From the keynote speech at "CEATEC JAPAN 2003"

Toward the Realization of a Japan-Initiated Ubiquitous Society

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1. INTRODUCTION

The word "Ubiquitous" has become a part of every-day conversation. My definition of a ubiquitous society is "a society in which IT is incorporated into everything around us."

In Japan today, use of broadband communication, which is a backbone infrastructure, is rapidly growing. This means that an essential piece to building a ubiquitous society is swiftly being put into place. The next step is to promote utilization of IT as described in "e-Japan Strategy II."

On that account, I consider it necessary to further advance discussions on new ubiquitous-related markets, ubiquitous solutions, and the core technologies to uphold such solutions. On the basis of Japan's social environment, well-developed infrastructure, and technological edge, it is important to seek ways to globally develop and expand a Japan-initiated ubiquitous society.

Photo 1 Hajime Sasaki during speech.

2. RAPID GROWTH OF THE BROADBAND NETWORK SOCIETY

At the end of 2002, the number of broadband users in Japan reached 19.55 million and is expected to increase to as many as 60 million by the end of 2005, putting Japan into the position of being the most advanced broadband network country in the world. The combined number of ADSL, FTTH, and CATV subscribers surpassed 10 million in May 2003 and by August it was nearing 12 million. These figures indicate the reality of broadbandization and its rapid growth today (**Fig. 1**).

In regard to broadband service charges, according to survey data of ITU, Japan is rated as the best in the world in terms of comprehensive cost performance for the speed delivered. For example, the charge per 100kbps is 0.09 dollars, the lowest in the world. And at the end of fiscal 2002, the
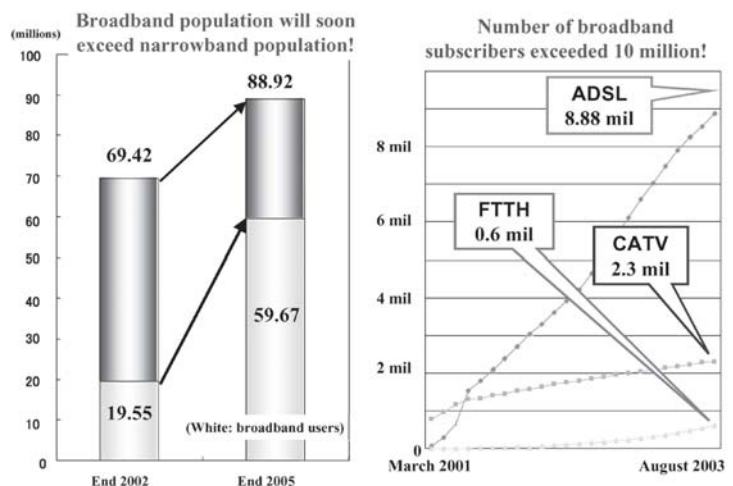

Fig. 1 Broadband user population and number of subscribers (source: Ministry of Public Management, Home Affairs, Posts and Telecommunications).

number of subscribers was ranked third in the world after the United States and South Korea (**Fig. 2**).

In the future, we must address how Japan's established infrastructure can be utilized to create new services and how we can take advantage of it to enhance corporate competitiveness.

In the area of mobile communications as well, Japan can be considered the world's most advanced country. The combined number of cellular phone and PHS subscribers exceeded the number of fixed-line phone subscribers at the end of November 2000, and at the end of March 2003 the ratio of fixed-line phones to cellular phones became 1 to 1.3 (**Fig. 3**).

Furthermore, above 80% of cellular phone subscribers use a handset capable of Internet access, which is far above the number in the United States and Europe. In Japan, contents businesses and services such as i-mode* and J-Sky† are already established as business models. In particular, i-mode has spread throughout Europe and Asia and thus, a Japan-initiated business model is expanding worldwide.

What serves as the main engine for Japan's broadbandization and mobile communication diffusion is the mobile-culture of young people, with their use of games and images on cellular phones. Moreover, the ten-key culture (operated by thumb) has naturally evolved in Japanese society since the full-sized keyboard was not yet part of most people's daily lives, and, that inputting "Kana" (Japanese syllabary characters) is easier than inputting alphabetic characters on a handset, these are also major factors in the fast growth of mobile communications (**Fig. 4**).

Looking at the cellular phone penetration rate by age, while the average rate of

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*i-mode and its logo are trademarks or registered trademarks of NTT DoCoMo.

†J-Sky is a trademark or a registered trademark of J-Phone.

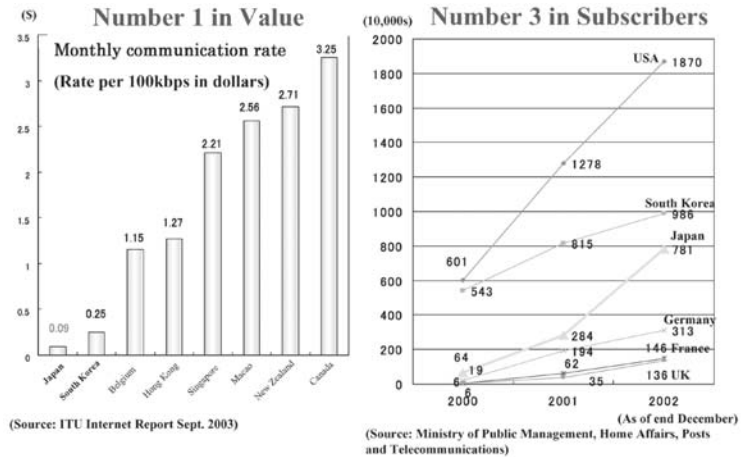(This service is currently operating as "Vodafone live!" by Vodafone.)

Fig. 2 International comparison of broadband communication diffusion (rate, number of subscribers).
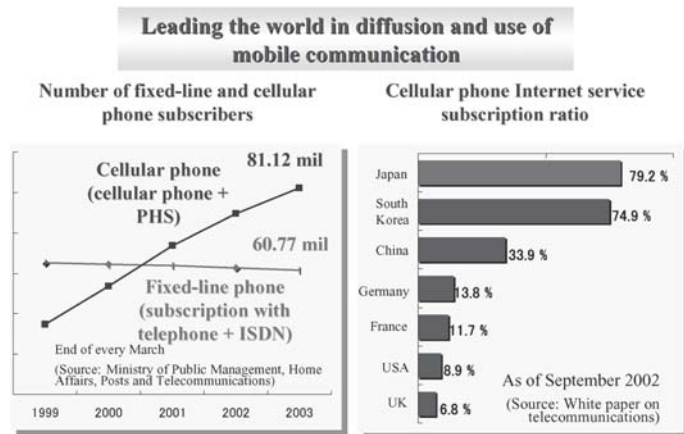

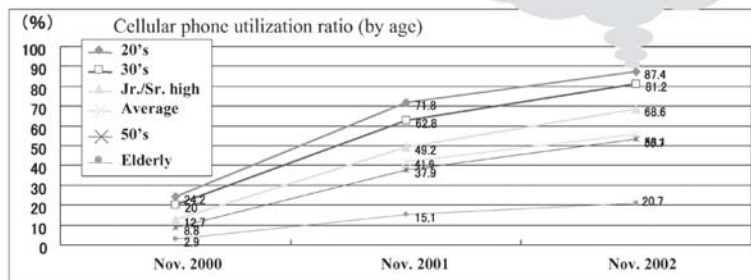**Fig. 3 World-leading use of mobile communications.**

Fig. 4 Mobile communication leads the broadband growth.

all ages is around 60%, among people in their 20's it is as high as 90%. This indicates that in the future, development of devices and provision of services that are user-friendly for the elderly will be the key elements for establishing a ubiquitous society.

3. TOWARD THE IMPROVEMENT OF IT INFRASTRUCTURE AND PROMOTION OF IT UTILIZATION

Until the 1990's, we felt that there was no clear IT strategy in Japan. The main emphasis of the government policy was infrastructure construction, hardware development, and revision of the legal system. Therefore, the implementation of a policy that focused on the IT users' position was late in coming. In this regard, from now on it is vital that the government takes action based on the recognition of the significance of IT utilization. A policy shift can be seen in the government's policies (**Fig. 5**).

In "e-Japan Strategy II," emphasis was shifted from the conventional focus on infrastructure to effective IT utilization including broadband. Specifically, the following 7 areas are being emphasized: medical services, food, lifestyle, small and medium enterprise financing, knowledge, employment and labor, and public service. Already, concrete numerical targets have been set for each of these areas in preparation for promoting broadband utilization. One of the significant aims is to enhance the international competitiveness of Japanese industries through promoting IT utilization to build an "energetic, worry-free, exciting, and more convenient" ubiquitous society (**Figs. 6 and 7**).

As for the concrete measures to realize a ubiquitous society, I think three points should be considered: continuous infrastructure improvement, environment improvement to ensure security measures and promote content distribution, and IT utilization promotion in the 7 key areas.

The current broadband infrastructure is still mainly based on a wired network. In order to realize the ability to be "Anytime and Anywhere," a vital ingredient of a ubiquitous society, it is necessary to improve the wireless network, for example, by speeding up mobile networking and improving wireless LAN and hot spots. At the same time, in order to promote IT utilization, it is also essential to improve the back-end networks in enterprises and
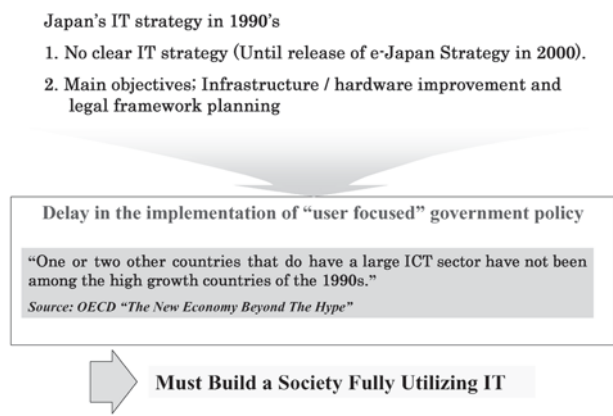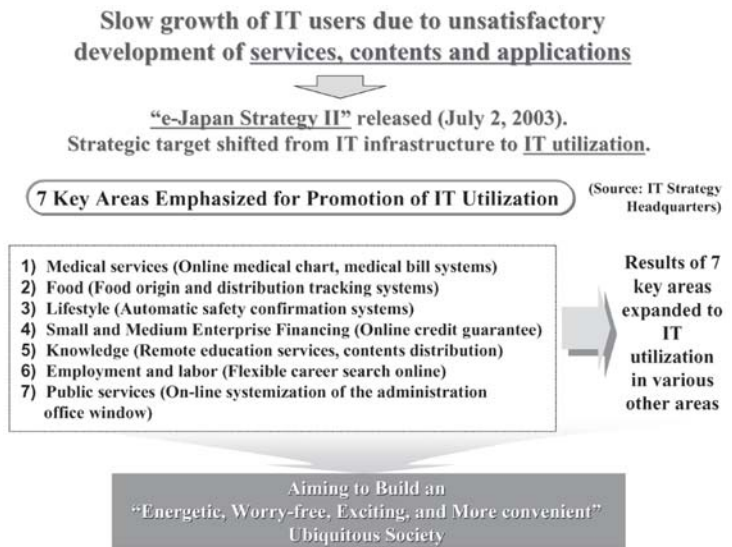

Fig. 5 Looking back at 1990's.

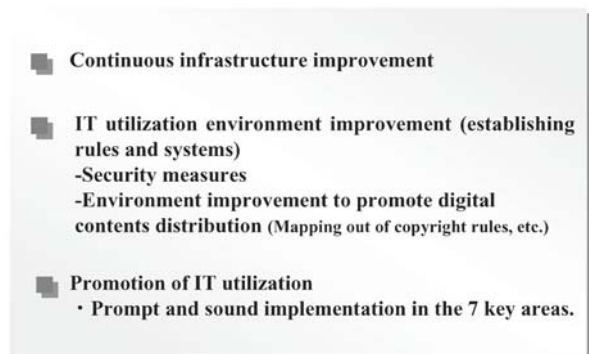**Fig. 6 Japan's New IT Strategy.**

Fig. 7 Measures to realize an "energetic, worry-safe, exciting, and more convenient" ubiquitous society.

organizations.

Further, as it is a reality that users are concerned about security, measures to protect consumers' privacy must be devised while enhancing convenience and usability. As for digital contents distribution, the current framework for the protection of rights holders and profit sharing is insufficient to promoting contents distribution. Therefore, in addition to improving the quality of contents and services, it is also necessary to devise balanced measures that properly address the needs of both rights holders and users.

4. SERVICES AND SOLUTIONS IN A UBIQUI- TOUS SOCIETY

Once a ubiquitous society is realized, a world will appear where "people," "things," and "organizations" are connected worldwide anytime, anywhere, and with anybody. Ubiquity can be enjoyed at home, in the car, via mobile equipment, and in the office. Although communication is still constrained geographically, temporally, and physically in the current social environment, we will be released from such constraints in a ubiquitous society (**Fig. 8**).

On the other hand, people's desires will increase in regard to usability, understandability, security, etc. and accordingly there will be demands for higher-quality services with user-friendliness (**Fig. 9**).

For the purposes of enhancing corporate and organizational competitiveness, achieving profitability, and improving customer service, ubiquitous service solutions will be offered in business and public service fields such as medical, remote education, and administrations. These will be bolstered by the growth in broadband and mobile communications (**Fig. 10**).

On another front, comprehensive services to help improve the life of consumers will be expected to become more secure, natural, and timely. In addition, services will be created that "Watch over," "Inform," and "Help" the individual. For example, to eliminate anxieties and problems people have in daily life related to health, security, and other issues, we anticipate the creation of services such as those for remote health care and for remote monitoring of independent elderly (**Fig. 11**).

With the progress of such services and solutions,

the ubiquitous-related market scale, which includes network equipment and hardware, is expected to reach 30 trillion yen by 2005 and 84 trillion yen by 2010 (**Fig. 12**).
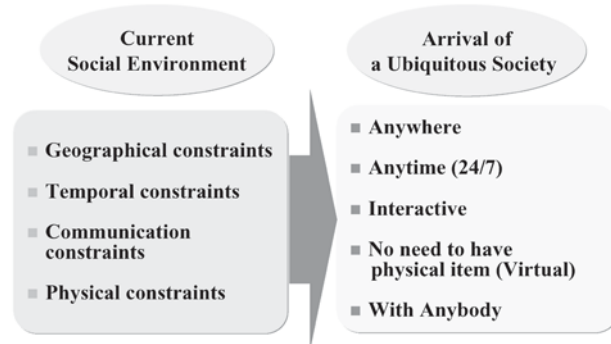

Fig. 8 What changes will a ubiquitous society bring?

Fig. 9 Accelerating people's desires in a ubiquitous society.

Fig. 10 Ubiquitous service solutions to expand new possibilities in the fields of business and public services.
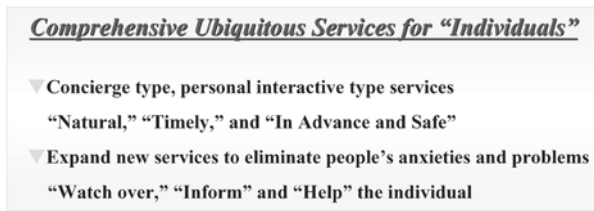
Comprehensive Ubiquitous Services for "Individuals"

▼ Concierge type, personal interactive type services

"Natural," "Timely," and "In Advance and Safe"

▼ Expand new services to eliminate people's anxieties and problems

"Watch over," "Inform" and "Help" the individual

Fig. 11 Ubiquitous services that improve the lives of consumers.

5. CORE TECHNOLOGIES TO SUPPORT A UBIQUITOUS SOCIETY

I think the most important technology to support a ubiquitous society is device technology. This technology covers a wide range of areas, not only devices such as components or hardware, but also middleware and applications to support service businesses. It is not an exaggeration to say that the success of a ubiquitous society depends on the development of device technology. There are two important points here: development of ultra-small ubiquitous devices and reduction of their power consumption. It is extremely important to miniaturize devices, because this is a society in which chips are incorporated into various equipment so that they have telecommunications functions and are flexibly connected by networks. Also, in a ubiquitous environment, the number of systems and areas that are used only occasionally and unconsciously will increase vastly. Such equipment and devices will be required to operate in an environment where they are on standby for long periods, interspersed with short continuous operating time. In order to meet such characteristics, it is important to develop necessary technologies to reduce the power consumption of devices (**Fig. 13**).

Besides device technology, there are a broad range of important technologies: sensing technology to manage and control various sensors, storage technology to securely manage large capacity data, grid computing technology, security technology to identify and authenticate tens of millions to hundreds of millions of sensors and equipment, cross-system network technology to enable interconnection of various network systems, agent technology to manage ubiquitously distributed attribute information, and customization and personalization technology to offer services that correspond to the TPO of individual users.

6. TOWARD THE REALIZATION OF A JAPAN-INITIATED UBIQUITOUS SOCIETY

The vital points in working to realize a ubiquitous society initiated in Japan are as follows (**Fig. 14**):

1) Take advantage of Japan's world-leading position in strengths such as home information appliances, mobile communications, car navigation systems, and games,
2) Build a society in which even users without IT literacy can enjoy its convenience,
3) Utilize IT in finding ways to help solve the unique problems in Japan, such as its aging society and falling birthrate,
4) Realize an Asian ubiquitous society through Japan's leadership, by way of cooperating with Asian countries with whom we have a high degree
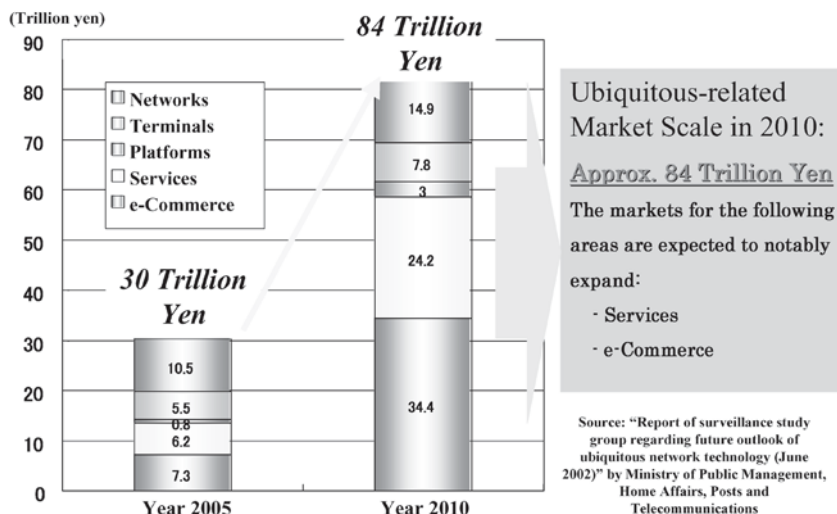

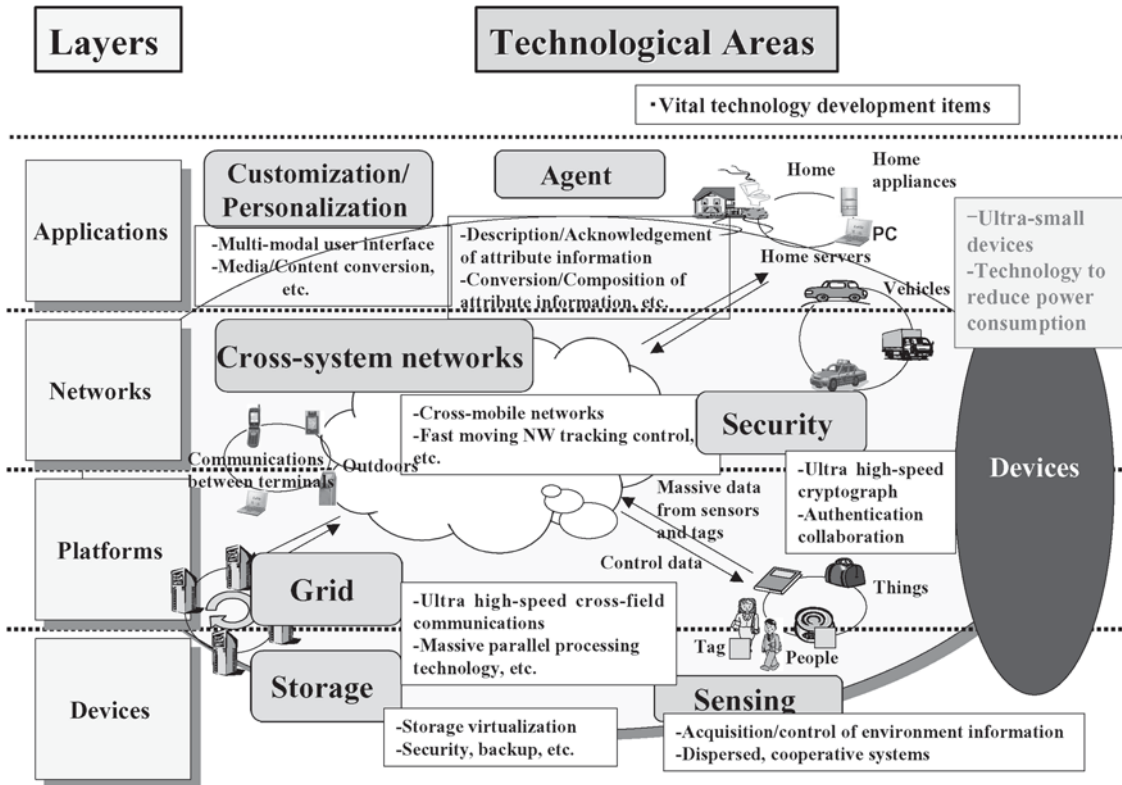**Fig. 12 Forecast for the ubiquitous-related market.**

Fig. 13 Core technologies to support a ubiquitous society

Photo 2 The hall of keynote speech (place: Makuhari Messe).

Fig. 14 Realization of a Japan-initiated ubiquitous society.

of geographical and cultural interaction, and expanding the Japanese way of IT utilization, or "IT for community," which places importance on maximizing organizational and social benefits.

5) Find the solutions to eliminating the "negative" aspects of IT, such as problems related to online dating sites and the brain wave abnormality called

"game brain."

In other words, while capitalizing on Japan's strengths, weaknesses must be overcome in such areas as software, contents, and security. In addition, it is necessary to carry out regulatory reforms and drastic legal revisions in such fields as medical
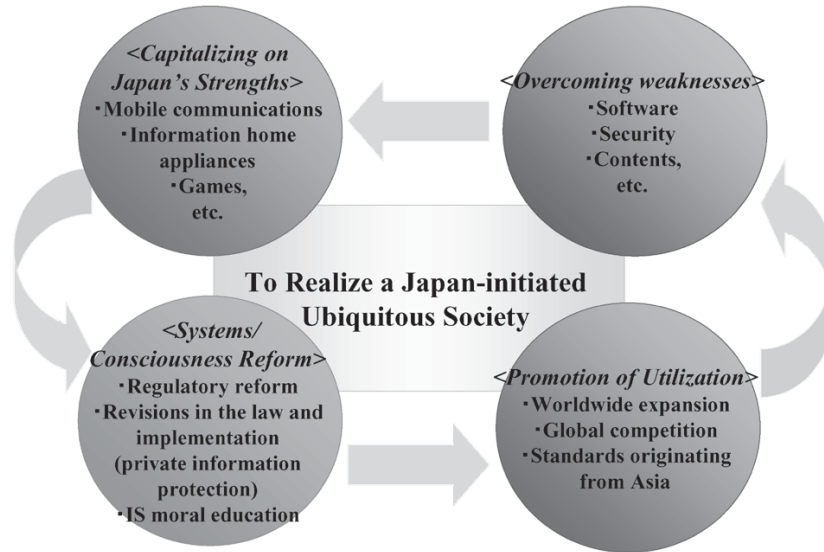
Fig. 15 Conditions to realize a Japan-initiated ubiquitous society.

service, education, and welfare, as well as to change people's thinking through moral education focusing on the information society (IS). Concurrent promotion of these activities will turn the realization of a Japan-initiated ubiquitous society in a "positive" direction (**Fig. 15**).

Right here, in CEATEC JAPAN 2003, I sincerely hope people will become aware of the present move-ments toward the realization of a Japan-initiated ubiquitous society.

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