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*Multimedia Society Is Coming
– Japan Has to Change –*

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No. 105

From the Editor

The Ministry of Posts and Telecommunications (MPT) predicts that Japan's multimedia market will enlarge to 123 trillion yen by 2010, accounting for 5.7% of GDP. According to the MPT, new markets of some 56 trillion yen will be generated by constructing and extending optical fiber networks for video program distribution, TV shopping, software distribution, and network terminals, while the existing multimedia market will grow to 67 trillion yen through expansion of optical fiber networks. The MPT also predicts that these new markets will create new employment for 2.4 million persons. Although various definitions of multimedia have been proposed, in general use it indicates high speed digital exchange of voice, data, and images through the convergence of telecommunications and broadcasting.

In January 1996, the Electronic Commerce Promotion Council of Japan (ECOM) was established as a JIPDEC-affiliated organization under MITI's guidance. While another JIPDEC-affiliated organization, the Center for the Informati-

zation of Industry (CII), has been engaged in various activities to promote EDI in Japan, the aim of Electronic Commerce (EC) is much broader: to implement an open electronic network for commercial transactions not only between specific companies, but also for many, non-specific users over a wide area, including general consumers. To achieve this purpose, those technologies needed for transactions between enterprises and consumers are being developed and implementation experiments in encryption, authentication technologies, and IC card software and hardware technologies are planned. In the experiments, workshops are to be set up on individual themes covering technological issues such as standardization of commodity attribute information, security technology, personal identification technology, IC cards, related legal systems, privacy, and systems for international transactions. Ten billion yen was appropriated for EC promotion projects in the fiscal 1995 primary supplementary budget. In the fiscal 1995 secondary supplementary budget, 21.75 billion yen was ap-

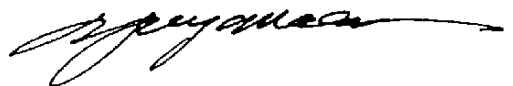
propriated for "advanced inter-enterprise EC implementation experiments." Its targets are "standardization of commodity attribute marking specifications," "implementation of digitalization technology based on basic specifications and development of information sharing environments on networks," and "EDI for transaction and distribution information over a wide range of - including medium- and small-sized enterprises by use of the Internet or PC communications." Nineteen projects have been selected from more than 200 proposals presented to accomplish these targets. The working groups that were set up for the individual projects have begun their development activities.

Character information has been the major focus of communications for most electronic transaction systems that have been developed up until now. Since progress in multimedia technology will enable information transmission to include image and voice data, the potentials for EC should expand greatly.

Recently, NTT announced the Open Computer Network (OCN) plan. By lowering charges for connection to the Internet, this plan will promote the use of multimedia communica-

tions. Under NTT's leadership, various multimedia-related projects are underway. Rapid progress in multimedia-related technology and networking is exerting a major influence not only on the industrial structure, but also on the individual business strategies of companies in Japan. However, a great many problems must be solved in order to smoothly promote multimedia application in industry. For example, enormous funds for infrastructure development such as for optical fiber installation must somehow be obtained. Other issues include service charge systems, intellectual property rights, and deregulation. At the same time, sufficient consideration must be given to the business practices and commercial customs that are unique to Japan.

This issue introduces progress in multimedia in Japan and its influence on industry. We hope that the information will be of use to our readers.



Yuji Yamadori
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I. From Closed Network to Open Network – Transformation of the Japanese Economy in the Information Age –

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1. Introduction

Japan is about to enter the 21st century with mixed feelings of expectation and uncertainty. The bold assertions, voiced until only recently, that the 21st century would be the “century of Japan” are no longer to be heard. Instead, some doubt whether Japan will even be able to keep up with world trends.

Even were the individual issues immediately facing Japan to be solved, a structural problem would still persist: namely, the fact that the organizational principles governing Japanese society are “closed.” The self-sufficient, closed business practices by which a single business group fulfills all functions, the administrative framework under

which discretionary regulations are enforced under ambiguous rules, and structures built upon nebulous designations of responsibility are all factors that serve to isolate Japanese organizations from the outside.

During a period when all functions from business activities to daily life were satisfied within a self-sufficient society, inwardly-focused organizations could be relied on and indeed were quite powerful. This type of society has been favorably evaluated as being able to manage organizational functions with extreme flexibility, through close-knit interactions between fellow members who understand each other well. But the viability of this type of framework is being questioned as globalization of business and soci-

ety progresses amid today's networking of information.

Information networks are developing at a pace far outstripping even the expectations of specialists in related research such as myself. Although overstatement should be avoided, it is quite likely that the main driving force of the 21st century will be information, just as the 20th century was propelled by the energy revolution.

Technical discussion aside, today's information networks make it possible for far-flung individuals and firms to form linkages, overcoming conventional physical restrictions. An age is arriving when people formerly separated socially and economically are able to transcend national and organizational barriers to exchange information based on freely-formed alliances.

As previously impossible patterns of alliance become possible, ideas about the nature of the family, the company, and the nation are being transformed. One example of this can be seen in the realm of economic activity. From an age in which large corporations found overall, competitive strength in having a full range of functional capabilities within a group of related com-

panies in a specific geographical area, we are entering an era when companies carve out particular realms of expertise and form global ties with other companies with excellence within that realm, building supply systems that provide products worldwide.

Networks intimately tied to individual life styles are also developing apace. One of my university students recently did a research project on *go* services provided over the Internet (*go* is a traditional Oriental board game). He found that in Net "go clubs," *go* enthusiasts were crossing the oceans to make friends with fellow *go* fans with time on their hands thousands of kilometers away, and were taking advantage of "chat" sessions (which still employ only character transmissions) to converse while playing games. Moving beyond the game itself, the "go clubs" were becoming international plazas for friendship. My student became excited at the great power this gave to the elderly or physically challenged to form direct, first-hand contacts with the world at large. A recent graduate, he has now launched a business to provide such services.

Amid these changing movements by individuals and companies, the na-

ture of the nation will inevitably also be transformed. The age of separation between "them" and "us" based on national boundaries has already passed. For example, when it becomes normal for consumers to make purchases directly from overseas businesses by network, and economies join together into a single entity, differences in legal codes between countries may develop into a major problem. At the very least, a unified commercial code and regulations and common business practices will become a necessity. One must presume that, however regrettable, crime also will become increasingly globalized. When distribution of pornography becomes global in scale, drawing of lines to demarcate moral distinctions will no longer have any meaning if it only involves a single country.

In a world in which society is fast becoming globalized, the inwardly-oriented makeup of Japan's enterprises and society presents very real risks. If they remain as is, Japan will be excluded from the international social and economic activities that are developing in the infrastructure called "cyberspace" through utilization of the open characteristics of networks. Another problem is that an inward orientation results in a lack of capacity for

self-reformation. At the risk of offending my fellow Japanese, it seems to me that current organizations in Japan are thinking only of their own self-defense, while ignoring external changes in their environments.

In order to create an open society or organization, there must be points of contact with the outside. I describe this as "creation of organizations with open interfaces." The meaning of having open interfaces lies in being able to build systems with links all over the world by division of responsibilities using clearly-understood methods that can be understood by all. Up until now, however, Japanese society and organizations have taken pride in uniqueness, operating using language and rules that could be understood only by insiders. "Creating open interfaces" means to change so that it will be possible for these to be understood by those on the outside.

Having open interfaces does not mean that Japan must unconditionally accept the methods of foreign countries. Nor does it mean that we must lose our own identity. Instead, it means to make this individuality "intelligible" to the rest of the world and make efforts so that

it will be accepted. Japan has a culture and a technological prowess of which we can justifiably be proud. Having open interfaces means to communicate and express ourselves plainly, in forms that will make the world appreciate Japan's "expertise," which up to now we have preferred to believe no one else can understand.

2. Waves of Technological Innovation

Let us review the nature of present technological advancements. "Inter-organizational information systems" may be defined as systems that connect companies using communications networks. Many commentators have pointed out that they will not only affect the competitiveness of individual companies, but will also change the structure of the market itself.

Viewed dispassionately, however, commercial use of computer networks is nothing new. It has existed in various forms since the 1960s. One famous example is the SABRE reservation system in the airline industry. In Japan, large systems such as the Zengin System (system of the Federation of Bankers Associations of Japan) have played important roles as infra-

structure for commercial transactions covering many organizations. The current excitement about computer networks arises from the startling new potential they have been provided by three factors that distinguish contemporary computer networks from those of the past.

First, it is now possible to construct transaction systems at far lower cost than before, due to the advance of so-called distributed databases and distributed processing networks such as the Internet. The range of use is thereby broadened dramatically, extending even to the individual. Traditional electronic data interchange was developed on the premise that data would be exchanged between corporations, but there may be significant growth in transactions between corporations and individuals and between individuals from now on.

The second factor is functional improvement. Conventional transaction systems have chiefly handled character data, but contemporary networks are capable of multimedia information transmission using voice and image data. This expands the scope of transactions that can be handled electronically, so that new objects of electronic transaction are expected to emerge. One

great change is that it has become possible to base negotiations between companies on design drawings, now that CAD data can be exchanged at high speed. In the past, network transactions could only involve products that could be specified using characters such as product codes. But when product information can be expressed over the network using drawings, even customized products can become objects of transaction. This alone drastically expands the possibilities for electronic commerce.

The third factor is the "openness" of the new networks. Conventional computer networks have been used

primarily for exchange of information between parties specified in advance. In many cases, these were closed networks for a specific company or business group. The systems were designed with closed structures that made it impossible to connect to the outside, by using unique protocols in system construction. This was particularly true of the inter-company systems constructed under the slogan of SIS (Strategic Information Systems), networks based on distributing proprietary terminals to customers with the intentional aim of "enclosing" them so they could not tie up with any other company (Figure 1).

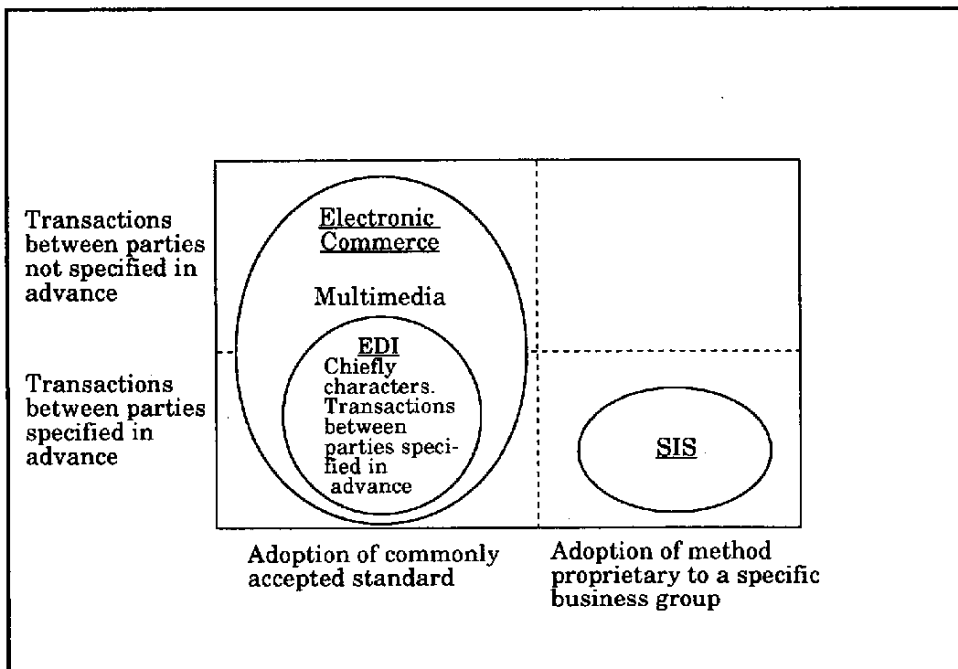


Figure 1. Model for Electronic Commercial Transactions

However, networks have become open with the advance of the Internet and the progress of standardization work for EDI (Electronic Data Interchange) and CALS (Continuous Acquisition and Life-cycle Support), so that any combination of companies can exchange multimedia information at any time. The groundwork is being laid for large numbers of unspecified companies to carry out transactions over computer networks — at least technically. A world is expected to develop in which a universal range of parties all over the globe can transact dynamically based on ad-hoc needs.

At the least, today's spread of distributed information and communication systems should have an impact equal to or greater than the appearance of road highway networks. American business history offers detailed evidence that the development of railways and telegraph gave birth to the first large corporations in the modern sense by providing economies of scale to corporate activities. In the midst of this transition, many previously successful companies declined and disappeared. Again, the development of America's road network and inventory systems changed consumer activity patterns, so that the

leading city department stores near railway terminals were replaced by suburban discount stores.

3. Age of Open Network Management

When we consider the relationships between technology and the future, it is important to go beyond mere projection and shape a vision of what form the future should take and what we need to achieve it, based on objective analysis of current conditions and trends. After all, technologies simply open up new possibilities. It is creative entrepreneurs who in fact set the new direction for progress by envisioning new enterprises that actually utilize such possibilities. Rather than simply making predictions with technologies as key determinants, what is really needed is to envision a specific form of industrial society and to put forth efforts to make it a reality. Social systems can either "make" or "break" technologies. Having an active vision is extremely important both at the level of the entrepreneur and at the level of the government policy maker.

As an active proposal from such a viewpoint, I would like to advocate that the Japanese organizations migrate from traditional "enclosure

management" to "open network management." Here, I will first explain the characteristics of enclosure management and then discuss the conversion to open network management.

3.1 The Creation and the Fall of Enclosure Management

Japan's large corporations have traditionally maintained and strengthened their competitive positions by holding "captive" business resources such as personnel, distribution channels, and subcontractor networks for their exclusive use, and wielding tight control over them. We call this behavior an "enclosure" strategy. By constructing a strong network of firms centering around a core corporation and working out fine-tuning mechanisms between them, these large corporations have built mechanisms for "sustainable competitive advantage" that in practice, make it virtually impossible for outsiders to make any inroads. The strategic information systems (SIS) of the 1980s effectively served as tools to promote such "enclosure management." Through such actions as design and construction of transaction systems or installation of terminals on customers' and vendors' premises, the corporations that

introduced SIS ahead of their competitors not only won orders from customers, but also consolidated their presence in customers' business operations. Establishing such a presence on the business process level, not only the product level, created firm bonds that could not be easily broken.

Such enclosed organizations were created on the premise that information would be transmitted more efficiently within an organization than between organizations. To illustrate, the unpartitioned open-space office is one of the characteristics of Japanese companies. Undoubtedly, open-space offices lend themselves to both efficient transmission of information within the organization and close coordination of activities, since employees can absorb what is being done with little need to converse.

However, the basis for this premise is now crumbling. Today, it is possible for each employee to have a computer on his or her desk linked to other computers around the world, enabling them to freely exchange various forms of information, including text, images, and drawings. Personally, I find it easier to work cooperatively with colleagues abroad who use e-mail than

with those in the same building who do not. And in the field of inter-company exchange of large-volume, fixed-form information, such as in the placement and acceptance of orders, electronic data interchange (EDI) systems have been spreading around the world rapidly.

Figure 2 shows inter-company flows of information in the network age. Inter-company relationships have traditionally been "point-to-point" relationships. In the figure, for example, departments such as the marketing and purchasing depart-

ments, which served as the points of contact with the outside, pulled together internal factors and negotiated with customers and suppliers. In the future, however, inter-company relationships will become "holistic." That is, each department will be connected to other internal departments by an information network that is in turn linked to customers' networks. Without the marketing and purchasing departments acting as intermediaries, employees will be able to directly exchange e-mail, drawings, and other information from desktop PC to desktop

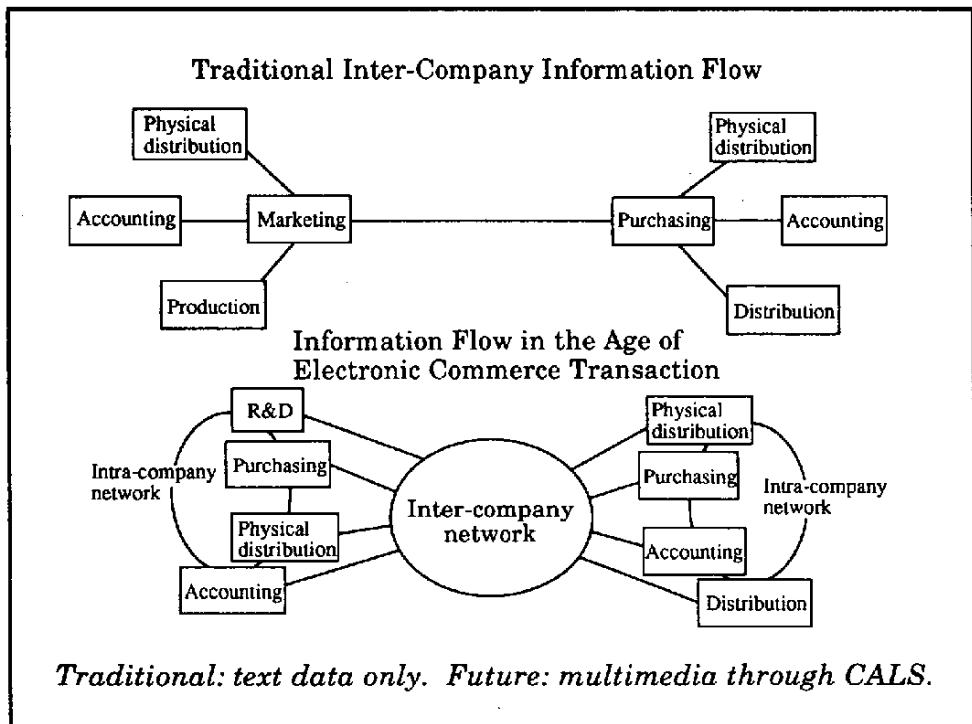


Figure 2. Electronic Commerce Transactions and Strategic Alliances

PC. This will significantly improve information transmission with respect to speed, quality, and quantity.

The lowering of organizational barriers will bring about a revolutionary change in methods of business administration. I position this change as a migration from "enclosure management," in which business resources are retained within a company or business group, to "open network management," in which the business resources of one company are organically combined

with those of other companies (Figure 3). In a society where networks are ubiquitous, competitive strength will depend largely on the ability to make dynamic use of the many external business resources in the world.

As I mentioned above, traditional companies based on enclosure management have secured crucial business resources for exclusive use within their own organization or within their business group. A typical example is seen in personnel management. They employ fresh

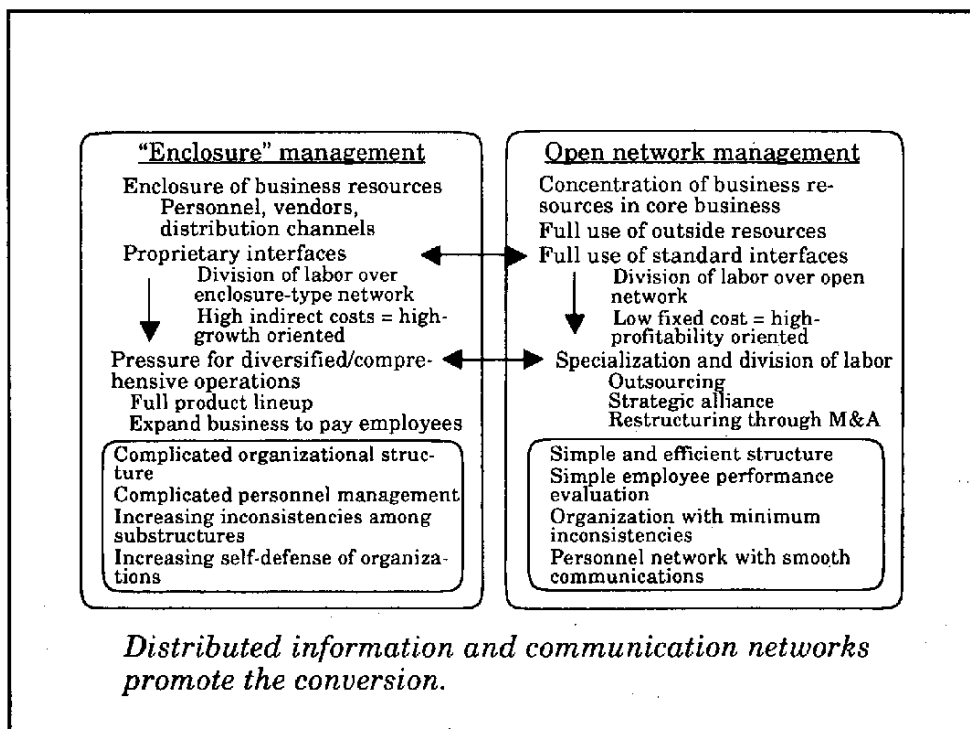


Figure 3. Business Administration in the Age of Electronic Transactions

college graduates, and train and tame them over the long term to suit their corporate culture. Needless to say, they strictly forbid their employees to work concurrently for other companies. The same can be said for distribution channels. The strength of dedicated distribution channels, organized exclusively for their own use, has been a primary source of manufacturers' competitive strength. On the upstream side, companies have strengthened their presence by nurturing excellent vendors and keeping them under their control.

In open network management, in contrast, companies concentrate their business resources in their strong areas (core capabilities) and do not hesitate to utilize outside resources in other business areas. In enclosure management, the emphasis was on securing all important business resources within the company or within the business group. In open network management, the company acts to retain only those operations which it can carry out more profitably than other companies and to discard any operations which it cannot, even if those operations are important.

Open-network companies use other companies' business resources as

though they were their own through strategic alliances. The support for this practice is provided by computer networks. Allowing real-time exchange of large volumes of information among partner companies, computer networks materialize efficient inter-company operations.

The computer industry provides the most dramatic example of this conversion from enclosure management to open network management. Until the mid-1980s, the mainstream strategy in the industry was the enclosure strategy; each computer manufacturer strove to completely "enclose" its customers within its own product line, from the central processing unit to peripheral equipment such as storage media and printers. Today, major computer-related companies act on the premise that their products will be used in combination with those of other companies; Intel and Microsoft, for example, pour great effort into promoting the adoption of their products into those of as many other companies as possible. It may be said that the strategic aim of enclosure management is to fill "all the needs of some customers," while that of open network management is to fill "some of the needs of every customer."

All of today's high-tech products, not only computers, are assemblies of components with the most sophisticated technological requirements. Therefore, it is unrealistic for any manufacturer to think of maintaining, entirely within its own group, the highest standards for all technologies over such a broad spectrum. Pursuit of that goal results in an overly expanded, and eventually uncontrollable, R&D department. To avoid such a situation, manufacturers must give up the idea of supplying the whole range of products within one group. Instead, they should concentrate their efforts on their strong areas and endeavor to acquire an overwhelming competitive edge there. Then, by having partners adopt their products, they will be able to do business profitably.

In the United States, open network management has come to be adopted throughout the private sector, not only in the computer industry. In the background to its spread lies the "bursting of the bubble economy" in the United States. In the U.S., the bubble inflated enormously in the early 1980s, several years earlier than in Japan, and its collapse began with the great 1987 stock market crash ("Black Monday"). The operating performance of finan-

cial institutions worsened rapidly and stirred up credit unrest, a situation very similar to the one we are now seeing in Japan.

Corporate America tackled the resulting serious recession with a drastic curtailing of costs, especially fixed costs. Such efforts centered on concentrating on core businesses and aggressive utilization of outsourcing. A well-known example is found in Continental Bank, which recovered from bankruptcy by adopting a drastic outsourcing policy. In the realm of physical distribution, there has been a general trend for companies to do away with in-company distribution centers and commission delivery services to a specialized transport company. In covering the U.S. business scene in those days, the Japanese media reported mostly on conspicuous, drastic actions such as mergers, acquisitions, and layoffs, but at the same time there was also an underlying current of returning to core businesses and outsourcing inefficient operations.

Perhaps the greatest contribution made by the shift to open network management is the recovery of simplicity. Studies have shown that it is risky for any one company to take on too many different businesses or

operations. If a company has diverse products or projects that present conflicts of interest, or has operations that require different evaluation standards or cultures, then decision-making will slow down, cooperative relationships within the organization will collapse, and the only thing that will expand will be coordination functions (middle management).

The cause of "big company syndrome" is not merely the size of the organization but the complexity of its objectives. If a company fails to eliminate such complexity, its actions inevitably become slow and bureaucratic. Conversely, if the objectives of the organization are simple, departments can form strong, mutually complementary relationships to achieve common goals.

Lessons learned from cases in the United States may not be directly applicable to Japan. In addition, it is true that U.S.-style restructuring was accompanied by a great deal of sacrifice and a number of undesirable side-effects. However, it is also true that many of the problems now facing Japanese companies are the same as those faced by U.S. corporations in the 1980s. But where U.S. corporations overcame those

problems, Japanese companies are still struggling to face them. Therefore, it seems crucial for the Japanese business world to break through preconceived notions, try to grasp the new paradigms, and consider utilizing them.

3.2 Open Networks vs. Closed Networks

The first premise of adopting open network management is that the company must form alliances with other companies. In this respect, the roles of core capabilities in business administration have been re-examined in recent years, leading to increased recognition of the need to make effective use of outside resources. However, this shift requires more than simplistic rethinking or mere rhetoric. The effective use of outside resources will not materialize without opening up the whole business structure, including organizations, product lines, and personnel management. Let me examine this point a little further.

In enclosure management, the adoption of proprietary interfaces is one of the major characteristics of "holding resources for the company's exclusive use." In this context, I use the term "interface" to refer to the formats that different organizations

use to exchange information or products. Examples are business forms, terminology, and the shapes of boxes. Proprietary interfaces are peculiar to specific companies or specific business groups, rather than being standardized or shared throughout society.

In many Japanese business groups, daily contacts over many years between group companies based on enclosure-style management have gradually produced highly proprietary commercial jargon and business procedures. Concrete examples of this are business forms and computer systems; highly unique methods have become fixed in the form of bookkeeping formats, computer programs, and so forth.

Conceptually, so-called network organizations can be divided into "open network organizations" and "closed network organizations," depending on whether they use proprietary or standardized interfaces.

It is widely known that Japan's automotive industry has a higher outsourcing ratio than its U.S. counterpart. Instead of having all the necessary operations within their organizations, Japanese auto makers flexibly utilize outside vendors' products and services and even

share design and other important information with them. Pointing out these practices, some experts say that Japanese companies have already been implementing "networked division of labor" by utilizing outside business resources and are thus pacesetters in the age of computerization.

According to my classification, however, Japan's manufacturing industry would still be considered to be lagging behind in the open networked division of labor supported by the development of information networks. This is because even though it has been a world leader in the networked division of labor, it has been using closed networks that employ proprietary interfaces. Therefore, the challenge we now face is to transform Japan's industrial structure from a "closed network (enclosure) society" into an "open network society."

4. The Gap between Ideas and Reality

The "open network management" that I am advocating is by no means a new idea. Professor Ken-ichi Imai of Stanford University and other researchers came up with the concept of "networked division of labor" quite a while ago and have been

proposing it as the path Japanese industry should follow. This essay has been strongly influenced by Professor Imai's ideas. More recently, Jun-ichi Handa of McKinsey & Company has proposed "open system management." From the viewpoint of management philosophy, he makes nearly the same assertions as I do here, although he does not touch on the role of information systems.

Despite the efforts of these torchbearers, however, Japanese industry still stubbornly clings to its faith in enclosure management. Moreover, in the early 1980s, information systems did more to reinforce than to weaken enclosure management both in the United States and in Japan. In these SIS, or strategic information systems, the computer system was constructed around the mainframe computer of the core member of a group, and other members were given terminals; the ownership and control of the mainframe computer provided the core company with a competitive edge.

However, with the diffusion of distributed processing systems in the late 1980s, U.S. corporations shifted gradually to open network management, both in management strategies and in information systems.

The problem is that Japanese companies have been very slow to follow suit in both areas. In Japan, the forces that serve to defend enclosure management are still strongly rooted. What are the reasons for this?

The first reason is simply the timing of the "bubble" cycle. The recession and the resulting pressure to reduce fixed costs, the main driving forces for restructuring in the United States, arrived in Japan later. Suffering from heavy fixed costs, U.S. corporations boldly restructured, through drastic disposal of unprofitable operations and substantial reductions in internal overhead. This same pressure is now belatedly falling on Japanese companies.

A second, and more important, reason is that the adoption of the open network management requires a bold departure from the "winning formulas" and "business virtues" of traditional Japanese-style business administration. Enclosure management enables the core company to control the overall fine-tuning of group operations, from upstream to downstream, under its leadership. This has so far been extremely effective in strengthening the competitive positions of Japanese com-

panies. In the automotive industry, for example, major manufacturers have derived most of their power from constructing consolidated networks from vendors to dealers. But the "protocols" used within such groups have been uniquely developed and thus have no interchangeability with those of other groups.

Of particular importance is the development of "company-unique skills" in its personnel. Large Japanese companies have consistently adopted a "personnel enclosure" policy since the end of World War II, in which fresh graduates are recruited directly from school and retained in the business group throughout their careers. Combined with the highly-developed company-unique work procedures within the group, this strategy has resulted in large numbers of personnel who are extremely capable within the group but quite worthless on the outside. Therefore, capable employees cannot escape the company even if they are treated shabbily. Since they cannot get away, though, the companies give them employment security in return.

Dynamic use of outside business resources inevitably means fluidity of employment. In a period of tran-

sition from enclosure management, open network management will not only produce frictional unemployment but also destabilize employment in the long run. This is clearly shown in the way that in the United States, restructuring has left people out of work and given rise to job insecurity among white-collar workers. In this process, workers will be screened more severely.

A major problem in this context is that employees nurtured in Japanese companies are of little use in other companies if they are forced to change employment as a result of restructuring, since they tend to have only special, in-company knowledge with no general applicability.

The opposite is also true. Once closed organizations are established, it is difficult to recruit capable personnel from the outside. Even if an organization secures such personnel by paying them handsomely, it is difficult for them to fully display their abilities. It is no wonder that they cannot function efficiently, because they are not party to the informal internal work arrangements, in-house jargon, and personal connections of the organization, and thus do not understand how decisions are being made. This

means that even if a company needs talent it can find only on the outside, the company cannot acquire that talent because of the barriers of closed personnel management, closed education and training systems, and closed corporate cultures based on the premise of hiring only new graduates.

The third reason is a lack of structure in operations. This is closely related to the problem of company-unique personnel specifications. Based on the enclosure of personnel, work is efficiently processed through highly developed, implicit communication mechanisms. This also holds true for the enclosed vendors and dealers; even without being shown any detailed drawings or other documents, they know exactly what they are expected to do. Under enclosure management, such highly sensitive reactions are considered good and taken for granted.

However, when open network management becomes the mainstream mode of industry, all the demerits of enclosure management will come to the surface at once. With division of labor still based on tacit communication, the work flow will become alienated from its interfaces and it will become impossible to properly combine business re-

sources.

Further, inter-company operations will become bogged down in time-consuming communications problems because there is no common, shared terminology for exchanging information between companies in different lines of business. This means that a company may find efficiency to be very low when working with a new partner. Conversely, the partner will find the company excessively closed and hard to deal with.

In an age of open network management, it will be extremely dangerous for any company to be regarded as "closed and hard to deal with." Unless the company has an exceptionally competitive product, it will be counted out as a strategic partner. Such companies may be able to survive if they are able to provide a full range of products on their own, as some computer makers did in the past. Even then, it is still risky to become too isolated in today's business environment, where products are increasingly sophisticated and systematized. Unless they are prepared to join hands with other influential companies whenever necessary, companies will not be able to survive in a world where inter-company relationships

constantly change at such a rapid pace.

The fourth reason is that Japan has neither the social systems nor the infrastructure needed for the deployment of open network management. The following points can be cited with respect to this:

(1) Absence of a labor market that ensures smooth movement of personnel

Since Japan's labor market is immature, Japanese companies tend to employ more workers than are necessary for their ongoing business operations in an effort to prepare against possible labor shortages. I can state from my own experience that Japan's seniority-based salary and retirement allowance systems are extremely disadvantageous to those who change jobs in their 30s. This brings about the evils I have already mentioned.

(2) Lack of business assessment by independent institutions and lack of an adequate credit system

What are particularly lacking are functions to evaluate newly-emerging businesses and ventures objectively. Although these functions are

indispensable to the construction of strategies based on the use of business alliances, Japan's has made insufficient efforts to create independent institutions that provide such functions or services. Equally important is the opposite function of identifying companies and divisions that have become "bad assets" and helping them to regain financial health by accurately appraising their residual values.

The fifth reason for the slowness of the shift to open network management is the presence of extremely rigid service charges in the telecommunications network field, a field which otherwise would serve to promote the shift, and of a complicated network of regulations and standard contracts that restricts the methods of using those services. These factors make it very costly for Japanese companies to pursue innovation in management styles by utilizing information and communication systems based on distributed processing. Particularly important problems in this connection are the unreasonable system of service charges and the policy of restricting entries into individual markets.

Japan's present telecommunications system inherited its system of service charges from the era of central-

ized processing systems. Therefore, the system of charges is not structured so as to encourage the development of broadband multimedia communications. These distorted systems, including the distorted system of service charges, impede the favorable growth of demand, which in turn hampers the development of attractive products and services. Caught in this vicious cycle, Japan's information systems industry is failing to keep pace with developments in the rest of the world. In the United States, telecommunications services are easy to use, partly because they are available at very low rates. This allows venture businesses to operate freely and provide creative services with small amounts of capital and at low risk by forming information service companies and value-added communications companies (i.e., companies that provide sophisticated services by connecting software and databases via communication lines leased from telephone and CATV companies). The U.S. communications, software, and hardware industries are growing through mutual synergy in an ideal fashion; vendors are following rapidly expanding demand with a variety of proposals advocated by many proponents. Platform businesses are also developing without restriction.

The discussions on reform of Nippon Telegraph and Telephone Corporation (NTT) held throughout 1995 marked a first step forward toward telecommunications system reform in Japan. When viewed objectively, however, Japan lags far behind the United States and needs to take action without further delay.

5. Toward Reform

That open network management will become the world's mainstream style of business administration is an inevitability. Based on this recognition, what concrete actions should Japanese companies take? I would like to point out just a few of these. First, every company ought to fully analyze and gain a systematic grasp of its business processes. As pointed out by Chihiro Suematsu, Japanese business administration systems have been generated spontaneously and operate with many areas remaining ambiguous. Under such systems, it becomes impossible to create interfaces within the flow of work or to introduce business resources from outside.

In an age of open network management, one of the basic actions a company must take is to properly structuralize its business processes in order to standardize its inter-

faces (ways of interacting with the outside) for doing business with other companies as much as possible. This action will enable the company's resources to be easily accessed by other companies. This will in turn allow the company to coordinate its operations with those of others much more easily.

"Standardization" as used here means the *standardization of interfaces*. It is mere quibbling, therefore, to assert that open network management will eliminate the potential for "differentiation." Within the internal structures enclosed by these open interfaces, each company can and should make active use of creative ideas and strive to differentiate its products and services. Indeed, it is partly to ensure successful differentiation based on the effective use of its own core capabilities that each company needs to adopt standard interfaces throughout.

Secondly, it is important for us to construct better platforms to serve as the infrastructure for open network management. Together with Professor Imai, I advocate the concept of "platform businesses" as mechanisms that play important roles in the movement of business resources across industries and in

the outsourcing of functions by companies.

A platform business is defined as "a business that provides, as a private entity and in an open manner (i.e., with explicit and fair conditions to anyone who wishes to receive them), such products or services that stimulate trade among third parties and/or the creation of new businesses."

A credit-card company, for example, makes a profit through realizing transactions (by extending credit) between consumers and retailers. A credit bureau makes a profit by providing credit research functions, which promote new transactions. The more active such platform businesses become, the easier open network management will be.

Information and communication systems based on distributed processing open up enormous possibilities for platform businesses because collecting, processing, and providing information is an important part of their business. In the days of centralized processing systems, such services often could not be provided without owning a mainframe computer, installing all related software on it, and even supporting customer terminals. This means that large fixed costs were a requirement

for engaging in a platform business.

The advent of fully developed distributed information and communication systems means that a platform business can provide services to a wide range of customers at extremely low cost simply by installing a small workstation and connecting to information networks. The progress of the Internet is a portent of what is to come. Lower fixed costs mean that businesses can afford to specialize, so businesses offering numerous services tailored to meet specific needs can be expected to emerge.

Platform businesses are capable of destroying existing enclosures, and they are generally not welcomed by existing companies. Pioneers that have developed such business areas in Japan (such as Aucnet, a company that auctions used cars over networks) have had to overcome doubts, obstacles, and challenges. The growth of platform businesses has also been suppressed because their services directly compete with services provided by the public sector. Unless this situation is rectified, we will never be able to improve Japan's basic economic structure. It is imperative that we positively foster platform businesses as a means of stimulating the "metabo-

lism" of industry and utilize them as social "lubricants."

The third point in reform is deregulation. The formation of institutionalized enclosures around bottlenecks in industry is often a major factor that thwarts efforts to adopt open network management. In the beer industry, for example, government licenses used to be required for distribution channels. This licensing system enabled the existing major breweries to enclose distribution channels, prevent new entries, and thus stabilize their market shares. According to an analysis by a student in one of my seminars, when dairy product imports were restricted, the dairy product manufacturers that were able to secure stable supplies of the raw materials utilized their distribution channels to develop the ice cream business.

The phenomenon in which a company takes advantage of the position of "owning" a bottleneck to enclose a whole chain of values is called a "bottleneck monopoly" by economists. In Japan, the government's administrative systems tend to work to fix the positions of monopolies more firmly rather than to suppress them. If this situation is left unchanged, and

Japanese companies are the only ones that cling to enclosure management, resisting the global changes in the tides, they may eventually be cut off by the world's companies, which are shifting to open network management.

After deregulation, the fourth issue is reform of the social system. Many features of Japanese social systems promote the formation of enclosures by companies. For instance, seniority-based salary systems, preferential tax treatment for retirement allowances, and legal provisions under which dwelling facilities provided to employees are not regarded as taxable income have the effect of encouraging employees to work for the same company for many years. A system has evolved under which young workers are not paid very much but are allowed to live in company housing at low rent, providing employers with a means of enclosing young workers with highly marketable labor.

These structures that promote the enclosure of personnel need a drastic review. To some, this may sound like a dangerous assertion that threatens employment security and the stability of workers' lives. But while stable incomes and dwelling facilities are important to human

happiness, they need not necessarily be provided by employers alone. Conflicts are brought about by the linkage of health insurance, pensions, and other such benefits to specific economic entities; a good example of this is the mutual benefits association for employees of the now defunct Japan National Railways (JNR). As the roadway network developed, JNR lost the power to absorb employees, and the association's pension program had to be saved through integration into another, more broadly-based, pension program. Judging from this symbolic case, it may well be best to separate social welfare systems for employees from individual companies and to operate them independently.

6. Conclusion

I commute to my office in Yokohama from my home in Tokyo. On the way, I pass through Ohta Ward and the city of Kawasaki, which together form one of the major industrial districts in Japan. Many intellectuals are worried about the "hollowing-out" of this Keihin industrial district, and I really feel this every time I pass through the area. The streets are becoming more refined, and an increasing number of fashionable condominiums are being

constructed. Though there is nothing wrong with this, it also means that an increasing number of small factories are ceasing to exist. I cannot help but feel a sense of crisis because it was the networks of such small factories that used to support the growth of Japan's high-tech industries.

How should we react when we have a sense of crisis? This is the question that must be answered now. Some are nostalgic about the things that are fading away and are searching for ways to preserve them. However, I feel it is dangerous to take a defensive stance in the face of the trends of the times. Such an approach will only lead to a protracted decline over many years. Instead, I think we must form a new, dynamic picture for the economy and search for new styles that enable each individual to lead a happy life in society. We should not allow our successes of the past to hamper us in making new efforts. Our past achievements are no guarantees of future success.

If the analysis I have offered in this paper is correct, the times demand that we make a sweeping review of Japan's postwar economic systems. This will not be an easy job. I myself am far from confident that we

will be able to complete this task successfully. History teaches that once a success has been achieved, that experience and the systems constructed as a result often turn into obstacles that result in inappropriate responses to a new era. Without a sweeping review, however, Japanese companies will gradually lose their economic vitality.

While such a pessimistic view is possible, it is also true that Japan has overcome a number of critical problems in its process of development. Some predicted that the oil crisis would put an end to the economic prosperity of resource-poor Japan. Looking back, however, we find that Japan has since achieved greater prosperity by successfully shifting from energy-consuming heavy industry to high-tech industries that produce high added value.

Japan's economic growth is now checked by the delay in networking and by financial confusion that is approaching a panic. Against this background, however, there are excellent companies carrying out daring reforms, particularly in the globalization of procurement systems. Though the outcome of these efforts is yet to be made clear, and I am still just beginning to examine

these issues, I would like to believe that the time is coming when advanced companies will complete fun-

damental reforms and make inroads anew into the world market.

II. Various Multimedia Related Projects

Various multimedia projects have been conducted since 1994. The backbone for these projects is the multimedia communication experiments to which NTT invited participation in April 1994. High speed computer communication utilization experiments, multimedia network utilization experiments, and CATV video transmission experiments are conducted to experiment uses of a high-speed wide-area backbone network. NTT bears network expenses, while participants bear the expenses for terminals. Major multimedia related projects are conducted in line with NTT's proposal. The major projects are introduced below.

1. High-speed and Broadband Backbone Network Utilization Experiment

ATM switching systems are installed in ten major cities nationwide and experiments are conducted in the nearby areas. ATM technology and optical fiber technology are applied to implement communi-

cation speeds of 2.4 - 10 Gbps on trunk lines and 156 Mbps on the user network interface.

(1) High speed computer communication utilization experiments

Various experiments are conducted by 13 groups consisting mainly of universities and public organizations as of October 1995 with an objective of high-speed and large-capacity transmission mainly between LANs. The experiment period is planned to be from September 1994 to March 1997.

- Academic Information Center (Ministry of Education) and 9 other organizations
 - Development of ultra high speed telecommunication network utilization methods for supporting academic research
- Tohoku University and 5 other organizations
 - Development of a centralized

image processing system by high speed medical image transmission

- Osaka University and 2 other organizations

- ATM wide-area computer network utilization experiment, etc.

- Keio University and 2 other organizations

- Demonstration experiment of remote medical service (Telemedicine) by high speed transmission of ultra high precision images, construction of a high speed computer network connecting distributed campuses, R&D of tele-education, etc.

- Shinshu University and Nagoya University

- Construction of a joint research system connecting research organizations by a high-speed WAN

- Tokyo Institute of Technology and 5 other organizations

- Development of a joint research support system for a virtual laboratory on a network

- Communications Research Laboratory (Ministry of Posts and Telecommunications)

- Construction of a ultra high-speed optical communication network and its utilization experiment

- The University of Tokyo and 2 other organizations

- Utilization experiment of an ultra high-speed computer network for genome information processing (gene information network) such as parallel processing of distributed supercomputers

- The University of Tokyo and 4 other organizations

- Establishment of distributed processing technology in ultra high-speed network environment

- High Energy Physics Laboratory (Ministry of Education) and 9 other organizations

- High-speed and large-capacity communication utilization experiment between High Energy Physics Laboratory and other research organizations

- Tokyo Women's Medical College
 - Remote medical care experiment

- National Cancer Center
 - Quality assessment experiments for obtaining basic information for constructing an integrated remote medical information network

- National Institute of Radiological Sciences (Science and Technology Agency) and National Cancer Center
 - Development of a medical information network related to corpuscular beam treatment patients and a remote diagnosis system

(2) Multimedia network utilization experiments

These experiments support not only the interface of 156 Mbps, but also routing using Internet Protocol (IP). A selection can be made according to the needs of each application. As of October 1995, 111 systems participate in the experiments. The experiment period is planned to be from April 1995 to March 1997.

Many enterprises and groups par-

ticipate in this field for a large variety of applications. The majors are introduced below.

- Newspaper and publishing

R&D of new types of information supply services such as news on demand and electronic newspapers

- Banking and insurance

R&D of multimedia technology applications to remote customer consulting, non-life insurance and business (virtual banking)

- Manufacturing

R&D of a virtual factory such as remote plant operation and integrated operation of a number of plants in multiple (wide) areas

- Construction

Implementation of a virtual office connecting sites and headquarter experts and feasibility study of cooperative design and work

- Entertainment

Remote joint production and distribution of high quality digital images and implementation of

games participated simultaneously by many

demand service (VOD) of cultural facilities

- Education

Interactive remote studying and joint work, etc.

- Information service

Database management and a remote building security system using a multimedia network

- Administration

Study on feasibility of an interactive network for window services and new administrative services using a high-speed and large-capacity network such as video on-

**(3) Utilization experiments
such as CATV video transmission**

An experiment of composite applications such as TV program transmission and VOD and CATV telephone services is to be conducted by the passive double star optical subscription method. BRI-ISDN lines are to be used for the telephone service.

The experiment period is planned to be from April 1996 to March 1997. Three CATV companies participate in this experiment.

III. Multimedia Related Market

The telecommunication infrastructure for multimedia services includes ISDN, CATV, and broadband services such as cell relay services and frame relay services. NTT plans to start the Open Computer Network (OCN) service at low charges in 1996. This network supports computer communications exclusively. It is expected that it will greatly promote multimedia communications such as connections to Internet.

1. ISDN

NTT started Basic ISDN (NTT's service name; INS NET64) in April 1988 and started PRI-ISDN (23B+D) named INS NET1500 in June 1989. Both of the lines have been increasing at a high growth rate (Figures 1 and 2.).

INS64 users increased rapidly since 1995 when NTT made ISDN home connection equipment simpler and lowered the charges greatly. This is because the potential demand as high speed access lines to Internet was increasing just around that time. As a result, ISDN began ex-

panding from business users to personal users.

2. OCN (Open Computer Network)

In April 1995, NTT announced a plan to construct the OCN, an computer communication network requiring no public switching, by the end of 1996. This evoked great responses among Internet access providers because NTT announced that they will offer a fixed rate system, differing from the metering system used for telephone charges, and that they will place highest priority on a low-priced service. This service can completely change users' network utilization method. It is regarded as a double-edged sword which obliges NTT to change the profit structure.

In February 1996, NTT officially announced an overview of OCN and provided information about the connection method and the rate system. They showed standard charges for general users under the fixed rate system. The charge consists of an access charge and an OCN utili-

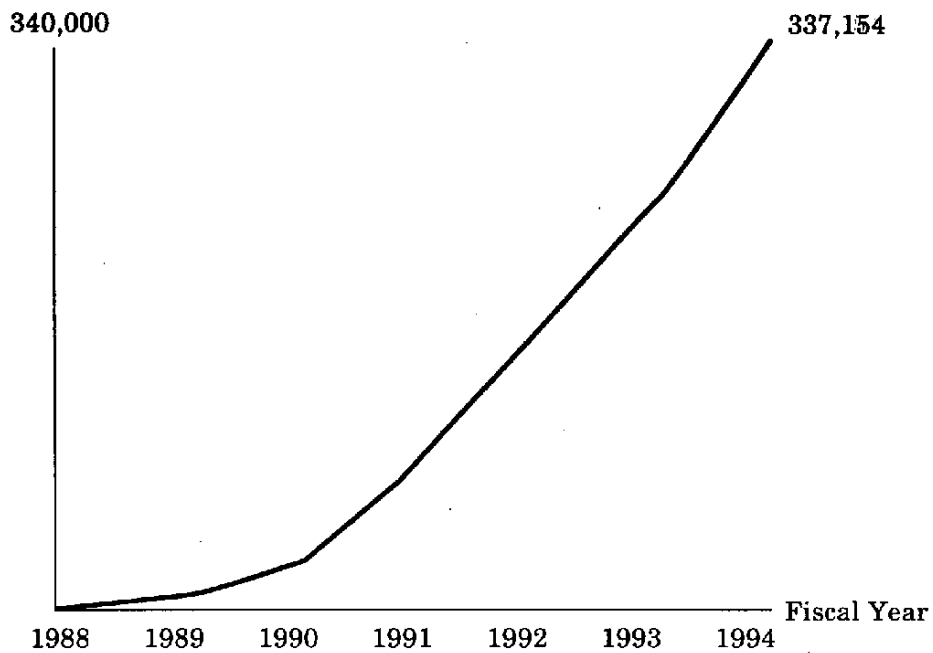


Figure 1. Number of Lines of BRI-ISDN

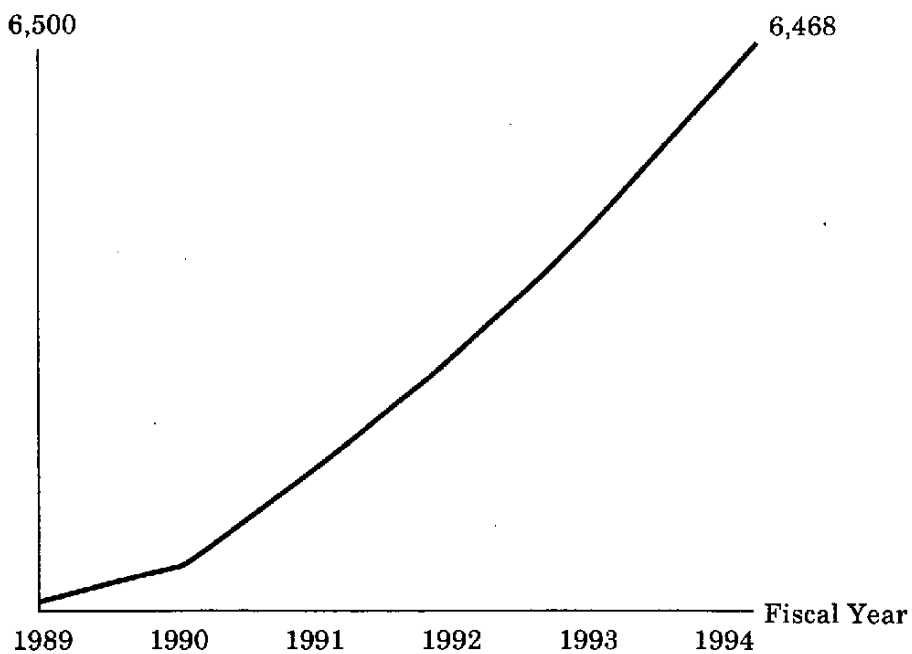


Figure 2. Number of Lines of PRI-ISDN

zation charge. The monthly charge is 30,000 – 40,000 yen for 128 kbps and 300,000 – 400,000 yen for 1.5 Mbps. A dial-up access charge from a subscriber's telephone or ISDN consists of a fixed amount (about 3,000 yen per month) and a meter-based charge (Table 1.). According to the rates for business users announced in April, the connection with interexchanges is 10.46 yen for 3 minutes, equal to long-distance NCCs' access charges. The connection with local exchanges is 4.05 yen. The connection with local

switches are about the same as the current monthly subscriber charges (Table 2.).

3. Other Broadband Services

Frame relay services were started by NTT and Japan Telecom in November 1994. Cell relay services were started in September 1995 by NTT and in October by Teleway Japan. Teleway Japan started frame relay services at the same time.

Table 1. OCN Monthly Service Charges (estimated)

(yen)

Access Lines	Access Charge	Network Charge	Total
128 kbps	10,000	20,000 – 30,000	30,000 – 40,000
1.5 Mbps	15,000	150,000 – 250,000	300,000 – 400,000
6 Mbps	15,000	650,000 – 750,000	800,000 – 900,000
50 Mbps	2,000,000	3,000,000	5,000,000
Dial-up	same as telephone	3,000 –	–

Table 2. Interconnection Charges for OCN

(yen)

Interconnection Level	Charge (three minutes)
Interexchanges	10.46
Local Exchanges	4.05
Local Switches	same as monthly subscriber charge

4. CATV

CATV for solving seeing and hearing difficulty was put to use in 1955. However, it is 1987 that a full-scale multi-channel CATV station was opened. Figure 3 shows the transitions in the number of subscribers since then. The absolute number of subscribers is still small. The number of CATV contracts is only about 8.5% of NHK receiver contracts as of the end of March 1996. This is quite low in view of the fact that more than 60% of TV owning households are CATV subscribers in the U.S.A.

The slow dissemination of CATV in Japan is accounted by the following reasons:

- Since Japan has seven ground-wave broadcasting stations, including public and private stations, the needs for multi-channel services have not been clear.
- Multiple System Operator (MSO) which operates in a number of areas was not authorized. Since individual CATV operators had to operate independently on a small scale, the CATV business was not profitable and lacked attractiveness as a business.

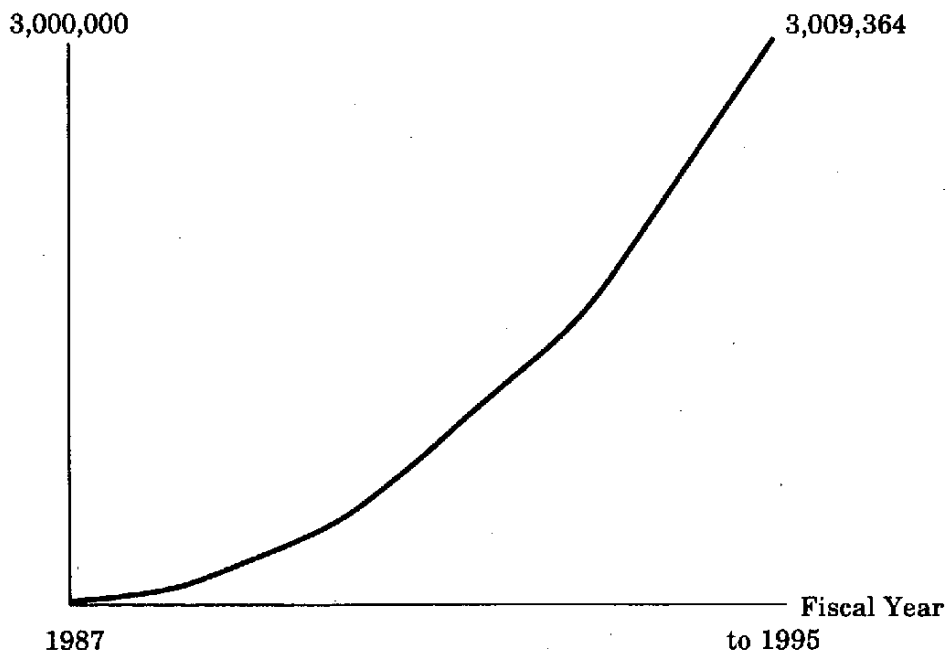


Figure 3. Number of Subscribers of CATV

- The expenses for connection are too high.

However, CATV networks began to be regarded as an important part of an infrastructure in the multimedia society. The Ministry of Posts and Telecommunications (MPT) set forth the following deregulation policies in December 1993 to promote the dissemination of CATV partly because the U.S.A. announced the NII action plan:

- 1) MSOs are approved.
- 2) A number of companies are approved for one franchise.
- 3) The foreign ownership restriction is eased from 1/5 to 1/3.
- 4) The construction permission application documents are simplified.

In November 1994, MPT prepared guidelines for introducing CATV telephones and improved the environment so that CATV operators could go into the telephone service

business.

As a result of these policies, companies such as large trade houses having great capital background began active movements to go into the CATV business as MSOs. Internet connection experiments are also attempted.

Multi-channel digital satellite broadcasting is to be started in 1996. This is a threat for CATV operators. High connection expenses still are a great inhibitor to CATV subscriptions. Some operators are trying to decrease subscribers' burden by adopting an installment payment.

CATV networks are still in the stage of dissemination. It is not clear whether they will occupy an important position as an infrastructure in Japan. NTT's subscriber lines may be replaced to optical fibers before CATV is fully disseminated. In any event, it is certain that CATV will play an important role for the establishment of broadband communication infrastructure.

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