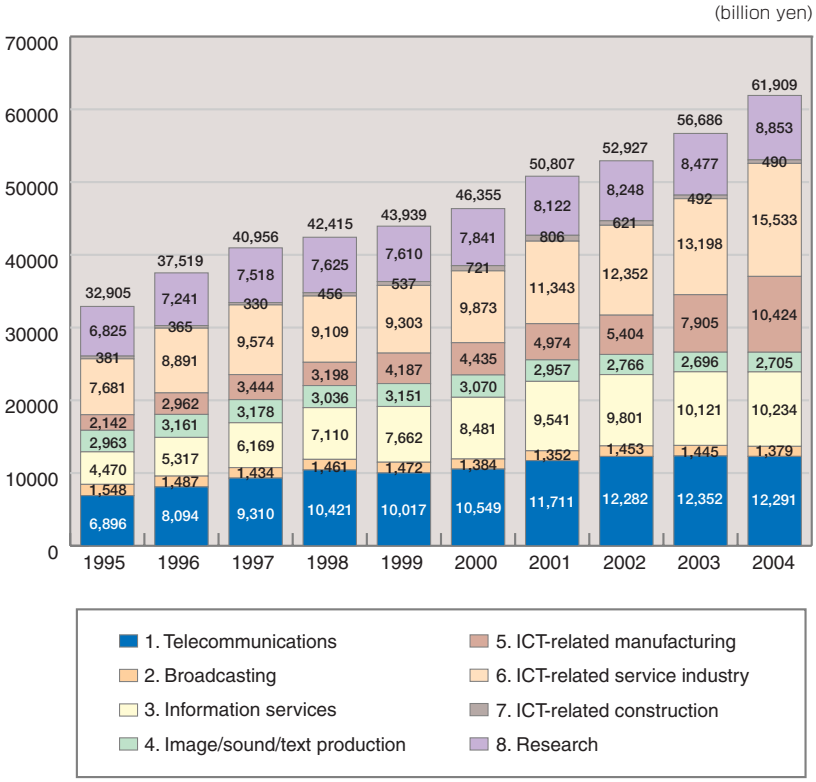
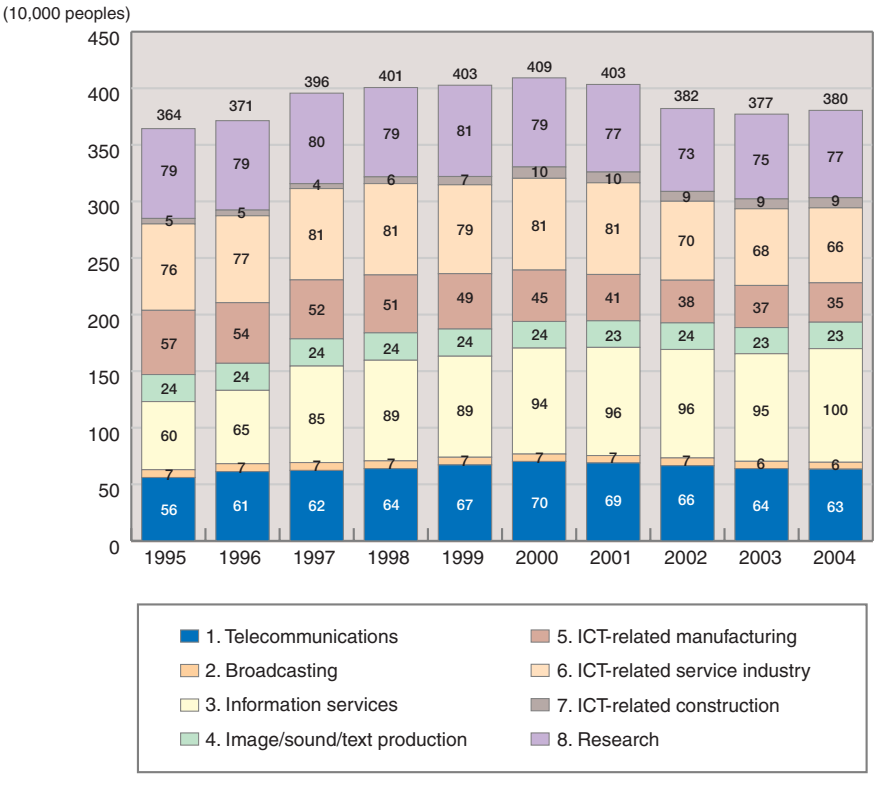


Figure 1-1-6 Number of employees in the ICT industry



(Source: "Survey on Economic Analysis of ICT")

3 Impact of ICT on economic growth

The following three aspects are pointed out as the effects of ICT on economic growth.

The first is the effect by the growth of the ICT industry: as a result of technological innovation in the ICT field, the demand for the ICT industry grows, which in turn leads to further growth of the ICT industry and the economic growth.

The second is the effect by deepening the ICT capital stock, i.e. an increase in the rate of labor's ICT capital reserve and the consequent rise in labor productivity will lead to the economic growth.

The third is the effect by improving productivity in the respective industry through the increase of ICT use in industry and business. For example, the increase of ICT use could improve order systems and inventory management in the transactions between customers and companies. Various fields in our society and economy will see ICT use, which will result in the long-term changes in the socio-economic structure and improve productivity and promote economic growth.

Hereinafter, we will analyze the impact of ICT on the economic growth, taking into account these three aspects. We will ultimately reach the conclusion that the impact of the first two aspects above can be recognized at the present, whereas the impact of the third aspect is not completely clear at the moment.

(1) ICT industry and economic growth

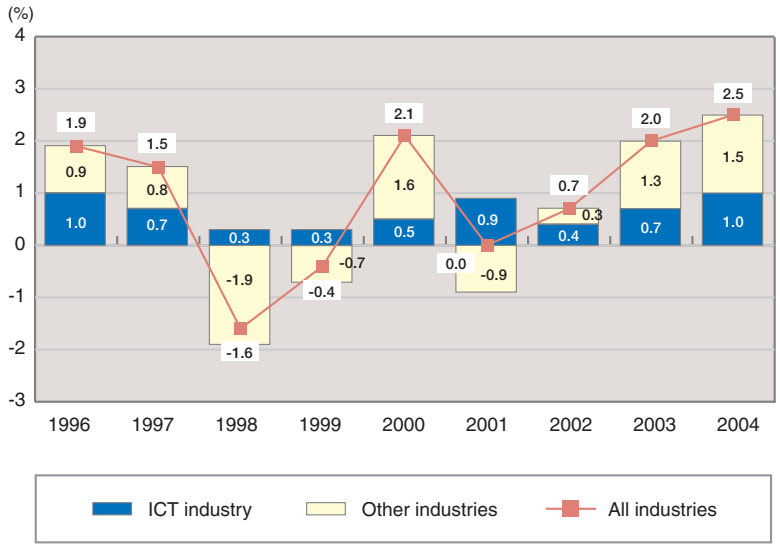
The percentage of the ICT industry in all the industries has been growing every year. As of 2004, the ICT industry occupies 11.8% of the real domestic product and 11.7% of the real GDP.

According to the rate of change in real GDP for each industry between 2003 and 2004, the ICT industry and electric equipment (excluding ICT equipment) showed a significant increase, and the contribution of ICT industry to the changes in real GDP was 40% **(Figure 1-1-7)**. The impact that the performance of the ICT industry has on the growth of the national economy is significant compared to other industries.

(2) ICT capital stock and economic growth

The contribution of ICT capital stock in economic growth from 1990 to 1995 was 0.21% to the economic growth rate of 1.51%; the percentage from 1995 to 2000 was 0.54% to the rate of 0.97%; and the same from 2000 to 2004 was 0.21% to the rate of 1.15% **(Figure 1-1-8)**. From these, the ICT stock was contributed to the overall economic growth: 13.9%, 55.7%, and 18.3%, respectively, for each of these periods. Considering that ICT capital stock occupied only about 2 to 3% of all private capital stocks, these percentages show its significant impact on the economic growth.

Figure 1-1-7 Contribution of ICT Industry to the Changes in Real GDP



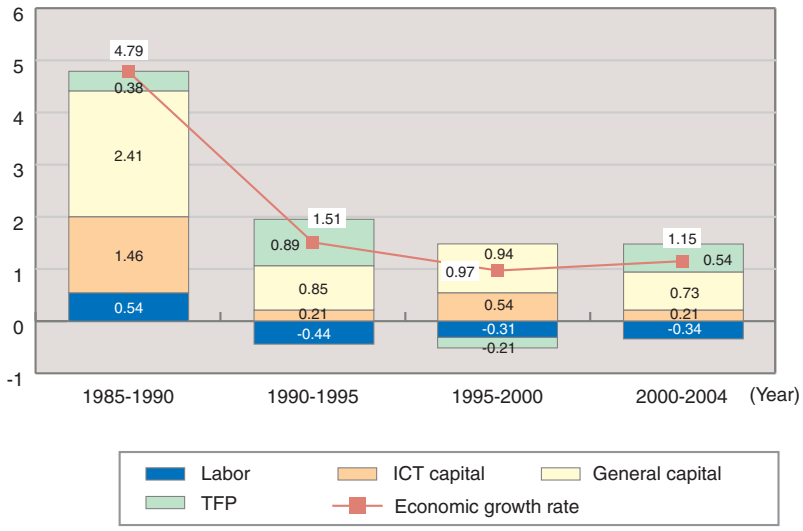
(Source; "Survey on Economic Analysis of ICT")

(3) Progress of ICT and economic growth

An improvement in the productivity of industries and companies due to the progress of ICT appears in the form of the improvement of TFP (Total Factor Productivity) which is a variable factor and not explained in terms of changes in the input of factors of production such as capital and labor.

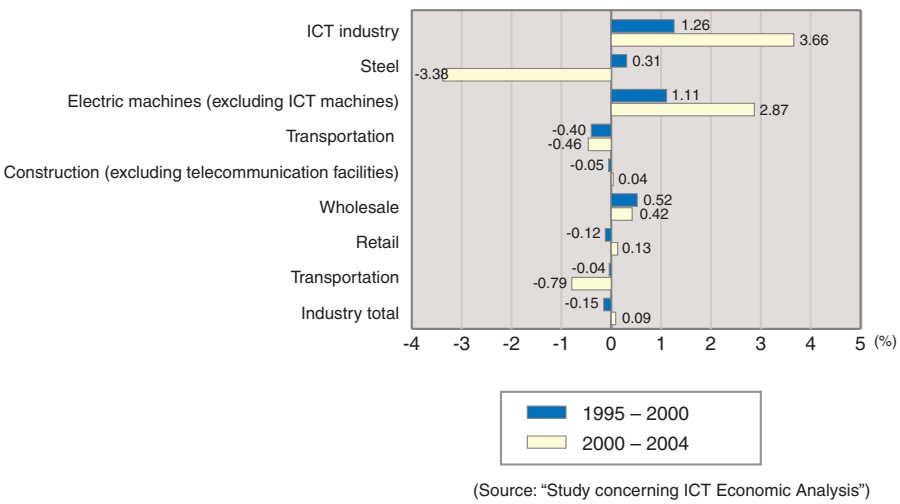
Between 2000 and 2004, the contribution of the TFP to the economic growth and labor productivity increased **(Figure 1-1-9)**. The percentage of the contribution was high in the ICT-related fields such as 3.7% in the ICT industry and 2.9% in electric equipment, whereas, the percentages in other industries are not necessarily high. In other words, the growth of the TFP in Japan is currently supported by the ICT industry which leads a technological innovation; the growth is not so apparent in all industries.

Figure 1-1-8 Contribution of ICT Capital to the Economic Growth Rate



(Source; "Survey on Economic Analysis of ICT")

Figure 1-1-9 Increase in TFP by Industry



(Source: "Study concerning ICT Economic Analysis")

Section 2

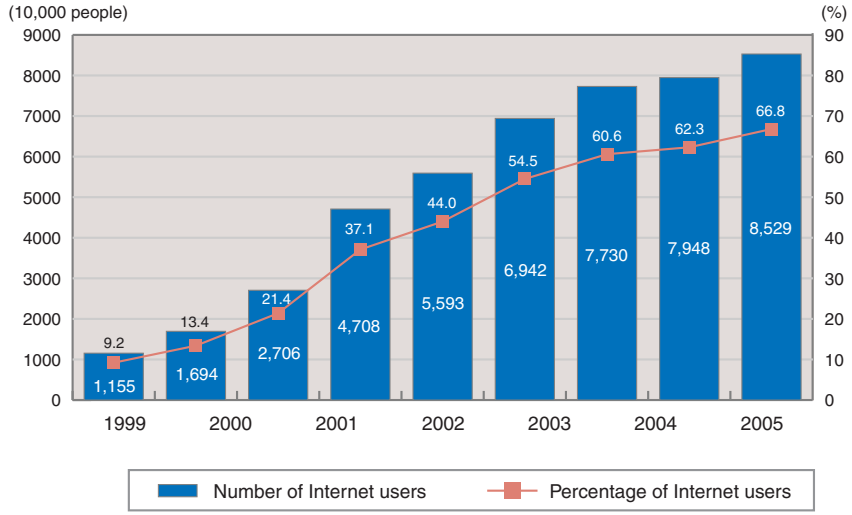
Penetration of Ubiquitous Networks

1 Status of penetration of the Internet

The penetration rate of the Internet in 2005 was 66.8%, and the number of Internet users was estimated at about 85.29 million (an increase of 5.81 million compared to the previous year) **(Figure 1-2-1)**.

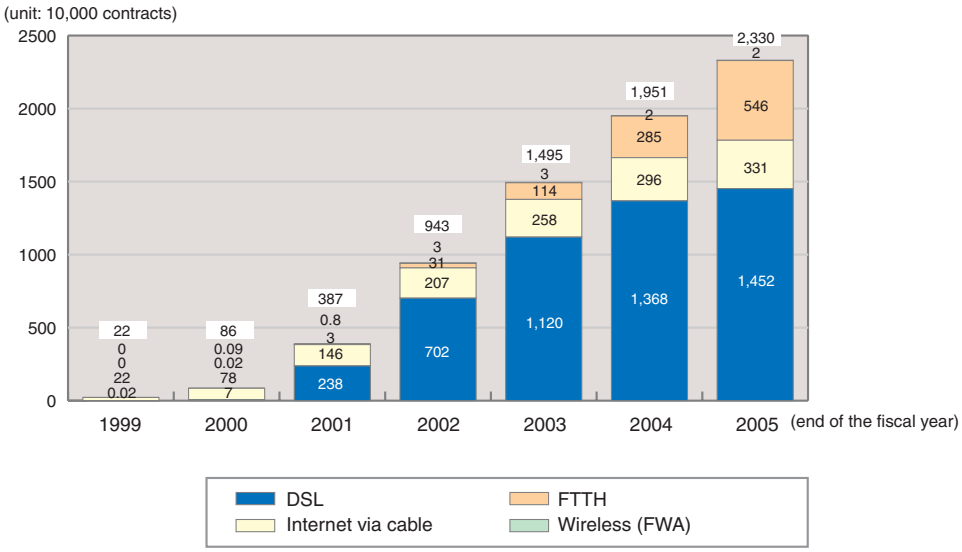
The number of broadband subscribers was approximately 2.33 million as of the end of 2005 (an increase of 19.1% over the previous year) **(Figure 1-2-2)**. Among those, the number of DSL subscribers was approximately 14.52 million (up 6.2% from the previous year), which was the highest figure. This was followed by FTTH (Fiber To The Home) with about 5.46 million (up 88.4%), cable modem service with about 3.31 million (up 11.8%), and wireless Internet (FWA) with about 20,000 (down 34.8%).

Figure 1-2-1 Number of Internet users and penetration rate



Produced from MIC, "Communications Usage Trend Survey"

Figure 1-2-2 Transition in the number of broadband contracts



2 Status of Internet use

The percentage of corporations using the Internet was as follows: as of 2005, 97.6% of enterprises and 85.7% of establishments had already been using the Internet **(Figure 1-2-3)**.

The amount of time that an individual or a household spent on the Internet (daily) was 34 min. 7 sec. per person as of January 2005; the average person viewed 65.5 pages and went online 28 times (monthly) **(Figure 1-2-4)**.

3 Status of the spread of ICT devices

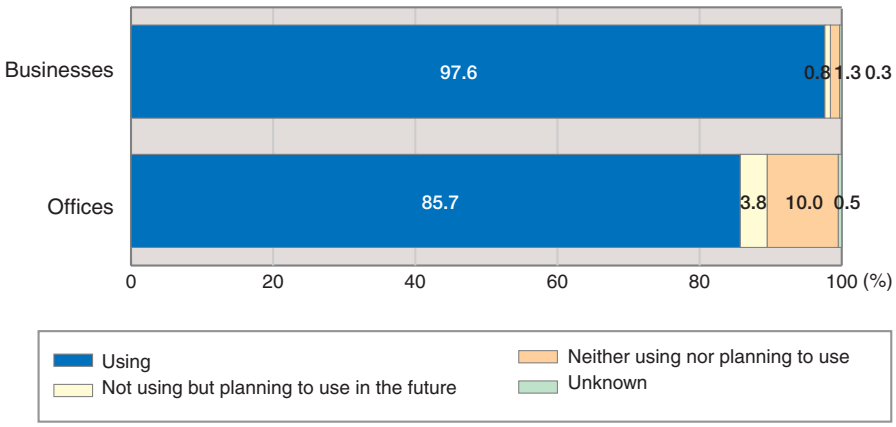
The penetration rate for households of various ICT devices were as follows as of the end of 2005: 85.3% for mobile phones, 68.3% for personal computers, 61.1% for DVD players, and 40.2% for video camcorders **(Figure 1-2-5)**.

4 Prospects for advanced functions on mobile ICT terminals

Mobile ICT terminals will be ICT devices that play the central role in a ubiquitous network society. The satisfaction (effect) obtained through the use of mobile ICT terminals will not only depend on the functions that the terminals themselves are equipped with (such as communications and music replay), but also on their popularity as well as the contents and services that can be used with the devices.

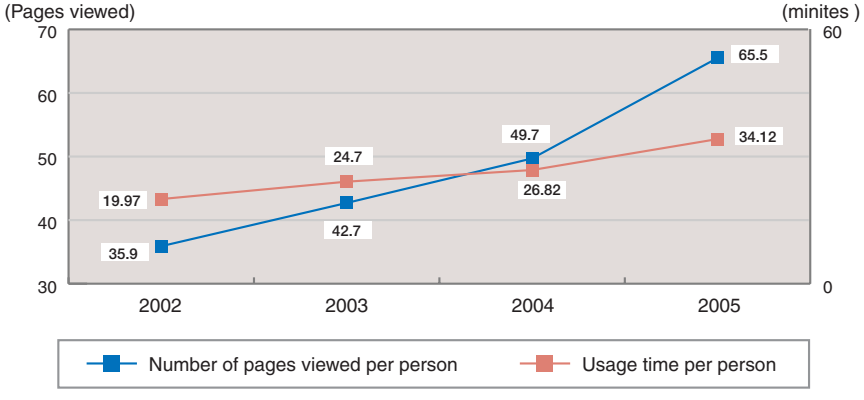
Mobile ICT terminals include everything from mobile phones to digital audio players, notebook computers, PDA units, and other terminals. At present, various functions are being integrated and converged toward the next generation of mobile ICT terminals **(Figure 1-2-6)**.

Figure 1-2-3 Status of Internet use at enterprises and establishments



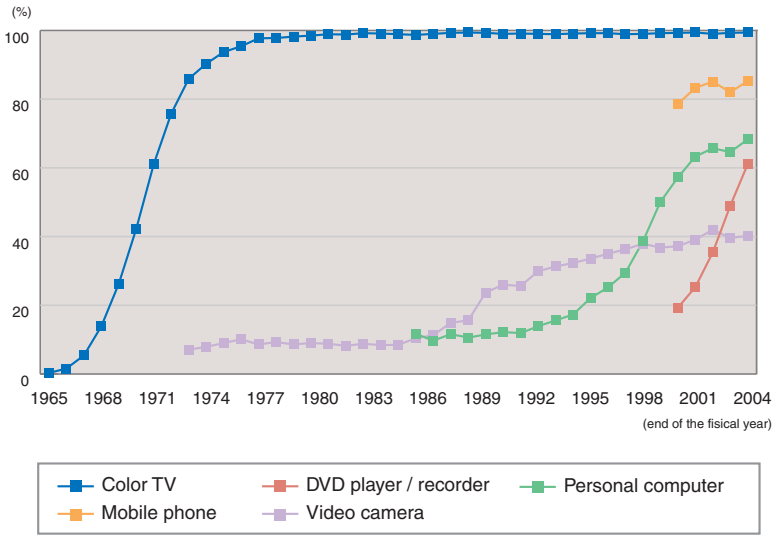
(Source; MIC, Communications Usage Trend Survey)

Figure 1-2-4 Status of use (daily)



(Source) "Access from Families," Nielsen//NetRatings

Figure 1-2-5 Percentages of households with ICT equipments



Produced from ESRI, Cabinet office, Government of Japan “Consumer Confidence Survey”

Figure 1-2-6 Advancement of functions on mobile ICT terminals

Section 3

Trends of Convergence of Telecommunications and Broadcasting

1 Background of convergence of telecommunications and broadcasting

The penetration rate of broadband services has been drastically increasing in recent years, with 22.37 million subscribers as of the end of 2005. Broadband networks are being established with the goal of making broadband services available anywhere by FY2010.
The term "convergence of telecommunications and broadcasting" refers to a variety of phenomena accompanying digitization and broadband. These phenomena include progress in the online distribution of image and sound contents, sharing of terminals, and networks, and cross entry between telecommunications and broadcasting.

2 Meaning of convergence of telecommunications and broadcasting

The market size for telecommunications and broadcasting industries in Japan is currently estimated at about 20 trillion yen, and the market size has grown at a stable pace **(Graph 1-3-1)**. In the future, it is expected that the convergence of telecommunications and broadcasting will accelerate, and new entry and the development of new competition are expected to make this convergence a new, leading industry which will contribute to economic growth.

Meanwhile, from the perspective of the user, the convergence of telecommunications and broadcasting will result in a variety of services expected to be available, and it is expected that everyone can benefit from technological innovations such as the advancement of IP.

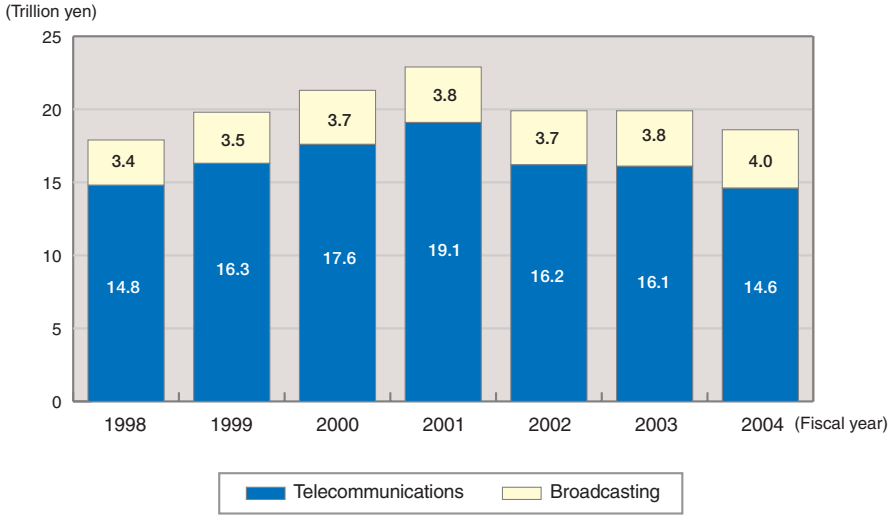
Further, the acceleration of the trend of the convergence in telecommunications and broadcasting, as well as the stimulation of telecommunications/broadcasting industry, will lead to more powerful information sending and improved content production; this is expected to contribute to strengthening the software power of Japan through such means as diffusing Japanese culture to all over the world.

3 Recent trends of convergence of telecommunications and broadcasting

(1) Advancement of the distribution of video and audio contents on the Internet

Telecommunications carriers have begun to provide VOD-type image delivery services (i.e. "Internet broadcasting"), which can be replayed on a PC, as part of the Internet connection service they operate, or through cooperation with content providers. In addition, by setting up STBs (set top boxes) in members' homes, some carriers have provided VOD-type image delivery services through their own communications networks. Meanwhile, broadcasting companies have begun their

Figure 1-3-1 Transition in the Market Size (Sales) of Telecommunications and Broadcasting industries



own Internet-based VOD-type image delivery services by taking advantage of the rich image contents they own, and by using online delivery Web sites which they operate, or through cooperation with Internet service providers.

(2) Sharing networks and terminals

Digital technology has seen significant progress, and the communication capabilities of networks have drastically risen through the use of broadband; the communication lines are now available both to telecommunication services and to broadcasting services.

In January 2002, the "Law Concerning Broadcast on Telecommunications Service" was enacted, setting legal stipulations for broadcasting using telecommunications services. As of May 2006, 49 companies had registered as broadcasting providers using satellite services and 16 companies had registered as broadcasting providers using cable services.

Among the broadcasting providers using cable services, there are 12 companies using, in part, facilities of telecommunications carriers. There are also 4 companies that operate their businesses nationwide using, in part, facilities of telecommunications carriers and using the IP multi-casting method, which is a type of Internet protocol.

In December 2003, terrestrial digital television broadcasting began. One of the intents of digitizing terrestrial broadcasting is to provide bi-directional services by connecting broadcasting with the Internet. Such bi-directional services enable the viewers and listeners to have access to a wide variety of services. Television is one of the most familiar information sources to the people, used in practically every household. Therefore, the digitizing of television leads to the formation of the ICT foundation for households.

(3) Cross entry and business cooperation in telecommunications and broadcasting field

Some cable television providers are now involved in the telecommunications industry by providing telecommunications services, and an increasing number of companies are providing services of both telecommunications and broadcasting.

In addition, there are now companies that provide so-called "triple-play" services, in which one company provides Internet access services, image delivery services, and telephone services.

4 Panel on Frameworks of Communications and Broadcasting

Convergence of telecommunications and broadcasting advance as communications is in transition to IP and broadband, and as broadcasting is digitized. In the midst of these changes, the Ministry of Internal Affairs and Communications (MIC) held "the Panel on Frameworks of Communications and Broadcasting" between January and June of 2006 for the purposes of responding to various questions and requests of the people, and promoting a variety of services to be provided to the people in a timely manner. In the meetings, the following topics were discussed: (1) problems in communications and broadcasting, seen from the perspective of the people; (2) problems in achieving convergence of telecommunications and broadcasting; (3) reasons for arising these problems; (4) future vision of convergence of telecommunications and broadcasting; and (5) the role that the government should play.

In the meetings, comprehensive proposals were made concerning the establishment of the new law on convergence, the review of regulations related to telecommunications, the deregulation of broadcasting, the reform of NHK, and other topics, which targeted the year 2011 when the world's most advanced infrastructure of telecommunications and broadcasting will be completed, toward achieving the goal of becoming a "broadband, mobile, and television superpower" in which Japan can exercise its strengths.

Section 4

New Trends Created by Ubiquitous Networks

1 New trends created by Web 2.0

As ubiquitous networks advance and the range of users rapidly expands, "Web 2.0," a concept that constructs a distinct brand new world web from the conventional web (Web 1.0), is attracting much attention in a viewpoint of focusing on the characteristics of the Internet and using its inherent capabilities effectively. At present, Web 2.0 does not refer to any specific service or technology, nor is there a clear definition of the term. However, in its theory, one can find a vision of new socio-economic system which may be brought by the progress in ubiquitous networks **(Figure 1-4-1)**.

2 Concept of Web 2.0

The two characteristics of Web2.0 are "user participation" and "open orientation."

(1) User participation

In Web 2.0, service providers consider the users as "reliable and productive collaborators" and many of whom will participate actively in the creation of contents and the development of services. A primary example is the online encyclopedia, Wikipedia.

(2) Open orientation

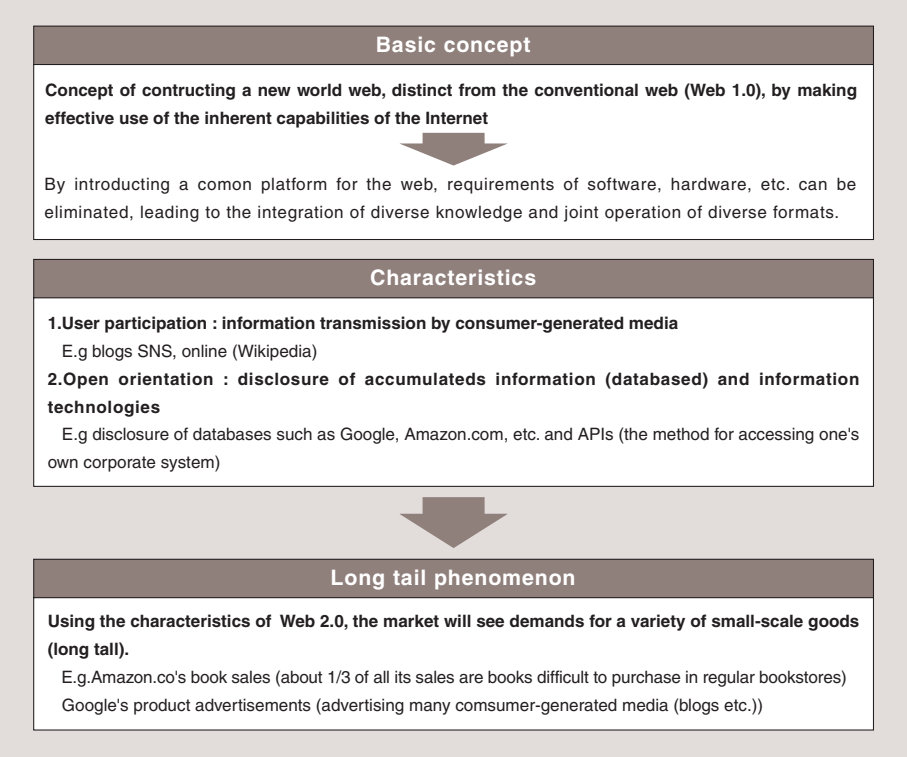
In Web2.0, service providers widely disclose the data they own (such as databases) and encourage others to use them actively; this is the idea of "open orientation."

For example, Google and Amazon.com publicly disclose their databases and APIs (application program interfaces) that explain how to access the company system. Anyone can use these databases and APIs to develop services with new added functions.

3 Long Tail

By the progress of Web 2.0, diverse and small-scale demands for goods, called "long tails," have gained a potential toward a possible attractive market. Until now, diverse and small-scale demands for goods have been expected to produce only limited profits even if they form a market. However, it has become possible to accumulate and create such demands for goods in an efficient manner through the progress of Web 2.0 which is char-

Figure 1-4-1 Outline of Web2.0



acterized by a wide range of user participation. As a result, these demands are now expected to form a market which is comparable with other general markets.

4 Trend to openness and progress in collaboration

The origin of Web 2.0 can be discovered in software development through open source. The significance of open source is to link dispersed knowledge together through networks and collaborate in developing intellectual properties and overcoming challenges.
One characteristic of open source in recent years has been that the field of collaboration has been rapidly expanded by the spread of networks including the Internet globally as well as to every field and the development into ubiquitous networks. The work of developing intellectual properties such as software heavily depends on human elements. Such progress in ubiquitous networks makes it possible to achieve collaboration which is based on much more diverse knowledge than in the past. It is thus expected that the power to develop software will increase drastically.

Section 5

Rise of Consumer-Generated Media

1 Consumer-generated media and value of networks

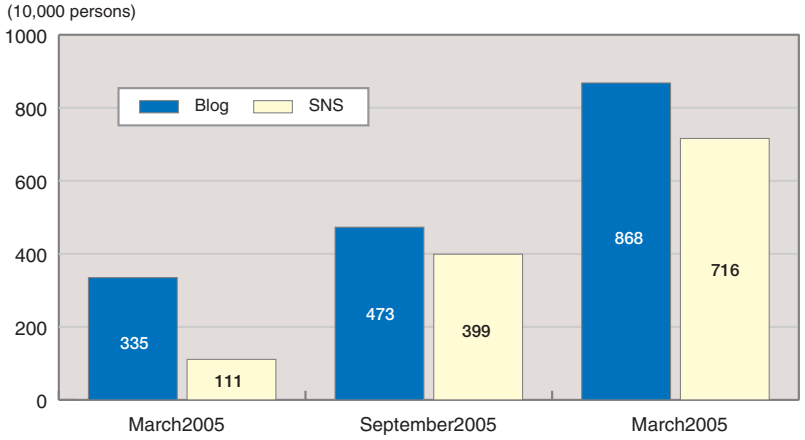
As new communication tools of the Internet, two things are getting much attention: blogs and SNSs. What is common between blogs and SNSs is the fact that any individual, with or without expert knowledge, can easily transmit information; they are called "consumer-generated media," or CGM.

While Web browsers and portal sites have contributed to the increase in Internet users, blogs and SNSs are contributing to the dramatic increase in the amount of information provided on the Internet as they turn many users who had only browsed the Net before into information providers and transmitters. In other words, the expansion of the range of information providers through blogs and SNSs is drastically raising the value of the Internet as a database.
As of the end of March 2006, 8.68 million people were registered as bloggers, and 7.16 million were registered as SNS members **(Figure 1-5-1)**.

2 Blogs

A blog is a journal-like web site operated by an individual or a small group of individuals, updated on a daily basis. Its contents vary widely from individual hobbies to just about anything. Some of the factors for the popularity of blogs are (1) it is possible to create one's own homepage simply by entering text; (2) free service is provided; (3) updating and browsing are possible even from a mobile phone; and (4) tools are available to promote more active communication, such as track back and RSS distribution functions.

Figure 1-5-1 Transition of registered bloggers and SNS members



Based on "Numbers of Registered Bloggers and SNS Members," MIC

3 SNSs

An SNS (social network service) is a community-type Internet service provided for the purpose of providing social networks for friends and acquaintances.

Characteristics of an SNS include (1) membership; (2) the possibility of anonymous registration; and (3) a variety of well-developed communication tools.

In order to maintain reliability, many SNSs use a system in which registration is allowed only through referral by registered members. For this reason, their reliability is kept at a high level among their members as closed communities. Many registered members use their own names, while libels and other abusive incidents, often seen in bulletin boards, are not very common.

Many SNSs make tools (such as blogs) available to their users, so sometimes an SNS can be referred to as a "members-only blog."

4 Influence of a Network Community

The rise of consumer-generated media is contributing to increasing the influence of consumers' opinions and evaluations in society, such as seen in the appearance of "word-of-mouth" sites, and it is thought to advance the consumer-governance.

A "word-of-mouth" site is an Internet-based bulletin board where contributors can submit opinions and critiques based on the actual experience; browsers are in turn able to use the information there to make decisions concerning purchasing goods and services. Companies can easily find out what the consumers feel about their products or services from these sites, so this has become a crucial marketing tool. In addition, information such as the reasons for purchase, problems with the goods and services, ideas for new products can be used to develop highly effective marketing strategies.

Section 6

Changes in Consumption and Purchases

1 Impact of low information cost

It has been said that "the prevalence of the Internet enhances market efficiency." One of the reasons for this is that various networks, including the Internet, reduce information gathering cost and searching cost by various economic bodies.

Traditionally, when a consumer is about to purchase a product, the consumer had to gather information by visiting several stores using transportation. Now, such information on the product is easily accessible using networks. Such reduction in the information-gathering cost makes it easier for consumers to compare and search for information. It eliminates time- and space-restrictions between supplier and consumer as well as information mismatches; it reduces the evaluation gap on the product before and after the purchase, and as a result, the consumer satisfaction level is expected to be heightened.

2 Gathering of product information and networks

As a method of gathering product information, 62.0% of consumers use the Internet prior to the purchasing; 26.1% of consumers use the Internet as an actual method for purchasing goods **(Figure 1-6-1)**.

3 Matching improved through the use of networks

Comparison among suppliers by using networks is expected to increase the level of consumer satisfaction by making it easier for consumers to gather product information and eliminating the information gap between suppliers and consumers.

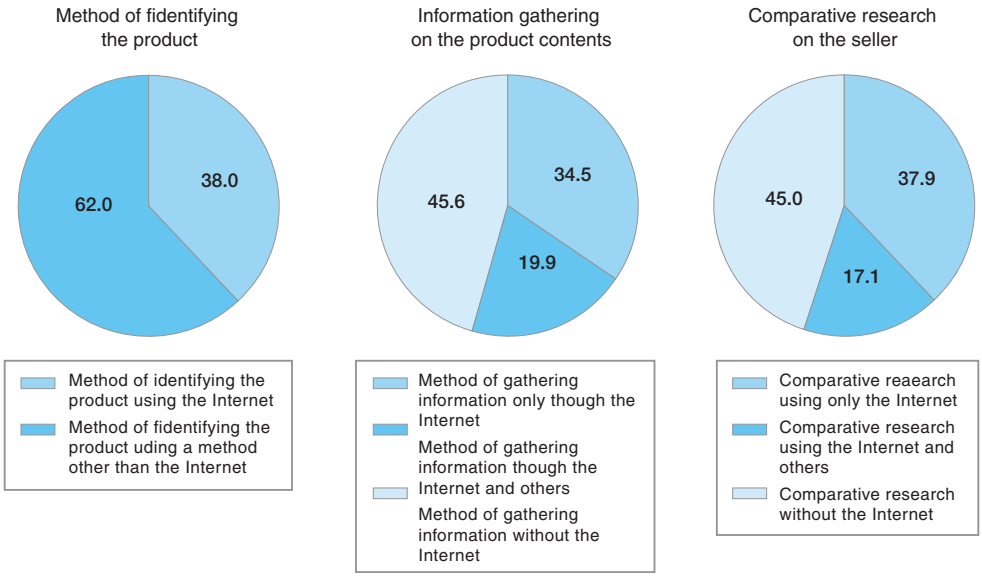
Comparison between those who gathered information using the Internet prior to the purchase and those who did not shows that the Internet-using consumer compared 5.75 stores on average whereas the non-user compared 1.62 stores on average. The Internet users have looked at and compared more stores than the non-users **(Figure 1-6-2)**.

4 Information transmission by consumers

The progress in ubiquitous networks, particularly the development of consumer-generated media, makes it easier for consumers to transmit information. Consumers are now able to hear other consumers' opinions directly, without going through suppliers, and use that information for their purchasing decisions.

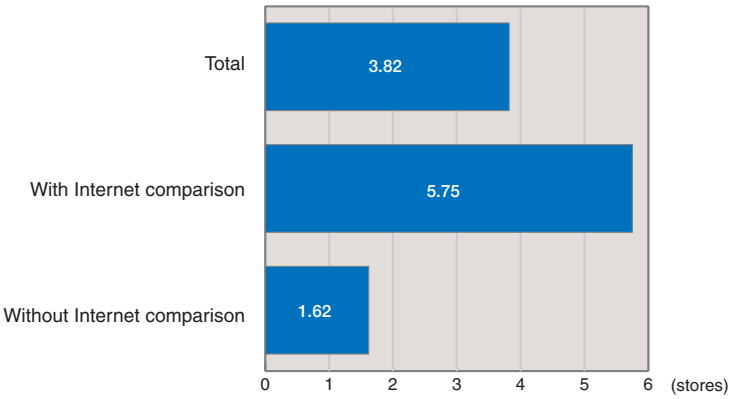
Regarding the method for submitting their own evaluation about the store or the product after the purchase, "direct communication (including the phone)" was the leading method with 15.4%, followed by "via email" (6.3%). As such, personal communication is a common method for feedback **(Figure 1-6-3)**.

Figure 1-6-1 Status of Internet use in gathering information



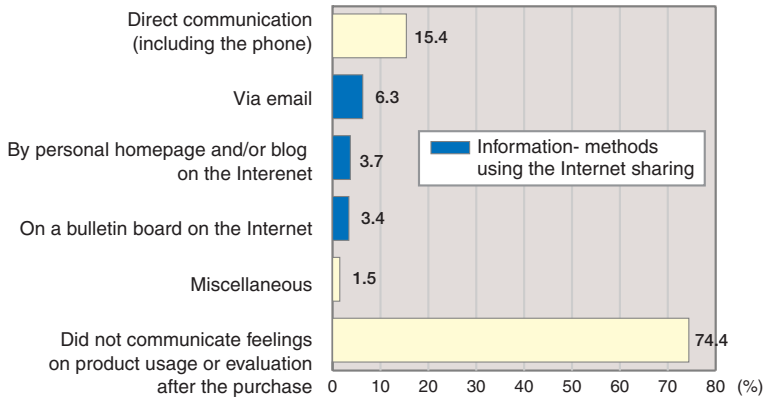
(Source: "Survey on the Use of Networks by Consumers")

Figure 1-6-2 Number of stores compared



(Source: "Survey on ICT and Buying Behavior")

Figure 1-6-3 Method of sharing information on product usage, evaluation with others



(Source: "Survey on the Use of Networks by Consumers")

Section 7

Advertisement Strategies of Businesses

1 Network use for advertisement

As consumer's information activities by using networks become more active, companies are also trying to use networks more aggressively in the development of their business. They are providing information directly to the consumers by their active use of homepages, blogs, email messages, and other Internet tools; they are able to get information directly from the consumers and reflect the feedback for their own business development.

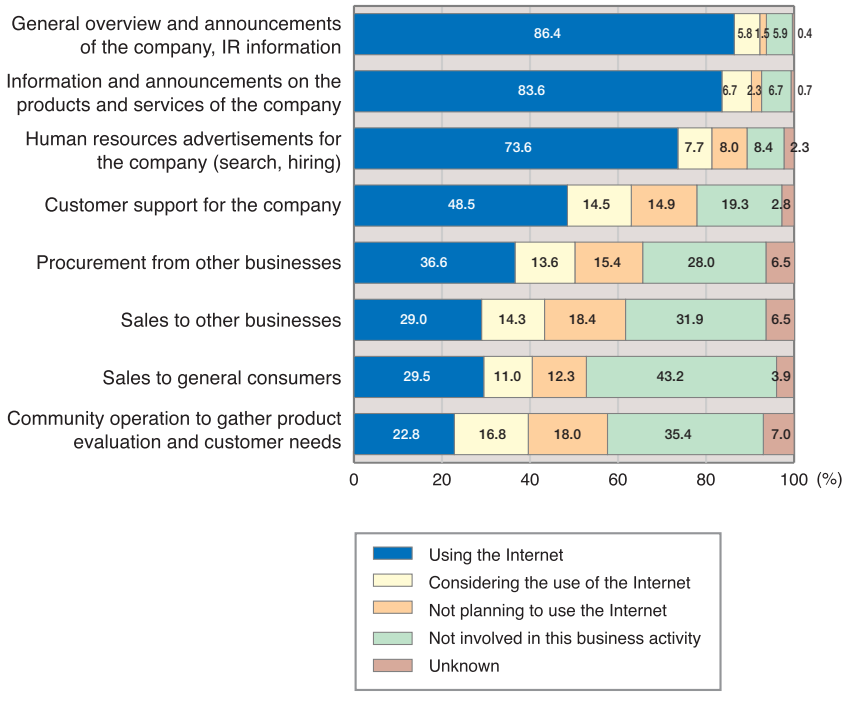
The status of the Internet use by companies shows that the use for "display and announcements on corporate summary of their own company and IR information" was the highest category at 86%, followed by "display and announcements on the company's product and service information," at 84% **(Figure 1-7-1)**. In contrast, "procurement from and sales to other companies" and "sales to general consumers" were around 30 to 40%, and "community operation for gathering product evaluation and customer needs" was merely around 20%.

Most companies now have their own Web site, which suggests that the Internet is used as an inexpensive advertising tool by companies.

2 Internet advertising

In the Internet advertisement, it is possible to send advertisement information only to those consumers who have shown interest in particular products; this is called personal directivity. While the overall advertising costs go up and down, the Internet advertisement cost is consistently increasing; it exceeded radio advertising in 2004, and the amount spent on the Internet advertisement reached 280 billion yen in 2005 **(Figure 1-7-2)**. In the Internet advertisement, bi-directional advertisement is also possible. If a consumer is interested in a product, he or she can place an order and even make a payment for the product on the Web site of the company which sells the product by using the mutual link in the advertisement.

Figure 1-7-1 Status of the Internet use in business activities



3 Portal sites

One crucial presence for the Internet advertisement business is portal site operator. The term "portal site" refers to a front entrance to the Internet, and as such, an Internet user visits a portal site first when connecting to the Internet. Portal sites come in a variety of types, depending on the purpose of the use, anything from information gathering to online shopping.

From the perspective of the form of the information being provided, portal sites can be classified into two categories. One is a total portal site, providing a wide range of information including breaking news, horoscopes, weather, sports, travel, restaurants, business, and finance. The other category is a specialized portal site, providing specific information in a relatively specific field, such as restaurants, electronic products, cosmetics, health foods, jobs, and price comparison.

4 Search Engines

Internet search engines have become an indispensable tool to pick up the information that users are looking for from the almost infinite amount of information on the Internet.

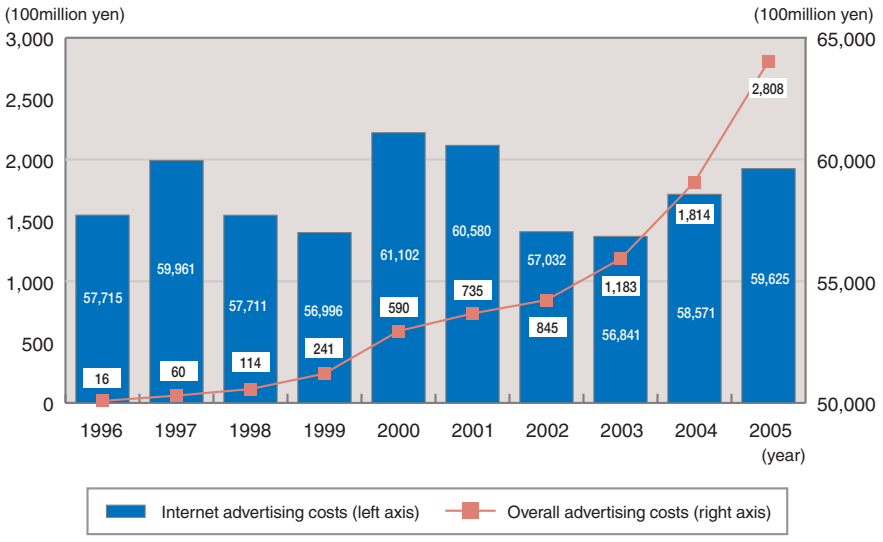
A search system is evaluated according to the level of match between the user's input information (keywords) and the output information (link). In other words, a search system is considered efficient when the mismatch between the information looked for by the user and the search results decreases and the information that the user intended to find is displayed in the top column of the screen.

From this viewpoint, the way to output search results has been innovated and the level of match between input information and output information has been heightened: one system searches only through blogs and video images, another searches for particular news and related blogs at the same time, and another displays search results on a map when the user looks for restaurants, for example.

Along this line, Internet advertisement is also reflecting the advances in recent search systems in order to further enhance an advertisement effect. For instance, a search system itself can guess the contents of the Web sites and send advertisements related to the Web sites.

By analyzing the personal browsing history of the user, the system can also deliver advertisements that match the user's preference. For example, if there is a user who frequently visits automobile-related Web sites, the system can display automobile-related advertisements even when the user visits a news site not related to cars. As such, the advertisement effect can be improved overall by providing advertisements consistent with the user's preference, even if the volume of advertisements delivered is small.

Figure 1-7-2 Transition of Internet advertisement costs



Based on telecommunications data

Section 8

Improvement of Market Efficiency

1 Trend toward networking in transactions

Transactions on the network (online transactions, "e-commerce") are expected to help improve market efficiency. For example, in an e-commerce market, companies can participate in the market regardless of the number or size of their stores. Consumers can also gather product information and compare prices without geographic restrictions; this reduces uncertainty due to the information mismatch and enables needs-based diverse transactions.

2 E-commerce for general consumers

The market size of e-commerce for general consumers in 2004 was 5.6 trillion yen (a 27.5% increase over the previous year), and the share of e-commerce overall was estimated at 2.1% **(Table 1-8-1)**.

There is an expectation that the market mechanism will function more effectively with e-commerce. If this is correct, prices in e-commerce will be lower than those in the conventional market.

When prices are compared between online stores and real stores, the prices at online stores were lower than those at real stores **(Figure 1-8-2)**. In particular, this difference is significant when the online stores are listed on the price-comparing sites and portal sites. On these price-comparing sites and portal sites, the prices at various stores are directly compared against each other, so customers jump to the lowest price. This suggests the possibility for a price-competition mechanism that will speed up price fall.

However, the clear price difference between online stores and real stores disappears in adjusted prices which take into account the shipping charges and point discount systems. This indicates that real stores and online stores may be competing against each other in terms of the actual prices including such factors as point systems and shipping charges.

3 Online auctions

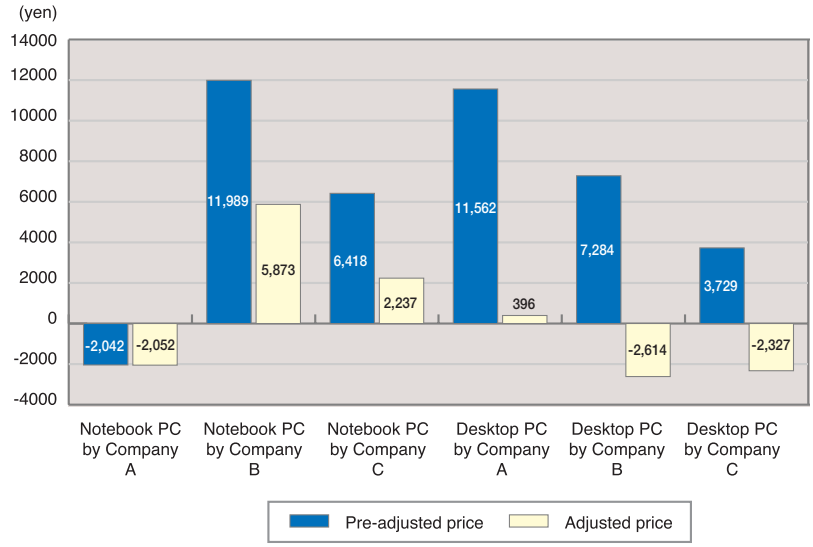
Through the progress in networks, including the Internet, online auctions whereby consumers and small-size companies directly carry out transactions have grown very rapidly with the total amount and number of distributed items drastically increasing. The total amount of distribution at online auctions (the total amount of money paid) was 582 billion yen in FY2003 and 784 billion yen in FY2004, an increase of 34.7% over the previous fiscal year.

Table 1-8-1 Breakdown of e-commerce and mobile commerce for consumers

Goods and services segment	E-commerce for consumers			Mobile commerce for consumers	
	Market size (100 mill. yen)	% of e-commerce (%)	Compared to previous year (%)	Market size (100 mill. yen)	% of mobile commerce (%)
PCs and related products	2,620	16.6	111.5	50	1.9
Household appliances	1,190	1.8	141.7	20	1.7
Travel	6,610	4.7	139.5	630	9.5
Entertainment	4,210	3.5	127.6	2080	49.4
Books & music	2,070	6.7	150.0	720	34.8
Clothes & accessories	1,830	1.4	111.6	340	18.6
Food & drink	2,990	0.7	136.5	230	7.7
Medicine, cosmetics, health food	2,220	4.1	144.2	360	16.2
Hobbies, sundry goods, furniture	3,420	1.3	132.6	550	16.1
Cars	6,560	5.2	108.8	220	3.4
Real estate	10,490	2.4	115.0	200	1.9
Finance	3,210	1.0	149.3	210	6.5
Finance (banks, securities)	2,110	16.8	144.5	—	—
Finance (life and other insurance)	1,100	0.4	159.4	—	—
Various services	9,010	1.6	141.2	4100	45.5
Total	56,430	2.1	127.6	9710	17.2

(Source: "Reality and Market Size Research on E-Commerce,"Ministry of Economy, Trade and Industry, Next-Generation E-Commerce Promotion Council, and NTT Data Management Research Center)

Figure 1-8-2 Difference in average price between online stores and real stores



The figure shows the difference: average price in real stores − average price online

(Source) "Survey on ICT and Buying Behavior"

Section 9

New Movement in Content Distribution

1 Current situation in content distribution

Music and image contents can be delivered directly to the users as digitized data via network. These contents themselves are intangible properties such as knowledge and information, so they are more "friendly" to network transactions compared to physical, tangible properties. By progress in broadband and the establishment of fixed-charge systems, the Internet is positioning itself as the content-distribution medium. At present, various companies are working on a variety of content distribution businesses via the Internet.

2 Music content distribution

Due to the popularity of portable digital audio players and the start of music distribution services to mobile phones, the music distribution service market through the Internet is growing rapidly. Record companies had revenue of 1.85 billion yen through pay music distribution services through the Internet in 2005.

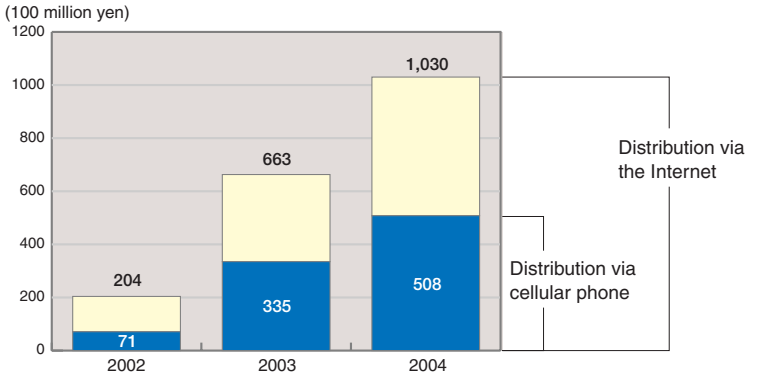
One of the attractive features of the Internet music distribution services is that it is relatively easy to obtain songs that used to be difficult to find or purchase in the past including those had just been released and were not well-distributed. Such a long-tail market is considered to be supporting the rapid growth of the music distribution service market.

3 Image content distribution

The market size of digital image content distribution via the Internet was 103 billion yen **(Figure 1-9-1)**. Out of this amount, 50.8 billion yen (1.5 times the amount of the previous year) was for the image content distribution market for mobile phones.

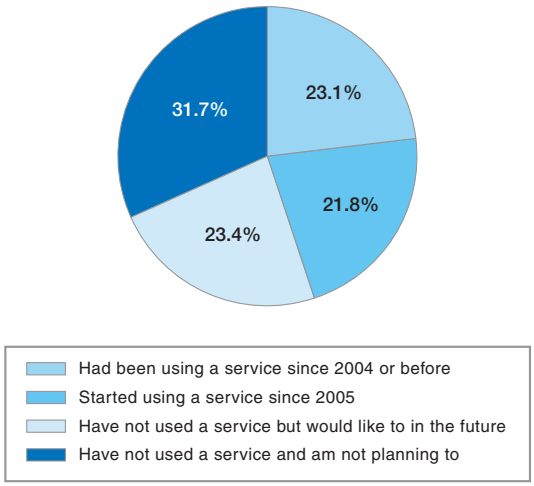
As far as video-image distribution services via the Internet (including both pay and free services) are concerned, the usage was as follows: 23.1% "had used such services since 2004 or before," and 21.8% "had used such services since 2005." A total of 44.9% were using such services, which implies that almost half the people had an experience in using such services **(Figure 1-9-2)**. 23.4% said that "they have never used it but would like to." These services are expected to grow in the future.

Figure 1-9-1 Transition of image content (Internet distribution) market size



Based on the "Survey on Media Content Production and Distribution," Institute for Information and Communications Policy, MIC

Figure 1-9-2 Usage status of video-image distribution services



(Source: "Survey on State of Use of Ubiquitous Network-Related Goods")

Section 10

Progress in Financial Transactions via Networks

1 Ubiquitous networks and finance

As seen in electronic wallets, online banking, and the Internet trading, financial services which take advantage of ubiquitous tools (such as contactless smart cards) and the Internet are gaining popularity rapidly. Through progress in electronic settlement using these ICTs, users can now easily access low-cost but highly convenient financial services.

2 Electronic settlement method

(1) Status of electronic money

The term "electronic money" refers to a method whereby users "charge" electronic monetary value to a smart card or a PC in exchange for cash or deposits in advance, and make payments for economic activities by transaction of the electronic monetary value.

Recently, the prepaid electronic money system is gaining popularity for a variety of reasons including (1) the advance in contactless smart cards has made information exchange between terminals speedy and the settlement smooth; (2) nationwide business deployment is now possible at low cost by collaboration with infrastructure-related businesses such as transportation and mobile-phone services; and (3) an increase in the number of participating companies and users has enhanced the network effect.

(2) Status of Internet banking

Concerning financial services using Internet banking, the total number of accounts of the four Internet-only banks was 2.66 million, and the total savings of the four banks were estimated at 1.0583 trillion yen. The number of accounts increased 33.5% from the previous year, and the total savings increased 47.0% from the previous year.

It is expected that Internet banking will continue to become more active through the spread of e-commerce.

3 Status of online trading

The number of accounts of Internet securities reached 7.91 million in September 2005 and the amount of transaction was 160 trillion yen (an increase of 38.1% over the previous year). The growth rate of online trading amount has always exceeded that of the total trading amount. The use of networks is growing in the stock market.

The use of networks in the stock market increases individual investors and makes their transactions more active due to the convenience of online trading. Individuals are now able to trade securities in ways that were not possible in the past, including obtaining real-time information via the network, exchanging opinions through a blog, and making investment decisions through self-analysis.

Section 11

Impact on Labor Economy

1 Networks and the efficiency in the labor market

The use of networks in the labor market is expected to reduce the distribution cost of information on job advertisements and job seeking in the labor market, as well as to increase the efficiency of job advertisement and job-seeking services. In other words, it is expected that those who seek jobs can increase job options, and that those who seek employees can have a diverse labor force which meets their needs and reduce the cost of searching and hiring. This is because a large amount of job-related information is accumulated on a network and information search is possible. As a result of efficient matching between those who seek jobs and those who seek employees, it is expected that frictional unemployment will decrease, the period of unemployment will be shorter, and the rate of job separation will fall.

2 Networks and the change in the working environment

As laborers' sense of value becomes more diverse, it is necessary that a flexible working environment be organized in order to secure a wide range of labor forces; the use of ICT can be an effective means to this end. In

particular, ICT will be more advanced in all areas including individuals and households in a ubiquitous society, so it is possible that various working forms will be produced.

The term "telework" refers to a "way of working by which workers use ICT and are not restricted to a particular place or time." It is expected that telework would make it possible not only to bring a flexible working environment but also to supply a wide variety of potential human resources to the labor market, and to improve the productivity of office work. Also, in an age when the number of children keeps declining, telework is expected to enable men and women with small children raised or older people to keep a balance between work and home; it is further expected to ease the concentration of jobs in giant metropolitan areas.

3 ICT literacy of employees

The average number of years that employees have used personal computers is 10.5 years, and most are able to use common types of software, such as word processors, presentation software, spreadsheets, email software, and the Internet. It has been pointed out that there is a positive correlation between the number of years of experience in using ICT and one's income, which means that the more ICT-literate a person is, the higher his or her income may be.

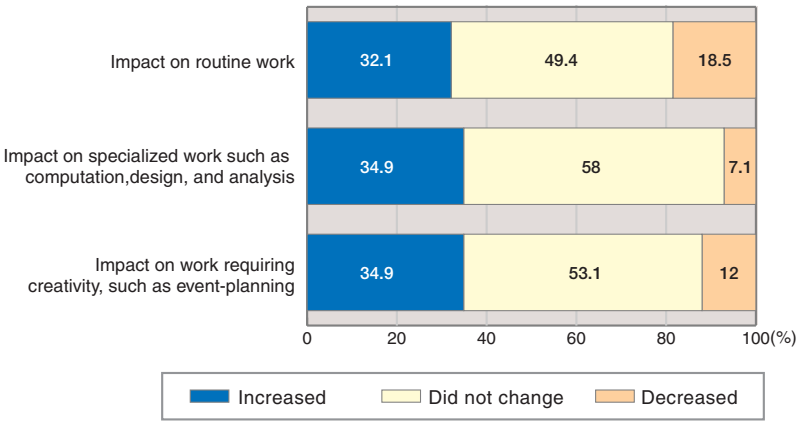
4 Growth in ICT and shift in labor demand

As far as routine work is concerned, the amount of work does not seem to be reduced by the use of the Internet and personal computers. In fact, many respondents said that the workload increased **(Figure 1-11-1)**.

Even in those areas that require creativity and innovation, such as event-planning and specialized work, more responses stated that the workload increased than before.

The progress in ICT does not necessarily reduce the amount of routine work; it may in fact increase the labor demand for non-routine work, which will further increase the value of such labor.

Figure 1-11-1 Changes in work caused by PCs and the Internet



(Source: "Survey on ICT Use by Workers")

Section 12

Advance of Corporate Networks

1 Status of ICT in businesses

The total information-related spending by companies is growing on a real base. In particular, the amount spent on software is increasing drastically; the amount spent on software asset per company is now four times more than that on hardware asset.

The purpose and effects of companies' investment in information technology are mainly to make their business more efficient and speedy. It is clear that ICT is expected to contribute to more efficient in-house management and governance, such as knowledge management, supply-chain management, and product life-cycle management.

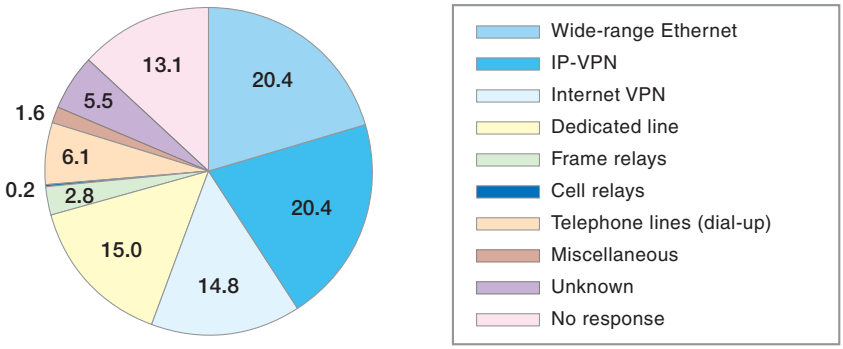
2 Status of information systems use in businesses

About 90% of companies (with at least 100 employees) had already used an in-house ICT network, and about 70% of companies had network architecture for the entire company. Particularly, wide-range Ethernet (20.4%) and IP-VPN (20.4%) had high usage rates **(Figure 1-12-1)**.

As for the installation of information system equipment (hardware), the smaller the company size is, the lower the percentages are of having mainframe computers, office computers, mini computers, workstations. Instead, they show higher percentages of having personal computers. Whereas large companies continue to use conventional systems centered on mainframe computers, it is thought that small companies often build new systems centered on personal computers because the upgrading of information systems is relatively easy.
In the development of software-related to information systems, software packages are more widely used for tasks which are relatively common to all types of businesses, such as finance, accounting, payroll, and human resources. On the other hand, order-made software is more often used for tasks which are different according to the business, such as distribution.

Concerning the use of ubiquitous tools, as of FY2005, 2.8% of companies used RFID tags and an additional 14.7% of companies planned to use them in the future. 10.9% of companies introduced contactless smart cards and an additional 14.8% of companies planned to use them in the future. RFID tags are expected to be applied in inventory management, product inspection, traceability, and other areas of production, distribution management, and settlement. From the viewpoint of the security enhancement, the use of contactless smart cards for entry management and other security measures is expected to grow.

Figure 1-12-1 Services used as main lines in corporate information networks



(Source: "2005 Communications Usage Trend Survey (Business Edition)," MIC)

3 Framework to promote ICT in businesses

As companies introduce more ICT, it becomes crucial to establish a framework such as establishing a department that handles information-related issues and appointing a CIO, Chief Information Officer, who oversees the information system. Currently, just less than 20% of companies have CIOs **(Figure 1-12-2)**. However, even if a company may have a CIO, the person is often appointed concurrently with another position; typically the CIO is an executive director, managing director, or executive officer.

On the other hand, human resources who actually carry out information-related work are computer administrators and information-processing staff who build, design, and operate information systems. There were 6.4 computer administrators per company (about 1.3 per 100 workers) and about 23.6 information-processing staff members (programmers or systems engineers) per company (about 4.6 per 100 workers).

4 Business-to-business transactions on networks (E-commerce between businesses)

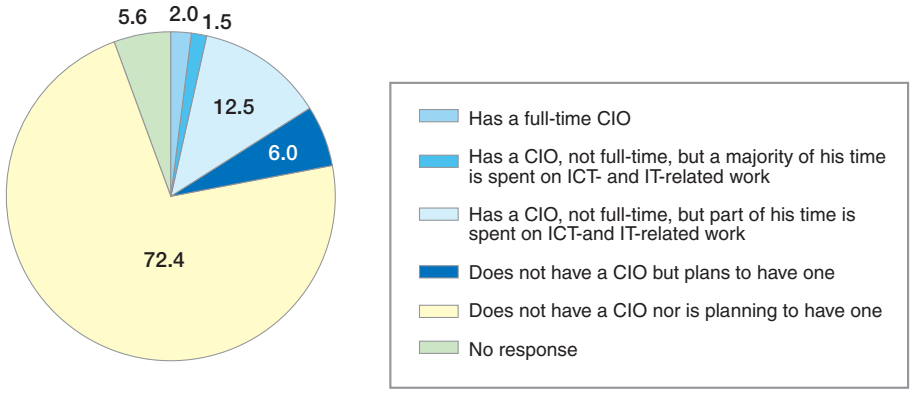
The market size of business-to-business e-commerce was estimated at about 102.699 trillion yen in 2004, with a 14.7% share taken by e-commerce. The market size was approximately 12 times more than that in 1998 (8.62 trillion yen) **(Figure 1-12-3)**.

5 ICT progress in businesses and productivity

As ICT advances, people, organizations, and society must change to take advantage of it. As companies introduce more ICT, it is thought that effective results will be expected by being linked the information systems with the reform of organizational capitals, such as the organizational structure, work processes, corporate culture, and pay structure.

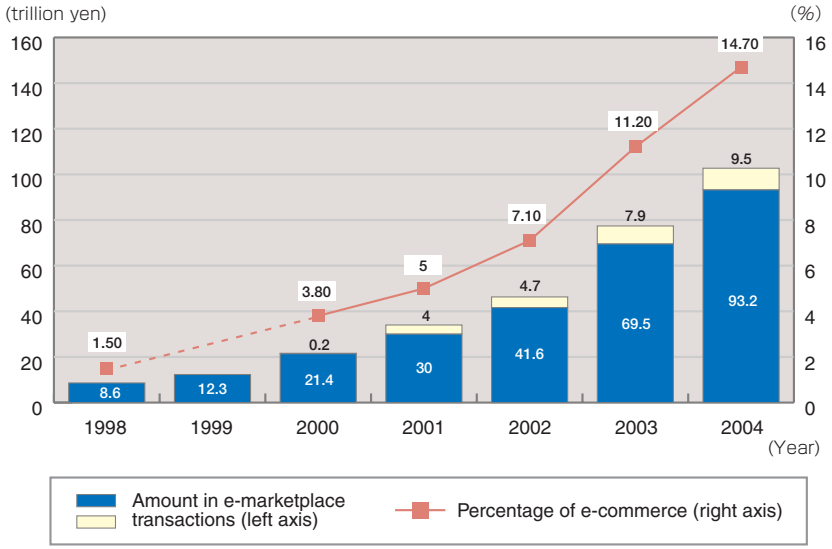
The following figures **(Figures 1-12-4, 1-12-5)** show the results of an analysis on the relationship between the use of ubiquitous networks (one area of ICT advancement in businesses) and corporate productivity, based on the results of questionnaires to companies. They show that the companies that use ubiquitous networks and have reformed the organizational and capital structures within the company are showing higher productivity than those companies that have taken only one of these two steps. This result suggests that ICT progress and ubiquitous technologies can yield even higher productivity if these are accompanied by the reform of organizational capitals such as corporate organization and pay structure.

Figure 1-12-2 Placement of a CIO



(Source: "2005 Communications Usage Trend Survey (Business Edition)," MIC)

Figure 1-12-3 Changes in the market size (narrowly defined) of business-to-business e-commerce and the percentage (narrowly defined) of e-commerce



(Source: "Reality and Market Size Research on E-Commerce, FY 2004," Ministry of Economy, Trade and Industry, Next-Generation E-Commerce Promotion Council, and NTT Data Management Research Center)

Figure 1-12-4 "Ubiquitous trend," "corporate re-structuring," and productivity

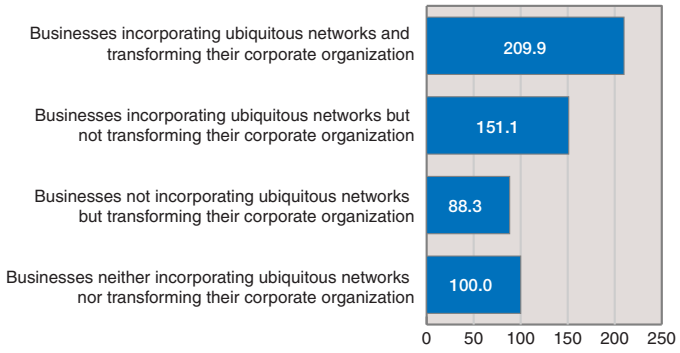
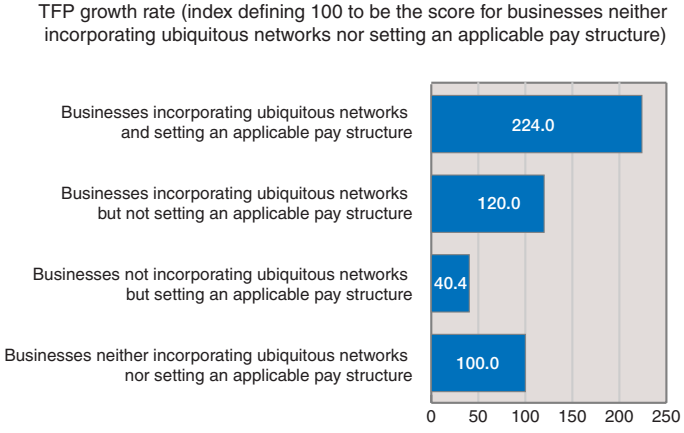


Figure 1-12-5 "Ubiquitous Trend," "Pay Structure," and Productivity



Section 13

Challenges toward Ubiquitous Society

1 ICT usage from the viewpoint of safety and security

A recent major challenge in our society is to ensure security in using ICT. More and more individuals and companies are becoming victims of ID theft, phishing, false billing under a variety of normal circumstances in daily life or daily work (e.g. using an ATM or a credit card, online shopping).

Concerning information security crime, 54.7% of individuals had suffered some type of information security damage. The breakdown shows that the largest number of them (21.7% of the total respondents) "either discovered a virus or had been infected with one." The second most common type was to "have received unsolicited emails" (20.6%), followed by those who "have been infected with a virus at least once" (7.0%) **(Figure 1-13-1)**.

As far as companies are concerned, 68.1% of them had suffered some damage. The breakdown shows that the most common damage was to have "been infected with a computer virus at least once" (29.4%). They were followed by those "used as a relay network or a stepping stone for spam mails" (3.7%), and "unauthorized access" (2.8%) **(Figure 1-13-2)**.

"Act on the Protection of Personal Information" which has been fully enforced since April 2005, stipulates that security control measures be taken to prevent leakage of personal information when operators who handle personal information do their business. Concerning the status of the implementation of measures

Figure 1-13-1 Experience of security-related damage, individuals (multiple answers)

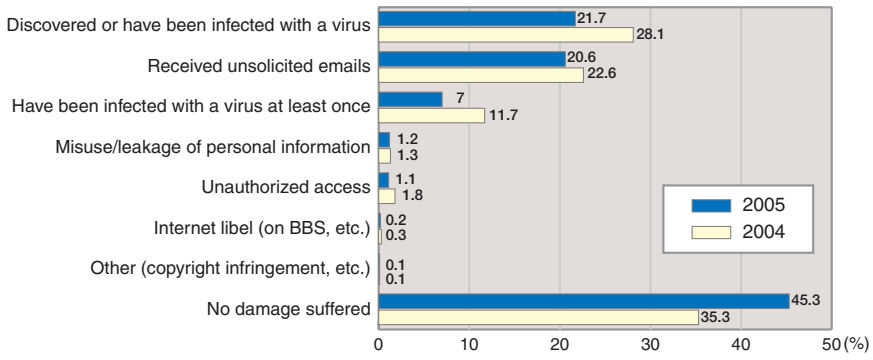
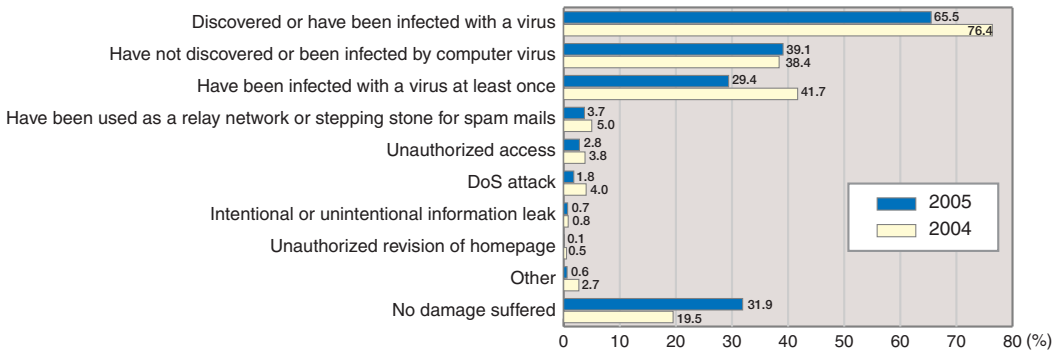


Figure 1-13-2 Experience of security-related damage, businesses (multiple answers)



(Source: "2005 Communications Usage Trend Survey (Business Edition)," MIC)

to protect personal information handled by businesses, an increasing number of companies say that they are taking some measure to protect personal information, compared to the last fiscal year,.

2 Status of the digital divide

Regarding the use of the Internet depending on age, gender, and household income (as of the end of 2005), there is still a large gap between those 60 years and older and other generations although the gap has lessened compared to the end of 2004. Even between those in their 50s (75.3%) and those in their 60s (55.2%), the difference is approximately 20 points.

Furthermore, the use of broadband among those who access the Internet from their home PCs shows a significant gap according to age (as of the end of 2005): the percentage of broadband users from the late teens to the 40s was about 50%; whereas, the percentage fell to around 10% of those in their late 60s; the gap was about 40 points.