

# The State of Digitalization in Modern Japan: the Road to an Advanced Information Network Society

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## The digitalization of Japanese society

Japanese society is now advancing rapidly in the direction of digitalization. In this article we will investigate the present state of this digitalization from a variety of angles including the business, media, consumer and infrastructure perspectives.

In Japan, the digitalization of society has only been a commonly discussed issue since three years ago, when U.S. Vice President Al Gore gave a speech on the "information superhighway" (NII, the national information infrastructure concept) in November 1993. This marked the start of a "multimedia boom" in Japan. The boom was in name only, however; the word "multimedia" became a buzz word even though there was still no clear definition of what it meant. The base of computer users expanded as transitional products like "multimedia personal computers," with attached television tuner and audiovisual capabilities, hit the market. Computer communications were also catching on at this time, but the spread was limited to a segment of the scientific community and "computer nerds," known as *otaku* in Japan. Furthermore, the environment and infrastructure for computer networks were not yet as developed as they are now.

At the time of the introduction of the "information superhighway" concept, the disparity between the level of information digitalization in the U.S. and Japan was obvious. Differences were clear in the percentage of general computer users, telecommunications infrastructure development, network development and the quality and quantity of network contents. Japan's future telecommunications network, the B-ISDN infrastructure, was targeted for implementation in the year 2015 while

CATV network diffusion, considered the alternative until the B-ISDN was up and running, was less than 5%. In the midst of talk of this crisis in the state of Japanese infrastructure, the possibility of various multimedia platforms were discussed and the scale of the multimedia industry in the 21st century was posited at between ¥70 and ¥130 trillion. At the time, the Japanese economy had yet to completely shake off the effects of the bursting of the bubble economy, and the multimedia industry may have been seen as a single ray of hope.

At around this time, the term "multimedia" and articles about multimedia began appearing in the Japanese media. Television stations broadcast feature programs on multimedia and a flood of books were published on the subject. Multimedia experts and commentators appeared and special courses on multimedia were developed at many universities. The whole of Japan was caught in the grip of multimedia fever. The theme of this article will be to take a look at what is happening in Japan now, three years later.

## The Internet boom

The Internet only began to make real inroads into Japan in 1994, less than two years ago. Until then, the Internet was the province of a small segment of the scientific community and hard-core PC users. Use of the Internet began to catch on first at Japanese companies, who were pursuing systemization and digitalization as strategies to gain an edge over competitors, and then spread rapidly among individuals and households over the past several years. The spread of the Internet accelerated following the release of Windows '95 in the fall of 1995, and subsequent improvements in personal computer performance, a reduction in computer

prices and the release of high-performance browser software.

Over that period in Japan, the number of Web sites and their contents rapidly expanded and improved, although there is still no comparison to the U.S. in terms of either quality or quantity. According to a recent survey conducted by the Japan Institute for Social and Economic Affairs, 36.4% of Keidanren affiliates have a homepage on the Internet and 41.3% are looking into making a homepage. Furthermore, 70.9% plan to emphasize advertising activities on the Internet in the future. On-line media, on-line shopping and so on are also rapidly moving toward the implementation stage, but still face many problems and future developments are being awaited. Reference sites such as Yahoo Japan are being built up and the contents of Web sites originating in Japan have also improved greatly over the past year. On the other hand, quite a few company sites are either unmaintained or have dropped off the Net.

Around 5 million personal computers hit the Japanese market in 1995. The majority of these went to corporations. At the beginning of 1996, computer shipments for 1996 were predicted to hit 7.5 million and it seems that figure will be reached. It is thought that the bulk of this demand has been supported by sales to individual consumers. The increase in sales of modems, printers, MO and other peripheral computer equipment is far above computer sales.

This information about computer sales in Japan suggests that Japanese PC users are beginning to use their computers in quite advanced ways. One factor behind this trend seems to be the recent rapid expansion of ISDN circuits. Furthermore, although still in the minority, some Japanese individuals are creating their own homepages on the

Web rather than just Net surfing. Magazines specializing in the Internet, other than those dealing only as introductory guides, are also turning their focus more from the "ins" and "outs" of Net surfing to the creation of homepages.

Currently, around 3 million personal computers in Japan are said to be linked to the Internet. Another 3 million people belong to personal computer networks such as NIFTY-Serve. Accounting for some overlap, 4 to 5 million computers are calculated to be linked into some kind of digital network. Most PCs now being sold come with internal modems or Internet software already installed. Consequently, the number of computers on the Net is only expected to increase.



Homepage creation enterprises on their toes as Japanese businesses rush to set up their own homepages on the Internet.

## The spread and diversification of PC/Internet magazines and the media-driven Internet boom

A flood of PC and Internet-related magazines is now being published in Japan. There are now said to be around 150 to 200 publications, but hard numbers are difficult to come by because competition is fierce and many magazines rise and fall within a short period. At the time of a survey published in the most recent *Senden Kaigi*, a magazine focusing on the advertising industry, around 160 PC/Internet magazines were thought to be in print. For specialized

magazines or information magazines, this is an exceptionally large number for a single field. Ten to 20 different magazines is usually tops for most fields.

As for contents, the magazines range from specialized, technical journals to magazines for hard-core PC and Internet fans, from ones with practical information aimed at businessmen to those targeted at beginners. Magazines for the beginner are the largest category, probably accounting for over one-third of all publications. The increase in practical computer magazines for beginners is thought to contribute to the growing numbers of PC users. As the base of users continues to increase in the future, it is expected to bring greater specialization of contents and further market-driven selection in the competition for readership.

A recent eye-catching trend has been the increase in the number of magazines targeting groups such as women and the middle-aged who until now hadn't been considered PC users. Incidentally, the general demographic for Internet users as of June 1996 was males in their 20s and early 30s. The proportion of middle-aged men and women is still relatively low. The proportion of female Internet users in Japan is less than 10%, which is under half that of the U.S. (According to Internet user surveys from *Nikkei BP*, etc.)

Most of these magazines are sold with accompanying CD-ROMs or disk drives. For several of the publications, the CD-ROM is the main product and the magazine text serves as instructions for using the CD-ROM. This kind of packaged media is another sign of further digitalization.

The attached CD-ROMs and disk drives cover many subjects, but the most common contents are trial offers for new software ( $\beta$  release), demonstrations of homepages and links to recommended Web sites. Recently, adult CD-ROM magazines, which concentrate on demonstrations for setting up adult Web pages and links to adult Web

pages, are increasing. Education-related Internet magazines are also being published, focusing on language study or child education.

Thus, in Japan, a variety of PC-related and CD-ROM related magazines are being published that span the spectrum from academic, specialized fields to the entertainment field. These publications are contributing to enlarging the base of the PC and Internet-related market. The conventional media, too, frequently broadcasts special programs or publishes feature stories on the Internet, stirring up interest in Internet-related topics. Thus, the Internet, more than anything else right now, has caught the interest of the Japanese people, although it is not clear whether they have a true grasp of what can be done with the Internet.

## The present status of Japan's Internet infrastructure and its future

Major problems with the infrastructure that supports the Internet are now appearing. The problems stem from the rapid enlargement of the base of Internet users that has come with a shift from use by a small number of scientists and hard-core PC jockeys to increased use for business purposes and increased use by individual users. Although the same problem is occurring in Europe and the U.S., it is particularly serious in Japan.

When commercial use of the Internet began in Japan in 1992, use was limited to scientists and some corporations. At that time, the infrastructure was maintained by scientists and a few leading service providers. Even though the number of users and the range of uses has exploded since 1994, the basic infrastructure has not changed since 1992. Consequently, many infrastructural problems have arisen. The present structure consists of 12 primary providers linked to around 800 large and small secondary providers. These providers, in turn, provide network access to some several million users. Supporting all this is the NSPIXP (net-



work service provider Internet exchange point), the link between 12 primary providers and internet exchanges (IX). The NSPIX is being experimentally operated by the WIDE Project, an Internet research organ. In short, the core infrastructure of the Internet in Japan, with its burgeoning use by businesses, is actually an experimental research project.

Japan's Internet infrastructure is set to undergo major changes starting in 1997, however. In 1997 the Internet exchanges linking Japan and the U.S. and linking Tokyo and Osaka, the backbone of the Internet infrastructure, will shift from circuit volumes of 1.5 megabits/second to 45 megabits/second. The one circuit between Japan and the United States will be increased to 13 circuits to make a total of 585 megabits/second and the total between Tokyo and Osaka will increase to 405 megabits/second. Furthermore, NSPIX-2 exchange points will be added to the current NSPIX-1 exchange points and providers will also be linked by 45-megabits/second circuitry. These improvements will accelerate and disperse internet exchanges within Japan and will make Internet traffic move more efficiently and contribute to the acceleration of the Internet as a whole.

Another major trend that will occur after 1997 will be the diversification of access circuits. So far, Japanese users have only had the choice of using normal telephone circuits or ISDN circuits, but new access networks such as long-distance NCC access service (new first-class telecommunications providers: DDI, Nihon Telecom, etc.) and CATV and OCN (Open Computer Network: an Internet service provided nationwide by NTT) will be added. This diversification of access circuits will make faster, cheap-

er services available.

The fastest service will be CATV Internet. A test service already began in July 1996 of the urban CATV company Musashino Mitaka Cable Television in the Tokyo suburbs, and commercial service began in October.

### The appearance of Internet television and the scenario for the final stage of multimedia

Internet television, an information household appliance that preceded the popularization of the Internet, is finally being marketed. In the fall of 1996, Mitsubishi Electric Corporation, Sanyo Denki Co., Ltd. and Sharp began selling Internet televisions as the ultimate in television. Sales of an exterior Internet connecting device preceded the Internet television and Hitachi, Ltd. and Sony Corporation will soon be selling new exterior connecting devices.

Around the time the multimedia boom was just taking off in 1994, all-in-one multimedia personal computers were put on the shelves that, in addition to telecommunications capabilities, had an internal television tuner and audiovisual capabilities. This product was heralded as a prototype multimedia platform. At that time, a serious discussion ensued over what would become of the multimedia platform for the 21st century. A scenario envisioning a more advanced television set was considered, but because of problems such as low resolution, multimedia television was seen as being too far in the future. Consequently, personal computers were thought to be the best bet for that time.

With the trend toward interactivity, as seen by the appearance of Internet television and the realization of CATV Internet access, developments surrounding television have suddenly become very exciting. The new Internet television is a wide-view television with computer capabilities and an internal modem so that Internet homepages can be viewed on the television screen.

"IT (InterText) Television," a interactive print media teletext broadcasting system, is also being marketed. Toshiba

has taken the lead in selling this product, which concentrates on broadcasting textual information and which is targeted for practical uses such as television shopping and survey-taking.

A number of scenarios for the future directions of these new televisions can be imagined, but at the least, if development of these televisions can successfully ride the burgeoning Internet boom, it will contribute to the widening of the foundation of the multimedia age. The prerequisite for this contribution will be the improvement and development of television-linked Internet contents and television programs using interactive capabilities.

### Conclusion

We have looked at the state of digitalization in Japan primarily through studying the spread and enlargement of the Internet, but digitalization of Japanese society is also moving forward rapidly in other areas not touched on here. Rapid digitalization is being driven forward in the areas of television broadcasting and production, newspaper editing, publishing and printing, the settlement system of financial organizations, the medical information system, the production floor in the manufacturing industry and the area of business management. As this change moves forward, new problems and issues are arising. Companies are adopting LAN and Intranet networks and seriously working to take on CALS and EC (Electric Commerce).

We have looked at digitalization in Japan primarily through the lens of major happenings. Digitalization will probably have as much of an influence on the consciousness and values of the Japanese people as television did. Finally, we would like to stress that the system in many aspects should be rearranged and reformed for the development of the advanced information network society in Japan. ■

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