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Current Situation and Challenges for Cable Television in the Broadband Era

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Current Situation and Challenges for Cable Television in the Broadband Era

Summary

1. Cable television is a system for transmitting and receiving TV signals, etc. through optical fiber and coaxial cable networks that can carry huge volumes of information. Its scope today is broad, ranging from the mere retransmission of TV signals to multi-channel broadcasting as well as connection to the Internet and telephone circuits. In terms of functions, the cable television business in Japan has been developed by contents aggregators (procurement and editing of individual contents), network providers (transmission) and service providers (client management, charge collection and sales). The function as a contents provider (production of contents) is limited compared with the US.

2. As of March 2000, 37.2% of Japanese households were connected to cable television, but only 5.9% received multi-channel broadcasting through it. Competing media including BS digital broadcasting and 110-degree CS digital broadcasting are expected to grow and could gain control of the information networks that connect households to outside sources, resulting in greater competition.

Cable television was traditionally considered as a monopoly closely related with the local community. Thus, cable television operators were licensed for individual local areas and placed under structural regulations based on their status as local businesses, including the requirement that local capital be invested. As a result, service areas became fragmented at the local level, forcing individual operators to build and maintain their own distribution systems. It was not until the 1990s that cable television was significantly deregulated, leading to influxes of major capital and restructuring to gain economies of scale.

Cable television is basically an infrastructure-based business, which requires facilities such as head-ends and transmission lines to be built before obtaining subscribers. This requires heavy initial investment by the operators until a certain number of subscribers have been secured. Income and expenditure trends in the industry as a whole since fiscal 1993 indicate that the business has remained unprofitable despite a steady increase in sales. Although an increasing number of operators recorded surpluses in the same period on a single-year basis, many enterprises are still facing financial difficulties as more than 70% of them had carried-forward losses as of fiscal 1999.

3. In contrast, 68% of TV households in the US were connected to cable television as of December 2000, showing a striking difference from Japan in terms of market penetration. There are two factors behind the diffusion of cable television in the US. First, cable television is a good way of overcoming poor reception of TV broadcasts in many areas. Second, specialized cable television programs had emerged and developed well before the growth of competing entertainment services such as video rentals. Total sales of the industry indicate that revenue from customers has increased due to the rises in the number of subscribers and basic charges. Advertising revenue has also increased in recent years thanks to the expanded customer base. Under increased competitive pressure from satellite broadcasting and major telephone companies

entering the multi-channel broadcasting market, however, US cable television companies are now maximizing use of their established networks to provide a wide range of services. These include telecommunication services such as the Internet and telephone, as well as interactive cable services. Thus, the companies are actively investing to upgrade their facilities.

4. In recent years, the rapid growth of Internet users in Japan has been accompanied by rising expectations for accelerated development of the connecting environment and the expansion of broadband networks.

The term "broadband" generally refers to wideband access lines that enable rapid transmission of large volumes of data such as pictures and music. A precise definition is difficult, however, due to the differences in viewpoints between suppliers or users, and in the technological level. One possible standard is high-speed services, which are defined by the US Federal Communications Commission (FCC) as services enabling at least one-way transmission of 200 kbps or faster.

There are various types of broadband such as CATV Internet, DSL (Digital Subscriber Line), FTTH (Fiber To The Home), next-generation cellular phones, FWA (Fixed Wireless Access) and satellite. The various technical and institutional bottlenecks have been eliminated in Japan to accelerate the spread of broadband networks. The year 2001 will mark the start of the "broadband era" in Japan, as major firms are entering the cable television market in anticipation of rapid growth. Major business opportunities have also emerged for the existing cable television enterprises to effectively utilize their own well-developed networks.

The United States, the leading country in high-speed Internet, revised the Communications Act in 1996 to enable local exchange and inter-exchange carriers, as well as telephone and cable television companies, to enter each other's business. The large-scale vertical and horizontal business integration that resulted has stimulated the development of broadband access networks, which is now a promising business area, and CATV Internet and DSL in particular have been growing strongly.

In comparison, the broadband connection business has just started in Japan, and is currently led by CATV Internet. DSL is expected to grow rapidly as conditions for ensuring fair competition have improved the business environment. Although FTTH has an overwhelming advantage in terms of speed, its early diffusion on a national scale remains uncertain, as huge investment will be required. It should be noted, however, that the FTTH service has already started in some areas including the Tokyo metropolitan area.

5. There is a worldwide transition from analog to digital broadcasting, and broadcasting is going digital in Japan, too. Digitalization enables efficient compression of visual information. The transmission of more information in a specific bandwidth will facilitate the development of HDTV (High-Definition TV), multi-channel and two-way transmission, as well as the emergence of new Internet-related services.

The digitalization of broadcasting in Japan has been led by satellite broadcasting. CS digital broadcasting became fully operational in October 1996; BS digital broadcasting started four years later, in December 2000. In addition, 110-degree CS broadcasting is expected to start around the autumn of 2001.

Technically, there are various methods for cable television operators to receive digital broadcasting in their central facilities and distribute it to their subscribers, but additional investment is required in each case. This investment burden has become the driving force behind the restructuring of the industry, stimulating the establishment of joint reception facilities in various parts of the country in fiscal 2000. However, most cable television companies have not

yet become involved in retransmitting BS digital broadcasting.

6. The two major developments, namely the emergence of broadband and the digitalization of broadcasting, could transform the business models of cable television.

The upcoming broadband era will require CATV operators to actively address relevant issues such as (i) the realization of potential demand through early price reductions, (ii) the diversification of services and package sales, (iii) cost reduction and the improvement of competitiveness through horizontal division of labor, and (iv) focus on customer satisfaction.

As digitalization progresses, it is important to create an environment that allows cable television subscribers to receive a substantial amount of digital broadcasting at relatively low cost, in order to maintain the raison d'être of cable television. Many of the subscribers to major cable television stations are still connected to the network by transmission lines of less than 550 MHz capacity. Although the bandwidth of such transmission lines must be improved, many operators may fail to do this due to problems such as financial difficulties.

Against this backdrop, new trends have emerged since 2000 such as the sharing of digital head-ends by cable television companies and the pursuit of economies of scale through extensive cooperation. Although it is not simple to integrate different cable television stations because the specifications of facilities may be incompatible and neighboring stations do not necessarily have close economic relations, this trend should be accelerated for the sound development of the cable television industry.

One way to benefit from economies of scale is through merger and acquisition of other companies. The practice of managerial techniques adopted by MSOs (Multiple Systems Operators), which involves enlarging business scale chiefly by acquiring other firms, will therefore continue to expand. Recently, Internet service providers have started to deliver various support services to CATV operators, in recognition of their historical independence. By using those support services, it will be possible to benefit from economies of scale and scope such as reduced capital investment requirements in the future, the outsourcing of technical and customer management departments that immediately need to be improved, and efficient development and startup of new services. Such services are expected to become full-fledged as the effects of diffusion of broadband and digitalization of broadcasting are felt nationwide.

Cable television businesses in Japan have generally developed good relationships with local authorities and companies and are considered an integral part of the local information infrastructure. While maintaining their know-how and brands developed in partnership with local communities, managers of cable television operators must become involved in various tie-ups and support services to respond to growth areas such as broadband and digital broadcasting, in which speed is of the essence.

Introduction

In the late 1980s, cable television was expected to play a key part of the information infrastructure in local communities with its integrated public media functions thanks to (i) its large transmission capacity, (ii) the possibility of interactive communication, and (iii) its affinity with other media including communications satellite, broadcasting satellite, Hi-Vision TV and personal computers (CATV Administrative Issues Research Group, "CATV Administration '88"). Despite various developments in the information industry in the 1990s such as the rapid progress of digital technologies and the diffusion of mobile communications and the Internet, expectations for cable television have changed little. Nevertheless, the environment surrounding cable television has changed significantly over the years and will continue to change.

This report identifies the functions and strategy of cable television as technology such as broadband and digitalization progresses. Chapter I outlines the current situation of cable television in Japan and the US. Chapter II discusses the complex and rapid change in the business environment surrounding cable television. Based on those discussions, Chapter III addresses the challenges facing the Japanese cable television industry.

I Current Situation of Cable Television

1. Definition and Functions of Cable Television

1.1 What is cable television?

Article 2 of the Cable Television Broadcast Law defines cable television as "cablecasting (the transmission of wire telecommunications for direct reception by the general public) other than the cable sound broadcasting stipulated in Article 2 of the Law to Regulate the Operation of Cable Sound Broadcasting Services." The "wire telecommunications" are defined in Article 2 of the Wire Telecommunications Law, which is a general legislation, as "the transmission or reception of codes, sound or images by electromagnetic methods using filaments or other conductors between the site of transmission and that of reception."

In more general terms, cable television may be defined as a system to transmit TV signals, etc. by large-capacity networks composed of optical fiber or coaxial cables[1]. The concept of cable television however has come to include various activities ranging from the simple retransmission of TV signals, etc. to the provision of sophisticated services such as multi-channel broadcasting, the Internet and telephone.

1.2 Functions of cable television

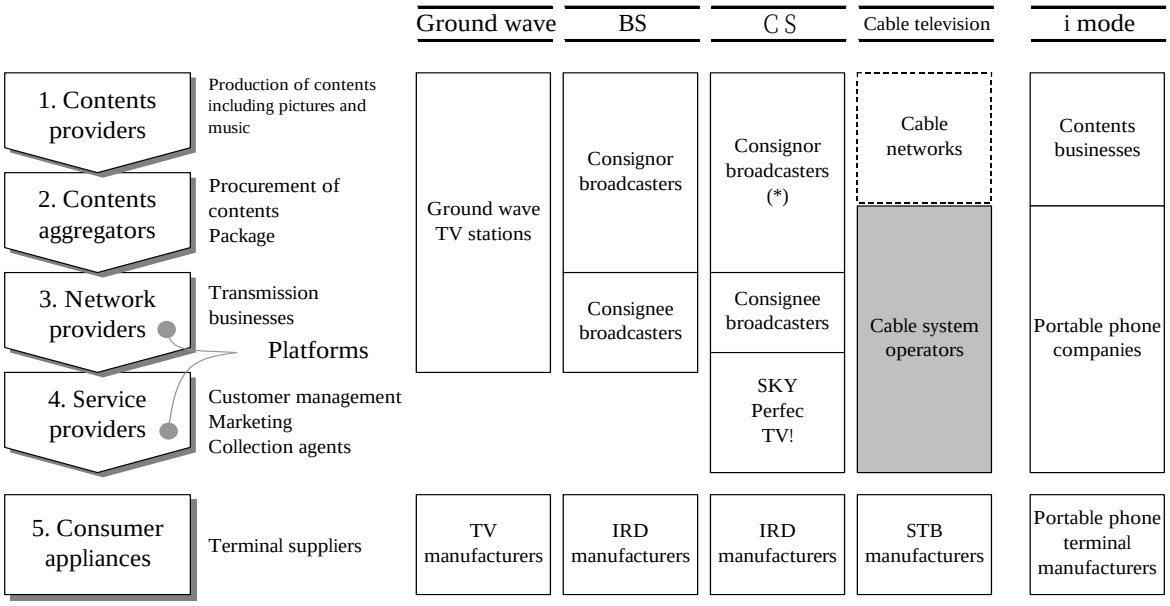
The information industry including cable television is changing dramatically as communications and broadcasting become integrated; various media of information transfer are being brought together in complex ways through digital technologies. The emergence of various forms of media and business models has made it difficult to clearly classify information businesses. This section seeks to review the functions of media, particularly that of cable television.

Media can be classified into five strata as shown in Figure 1-1 according to their functions. These include, from upstream to downstream, (i) contents providers, who produce contents, (ii) contents aggregators, who procure and edit individual contents, (iii) network providers, who engage in transmission operations in general to deliver commercial contents to consumers, (iv) service providers, who manage customers, collect charges, and conduct sales. Items (iii) and (iv) are also collectively known as platforms. Media other than Items (i) through (iv) above are consumer appliances, which provide the users with terminals.

According to this classification, the cable television business in Japan has focused on Items (ii)-(iv) above, managing and operating infrastructure constructed at the local level (such businesses are generally called cable system operators in the US). As will be mentioned later, media classified under the heading (i), called cable networks, have developed substantially in the US, but their development has been limited so far in Japan.

[1] A cable consisting of an insulated copper conductor at the core covered by a mesh of copper wires, which is then covered by polyvinyl chloride.

Figure 1-1. Classification of Media by Function



Note: IRD: Integrated Receiver Decoder, STB: Set Top Box.
Source: Jun-ichi Ikeda, "Techno Zukai, Digital Hoso."

2. Current Situation of Cable Television in Japan

2.1 Diffusion

Figure 1-2 shows the diffusion of cable television in Japan as a percentage of total households (Basic Resident Register households). The data indicate that 37.2% of total households (Basic Resident Register households) – 17.65 million households – used cable television facilities as of March 2000. Cable television can be largely classified into facilities transmitting "self-origination" (including sustaining programs) other than the retransmission of ground wave, BS (Broadcasting Satellite) and CS (Communications Satellite) broadcasting and the so-called joint reception facilities, which are only equipped with retransmission functions to overcome poor reception of TV broadcasting. The former represents 20.0% of total households (9.47 million) while the latter accounts for 17.2% (8.18 million).

However, the number of households receiving multi-channel broadcasting via cable television is still limited despite steady increases. A questionnaire survey for cable television operators engaged in multi-channel broadcasting[2] indicates that although the home path (the number of households in areas with access to cable television) accounts for 41.5% (19.73 million) of total households (Basic Resident Register households), only 5.9% (2.79 million) receive multi-channel broadcasting via cable television, connecting their television receivers to STBs (Set Top Boxes)[3], which are also known as "home terminals" (Figure 1-3).

[2] Survey conducted by Hoso Journal.
[3] Installed in households subscribing to cable television, etc., STBs assume receiver, tuner and other functions when connected to television receivers.

Figure 1-2. Diffusion of Cable Television in Japan (March 2000)

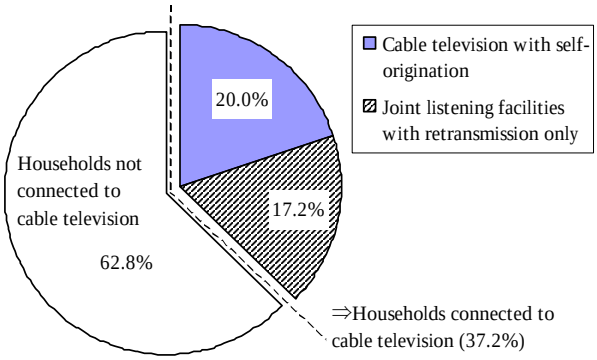
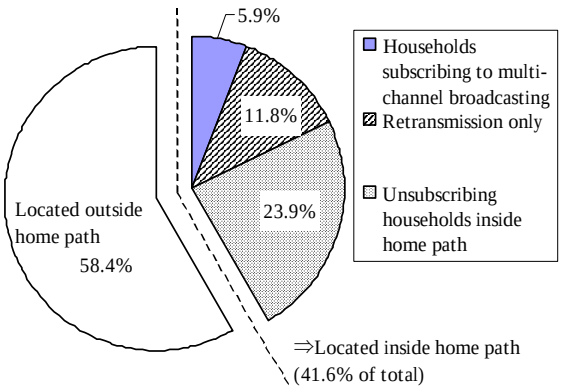


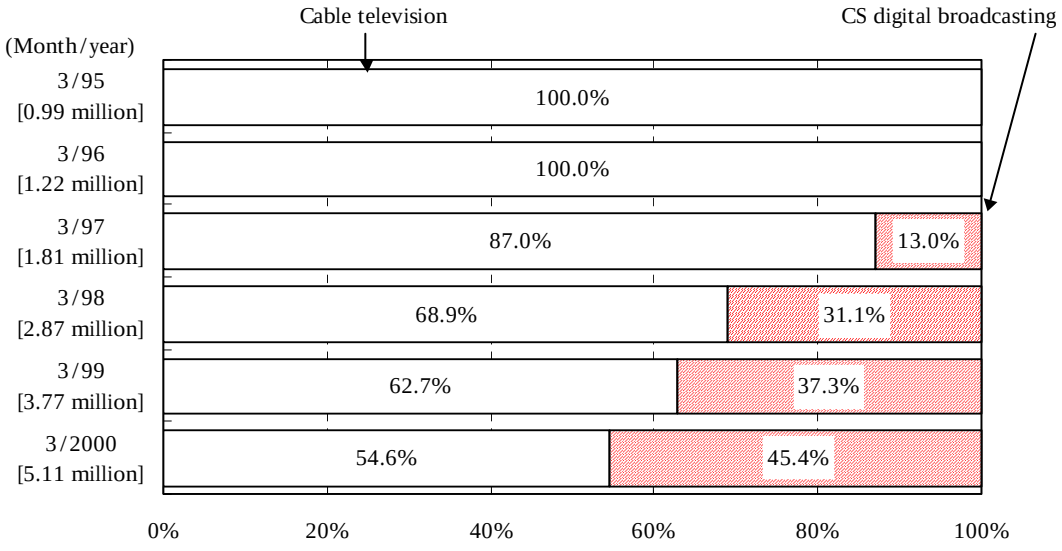
Figure 1-3. Diffusion of Multi-channel Cable Television (355 Stations) in Japan (March 2000 Questionnaire Survey)



Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, "Current Situation of Cable Television," Hoso Journal, "CATV Data Map 2000."

Operators distributing multi-channel broadcasting are sometimes called MVPDs (Multi-channel Video Program Distributors). In addition to cable television operators, MVPDs include CS digital broadcasters, which were launched in 1996. The total number of contracts with MVPDs in Japan increased by as much as 4.12 million in five years, from 0.99 million in March 1995 to 5.11 million in March 2000. In the meantime, the share of cable television in MVPD contracts declined from 100% to 54.5% (Figure 1-4). Some argue that the advent of CS digital broadcasting raised public awareness of multi-channel broadcasting in Japan, thus generating a

Figure 1-4. Shares of Various Services in Total MVPD Contracts in Japan



Note: Total number of contracts is in parentheses [ ].
Cable television: number of households equipped with home terminals (questionnaire survey).
CS digital broadcasting: number of direct receiver's contracts
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, and Hoso Journal data.

synergistic effect on cable television. As multimedia including BS digital and 110-degree CS digital broadcasting are expected to develop further (thus increasing the threat of alternative services to cable television businesses), competition will intensify to gain control of information networks linking households with external sources.

2.2 History of development

The previous section outlined the diffusion of cable television in Japan. The situation of cable television varies in different countries and regions as its development has been influenced strongly by technical and institutional trends in the past. This section outlines the history of development of cable television in Japan.

Cable television in Japan is considered to date back to 1955, two years after the launch of ground wave broadcasting in 1953. Initially, its primary function was to resolve poor reception of ground wave broadcasting[4] through retransmission. Thus, large antennae were jointly established in good reception areas to distribute the received TV signals to individual households by way of cables.

Subsequently, idle channels in cable television networks were used to distribute local information to subscribing households. As a result, the first cable television station in Japan with self-origination was launched in 1963. This function of production and distribution of local programs is still one of the characteristics of cable television in Japan. In 1972, the Cable Television Broadcast Law was enacted to provide legal infrastructure for the installation and operation of cable television facilities as well as the management of businesses.

Multi-channel broadcasting via cable television requires, among others, (i) the improvement of broadcast contents both quantitatively and qualitatively, (ii) the existence of instruments to transmit broadcast contents efficiently from broadcast program producers to central facilities of individual cable television stations, and (iii) the development of cable television networks to transmit more video information to connected households. In Japan, the distribution of programs to cable television using CS began in 1989 but initially there were few programs. It was not until 1996 that multi-channel broadcasting by cable television materialized, due to a substantial increase in specialized broadcast programs with the start of CS digital broadcasting.

Traditionally, cable television in Japan was a monopoly business in close contact with local communities. A license was issued for each local service area, according to structural regulations based on local characteristics such as the requirement for local capital investment. As a result, service areas were fragmented at the local level with each operator building and maintaining a separate system. Partly due to such regulations and guidance, cable television often takes the form of a semi-public enterprise that is operated as “community medium” owned by local capital.

The 1990s was a period of deregulation for the cable television industry. For instance, the local capital requirement was abolished and the regulation on service areas was lifted in December 1993, resulting in a significant influx of non-local capital. Also, it became institutionally possible to improve managerial efficiency through economies of scale. Following the progressive deregulation of foreign ownership of cable television, which started in 1993, new trends emerged in the previously independent management of cable television stations. For example, the first multiple system operator (MSO) was formed in 1995 as a joint venture between a major Japanese trading company and a US company to control multiple cable television stations. While pursuing economies of scale by acquiring local cable television stations,[5] MSOs have been

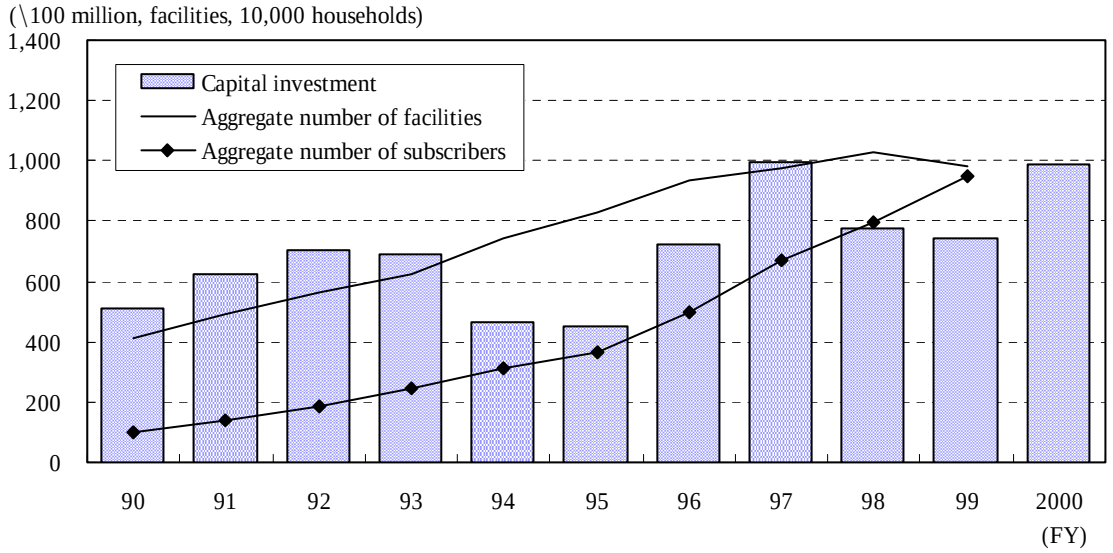
[4] The problem arises where TV reception is impeded by mountains (poor reception in remote areas), or where obstacles such as high-rise buildings make the reception impossible or causing ghosting (poor reception in urban areas).

[5] Jupiter Telecommunications, the largest MSO in Japan, has 5.07 households in its broadcast home path as well as 0.91 million subscribing households (a subscribing rate of 17.9%) as of March 2001.

raising management efficiency based on scale merits, including the reduction of initial subscription charges, package sales of various services (for example, the provision of basic services and most popular pay channels at a set price), efficient allocation of human resources, as well as reduction of program and material procurement costs.

With the development of multi-channel broadcasting and a series of deregulation measures, the number of cable television facilities with self-origination rose from 414 in fiscal 1990 to 984 in fiscal 1999, while the number of subscribing households increased substantially from 1.02 million (a market penetration of 2.5%) to 9.47 million (20.0%) in the same period (Figure 1-5). Although the number of facilities fell after peaking in fiscal 1998 due to the decline in the number of newly established stations and progressive consolidation, capital investment has remained high due to such factors as the cutover of offices in secondary areas, the introduction of hybrid fiber/coax (HFC)[6], and the enhancement of communication business.

Figure 1-5. Trends in Aggregate Numbers of Facilities and Subscribers of Cable Television with Self-origination and Capital Investment in Cable Television



Note: Capital investment only covers facilities with 10,000 or more drop terminals (terminals connecting transmission lines with subscribing households).
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications data.

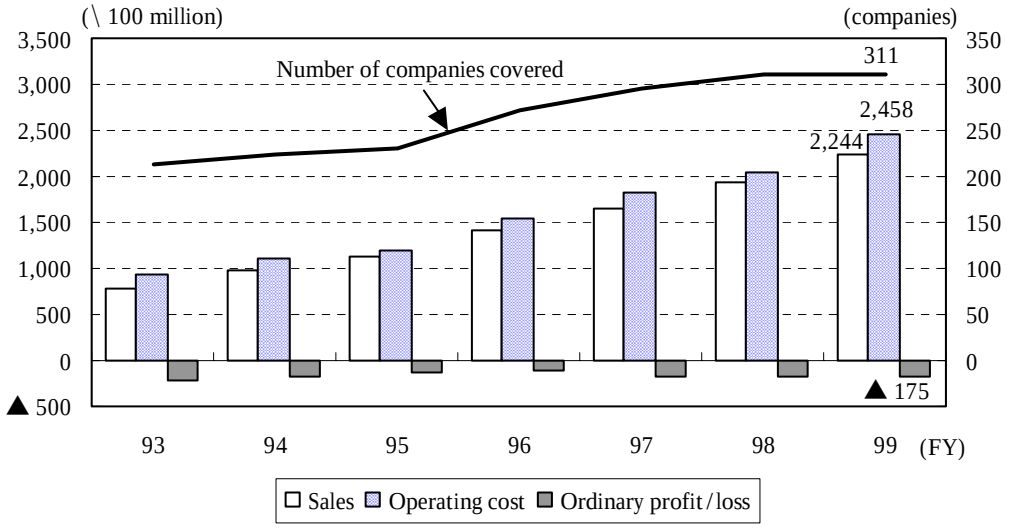
2.3 Financial condition

Figure 1-6 shows the trend of income and expenditure in the industry (broadcasting department) since fiscal 1993. Although sales have been growing steadily due to the increase in the number of operators covered by the survey and subscribing households, they have not been able to cover operating costs including depreciation expenses, program purchasing costs and personnel expenses, resulting in constant operating and ordinary losses. The financial condition of cable television operators in the same period is shown in Figure 1-7. The number of operators with a single-year (any one business year) surplus has been rising. More operators recorded a single-year

[6] A system combining optical fiber cables and coaxial cables. A service area is divided into several hundred zones and optical fiber cables are used in trunk parts. The main advantage of this system is lower cost compared with using optical fiber cables in the whole system.

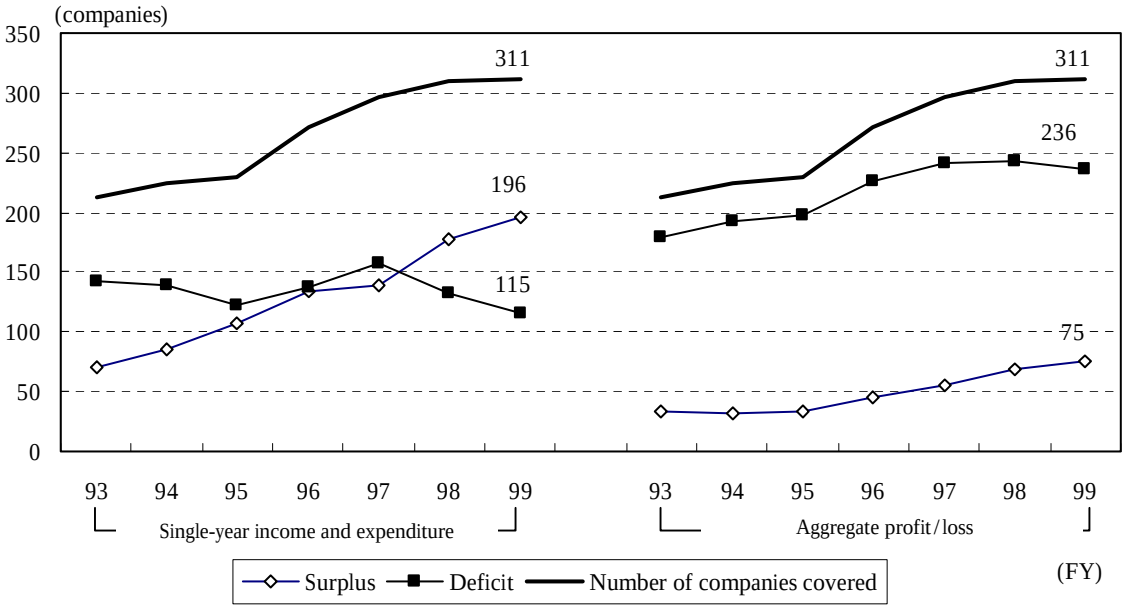
surplus than deficit for fiscal 1998. In fiscal 1999, 63.0% of the operators (196 companies) recorded a surplus. Nonetheless, the financial environment remains adverse, as 75.9% of the operators (236 companies) had carried-forward losses in fiscal 1999.

Figure 1-6. Income and Expenditure of Cable Television in Japan



Note: Data only cover the broadcasting departments of commercial operators.
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, "Current Situation of Cable Television."

Figure 1-7. Financial Condition of Cable Television Operators in Japan



Source: Same as in Figure 1-6.

Since cable television is in general an infrastructure-based business requiring the development of equipment such as head-ends[7] and transmission lines before any potential customers can subscribe at all, operators usually have to invest heavily at the start until a certain number of subscribers can be secured. Although the unit price of transmission lines, which account for most of the capital investment, has been declining in general for newer stations, it still exceeds ¥20,000 per home path. Additional costs accrue after the cutover of an office mainly from lead-in works and modification works in condominiums. It is difficult to recover all such costs in a short time by passing them on through lump-sum subscription and connection charges to be paid by subscribers. Moreover, the negotiating power (program procurement power) of operators tends to be undermined, as they often negotiate separately with program suppliers. Thus, factors at various levels restrict the profitability of the industry. Nevertheless, it is generally considered that cable television operators can expect stable profits once a certain level of subscriptions has been secured, as long as they remain local monopolies.

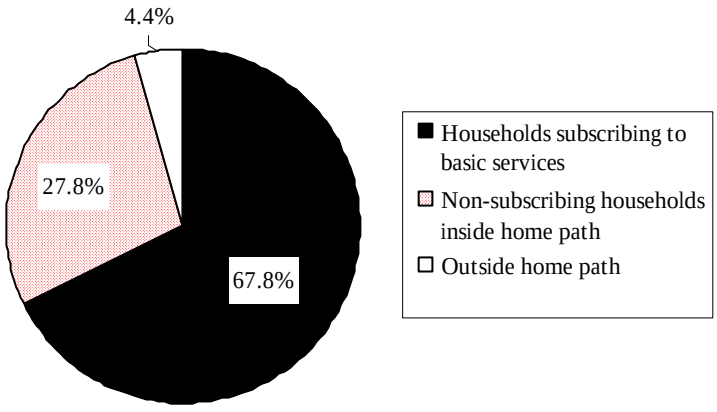
3. Current Situation of Cable Television in the US

As was mentioned in the previous section, subscriptions to cable television in Japan have increased substantially since the 1990s on the back of multi-channel broadcasting and deregulation. In order to forecast future developments, we first review the history and current situation of cable television in the US, which is 20 years ahead of Japan in the development of the industry.

3.1 Diffusion

As shown in Figure 1-8, 6,930 households in the US – 67.8% of total households with television – receive basic cable television services (i.e. services that are available with the basic charges defined by operators) as of December 2000. Cable television networks are already running near most of the US households, with home path accounting for 95.6% of television households (97.70 million households). Thus, there is a striking difference between Japan and the US in the diffusion of cable television.

Figure 1-8. Diffusion of Cable Television in the US (December 2000)



Source: NCTA, "Cable Television Industry Overview 2000."

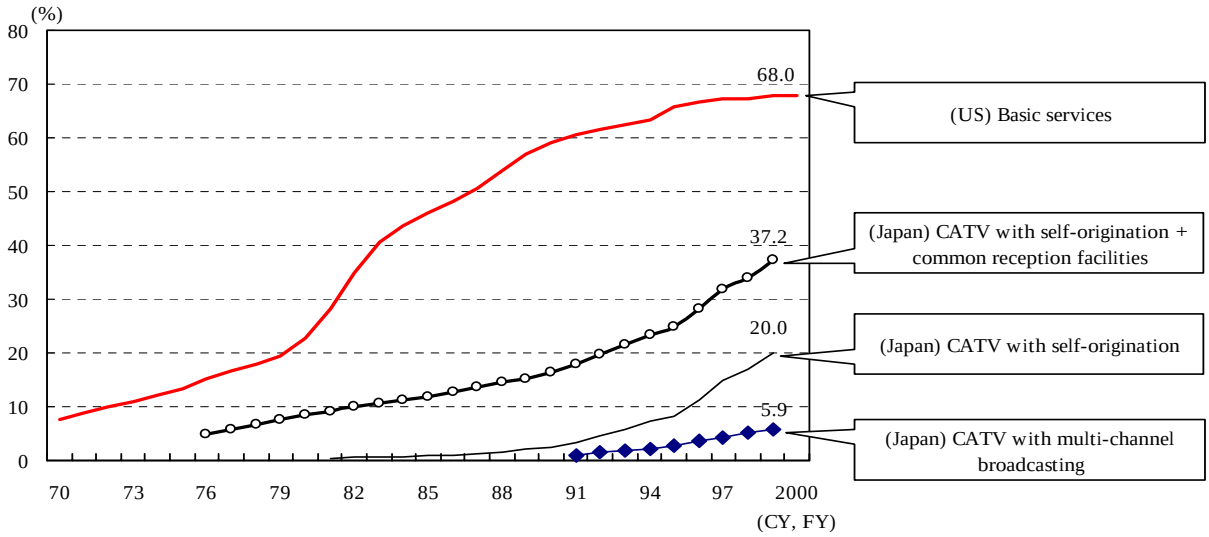
[7] A set of devices composed of channel processor, frequency converter, modulator, mixer, etc. to amplify, convert and then mix the various signals received by the antenna for sending them to cable television transmission lines.

Figure 1-9 compares the market penetration of cable television between Japan and the US. As was mentioned earlier, cable television in Japan grew in the 1990s, whereas it developed rapidly from the late 1970s through the 1980s in the US. Thus, Japan trails the US by two decades in terms of the market penetration of cable television.

There are two major factors behind the strong development of cable television in the US. The first is the existence of poor reception areas. The US had to address poor reception in remote areas due to the vastness of its territory, while poor reception in urban areas was a serious problem early on due to high-rise buildings. Unlike in Japan, sufficient compensation from those causing the interference could not be obtained. Cable television was therefore an effective way of resolving the problem of poor reception until DBS (Direct Broadcast Satellite) became widely available.

Second, specialized cable television programs (pay TV) had attracted many subscribers even before the advent of competing services such as video rentals.

Figure 1-9. Market Penetration of Cable Television in Japan and the US



Note: US: Percentage of households with television (as of December in each year). Japan: Percentage of basic register households (as of March in each year).
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, Hoso Journal, and NCTA data.

3.2 History of development

Cable television in the US was started in 1948 to resolve the problem of poor reception for topographic reasons. Initially, it was not regulated by public authorities, except for franchise regulation by local governments.[8] In the 1960s, however, some operators (cable system operators) started out-of-area retransmission mainly in smaller cities using microwave communications. The resulting conflict with local ground-wave TV stations caused the Federal Communications Commission (FCC)[9] to regulate retransmission.

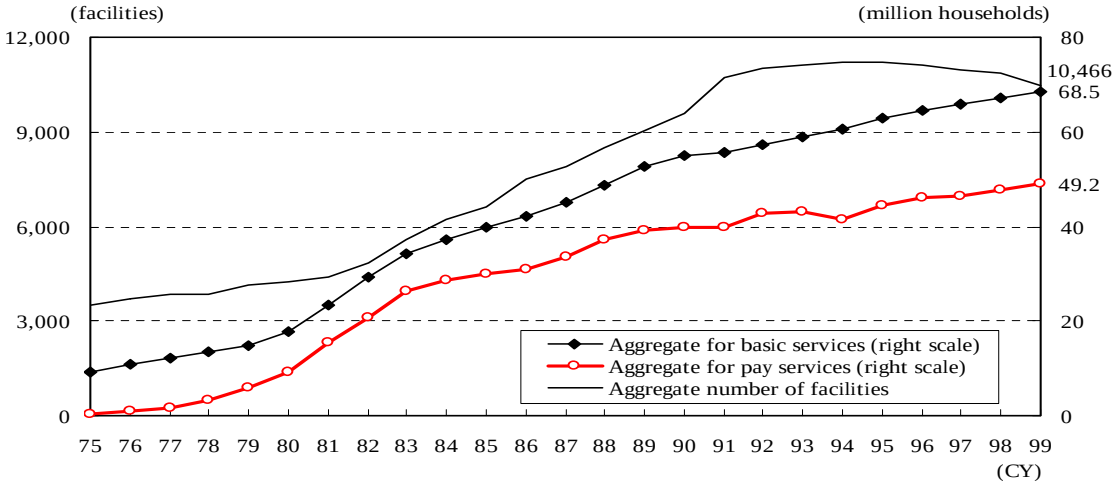
[8] Cable television in the US is granted franchises from local governments. Unlike in Japan, the franchise is limited in time and requires the payment of a franchise fee (up to 5% of gross revenue).

[9] An independent administrative commission established under the 1934 Communications Act and a federal government agency regulating interstate and international radio and wire communications. The Commission is directly responsible to the Congress.

With the advent of full-fledged pay TV in the late 1970s, cable television in the US began to grow spectacularly. Following the liberalization of domestic communication satellites in 1972 (Open Sky Policy), a commercial-free pay TV channel called HBO (Home Box Office) which showed entire movies, started to be distributed nationwide to cable system operators in December 1975, using a communication satellite (SATCOM No.1). To be able to watch movies and live sport programs at home was a revolutionary event in itself, as VCR was not widespread at that time. Cable television operators attracted new subscribers with those featured programs (pay TV).[10] In fact, the US cable television market grew strongly from 3,506 facilities and 9.2 million subscribing households (a market penetration of 13.2%) in 1975 to 6,600 facilities and 39.87 million subscribing households (46.2%) in 1985 (Figure 1-10).

In 1984, the Cable Communications Policy Act[11] came into force to deregulate the cable television market. The Act was beneficial to cable television operators, abolishing the authority of local governments to regulate basic charges except for certain cases.

Figure 1-10. Numbers of CATV Facilities and Subscribing Households in the US (Basic, Pay)



Source: NCTA data.

As a well-developed industry, cable television in the US invested actively in building systems to supply a large number of programs. As program procurement costs rose, including for live broadcast of popular sports, however, some cable television operators raised charges frequently on the pretext of improving the quality of programs, and there was also criticism about the deterioration in customer services. The problems of deregulation thus emerged.

Against this backdrop, the FCC clarified its policy of re-regulation with the Cable Television Consumer Protection and Competition Act of 1992. However, the Commission again changed its policy in favor of deregulation with the US Telecommunications Act of 1996, substantially lifting the regulation on charges for some small-scale operators, and the regulation was totally abolished in 1999.

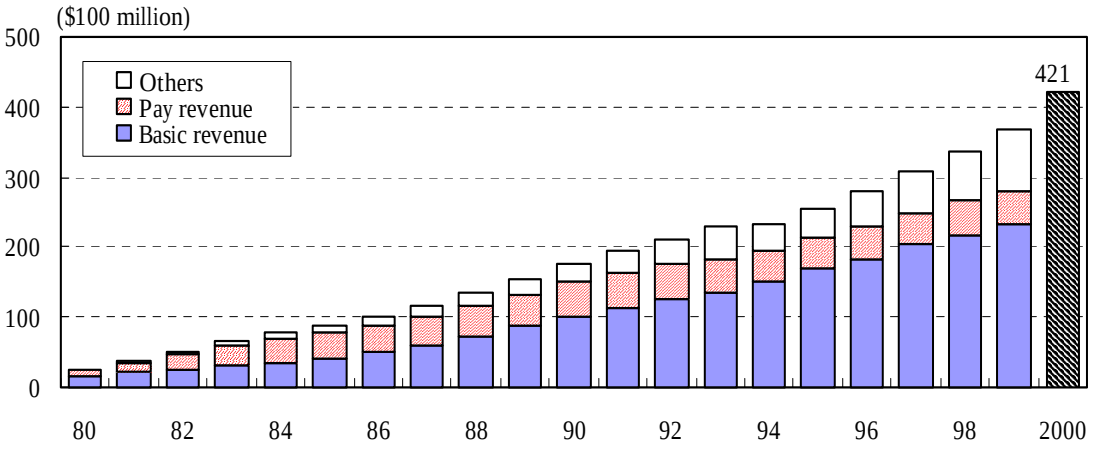
[10] The growth of subscribers to pay TV levelled off in the late 1980s due to excessive competition and the emergence of home video.

[11] Legislation to consolidate cable television regulations at the federal level, mainly providing for (i) the introduction of a franchise licensing system, (ii) the abolition of regulations on charges, and (iii) the introduction of a cross-ownership system (precluding local telephone companies to be involved in cable television business in their own service areas).

3.3 Financial condition

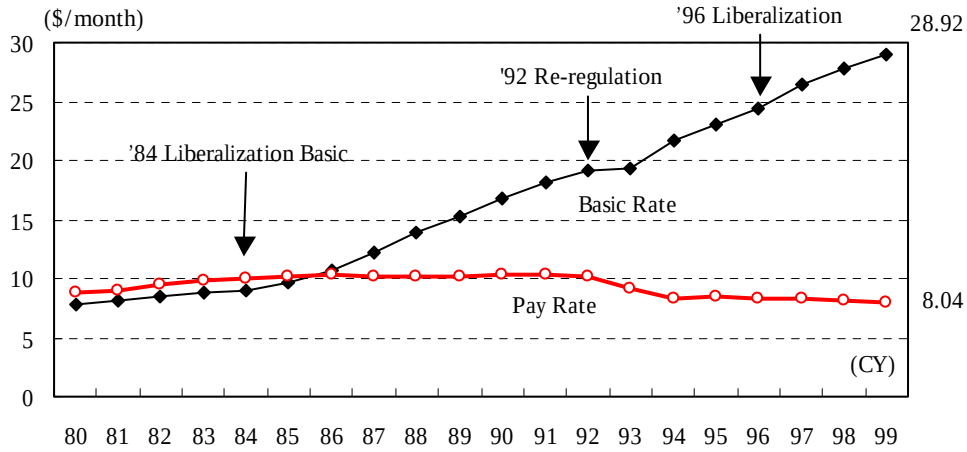
As shown in Figure 1-11, customer revenues for cable television in the US have been rising strongly. Of the total revenue of $36.9 billion in 1999, basic revenue accounted for a majority (62.7%) with $23.1 billion, while pay revenue amounted to $4.9 billion (12.4%). In addition to the growth in the number of chargeable subscribers, the increase in basic revenue was largely due to the above-mentioned successive hikes in basic charges. Figure 1-12 shows that basic charges (average for the whole industry) rose almost threefold between 1985 and 1999, from $9.73/month to $28.92/month. US cable television operators have also increased their advertising revenues in recent years thanks to their strong customer base. Figure 1-13 shows the status of cable television in advertising cost in the US as of 1999. Although the industry accounted for only 4.8% of total advertising cost, the 22.0% increase from the previous year was well above the increase in total cost (up 6.8%).

Figure 1-11. Trend of Customer Revenues for US Cable Television



Source: NCTA data.

Figure 1-12. Trend of Average Monthly Rates of US Cable Television



Source: NCTA data.

Figure 1-13. Cable Television in Advertising Cost in the US

Advertising cost in the US (1999)

($ million, %)

Medium	1999 Amount	1999 Share	1999 Change from previous year
Newspapers	46,648	21.7	5.3
DM	41,403	19.2	8.7
Network TV	40,011	18.6	2.1
Radio	17,215	8.0	14.2
Yellow pages	12,652	5.9	5.5
Magazines	11,433	5.3	8.7
Cable television	10,429	4.8	22.0
Industrial papers	4,274	2.0	1.0
Internet	1,940	0.9	84.7
Outdoor advertisement	1,725	0.8	9.5
Others	27,571	12.8	8.0
Total	215,301	100.0	6.8
As % of GDP	2.33%		

<Ref.> Advertising cost in Japan (1999, 2000)

($ million, %)

Medium	1999 Amount	2000 Amount	2000 Share	2000 Change from previous year
TV	19,121	20,793	34.0	8.7
Newspapers	11,535	12,474	20.4	8.1
Inserted bills	4,241	4,546	7.4	7.2
Magazines	4,183	4,369	7.2	4.4
DM	3,242	3,455	5.7	6.6
Outdoor advertisement	3,148	3,110	5.1	▲1.2
Traffic advertisement	2,320	2,450	4.0	5.6
Radio	2,043	2,071	3.4	1.4
Telephone directory	1,777	1,748	2.9	▲1.6
POP	1,610	1,695	2.8	5.3
Internet	241	590	1.0	144.8
New media	225	266	0.4	18.2
Others	3,310	3,535	5.8	6.8
Total	56,996	61,102	100.0	7.2
As % of GDP	1.11%	1.19%		

Note: New media include cable television, satellite broadcasting, character broadcasting, etc.
Source: "Dentsu Advertisement Almanac '00/'01," and published Dentsu data.

3.4 Changes in competitive environment and response

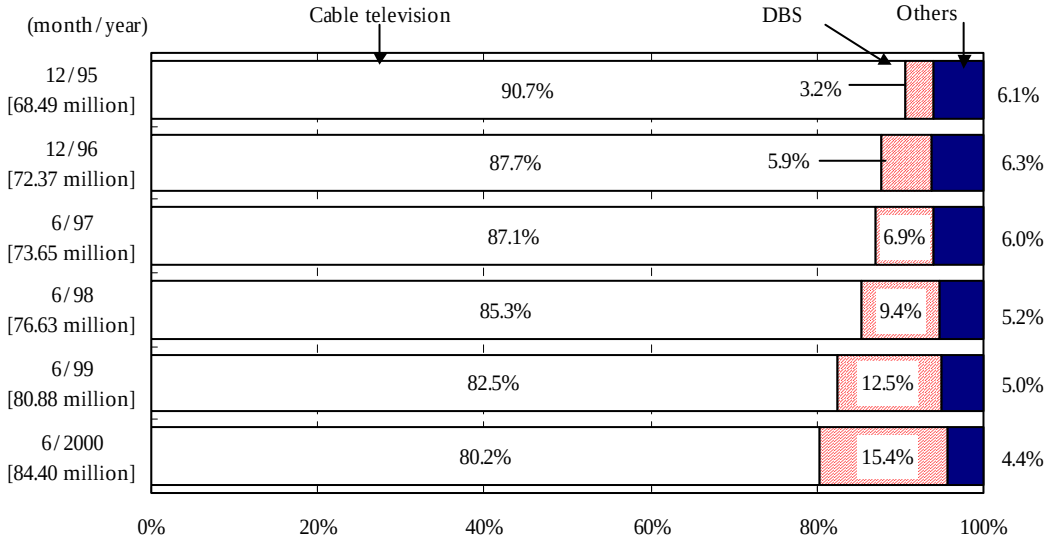
Today, US households receiving multi-channel broadcasting enjoy the latitude to choose from various MVPDs (Multi-channel Video Program Distributors) other than cable television operators, including satellite broadcasting and telephone companies. Figure 1-14 shows the total number of MVPD contracts and the share of each service. The number of contracts rose from 68.49 million in December 1995 to 84.40 million in June 2000. In the same period, the share of DBS including DirecTV (cutover in June 1994) and Ecostar (cutover in April 1996) rose from 3.2% to 15.4%,[12] while the previously overwhelming share of cable television declined from 90.7% to 80.2%. The Telecommunications Act of 1996, which institutionally allowed cable television operators and telephone companies to enter each other's markets, stimulated the direct entry of major telephone companies into the multi-channel broadcasting business.[13]

The mounting competitive pressure has made it increasingly difficult for cable television operators simply to resort to price hikes, compelling them to respond differently. The cable television operators must therefore consider providing various services utilizing their existing networks, in addition to boosting advertising revenue on the back of the existing customer base. Indeed, they are increasingly entering the communication businesses such as providing Internet and telephone services, as well as in interactive services. Cable television operators are also actively promoting digitalization. About 7.8 million households were already receiving digital broadcasting as of September 2000, and one industrial association predicts over 40 million contracts by 2006.

[12] Thanks to technical and institutional progress, DBS in the US now provides local channels in major urban areas around the country.

[13] However, the entries of telephone companies into the cable television business have not resulted in significant success, as many new entrants are facing financial difficulties.

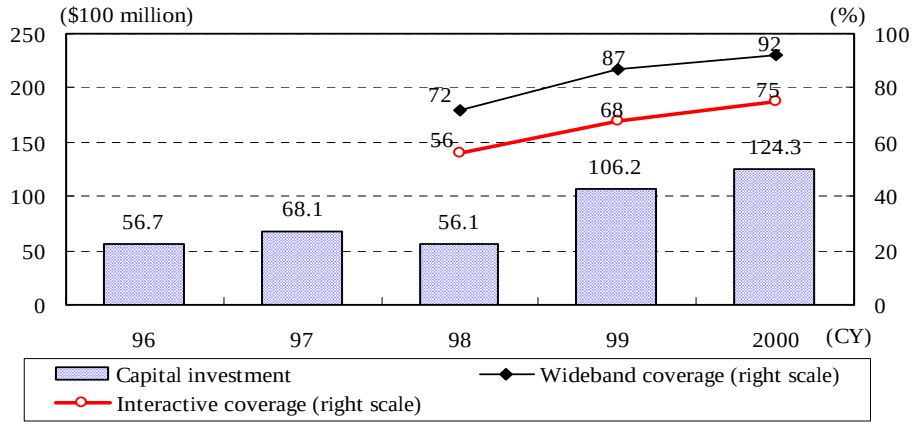
Figure 1-14. Composition of Total MVPD Contracts in the US by Service



Note: Total number of contracts is in parentheses [ ].
Source: FCC data.

A major challenge in achieving this goal is the sophistication of facilities such as the development of wideband and two-way transmission lines including the introduction of HFC and communication equipment. The cost of sophistication greatly raises the capital investment required in cable television, amounting to some $1,000 per user according to an estimate. Figure 1-15 shows the progress in the sophistication of cable television facilities and the amount of capital investment. Cable television operators invested over $10 billion in facility upgrading in both 1999 and 2000. The wideband (550 MHz-750 MHz) facilities thus developed covered 92% of the households subscribing to cable television in 2000, up from 72% in 1998. Likewise, the coverage of interactive facilities rose rapidly from 56% to 75% in the same period.

Figure 1-15. Trends in Facility Upgrading and Capital Investment of US Cable Television Operators



Note: Wideband facilities refer to those with a capacity of 550 MHz or over.
Source: Paul Kagan Associates, Inc. data.

4. Summary

This chapter has described the current situation of cable television from a rather traditional viewpoint, focusing on the broadcasting sector.

Although Japanese cable television operators were given a chance to grow as multi-channel broadcasters in the 1990s thanks to technological progress and deregulation, they have yet to develop strong cable networks comparable to those in the US. Many of the Japanese cable television operators with self-origination, defining themselves as community-based businesses, are equipped with studio facilities and production departments with special emphasis on providing local information. Some Japanese operators are daily producing and distributing quality broadcast contents with high subscription rates. However, many operators do not have a well-established management base and therefore cannot invest sufficient managerial resources in program production; indeed, cable television operators procure most of their programs from external sources. Furthermore, many of the cable television operators involved in multi-channel broadcasting have ended up dividing the broadcasting media-conscious clientele with satellite broadcasting, which started and developed concurrently.

Thus, Japanese cable television operators are now entering the fast-moving multimedia era without the growth scenario enjoyed by US counterparts which reaped the leader's benefit as broadcasting contents providers. Of course, the fragmentation of service areas has brought huge numbers of subscribers to some operators in regions that strongly need out-of-area retransmission (notably in Nagano Prefecture), and some operators have overcome the handicaps and achieved financial stability. However, despite such success stories, operators have been unable to develop into MSOs by acquiring other stations. In summary, the development of MSOs and industrial restructuring are being led by major capital from other industries such as trading companies and home electronics manufacturers, and particularly by foreign capital.

With this background, Chapter II will present an overview of the changing business environment for cable television.

II Changing Environment for Cable Television

As was outlined in the previous chapter, Japanese cable television lags behind its US counterpart by almost 20 years in terms of market penetration. This time lag is important when considering whether cable television in Japan will be able to play a role similar to that in the US, for the whole information industry is changing in a way that might undermine the current status of the cable television business. This chapter focuses on two factors, the development of broadband and digitalization, and identifies the imminent changes in business environment facing cable television operators.

1. Rapid Growth of Internet and Trends in Broadband

1.1 Rapid growth of Internet

The Internet is a global grouping of computer networks. It is practically impossible to assess the number of users at any point in time due to its universal accessibility, and so such estimates provided by several institutions vary considerably with differences in survey methods. According to a survey conducted by the Ministry of Public Management, Home Affairs, Posts and Telecommunications, the number of Internet users[14] stood at 47.08 million as at the end of 2000, representing 37.1% of the total population. Although the expansion of the coverage of the survey precludes a precise comparison with previous data, the figure indicates a much faster increase than in 1999, when it grew by over 10 million from 16.94 million in 1998 to 27.06 million.

One of the major factors behind the acceleration of Internet use in Japan is the rapid expansion of Internet service through portable phones, led by the "i-mode" of NTT Docomo (launched in February 1999). With a basic charge of ¥300/month, i-mode is billed based on the amount of data transmitted (¥0.3 for 128 bytes) regardless of time, keeping the cost of non-use low. Coupled with the ability to connect to the Internet simply by pressing a specific button on the portable phone handset, i-mode has rapidly attracted customers, particularly the young, and grown far more spectacularly than even the supplier had anticipated.

1.2 Emergence of broadband

As Internet usage started to expand in Japan, led by the technological advance and diversification of such terminals, demand grew for lower, fixed telecommunication circuit costs, as well as high-speed connections. Attention has focused on the access lines linking the users with ISPs (Internet Services Providers). Wideband access lines that offer fast transmission of large volumes of data such as pictures and sound are referred to as "broadband[15]." Its precise definition is difficult, however, due to differences among suppliers and users and the level of technology. One possible standard definition could be high-speed services, which are defined by the US Federal Communications Commission (FCC) as services enabling at least one-way transmission of 200 kbps or faster. "bps" (bits per second) is a unit of data transfer rate for telecommunication circuits, etc. 1 bps indicates the capacity of transferring one bit of data in one second. 1,000 bps is written as 1 kbps, and 1,000 kbps as 1 Mbps. A speed of 220 kbps or faster would ensure relatively smooth reception of moving pictures by streaming (real-time playing of sound and moving pictures for receiving data on the Internet). However, some argue that a speed of at least 500 kbps is necessary in order to charge for the reception of moving pictures in the future.

[14] Those who use the Internet (including users of the Web or e-mail only) whether at home or elsewhere with personal computers, portable phones or other terminals.

[15] Originally, "broadband" meant wideband (wide frequency bandwidth).

Early development of such high-speed Internet access networks has been identified as one of the national strategies of Japan. In its "Basic IT Strategy" (Decision in November 2000), the IT (Information Technology) Strategy Council, an advisory organ of the Prime Minister, set out an ambitious objective: "Under competition and the market mechanism, to develop within five years a world-level Internet network with an ultrahigh-speed access capacity (30-100 Mbps) to ensure access for all citizens who need it at an affordable price. The plan is to create an environment where at least 30 million households can be connected to high-speed Internet networks and 10 million households can be connected to ultrahigh-speed Internet networks at any time."

1.3 Situation of broadband access networks

There are various types of broadband access networks including CATV Internet, DSL (Digital Subscriber Line), FTTH (Fiber To The Home), next-generation portable phones (IMT-2000), FWA (Fixed Wireless Access) and satellite.

The environment for broadband networks in Japan has changed dramatically, as technical and institutional bottlenecks have been rapidly overcome. As many newcomers have been attracted to this fast-growing market, the year 2001 will mark the start of the broadband era. Cable television operators therefore have outstanding business opportunities.

However, the development of broadband will be influenced by various factors such as the trend of Internet users, institutional developments including deregulation, the contents of services (speed, charges) and the trend of unit prices for related equipment including special-purpose modems. Therefore, conditions differ from country to country. For instance, both CATV Internet and DSL are expected to develop in the US as will be mentioned later, whereas in South Korea, the development of DSL leads that of CATV Internet. This section outlines the trend of broadband networks in the US, the leader in high-speed Internet, then summarizes the situation of broadband in Japan today.

(i) Broadband in the US

In the US, cable television operators, telephone companies and ISPs have actively invested in broadband as a promising business. The US Telecommunications Act of 1990 has played an important role, as it profoundly transformed the regulatory framework based on the 1934 Communications Act to encourage local exchange and long-distance carriers as well as telephone companies and cable television operators to enter each other's markets, resulting in large-scale vertical and horizontal integration for competitive advantage. Cable television has been affected by such restructuring. For instance, AT&T, a long-distance telephone company, acquired major cable television operators TCI (agreed in June 1998, approved in February 1999) and Media One (agreed in April 1999, approved in April 2000) for almost $9 trillion in total to secure home access networks before entering the local telephone and data communications businesses. As a result, AT&T suddenly emerged as the largest cable television operator.[16] Also, the merger between AOL, the largest ISP, and Time-Warner, a media company with a cable television department, attracted much attention in Japan as an integration of the old and the new.

Figure 2-1 shows the aggregate number of subscriptions to CATV Internet and DSL in

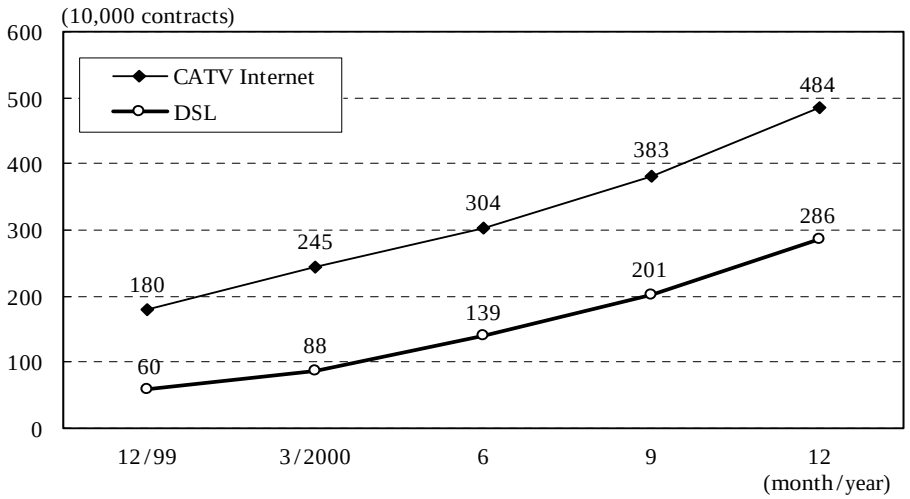
[16] However, the sea change in macroeconomic conditions in the US generated some reaction to active acquisition and capital investment. AT&T announced that it would break up into four companies dealing in (i) corporate long-distance communication, (ii) private long-distance communication, (iii) portable phones and (iv) cable television, and that the portable phone and cable television companies would be given full autonomy regarding capital (announcement made in October 2000). It was also announced that part of the cable television operation would be sold to two peer companies, Charter Communications and Mediacom Communications (announcement made in February 2000).

North America (the US and Canada). CATV Internet, which started in 1995 in the region, was soon followed by DSL, launched in 1996, both experiencing substantial growth subsequently.

The aggregate number of subscriptions to CATV Internet in North America (the US and Canada) is estimated at 4.84 million as of December 2000. The number of subscribers has grown rapidly due to increased recognition of the service, the expansion of potential service areas and the introduction of self-installation: the average increase in subscriptions rose from 206,000/month in the first half of 2000 to 300,000/month in the second half. By operator, seven major MSOs in the US account for 74.7% of the North American market as of December 2000, including AT&T Broadband (23.7%) and Time-Warner Cable (19.5%).

The aggregate number of subscriptions to DSL in North America (the US and Canada), on the other hand, is estimated at 2.86 million as of December 2000. As in the case of CATV Internet, the number of subscribers has increased strongly with improved recognition and lower charges to a level comparable to CATV Internet (about $40/month). The average increase in subscriptions rose from 132,000/month in the first half of 2000 to 245,000/month in the second half. New carriers including ILECs (Incumbent Local Exchange Carriers) and CLECs (Competitive Local Exchange Carriers) have entered the DSL market in the US, with ILECs in particular acquiring many subscriptions recently, due mainly to their corporate strength.

Figure 2-1. Aggregate Number of Subscriptions to CATV Internet and DSL in North America (US and Canada)



Source: Kinetic Strategies data (http://www.cabledatacomnews.com/) and TeleChoice data (http://www.xdsl.com/).

In the US, CATV Internet and DSL will likely lead the development of broadband, as optical fiber is not expected to significantly penetrate the household market (though other promising broadband technologies may emerge in the future). Major reasons include (i) the huge cost of laying new optical fiber cables to reach individual households in the vast territory of the US inhibits players in the US information industry, which are in intense competition, from making such decisions at the management level, and (ii) that CATV Internet and DSL require less investment as existing lines can be used, and their technologies can transmit data quickly.

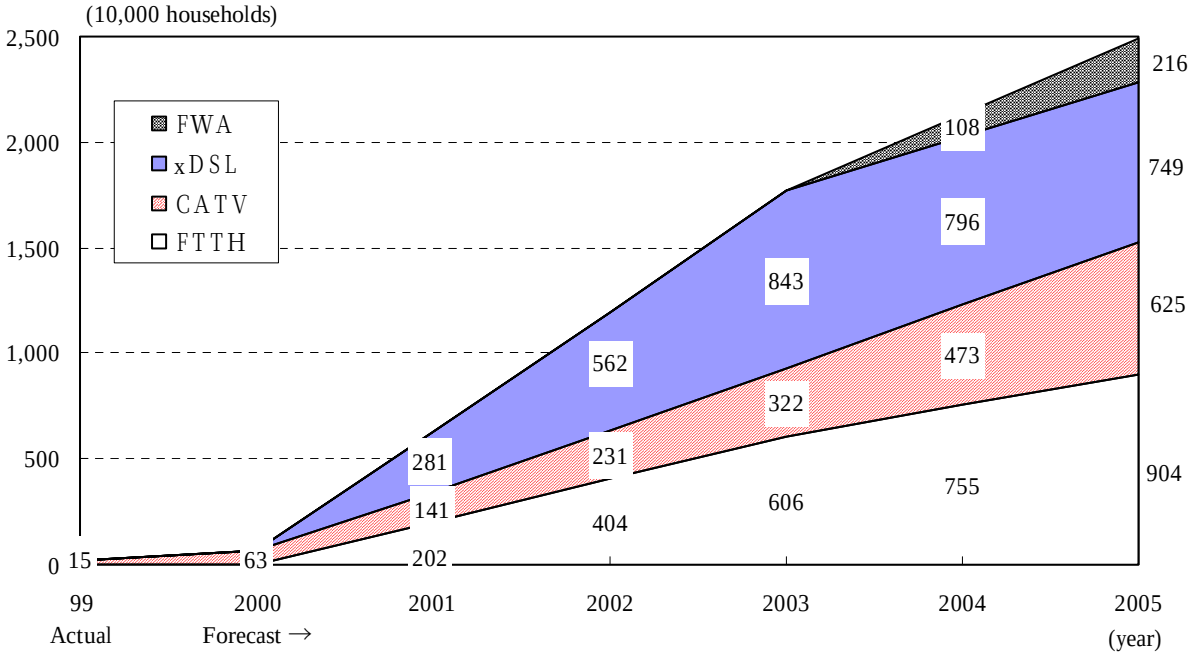
Under Section 706(b) of the US Telecommunications Act of 1996, the FCC conducts a periodical survey on the availability of advanced telecommunications to all Americans (including elementary and secondary schools and their classrooms) to promote the diffusion of broadband.

Based on the survey results, the Commission determines whether the capacity is provided in a "reasonable and timely way." If not, it is legally required to take immediate measures to encourage the provision of capacity by removing obstacles to investment in infrastructure and promoting competition. According to the results of FCC surveys on the development of high-speed Internet services published in August (Second 706 Report) and October 2000, the number of high-speed service lines in the US increased from 2.8 million in December 1999 to 4.3 million in June 2000, while the number of cable modems and DSLs grew by 840,000 and 580,000 respectively in the same period. Based on these results, the FCC concluded that high-speed Internet services were spreading well. In order to promote further diffusion of high-speed Internet services, the FCC is currently researching whether to require cable television operators to open up their networks to Internet service providers.

(ii) Broadband in Japan

Whereas CATV Internet and DSL will lead the development of broadband in the US, optical fiber networks are expected to play a major role in Japan. Figure 2-2 shows the expected diffusion of broadband in Japan (estimate) stated in the Second Interim Report of the Round-table Conference on the Development of Information Networks in the 21st Century. According to this estimate, of households subscribing to broadband in 2005 (24.94 million households), FTTH will have the largest share with 9.04 million households, followed by DSL (7.49 million households), cable television (6.25 households) and FWA (2.16 households).

Figure 2-2. Expected Diffusion of Broadband in Japan (Trends in Estimated Number of Subscribing Households)

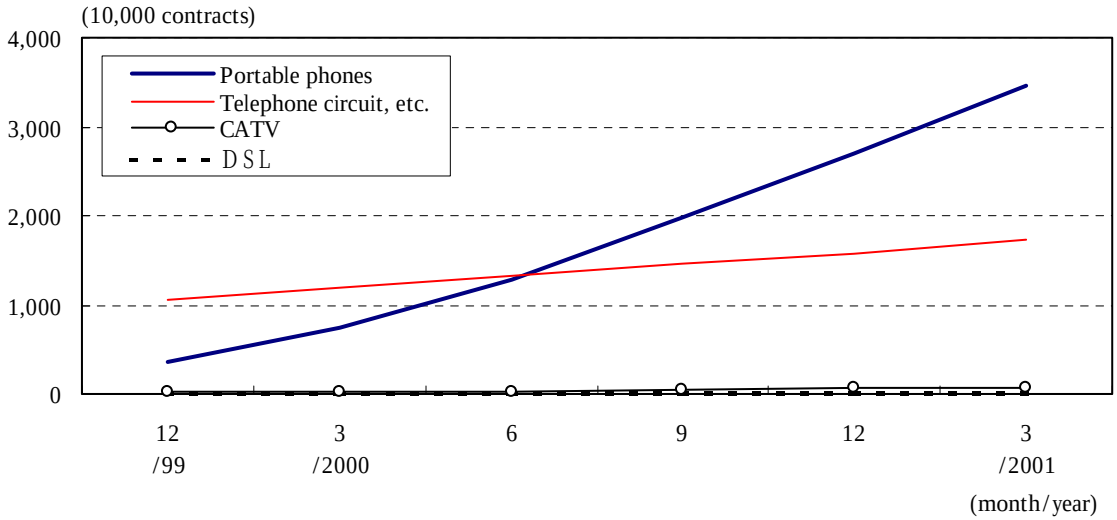


Source: Second Interim Report of the Round-table Conference on the Development of Information Networks in the 21st Century (December 2000) and Ministry of Public Management, Home Affairs, Posts and Telecommunications data.

As shown in Figure 2-3, Internet services in Japan are progressing rapidly in terms of the number of users and the diversification of access methods, and Internet services via portable phones are showing particularly impressive growth in Japan. The number of portable phone Internet service contracts stands at 34.57 million as of March 2000, increasing by as much as 27.07 million in just one year. With the advent of the next-generation portable phones (IMT-2000), to be launched experimentally at the end of May 2001, transmission speed will be improved from the current 9.6 kbps to 384 kbps at the maximum. Due to their solid customer base, attention has been focused on the future development of portable phone Internet services, including the potential for e-commerce in games, music distribution, advertising and finance, for example.

However, wire broadband including CATV Internet and ADSL is still in the initial stage of development, and most subscribers are dedicated Internet users. Currently, CATV Internet leads ADSL thanks to its head start. Subscriptions to CATV Internet rose at 29,000 contracts per month, from 154,000 in December 1999 to 329,000 in June 2000, and then increased even faster by 49,000 per month, reaching 625,000 contracts as of December 2000. Although the number of subscriptions to ADSL amounted to only 9,273 contracts in December 2000, it subsequently increased with the start of full-fledged service and had reached 71,000 contracts as of March 2001.

Figure 2-3. Number of Subscribers to Internet Services in Japan (by Means of Access)



(10,000 contracts)

	99/12	2000/3	6	9	12	2001/3
Portable phones	367	750	1,272	1,968	2,687	3,457
Telephone circuit, etc. (dial-up access)	1,059	1,193	1,327	1,454	1,580	1,725
CATV Internet	15.4	21.6	32.9	46.3	62.5	78.4
DSL	0.00	0.02	0.12	0.25	0.97	7.07

Note: Telephone circuit, etc. covers 15 major ISPs. (Original data are indices.)
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications.

The characteristics of the main broadband services at present are summarized in Figure 2-4. However, the contents of actual services are more complicated due mainly to technical factors, so the services cannot be easily compared. The following segments will outline the characteristics of CATV Internet, ADSL and optical fiber, which are the major broadband media in Japan.

Figure 2-4. Comparison of Major Broadband Services

Name	CATV Internet	ADSL	Optical fiber	FWA(P-MP system)[*1]	<Ref.> Flets IDSN[*2]
Access network	CATV network	Local telephone network (copper wire)	Optical fiber network	Wireless (22, 26, 38 GHz band)	IDSN network
Conditions of service areas	Limited to within CATV networks (201 operators as of March 2001)	Limitation on distance from central telephone exchange, optical serving areas, etc	Limited to within optical fiber networks	Limitation on distance from base stations (1 km radius)	
Introduction to condominiums	▲(streamed noise, improvement)	−	▲(improvement)	−	−
Relation with ISDN	−	▲(Interference)	−	−	−
Down-stream speed	○(about 128-500 kbps)	○～◎(1.5/3/6/Mbps)	◎(10/100Mbps)	○(1.5Mbps)	▲(64kbps)
ISP function (IX connection)	○	○	−		−
Use of access network	Shared	Exclusive	Shared	Shared	Exclusive
networkSpeed guarantee	No	No	Yes/no	No	No
Service areas (FY2000)	Local cities	Metropolitan areas	Metropolitan areas	Ordinance-designated cities	Prefecture capitals
↓	↓	↓	↓	↓	↓
(expected FY2001)	Local cities	Prefecture capitals	Metropolitan areas	Ordinance-designated cities	Local cities
Remarks	・Possible packaging with other services		・Considerable time required for developing nationwide networks	・Short period required for facility installation. ・Service geared to corporate sector (facilities not cost-effective for households)	・Provided by NTT. ・Easy to attract ISDN users

Notes: *1: Point to multi-point: A FWA system for sharing among two or more users a circuit with a capacity of 10 Mbps within a radius of 1 km from one base station. Other systems include P-P (Point-to-Point), which connects two points on a one-on-one basis.
*2: Flets-ISDN is not defined as broadband service using the criterion of 200 kbps or over.
Source: Various data.

CATV Internet

CATV Internet utilizes cable television networks developed for transmitting pictures, and enables high-speed data communications between head-ends and subscribers. In practice, one channel (a bandwidth of 6 MHz) is generally used each for the up-stream signal (band below 50 MHz) and down-stream signal (band above 50 MHz) to ensure two-way communication.

The CATV Internet service was started in 1996 in Tokyo. With the subsequent entries from affiliates of major railway and trading companies, the number of operators[17] had reached 201 companies by March 2001.

Individual operators set the content of their CATV Internet services in principle. A flat-rate system is used in most cases, charging ¥5,000-6,000 per month for a down-stream speed of up to several hundred kbps, which is faster than ISDN[18].

Despite the possibility of high-speed communications, CATV Internet has its own problems. Unlike ADSL, which is discussed below, two or more users share the same band for

[17] Including the operators providing circuits to Internet service providers as a specialized service.
[18] Short for Integrated Services Digital Network. Unlike continuous connection, dialling is required for each connection. Standard transmission speed is 64 kbps (or 128 kbps).

communication. Thus, saturation of the band by many users attempting simultaneous access or appropriation of the band by heavy users may reduce the effective speed per user. Furthermore, "streamed noise" is generated with the convergence of up-stream traffic, for cable television networks have a tree-like form, using one telecommunication circuit for a certain number of neighboring households. This poses technical and cost-related obstacles to its diffusion, particularly for existing condominiums in which wiring is difficult to alter.

DSL

DSL refers to techniques and services for high-speed data communications between central telephone exchanges and subscribers, making effective use of existing telephone lines (copper cables). It was developed in the US in the early 1990s. In the broad sense of the word, ISDN and analog modem communications may be included in DSL, but it usually means those services using telephone lines but not using the band used for telephone calls (up to 4 kHz). The x in the expression xDSL indicates that multiple specifications exist for the DSL technology. In Japan, the first experiment on using DSL in September 1997 was followed by a pilot experiment for ADSL in February 1998. The ADSL service was tentatively launched in December 1999. ADSL is one of the promising specifications of DSL in Japan. The A stands for "asymmetric," which means that the speed of the down-stream signal is faster than the up-stream signal. As broadband attracted greater interest, moves started to be made in 2000 to introduce DSL services. In December, NTT East and NTT West announced that they would start providing full-fledged DSL service. DSL ventures, which have led the DSL service in Japan, are currently predominant players in the ADSL market, but well-known major communication companies have announced that they will actively enter the business in 2001. Thus, the service areas are expected to expand rapidly to major cities nationwide, accompanied by further development in metropolitan areas.

Although ADSL fell behind CATV Internet as a full-fledged business, it has improved in terms of transmission speed and charges. As regards transmission speed, NTT East and NTT West, in entering the ADSL business in December 2000, raised the maximum speed from 512 kbps to 1.5 Mbps for the down-stream signal, and from 224 kbps to 512 kbps for the up-stream signal. Other DSL operators followed suit and as a result, the standard transmission speed of ADSL is now 1.5 Mbps at the maximum for the down-stream signal, already surpassing the maximum speed of CATV Internet. The service also became more affordable with the introduction of the outright sale system for ADSL modems in February 2001.

ADSL allows high-speed data communications between central telephone exchanges and subscribers in the Mbps range. However, one problem inherent to high frequency waves is that a long distance between the central telephone exchange and DSL modem may reduce the speed of communications due to attenuation. Thus, service areas are limited to within a certain distance from the central telephone exchange. In addition, speed falls in transit networks between central telephone exchanges and NOCs[19] (Network Operation Centers) when circuits became saturated due to intensive use. However, capacity has been increased and cost reduced by using dark fiber (idle optical fiber core).

Optical fiber cable

Optical fiber itself is made from glass or plastic and has a concentric cross section with cladding wrapped around the photoconductive core. The index difference between the core and cladding allows efficient long-distance transmission of optical signals by containing them within the core.

[19] Refer to sites and facilities for the management of networks. Usually, NOCs contain computers directly linked to backbone networks.

This enables high-speed data communications far outstripping all other network types, with speeds of tens or hundreds of Mbps or even faster. Access networks using optical fiber cables are classified into FTTH (Fiber To The Home), FTTC (Fiber To The Curb), FTTB (Fiber To The Building), etc., according to the extent to which optical fiber is used. FTTH is not expected to materialize at the national level in the near future, as capital investment of several trillion yen will be required. Therefore, the government's priority is to introduce optical fiber to the basic part of access networks called feeders (corresponding to FTTC), which is to be completed by 2005. Since such efforts are being led by the private sector, however, optical fiber is estimated to account for only 89% of the feeder lines in 2005.[20] Although the burden of investment in optical fiber for private companies will be somewhat alleviated by various support provided by the government, nationwide development will take a considerable time.

Nevertheless, the provision of optical services has already started in urban areas where the installation of optical fiber cables has been completed. The service was launched by NTT in December 2000, tentatively called the optical/IP communication network service, and offers three options: basic plan (¥13,000/month + ISP charges), high throughput plan (¥32,000/month + ISP charges) and condominium plan (¥3,800/month + ISP charges). The three options are identical in that they connect to NTT's local IP networks[21] at up to 10 Mbps, but differ in the number of users sharing a circuit. Thus, the effective speed is fastest for the high-throughput plan (32 users sharing a circuit), followed by the basic plan (256 users) and then by the condominium plan (about 750 users).

Since March 2001, some operators have been providing FTTH services in certain areas within the 23 wards of Tokyo at speeds of up to 100 Mbps for both up-stream and down-stream and with a monthly cost of ¥6,100 (including charges for modem use). Future developments of these services should be monitored, as they offer far higher cost-performance than other services.

In addition to the development of broadband networks and backbone networks, shorter download time and improved image quality, etc. have been sought mainly by introducing IP multicast[22] and QoS control technologies[23]. Distribution businesses have also sprung up for images and other large information contents. For example, AII, established in April 2000 with Sony and Tokyu Railway among the major shareholders, has been involved in a moving-picture distribution service using the cable television network, covering more than 150,000 households as of December 2000. This is wholly different from CATV Internet. As broadband accelerates, contents distribution businesses using ADSL and FTTH are expected to emerge.

1.4 Orientation of CATV Internet

Figure 2-5 shows broadband services in Japan as of March 2001 in terms of speed and user charges. The graph gives the impression of stability, with each service having its own transmission speed and user charges. Changes are coming, however, with the launch of new FTTH services offering higher cost-performance and with NTT announcing further price reductions for FTTH and ADSL services in its three-year management plan.

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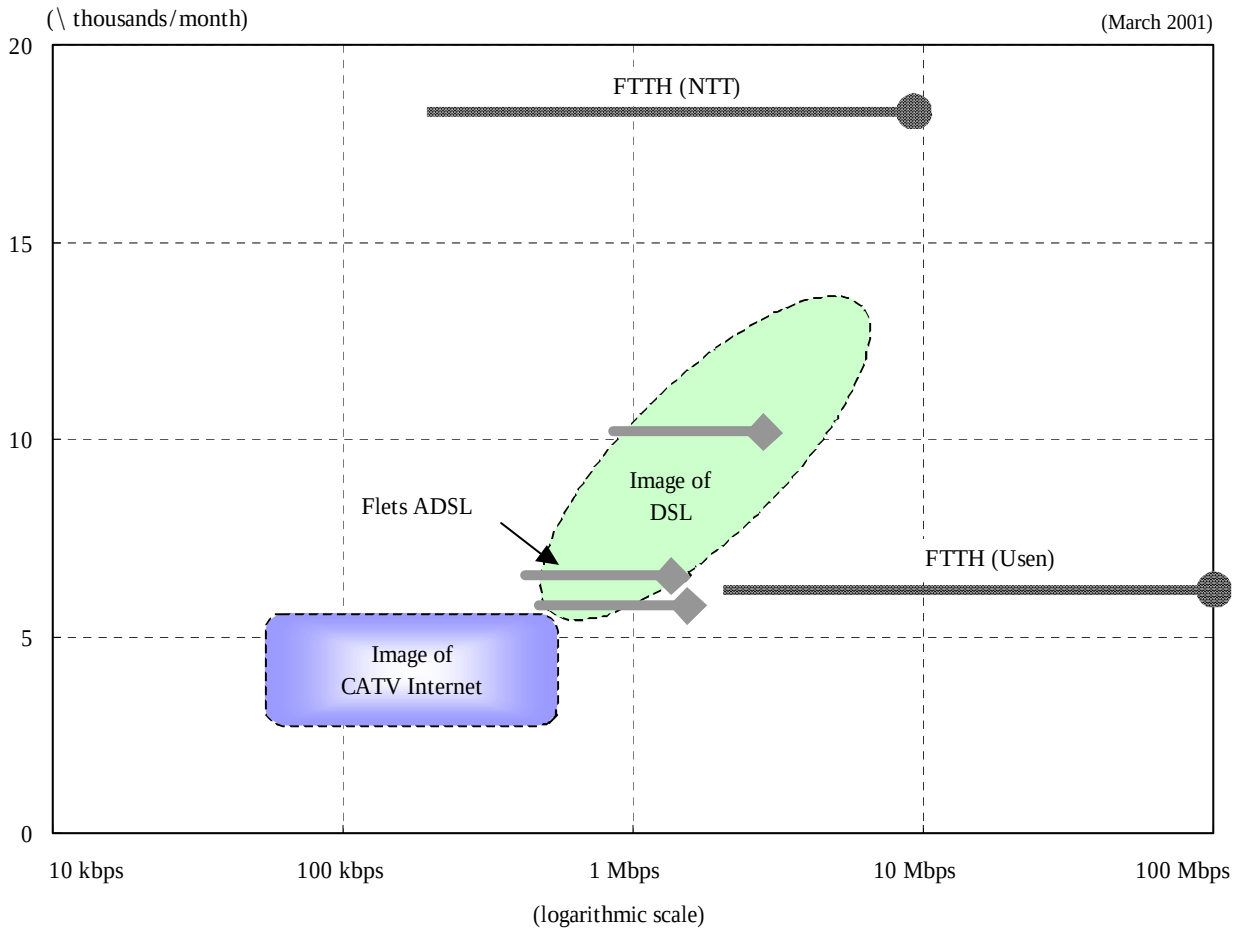
[20] Round-table Conference on the Development of Information Networks in the 21st Century (2000), "Second Interim Report of the Round-table Conference on the Development of Information Networks in the 21st Century."

[21] IP networks being developed by NTT East and West for individual areas. From the standpoint of ISPs, connection to a local IP network in each area is beneficial in terms of business development, etc., for it allows services to be provided to all users in the area.

[22] A technology to send the same data to two or more designated receivers on the Internet and other TCP/IP networks.

[23] A technology to guarantee a certain speed of transmission on networks by reserving a band for a specific type of communication. This is important for services that cannot tolerate any delay or interruption in communications, such as the real-time distribution of sound and moving pictures (radio & TV services) and TV phones.

Figure 2-5. Image of Principal Broadband Access Lines (Monthly Charges and Down-stream Speed)



Note: Monthly charges include ISP charges.
Source: Compiled by DBJ from various data.

Although the speed of CATV Internet may be increased to some extent by introducing the US standard DOCSIS (Data Over Cable Service Interface Specification) modems or by increasing the number of nodes to reduce the number of users per node, room for maneuver is limited compared with ADSL, for it is difficult to achieve effective speeds of several Mbps or higher.

ADSL, on the other hand, requires substantial initial cost and labor, because the distance and quality of the telephone circuit must be confirmed for each household. Therefore, any increase in demand that exceeds the capacity of works on the supply side may delay the provision of actual services. In contrast, increased cable television operators, with their tree-like network structures (combining a certain number of households into one channel), can rapidly expand business in a given service area.

It is virtually impossible for Japanese cable television operators to skim the cream by specifically targeting heavy demand areas at the national level, as service areas have been defined at the local level. Due to the characteristics of the product, CATV Internet operators should change their pricing policies to encourage rapid commoditization.

2. Progress of Digitalization in Broadcasting Industry

Following the global transition from analog to digital broadcasting led by the US and UK, broadcasting is also being progressively digitalized in Japan for satellite broadcasting, ground wave and cable television. Digitalization is receiving particular attention because it will profoundly transform the structure of the broadcasting industry, which has been built over the years since the start of TV broadcasting in 1953.

Digitalization facilitates HDTV (High Definition Television), multi-channel and interactive broadcasting as it enables more information to be transmitted within a certain bandwidth by effectively compressing video information. Linked with the Internet, digital broadcasting will be able to provide services such as Internet banking and TV shopping, as well as the purchase of music tracks by music program viewers through charged distribution, and securities transactions by news program viewers, all done just by using a remote controller.

However, viewers need to purchase tuners and other related equipment to receive digital broadcasting. The smooth transition from analog to digital broadcasting will require not only the provision of quality programs and sophisticated services for viewers to encourage voluntary replacement, but also the sharing and standardization of terminals to reduce replacement costs for viewers.

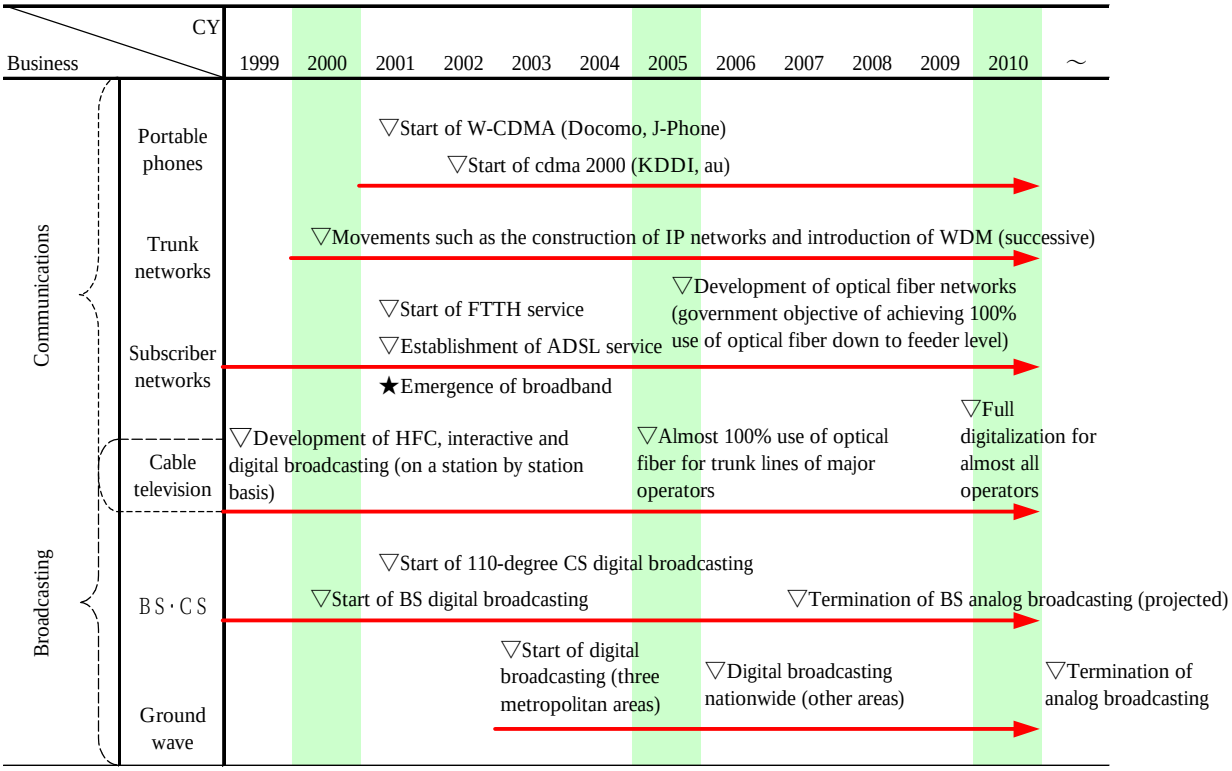
Also, the change in administrative policies on broadcasting has resulted in deregulation on market entry, etc., stimulating entries from other industries such as communications and electric machinery as well as foreign capital. The rapid diversification of media may increase the competition between different media, as viewers will not necessarily spend longer hours watching TV. Although a direct comparison is not possible, a decline in the rating of ground wave programs and diversification of the TV advertising market have been observed in the US since the 1980s, due to progress in multi-channel and multimedia broadcasting.

Figure 2-6 shows the timetable for upgrading the major information networks in Japan including the digitalization of broadcasting. Broadcast digitalization in Japan has been led by satellite broadcasting including BS and CS. CS digital broadcasting was fully commercialized in October 1996 and BS digital broadcasting was launched four years later, in December 2000. With the start of 110-degree CS broadcasting slated around the autumn of 2001, the digitalization of satellite broadcasting is expected to make good progress in the next few years.

Although CS digital broadcasting has been expanding steadily with the number of subscribers surpassing 2.6 million as of March 2001, the industry has experienced considerable restructuring including the withdrawal and merger of newcomers. Many companies entered the industry as contents providers for CS digital broadcasting, with over 100 consignor broadcasters currently producing programs, but some of them have had to withdraw as subscriptions stagnated against suppliers' expectations. Also, the three companies which entered the platform business, dealing in essential activities for charged broadcasting such as charging management, sales promotion and bill collection, subsequently merged into one corporation.

Twenty companies including eight data broadcasters have entered the BS digital broadcasting business, which started in December 2000, mainly to provide HDTV and interactive data broadcasting. BS digital broadcasters affiliated to ground wave private broadcasting companies have opted for free broadcasting with advertisement as the primary source of income. In order to establish themselves as advertising media, they need to increase both viewers and ratings quickly. The number of viewers of BS digital broadcasting are reported to be 1.4 million as of January 2001 (aggregate shipments of 447,000 TV receivers with the rest represented by viewers via cable television), but the broadcasters face numerous challenges including improvement of program production and co-existence with their ground wave parents in the advertising market.

Figure 2-6. Plan for Upgrading Major Information Networks



Source: Various data.

110-degree CS digital broadcasting is distinguished from CS and BS digital broadcasting in that it uses the communications satellite N-SAT-110. Greater convenience and less burden for viewers are expected by sharing receivers with BS digital broadcasting, which uses a satellite located in the same orbit of 110 ° E. Eighteen companies owned by key private stations and other existing broadcasters and home electronics manufacturers among others (98 programs) envisage entering this 110-degree CS digital broadcasting business (authorized as of December 2000) to provide multi-channel broadcasting with SDTV (Standard Definition Television) and full-fledged interactive services. In addition, two companies are contemplating entering the platform business including charging.

Digitalization of the remaining ground wave broadcasting is to be started by the end of 2003 in the three metropolitan areas of Kanto, Chukyo and Kinki, and by the end of 2006 in other areas. Since the frequency used currently for analog broadcasting is to be utilized effectively for other purposes including mobile communications, the existing analog broadcasting is planned to be terminated in 2011, regardless of the market penetration of digital broadcasting.

Many of the contents providers in Japan, such as ground wave private broadcasters, have not gained expertise compared with the ongoing development of multimedia communications. On the contrary, copyrights are often shared with playwrights and performers assuming one-time use, so reuse is complex. The emphasis is now on the so-called “one source, multi-use” to accumulate know-how on copyright management for maximizing the value of video contents through reuse. Amidst rising concerns about the lack of broadcasts contents as multimedia communications progress, the opportunities for companies owning copyrights for good broadcast contents will

increase.

Japanese cable television operators, who have specialized in network provision, must respond appropriately to the digitalization of broadcasting. Additional investment will be needed to receive satellite or ground wave digital broadcast at the central facilities of cable television operators for distribution to their subscribers, regardless of the technical method used. Such investment burden has been a major driving force behind the restructuring of the industry. Fiscal 2000 saw joint receiving facilities established in many parts of the country, and sharing of a head-end by two or more operators was institutionally authorized in December 1997. Many cable television operators however have not been involved in the retransmission of BS digital broadcasting due to financial constraints.

In anticipation of the advent of an information home electronics age, an “e-platform” initiative has been promoted by major electric machinery manufacturers in particular. This initiative envisages the development of common specifications for digital STB equipped with communication (modem) and storage (HD drive) functions in addition to the traditional function of reception, so as to construct a framework to provide participating households with storage and interactive services. The down-stream networks will utilize BS digital broadcasting, 110-degree CS broadcasting and ground wave digital broadcasting. It should be noted that public services including administrative services and local information are main pillars of the initiative. Such services will take effect when ground wave digital broadcasting starts in 2003. These movements may threaten the domain of cable television, which has developed over the years as a community-based business. Cable television operators must respond, either by co-existence or competition.

III Challenges for Future Development

When cable television derived income from multi-channel and other charged broadcasting and from very limited advertising within its service areas, major managerial issues included (i) effective acquisition of subscribers, (ii) diversification of services including video on demand, and (iii) development of uses as a community-based information infrastructure (water meter reading, health care, educational services, etc.). These are still fundamentally relevant and wait to be implemented. As described in the previous chapter, however, the two major changes of broadband and broadcast digitalization could radically alter the business models of cable television.

In this context, Chapter III will discuss the challenges facing cable television in light of the changes in its environment outlined thus far.

1. Impact and Future Direction of Broadband

As described in Chapter II, the year 2001 marks the start of the broadband era in Japan, with broadband expanding to include ADSL and the start of FTTH in addition to CATV Internet.

However, there are major differences in the competitive environment between urban and local areas in terms of the number of operators and the contents of services. Cable television will continue to be a primary broadband network for some time to come in certain areas, though the government objective of 100% introduction of optical fiber networks to subscriber loop systems nationwide by 2005 should be respected. Cable television will also play an important role in the early diffusion of broadband without reliance on telephone networks.

As mentioned earlier, it is virtually impossible for CATV Internet operators to "skim the cream" by specifically targeting heavy demand areas nationwide by relatively low-cost infrastructure development, for service areas are fragmented at the local level.

Given the local-specific nature of cable television, operators in the broadband era must address at least the following issues: (i) generation of potential demand through early price reductions, (ii) diversification of services and package sales, (iii) reduction of cost and improvement of competitiveness through horizontal division of labor, and (iv) focus on customer satisfaction.

(i) Expansion of demand and subscription through early price reductions

Basically, the price of each broadband service is initially determined on the supply side based on the cost of providing the service. Subsequently, however, this would be overtaken by competitive price setting as alternative services emerge.

In that case, the supply side would want to maintain the price level as a whole by providing new services such as moving picture distribution, but potential demand could be quickly generated by minimizing prices. Thus, it would be more beneficial for cable television operators to secure as many subscribers as possible before other broadband services become fully operational. Now is the time to adopt ambitious pricing policies, particularly for cable television operators in local areas where competition remains weak. Although CATV Internet itself may become less profitable at some stage, high subscription rates would not only ensure synergy with broadcasting services but also pave the way for other services such as local advertising and public services, which require a substantial degree of diffusion.

(ii) Diversification of services and package sales

Examples of the diversification of cable television services include the provision of IP telephone

and online-game services. IP telephone is an adaptation of the voice-transmission technology of VoIP (Voice over Internet Protocol), which uses IP (Internet Protocol) networks such as the Internet and Intranet. The use of IP networks, with their high circuit usage efficiency, enables lower prices to be set. Some technical problems remain such as significant degradation of tone quality in the case of inappropriate system design and operation. The uncertainties accompanying the startup of IP telephone businesses are complicated because competition is intensifying in the local telephone service market, which is the potential target of cable television operators, in anticipation of the "My Line" (preferential connection) service to be introduced in May 2001. If an IP telephone service of suitable quality is provided in areas where cable television subscription has become commonplace, and at a very low fixed price of ¥2,000/month for example, there could be strong demand for IP telephones as an economical telephone circuit alongside the traditional fixed telephone.

Even if a variety of services could be provided through cable television networks, clear differentiation from other services would be difficult when such services may be provided through other broadband networks, or when such services are in a communication area where there is already intense competition. Even in such cases, however, cable television enjoys a substantial advantage of being able to provide comprehensive services at lower charges. An important challenge for cable television operators is to take full advantage of this characteristic.

(iii) Reduction of cost and improvement of competitiveness through horizontal division of labor

If the objectives described in (ii) above are to be achieved, corporate strength must be improved to absorb the shock of price reductions. There would be limited scope for individual efforts. As regards functions not included in the core competence of individual operators, cost competitiveness should be improved by actively promoting tie-ups and other horizontal division of labor outside the existing framework.

(iv) Focus on customer satisfaction

It is completely out of date to consider that financial stability can be ensured by achieving enough subscriptions under a local monopoly. In the broadband age of fierce competition with other media, increasing support from subscribers will also be important for differentiation. For instance, early and efficient development of a customer support regime covering a wide range of basic and advanced issues will be required, with attractive services a prerequisite. With the complication of home wiring and equipment, installation engineers will require higher technical skills as their scope of work may extend into areas that were the customer's responsibility in the analog era. Although ideas and practices regarding customer satisfaction may vary with operators, a major cable television operator has set the objective of reaching the site of an accident within 30 minutes.

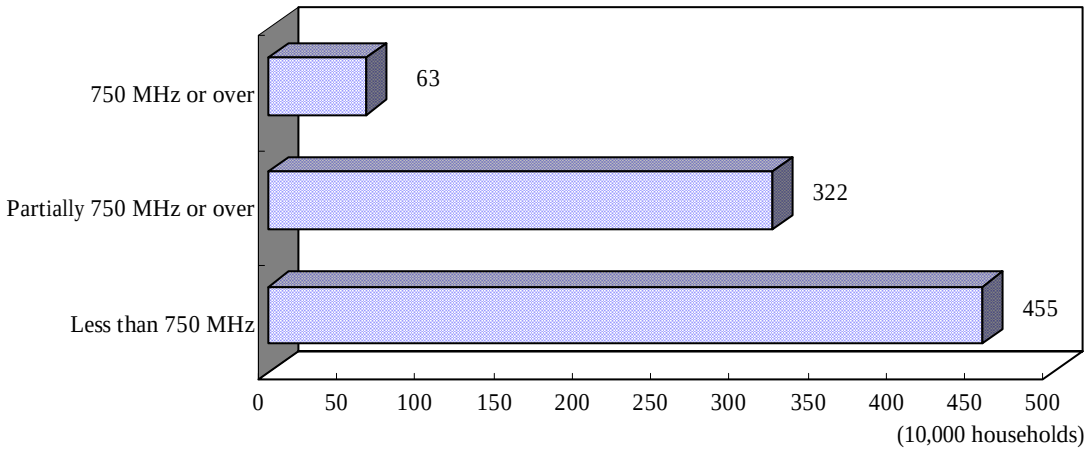
2. Impact and Future Direction of Digitalization

As described in Chapter II, the diversification of media brought about by digitalization, deregulation and the emergence of the Internet in particular will intensify competition between media. At the same time, new opportunities for growth of the rights business are emerging for providers possessing good content. So far, Japanese cable television operators have not provided content as observed in the US, and are unlikely to do so to a significant extent in the years ahead.

If cable television is to maintain its raison d'être as digitalization progresses in the broadcasting industry, an environment should be created that allows cable television subscribers to receive digital broadcasting at relatively low cost. As shown in Figure 3-1, however, of the

households subscribing to major cable television operators (totaling 8.4 million), 4.55 million households (accounting for 54.1% of the total) use transmission lines of less than 750 MHz in capacity. These include cable television with a frequency band of 550 MHz. Although all of those lines are not subject to wideband development, the introduction of multi-channel broadcasting basically requires the replacement of transmission lines, which many operators will be unable to do because of financial constraints.

Figure 3-1. Relation between Nominal Capacity of Transmission Lines and Total Subscriptions (including Retransmission) (FY 1999)



Note: Data do not cover non-members of the Federation as well as non-respondent companies.
Source: Compiled by DBJ from Japan Cable Television Federation, "Directory of Cable Television Operators 1999."

In order to meet the challenge of digitalization investment, individual operators must persevere, such as quickly strengthening their management base by securing subscriptions, as well as pursuing economies of scale, which is long overdue.

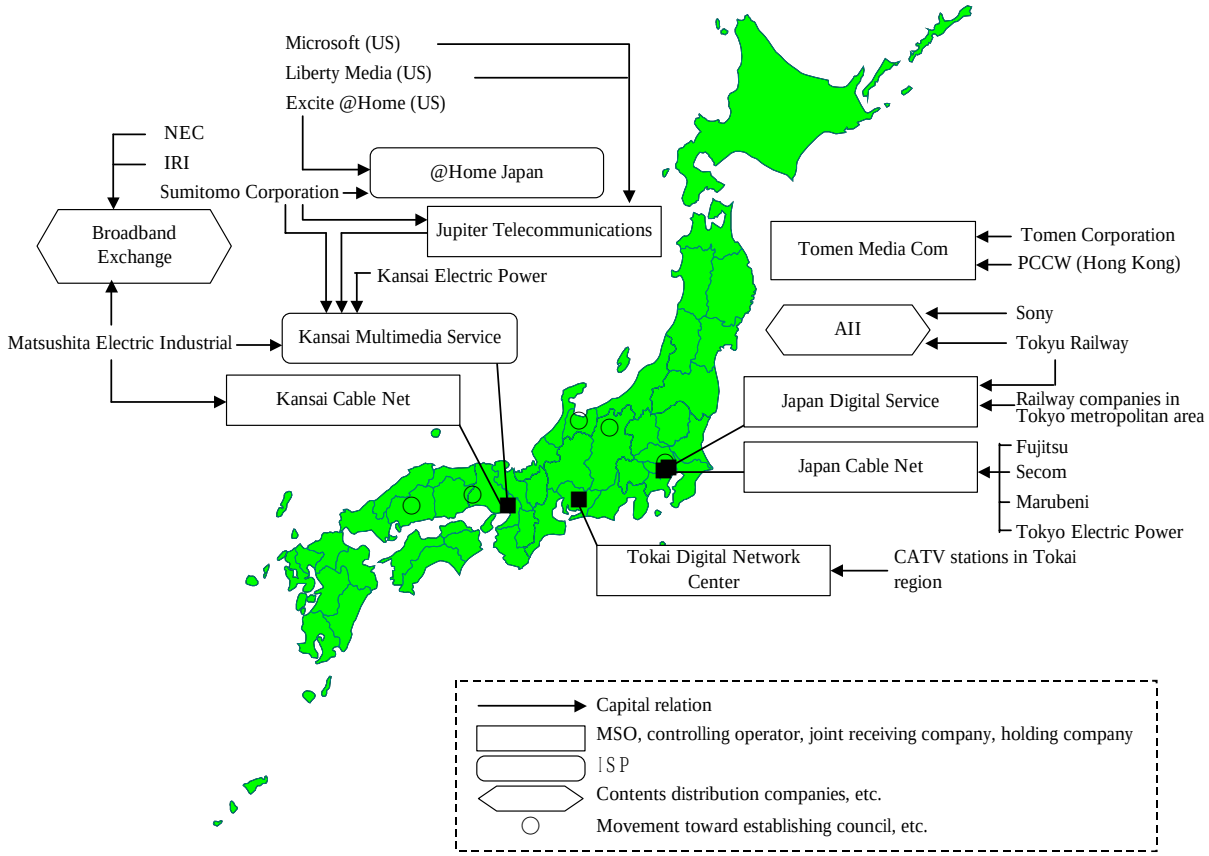
Figure 3-2 shows recent trends in the restructuring of the Japanese cable television industry. The sharing of digital head-ends by cable television operators has occurred since around 2000, as well as various collaborations including mergers. The networking of cable television operators is not easy, because of the differences in specifications of facilities and the lack of economic relationships even between operators in neighboring communities. Nonetheless, such moves should be encouraged to ensure sound development of cable television.

One way of achieving scale merits is through absorption or mergers with other companies. The practice of the aforementioned MSO-style management to enlarge business scale mainly by acquiring operators is therefore expected to accelerate. Recently, some providers have been offering various support services to cable television operators while respecting their historical independence (Figure 3-3). The merit of using such services is mainly reduction of investment risk by incorporating initial investment into variable costs, to benefit from economies of scale and scope. Profitability of the cable television business can be improved by reducing facility construction costs, outsourcing the technical and consumer management departments that need immediate improvement, efficiently developing new services, and accelerating the start of such services. Such services will develop rapidly as the impact of broadband and broadcast digitalization spreads throughout the country.

Japanese cable television operators have generally established good relationships with local

authorities and companies and are often regarded as an integral part of the information infrastructure in local communities. In order to ensure a rapid response to promising services such as broadband and digital broadcasting while taking advantage of the know-how and brands that they have developed as community-based enterprises, cable television operators must increasingly seek various tie-ups and support services as part of management policy.

Figure 3-2. Recent Trends in Restructuring of Cable Television Industry (March 2001)



Source: Compiled by DBJ.

Figure 3-3. Examples of Controlling Companies and Digital Distribution Companies

Name	Japan Digital Service (JDS)	Japan Cable Net (JCN)
Established	April 2000	December 2000 (planning company established in October 2000)
Core companies	Tokyu and some other private railway companies and Tokyo Electric Power	Fujitsu, Secom, Tokyo Electric Power, Marubeni
Operational	December 2000	April 2001
Main features	●Uses a broad-area network that interconnects optical fiber cables in the Tokyo metropolitan area owned by the private railway companies and Tokyo Electric Power	●Concentrates the strength of core companiesFujitsu: ISP, IDCSecom: security, health care and educational servicesTEPCO: ISP, backboneMarubeni: backbone ●Development and operation of inter-office networks with digital distribution centers in Kanto area, to be followed by nationwide operation
Main services	Response to digital broadcasting, Internet and contents services, etc. IT advertisement and IT terminal business at railway stations, etc.	Response to digital broadcasting, Internet and contents services, etc. Operational and financial support to cable system operators
Remarks	Participants include 30 operators with home path of over 3.7 million households	Planned participantsInitial: all affiliated stations2001: 40 stations with home path of 5.3 million households2003: 80 stations with home path of 10 million households

Source: Published corporate data and newspaper information.

3. Conclusion

Originally established as a joint listening facility for retransmission, cable television is now providing various services taking advantage of the wideband transmission lines. The experience in the US indicates that cable television has the potential to take households into the information era. As mentioned in Chapter II, however, the information industry has experienced profound technological innovation, and so Japanese cable television operators may not necessarily enjoy the privileged status of their US counterparts in 20 years. A new business strategy that reflects the characteristics of the Japanese cable television needs to be developed and implemented as soon as possible, for the future depends largely on the speed with which this challenge is addressed.

[by Shuichi Yoshida (e-mail: shyoshi@dbj.go.jp)]

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