

Worldwide Progress in the Convergence of Telecommunications, Information Technology and Broadcasting: The Tasks Facing Japan

Takeshi SHINOHARA and Yasutake OKANO

Nomura Research Institute

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Ubiquitous network technologies such as broadband (high-speed and large-capacity) technology, mobile communications and the Internet, which have been making rapid progress since the latter half of the 1990s, are accelerating the convergence between communications and broadcasting. As this fusion is making it possible to provide services by freely combining information transmission lines and contents, studies are being made to review the existing regulatory framework that has established a distinction between communications and broadcasting up to now.

In the course of this review, establishing global consistency, creating new services and strengthening competitiveness will constitute the major elements in pursuing this reform. Actually, an accelerating trend towards alliances and partnerships among companies that are predicated on competitive policies has been seen on a worldwide basis. From this viewpoint, approaches taken by EU (European Union) member states to formulate a new regulatory framework covering this convergence are of great interest and provide significant reference to Japan.

I Technological Developments and Convergence Phenomena

1 Definitions of Communications and Broadcasting

The issue of convergence between communications and broadcasting has been discussed at length for many years (see Table 1). Under Article 2, Paragraph 1 of the Telecommunications Business Law of Japan, communications are defined as “sending, transmitting and/or receiving codes, audio or video signals by means of wired, wireless and/or other electromagnetic systems.” Communications originally meant small-capacity voice communications at the 3.4-KHz band using wired technology as a means of one-to-one interactive communications, as represented by a telephone. The underlying concept of such communications was developed on the basis of “protecting secrets” as personal communications. Moreover, the provisions of Article 2, Paragraph 4 of this law set broadcasting outside the realm of communi-

cations by specifically “excluding wired television broadcasting.”

On the other hand, Article 2, Paragraph 1 of the Broadcast Law defines broadcasting as the “transmission of wireless communications for the purpose of being directly received by the public.” Accordingly, broadcasting has been developed as a means of one-to-*n* (many) mass communications for many and unspecified people using radio technology at the wide 6-MHz band, as represented by television broadcasting. Unlike personal communications, broadcasting has provided a means of delivery of a variety of information to the public. And because of its impact on society, the issue of its public nature has always been given prominence. As such, communications and broadcasting were defined and regulated as separate sectors.

2 Driving Force Towards Convergence

With the developments of some technologies, however, the elimination of borders between these two sectors has been accelerated in recent years. The first factor behind

Table 1. Attributes of Broadcasting and Communications

	Communications	Broadcasting
Definition	Sending, transmitting and/or receiving codes, audio and/or video signals by means of wired, wireless or other electromagnetic systems (Article 2, Paragraph 1 of the Telecommunications Business Law)	Transmission of radio communications for the purpose of being directly received by the public (Article 2, Paragraph 1 of the Broadcast Law)
Orientation	One-to-one, interactive between two specified persons (personal communications)	One-to- <i>n</i> , one-way to many and unspecified people (mass communications)
Band	3 KHz (narrowband)	6 MHz (broadband)
Major Usage Purpose	Voice, such as a telephone	Video and radio audio signals
Regulatory Objectives	<ul style="list-style-type: none"> The prohibition of censorship (Article 3 of the Telecommunications Business Law) The protection of communications secrets (Article 4 of the Telecommunications Business Law) 	<ul style="list-style-type: none"> The freedom of compiling broadcast programming (Article 3 of the Broadcast Law) However, programming regulations apply, such as not disturbing public peace, order or public morals, being politically impartial, and providing news based on facts (Article 3, Paragraph 2 of the Broadcast Law)
Major Contents of Regulations	<ul style="list-style-type: none"> Telecommunications Business Law <ul style="list-style-type: none"> Provisions concerning Type I and Type II telecommunications carriers Provisions concerning telecommunications facilities Interconnection rules Nippon Telegraph and Telephone Corporation Law <ul style="list-style-type: none"> Provisions concerning business activities Universal service 	<ul style="list-style-type: none"> Broadcast Law <ul style="list-style-type: none"> General provisions concerning compiling broadcast programming Deliberations about broadcasters Provisions concerning NHK (Japan Broadcasting Corporation) Cable Television Broadcast (CATV) Law <ul style="list-style-type: none"> Provisions concerning CATV business and facilities Wire Broadcast Telephone (Wire Radio) Law <ul style="list-style-type: none"> Provisions concerning wire broadcast telephone business and facilities
	<ul style="list-style-type: none"> Radio Law <ul style="list-style-type: none"> Licensing of radio stations Radio facilities Operation and supervision of radio waves Wire Telecommunications Law <ul style="list-style-type: none"> Provisions concerning notifications of wire telecommunications facilities Provisions concerning telecommunications facilities 	

Notes: CATV = Cable TV; KHz = kilohertz; MHz = megahertz.
Source: Nomura Research Institute.

this trend is the progress in broadband and large-capacity info-communications network technology. If the e-Japan program initiated by the government makes smooth progress, Internet facilities permitting superhigh-speed access at the 30- to 100-Mbps (megabits per second) level will become available to a substantial extent.

A variety of broadband (high-speed and large-capacity) technology is employed for the access section, such as FTTH (fiber-to-the-home) optical fiber networks, DSL (digital subscriber line) links that use existing metallic cable for high-speed communications, and CATV networks that use CATV circuits for high-speed Internet access. For the backbone (trunk line) section, WDM (wavelength division multiplexing) technology that permits the multiplexed usage of optical fiber cable by simultaneously using multiple optical signals with differing wavelengths is being promoted. This will make it easy to rapidly increase the information transmission volume.

At the same time, the application of these technologies will also substantially reduce communications costs and promote the realization of broadband transmission lines. This means that data in differing formats, such as video, voice and text, are all converted to a digital format, and that a large volume of data can be collectively transmitted via communications networks through the realization of large-capacity, broadband info-communications networks.

The second relates to the progress in mobile communications technology. In the fall of 2001, commercial service based on IMT-2000 (third-generation mobile systems) is expected to start, offering communications speeds as fast as 384 Kbps to 2 Mbps (static mode). The development of mobile communications using radio access at the 5-GHz band—on which the Multimedia Mobile Access Council (MMAC) is now conducting research—is also making progress. If this technology is realized, communications speeds up to 20 to 25 Mbps will become obtainable, making it possible to provide for video delivery equivalent to that of terrestrial wave broadcasting.

The third factor is the explosive growth of the Internet. According to an NRI (Nomura Research Institute, Ltd.) survey, the number of households with Internet access is predicted to reach 30 million as of 2005. Within this population, the number of users accessing the Internet at medium and high speeds (256 Kbps or more) will reach about 1.5 million.

In addition to the increase in the number of Internet users, the adoption of IP multicast technology that transmits the same data by designating multiple destinations will facilitate the delivery of large-volume data such as broadcast-type voice and video. The IPv6 (Internet Protocol Version 6) technology that is the next-generation IP is expected to substantially promote the spread of Internet broadcasting, as this technology

permits such standard capabilities as QoS (Quality of Service) functions in which certain communications speeds are guaranteed by reserving a band for specific communications and multicast capabilities.

IPv6 will make it possible to set an astronomical number of addresses—4.3 billion raised to fourth power. Together with progress in household information appliances and ITS (intelligent transportation systems), it will permit the networking of PCs, electric household appliances and automobiles as Internet terminals, and high-quality video will be provided regardless of time or place. In short, all of these technologies are coming together to accelerate the convergence of broadcasting and communications.

3 The Convergence Phenomena

The phenomena emerging from this convergence of communications and broadcasting that has been triggered by these technological innovations can generally be divided into the following four categories (Figure 1). The first is the “convergence of services” that offer intermediate service links between communications and broadcasting.

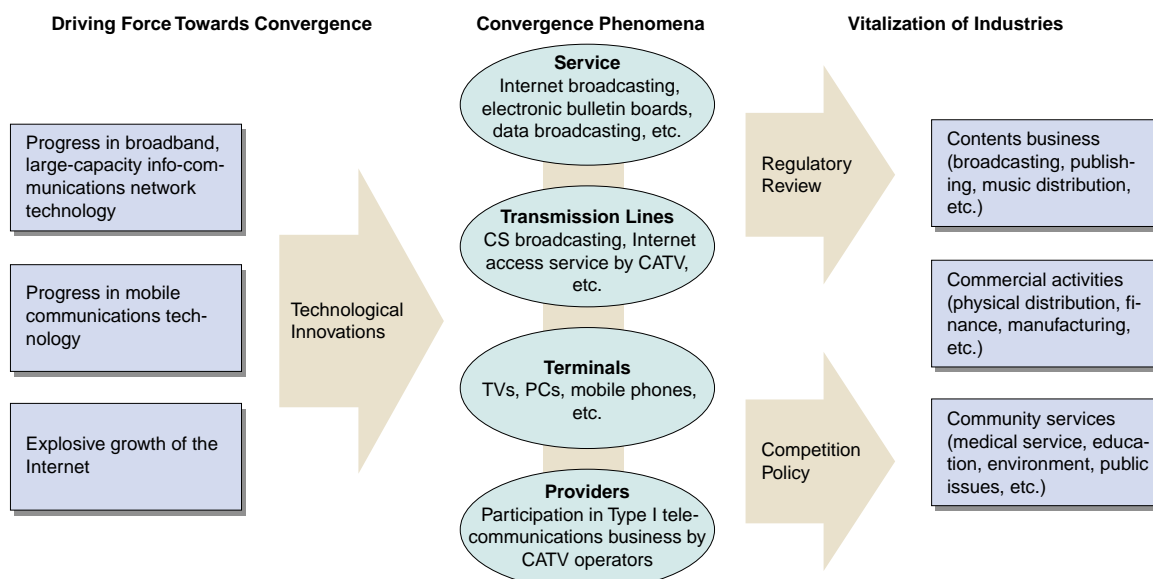
While personal communications and secrecy have long been regarded as core attributes of communications, the usage of IP permits 1-to-*n* information delivery via communications networks, such as replaying contents on the Internet by means of streaming (one-by-one reception and replay) technology. This will realize “communications with a public nature” whereby voice and moving images are transmitted to a number of viewers. The 1-to-*n* information deliveries currently available by communications include electronic bulletin boards, email, facsimile transmissions, video conferencing systems, and homepages.

On the other hand, broadcasting—which was originally based on mass communications—is providing examples of “broadcasting with a personal nature,” such as wired radio broadcasting, BS (broadcasting satellite) broadcasting and CS (communications satellite) broadcasting. These intermediate services that have the features of both communications and broadcasting are expected to expand in the future as well.

The second category is the “convergence of transmission lines” in which common transmission lines are used. With respect to terrestrial wave broadcasting, Article 2, Paragraph 3 of the Broadcast Law defines broadcasting stations as radio stations, and Article 2, Paragraph 3, Item 2 of the same law defines broadcasters as those with a license to operate broadcast stations. Article 3 of this law regulates the standards for programs and program compiling that are applied to broadcasters. This means that hardware and software are regulated on an integrated basis.

However, the regulations for CS digital broadcasting differ from those applied to terrestrial wave broadcast-

Figure 1. Phenomena of Broadcasting and Communications Convergence



Note: CS = communications satellite.
Source: Nomura Research Institute.

ing, as Article 52, Paragraph 9, Item 1 of the same law makes a distinction between consignor broadcasters that produce and compile broadcast programs and consignee broadcasters that own communications satellites and transmit broadcast waves. Moreover, the convergence of services that use common transmission lines is also seen in the case of Internet access via CATV networks and CATV business operations using the optical fiber networks of NTT.

The third category is the “convergence of terminals” whereby a variety of terminals such as information appliances themselves are used for both communications and broadcasting. Recently, PCs with built-in TV tuners have appeared on the market, making it possible to view not only terrestrial wave broadcasts, but also to record and compile programs. And a site in Korea that permits access on demand to already broadcast terrestrial wave programming is enjoying growing popularity. Also, an electrical appliance manufacturer has come to market with a set-top box that enables Internet access through a TV set. These trends amply demonstrate that the convergence of terminals to enable one terminal to offer both communications and broadcast services is being actively promoted.

The fourth category is the “convergence of providers” in which one provider operates both communications and broadcast services. While no mutual participation between broadcasters and telecommunications carriers was seen in the early stages, this was considered to stem from management problems rather than the regulatory framework. For example, communications carriers suffered from a lack of know-how in the contents production business, whereas broadcasters knew little about the communications business.

In the past several years, however, this situation has been gradually changing with the successive participa-

tion of foreign capital centered on trading firms and US companies. For example, the satellite operator JSAT Corporation is offering CS broadcasting service in the broadcasting realm, and international satellite communications service using international leased lines in the communications area. Cases in which CATV operators enter the Type I telecommunications business and provide Internet access service are also coming in for attention. With this continuing progress in convergence, the distinctions between communications networks and broadcasting networks—as well as the concept that “wire” somehow involves communications and “wireless” means broadcasting—are becoming less and less meaningful in terms of technologies.

At the same time, however, we are seeing some distortions because the current regulatory framework can no longer adequately deal with the rapid pace of technological innovations. Among such examples, the fact that the transmission and reception of moving pictures by Internet multicasting does not fall under the category of broadcasting means that there still are regulatory issues to resolve concerning the public nature of communications and the personal nature of broadcasting. Accordingly, prompt action to formulate and implement policies that can deal with the realities before us is also an urgent matter in order to increase the industrial competitiveness of Japan.

II Convergence and Changes in Industrial Structure

This progress in convergence is not confined to the communications and broadcasting industries only. It will bring benefits to all industries by utilizing the ubiquitous network technologies and services that have been

the driving force of convergence, thereby ushering in changes in the industrial structure and the reform of economic activities themselves. The vertically separated industrial structure will likely collapse and be replaced by a hierarchical structure in which all information is integrated and distributed on a boundary-free basis by means of the optimal media format without distinction as to wired or wireless.

1 Diversification of Contents Delivery Structure

As the demand for contents increases in the wake of expanding broadband capabilities in access loops and the spread of digital broadcasting, mechanisms are being developed that will make it possible to provide contents to general users in a manner that will allow stress-free access. This will enable the delivery of all kinds of contents such as publications, video, music and games through a variety of terminals (see Figure 2).

Contents delivery models between providers and consumers and amongst companies are also diversifying as the contents delivery market continues to expand. Indeed, the Digital Content Association of Japan notes that the domestic market for digital contents reached almost ¥10 trillion in 2000, registering a sharp increase of 29.8 percent over the figure for the previous year.

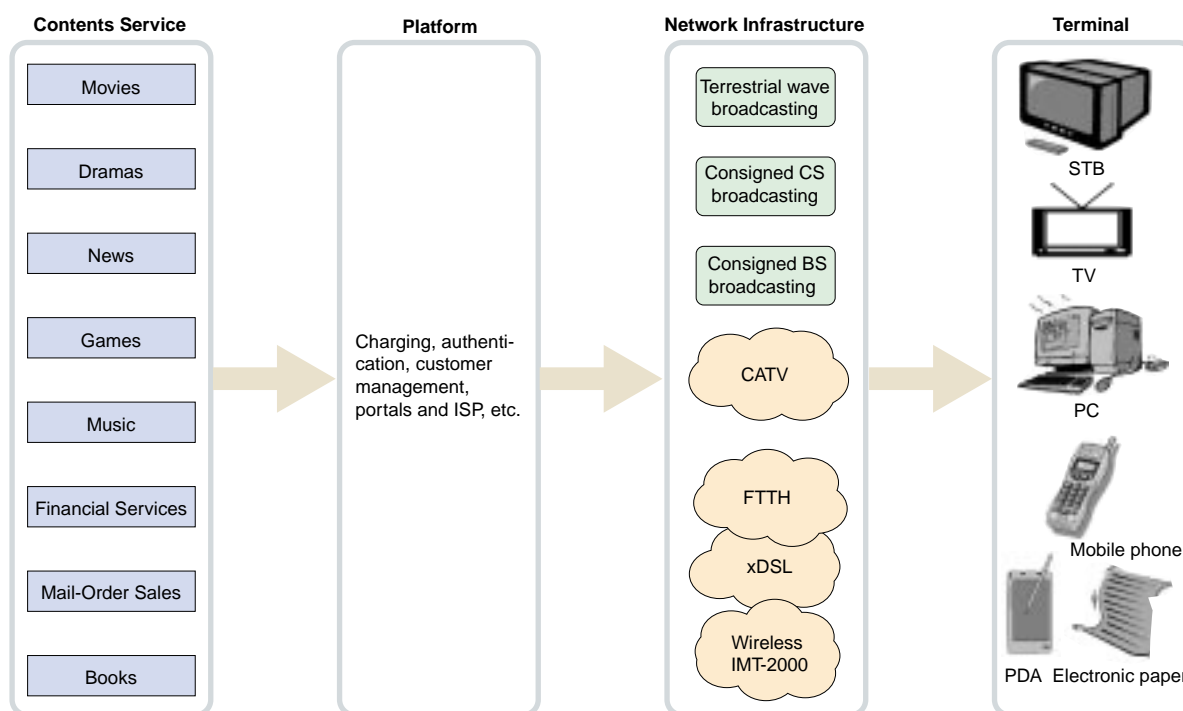
And moves by new businesses to realize the delivery of large-volume contents are rapidly expanding. For example, Nippon Herald Films, Inc. (a distributor of

foreign films) has joined with Nifty (Japan’s leading ISP) in a trial program to release movies via streaming technology over the Internet. This virtual movie theater uses a high-speed network to deliver movies and collect fees from users. In addition, the Usen Corporation has also opened a site for its access users and has begun delivery service for movies, music video and games. Sony Music Entertainment has also opened a site to deliver moving-picture contents and has established a business for large-volume filmed contents, both of which are being utilized as a new sales promotional model for music CDs.

Furthermore, TOHO and NTT-West are experimenting with a system to deliver new film contents that have been converted to a digital format to theaters via high-speed optical-fiber networks. TOEI has also been conducting tests to distribute products to theaters by means of communications satellite. And in a partnership with SKY Perfect Communications (a digital CS broadcasting service), NTT-East is now building a service to deliver dedicated SKY PerfecTV channels to consumers via optical fiber cable. As indicated by these initiatives, a wide variety of such services have already been inaugurated in Japan alone.

At the same time, however, these new trends have also opened up a new and serious social problem that has rapidly expanded in recent years—the peer-to-peer exchange of music contents by directly searching data. For example, huge file-sharing communities such as Music City Morpheus and Lime Wire have been set up in which

Figure 2. Diversifying Contents Distribution Structures



Notes: BS = broadcast satellite; FTTH = fiber-to-the-home; IMT-2000 = third-generation mobile system; ISP = Internet service provider; PDA = personal digital assistant; STB = set-top box; xDSL = digital subscriber line.
Source: Nomura Research Institute.

participants can exchange music files through the Internet. These peer-to-peer file exchanges are likely to continue even if contents producers prevail in the relevant litigation, as the source code for the software has been made public.

According to a survey made by Gartner Group in August of 2001, only 6 percent of Internet users who downloaded music files from the Internet paid the fees required. This means that governments and private industry must take concerted steps as soon as possible to establish appropriate copyright handling systems and transaction rules if a healthy contents distribution structure is to survive. Of course, the problem of formulating global rules is made even more difficult by those who refuse to recognize copyrights for such contents.

2 Platform Business Expansion

The full-scale deployment of BS, digital CS and Internet broadcasting, along with the expansion in the number of music and video contents providers through the Internet, will require a wide variety of network infrastructure mechanisms. These include stable transmission, rate charging and payment, authentication, copyright protection and management services, all of which will utilize high-speed backbone circuits.

For instance, in the world of e-commerce where anybody can easily buy and sell products through high-quality video images, participants can face various risks, ranging from whether purchasers actually receive the products they expect to whether sellers get paid for what they sell. This is leading to the emergence of new services designed to reduce such risks, such as escrow services (intermediate services to guarantee the safety of transactions) by financial institutions and trading companies as well as other credit-related businesses that have been emerging in recent years.

Moreover, there is an increasing demand for contents delivery network (CDN) services, which can provide better environments for the distribution of large-capacity contents (such as animated programming) that rely on broadband access. This function can be achieved by deploying contents servers capable of handling accelerated speeds on networks that are located close to data distributors and consumers. In Japan, Akamai Technologies, NTT Communications and NRI are providing services to accelerate network delivery speeds.

Under the current environment in which the convergence of communications and broadcasting is picking up speed, such platform markets are expected to grow even more rapidly than in the past.

3 Impact of Convergence on Industries

In the later half of the 1990s, the number of mobile users with access to the Internet has rapidly increased. In addition, we have seen an increasing number of

companies constructing local area networks (LANs) or intranets, as well as individuals using broadband services. All these trends have contributed to the tremendous growth of information and communications business centered on the Internet. In fact, the info-communications industry recorded a high average annual growth rate of 6.3 percent from 1985 through 1999—far exceeding that of other industries.

An NRI simulation which assumes the rapid development of ubiquitous networks (such as broadband networks) throughout society projects that the output in the communications and broadcasting industries between 1997–2005 can be expected to achieve an average annual growth rate of 14.9 percent, a figure that is far higher than that for other industries (see Table 2). This high growth will not be solely attributable to incumbent communications-related firms only, but is rather likely to be jointly due to the efforts of new market entrants from other industries who provide a wide variety of communications services.

In actuality, the distribution of high-quality video and audio contents that are made possible by this convergence is expected to exert a strong impact on other industries besides broadcasting and computers. In the medical and health care field, for example, the vast amounts of examination data, diagnostic images and other information entered by physicians in electronic patient charts can be exchanged between hospitals and shared among hospitals, pharmaceutical manufacturers and inspection agencies through networks. Jointly with Tokyu Corporation, for example, Kameda General Hospital is planning to establish an electronic databank containing patient information that has been accumulated by medical institutions located along the Tokyu railway lines.

Diagnostic and nursing services can also be provided to patients in remote areas by utilizing high-quality images. SECOM, a security service firm, has been providing home health-care services by organizing teams consisting of a chief physician, nurses, pharmacists, and home helpers to manage the medical care of patients on a remote basis.

In the education industry, distance-learning projects are likely to be developed on a full-scale basis by virtue of high-quality image transmission. In one example, Keio University has joined with the Nara Institute of Science and Technology and the University of Wisconsin to conduct an experimental post-graduate course through the Internet in which Japanese students can participate in interactive programs in the US with the sense of actually being present at lectures.

If the development of personal data assistants (PDAs) and electronic papers that make full use of high-quality and colorful images reaches the full-fledged stage and consumers are provided with attractive services, this may lead to the expansion of the electronic book publishing and online newspaper delivery business. The resulting

Table 2. Projected Industrial Structure in 2005

	Production in 2005 (Billion Yen)	Production in 1997 (Billion Yen)	Average Annual Growth Rate (%)
Agriculture, forestry and fisheries	13,007	15,465	-2.1
Mining	12,653	12,600	0.1
.....
Primary Industry Total	25,661	28,065	-1.1
.....
Foodstuffs	38,058	37,534	0.2
Textiles, clothing	9,812	10,020	-0.3
Wood products, furniture	11,013	8,122	3.9
Pulp, paper and related products	10,781	9,617	1.4
Ceramics	8,885	9,723	-1.1
Chemicals and plastic	44,051	37,048	2.2
Iron, steel, non-ferrous metals	25,285	22,757	1.3
Metal products	25,678	21,117	2.5
General machinery	28,298	27,105	0.5
Electrical machinery	109,052	62,520	7.2
Transportation machinery	52,978	46,174	1.7
Precision machinery	4,860	4,207	1.8
Other manufacturing	18,882	17,983	0.6
(Manufacturing Total)	387,632	313,925	2.7
Construction, civil engineering	86,659	90,943	-0.6
.....
Secondary Industry Total	474,291	404,868	2.0
.....
Public utilities	29,501	27,709	0.8
Communications, broadcasting	53,512	17,605	14.9
Finance, insurance, real estate	99,800	99,219	0.1
Wholesaling, retailing	117,881	98,984	2.2
Services to individuals	60,671	54,589	1.3
Services to corporations	98,663	66,255	5.1
Transport service	48,676	44,230	1.2
Education, research	47,877	37,473	3.1
Medical care, social welfare	40,101	35,708	1.5
Public service, postal service	31,120	27,847	1.4
Other industries	10,691	10,904	-0.2
.....
Tertiary Industry Total	638,492	520,524	2.6
.....
Grand Total	1,138,444	953,457	2.2

Source: Nomura Research Institute.

declines in the use of newsprint may reduce inventory risks.

Banking may shift from traditional brick-and-mortar operations to Internet-based transactions that will make it possible to provide customers with various services anywhere and at any time through mobile phones that offer high-quality images. For instance, California-based Wells Fargo (a major retail bank chain) has installed TV monitors at each branch office to provide customers with remote consulting services. Security firms, as exemplified by Nomura Securities and Merrill Lynch, may also use these technologies to deliver company information and analyst recommendations to investors, as well as to carry out programs to educate their sales staff.

In the real estate business, information that includes floor plans and location conditions can be provided to customers by sharp and real images through the Internet. This may make it possible for prospective renters or buyers to locate just what they are looking for without visiting real estate agencies.

Significant changes are also expected in the advertising industry. In the first place, advertising may shift from paper to Internet-based advertising. More importantly, traditional mass-media advertising is likely to be replaced

by services targeted at individuals by the use of animation and/or audio materials.

These phenomena that highlight this convergence are now encouraging cross-sector vertical integration among different industries by creating a host of new services. As this new environment continues to expand, companies that cannot keep pace with these rapid changes may be forced out of their respective markets in the future.

III Regulatory Systems and Features in Major Countries

With regard to the convergence of telecommunications and broadcasting, regulatory systems in major industrialized nations generally control activities in these areas under separate frameworks that deal with the separation of software and hardware, the control of intermediate services and other issues. All of these countries are now hastening to effectively cope with social changes by attempting to adjust their regulatory regimes in view of the number of problems arising from the convergence phenomena described above. EU

member countries in particular have already embarked on a reform of regulatory systems by focusing on competitive policies to stimulate industrial activities and new business creation.

1 Regulatory System Reforms to Deal with the Progress in Convergence

(1) United States

In the United States, the Telecommunications Act of 1996 came into being with the aim of actively introducing competitive policies based on the framework of the Communications Act of 1934, which had long prescribed the fundamental regulations governing the telecommunications industry. The 1996 Telecommunications Act provided opportunities to realize a number of regulatory reforms that emphasized three goals: (1) the introduction of competition into the local exchange market; (2) providing for universal service; and (3) the adoption of appropriate interconnection charges. More concretely, the law allowed competitive local exchange carriers (CLECs) to enter specific local exchange markets, opened intra-state communications markets, encouraged mutual market entry by local exchange carriers and CATV operators, and promoted the entry of electric power and gas companies into the telecommunications market.

These pro-competition policies have made it possible for businesses in various fields to freely provide services that transcend their traditional boundaries. However, traditional monopolies still maintain their powerful positions in respective markets. In short, no examples of intense competition have broken out in local telephone markets, nor have any significant reductions in telephone charges been achieved. On the contrary, major local exchange carriers have been successful in strengthening their monopolistic positions through a cycle of successive mergers and acquisitions. And, the current Republican administration is now considering policies to restrict as far as possible any market interference designed to artificially create competitive environments and to leave decisions to the market.

The US government has also aggressively promoted the introduction of market mechanisms in frequency assignments. The Radio Spectrum Act was revised in 1993 to adopt an auction system for the first time in the world. This system is based on the Simultaneous Ascending Auction software program developed under game theory principles by Professor Paul R. Milgrom at Stanford University.

(2) United Kingdom

In the UK, the Telecommunications Act was promulgated in 1981. As a result, a telecommunications carrier license was granted to Mercury Communications, and liberalization has been encouraged in the value-added network (VAN) business and the terminal equipment

market. The act was revised in 1984 to privatize British Telecommunications (BT), thereby shifting the UK telecommunications market from a BT monopoly to an oligopoly by BT and Mercury. In the same year, the Office of Telecommunications (OFTEL) was newly established as an independent regulatory agency to supervise the UK telecommunications industry along with the Department of Trade and Industry, which retained responsibility for the planning of fundamental telecommunications policies.

The Department of Trade and Industry issued a white paper on communications policy in 1991 that abolished the oligopoly in the fixed communications market by BT and Mercury and liberalized the domestic leased-line business. Moreover, restrictions on CATV operators in providing telephone services were also eliminated to promote the convergence of various fields. Business activities in these areas have been rapidly stimulated partly due to the entry of foreign capital.

At the same time, other measures have also been implemented to enhance competitiveness among market participants, including relaxed interconnection conditions among carriers and the abolition of the price cap system (a system that allows operators to freely set public utility charges within a range capped by an upper limit). A separate accounting system by operational unit was also introduced. As described above, the UK has been the most active among European countries in pursuing liberalization policies.

With regard to the convergence of media, CATV operations were liberalized and new services that combine fixed telephone and mobile telephone are currently being provided. BT Cellnet, a BT mobile telephone subsidiary, started an integrated service called OnePhone Service in 1999. In addition, OFTEL now has a program under way to open up BT's subscriber lines to other carriers in order to further promote competition in the broadband access market.

As shown by these trends, a characteristic of UK regulatory policy has been to thoroughly rely on the principles of neutrality and competition. OFTEL is pursuing a policy that looks to market mechanisms as far as possible and implements regulatory measures only for limited cases in which consumer protection is necessary. Because of such provisions, the communications policy in the UK has been regarded as a model case by other countries.

Greater importance has also been attached to market competition in radio spectrum assignments. For the first time in Europe, the UK government introduced license auctions for the third-generation mobile telephone (3G) system. Thirteen carriers submitted bids for the five licenses available, and the successful bidders paid a total of 22.5 billion pounds sterling—bringing in more than three times the expected bidding price. This has had a significant effect on radio spectrum policies in France and other European countries.

(3) Germany

German policy for telecommunications regulation has basically been deployed in line with the integrated deregulation policy in telecommunications, which is aimed at the coming integration of the EU market. In a 1989 spinoff, the postal savings and telecommunications operations of Deutsche Bundespost were broken off from purely postal operations under a new policy of promoting the separation of administrative supervision and business operations.

After the privatization of Deutsche Telecom in 1995, the Federal Posts and Telecommunications Authority was established at the end of 1997 as an independent regulatory agency under the German Ministry for Economy and Technology to carry out all supervisory matters concerning telecommunications, including the granting of licenses. In 2000, Deutsche Telecom lost some 30 percent of its share in the long-distance and international markets as a result of severe competition arising from the entry of competitors. At this moment, Germany is the country where competition is the most intense in Europe.

With regard to the assignment of the radio frequencies, auctions for 3G licenses were held in July of 2000, four months after the UK auctions. Seven carriers joined the bidding for twelve licenses. As a result of Deutsche Telecom's policy of applying for multiple licenses, the total brought in by the tenders was DM98.8 billion—topping even the previous record set in the UK auctions—and generating arguments over whether a bidding system was appropriate or not.

(4) France

France has pursued deregulation policies for its overall telecommunications market in line with the coming EU market integration, and trends towards liberalization have been rapidly spreading. In 1996, the Postal and Telecommunications Act was substantially revised to liberalize the installation of public telephone networks and the provision of fundamental telephone services. Under the revised act, the Ministry of the Economy, Finance and Industry becomes responsible for planning the regulatory framework and the supervision of France Telecom's domestic and international operations.

In 1997, a new Telecommunications Regulation Authority was established as an independent agency responsible for supervising markets, maintaining competitive conditions, mediating conflicts among operators, initiating sanction measures and calculating interconnection charges. This authority has been playing an important role as the regulatory organization for the telecommunications industry. As for new market-entry conditions, operations are authorized for a period of 15 years as in the United States and an upper limit of 20 percent is set for foreign capital ownership. Although the government decided to privatize France Telecom in 1993, strong opposition by the trade unions has prevented

the implementation of this decision and privatization is still pending.

In an attempt to avoid the auction system that resulted in the high bidding prices in the UK and Germany, the French government adopted a system that includes a comparative review process for its 3G frequency assignments. As bidders were obviously influenced by the contract prices in the UK bidding, however, the total tender amounts reached a high of 130 billion francs. The final winners were determined by evaluating their service contents, deployment speed and operational reliability. In the end, incumbent operators won the available licenses, and competition in the market has not been effective.

(5) Japan

The regulatory systems for communications and broadcasting in Japan have not yet fully progressed, as we will detail later. In contrast to the United States (where AT&T was broken up in 1984) and the United Kingdom (where BT was completely privatized), Japan's moves have been slow in comparison to these two antecedents. In July of 1999, Nippon Telegraph and Telephone Corporation was reorganized as a holding company under which NTT Communications (providing long-distance and international service) and NTT-East and NTT-West (local exchange carriers) were set up. Along with this reorganization, measures to promote competition and deregulation have been adopted by eliminating restrictions on foreign capital participation in new entrants and changing the rate-setting procedures from a system that required prior approval to one that simply calls for filing a notification. However, these measures have not been adequate to change the nature of Japan's telecommunication industry.

Foreign capital is still limited to only 20 percent in the case of NTT, however, and the government is still obligated to own shares in NTT. Under this type of environment, the capabilities of the NTT Group to form global alliances with overseas partners (as seen in the cases of AT&T and BT) are necessarily limited. Moreover, unlike the situation in both the US and the UK, the Japanese regulatory system lacks an independent supervisory agency over telecommunications, a circumstance that has led to heated discussions over the desirability of establishing such an agency.

Along with calls for the promotion of competition in the telecommunications industry by the IT Strategy Headquarters of the Japanese government, a revised Telecommunications Business Law came into effect in June 2001 that requires NTT-East and NTT-West to open their optical fiber networks that are now under monopolistic control. In addition, the mobile carrier NTT DoCoMo has also been required to make public its standards for calculating interconnection charges paid by other carriers for the use of NTT DoCoMo facilities.

These requirements may lead to some reductions in the usage rates for the optical fiber circuits necessary for ultrahigh-speed Internet connections and mobile phone charges. Tokyo Electric Power is now planning to apply to the Ministry of Public Management, Home Affairs, Posts and Telecommunications for a Type I telecommunications carrier license, which would enable it to use its optical fiber subscriber networks now employed for power consumption telemetering to provide general telecommunications services.

With regard to the regulatory framework for dealing with the telecommunications and information technologies to promote convergence, the Ministry of Economy, Trade and Industry and Keidanren (the private Federation of Economic Organizations) are now discussing a new info-communications law that would eliminate the regulatory distinction between the telecommunications and broadcasting infrastructures by integrating the Telecommunications Business Law that governs the current communications business, the Broadcast Law that regulates broadcasting, the Cable Television Broadcast Law and several related ordinances. The ministry hopes to realize this plan by 2003, and has requested the cooperation of the Ministry of Public Management, Home Affairs, Posts and Telecommunications and related industries. Comprehensively reviewing the regulatory frameworks to promote fair competition in the information and telecommunications markets will be an urgent task of the Ministry of Public Management, Home Affairs, Posts and Telecommunications.

2 Leadership of the European Union in Convergence

Europe has been successful in developing its economy through the moves towards market integration inaugurated in 1993 and the subsequent course of monetary and economic integration. These efforts have been made

by Europe with the aim of restoring economic activities to a level matching those in the United States and Japan by strengthening networks throughout the EU. As the development of intra-Europe communications networks is essential to enable an enormous European market to function effectively, Pan-European communications networks are now being built. In addition, liberalization policies designed to reduce regulations in individual countries as well as the development of European standards to adopt common services and regulatory contents in each country are being pursued.

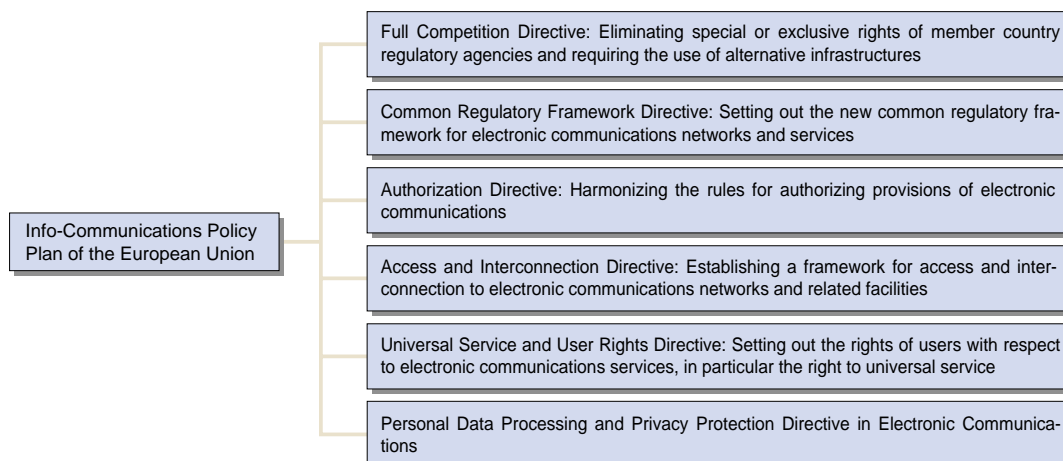
EU legislative organizations include the European Commission, the European Council and the European Parliament. In particular, the European Commission plays a core legislative role such as the submission of bills and the issuance of directives. A number of directives have been issued relating to the liberalization and harmonization of telecommunications policy. Although the binding power of such legislation is strong, the issue of how to implement these directives is left to the discretion of individual member countries.

With the aim of complete liberalization in the union, member countries announced in July 2000 a proposal for a new regulatory framework for electronic communications. The purpose of this proposal is to construct a unified regulatory framework for electronic communications networks and services in Europe. The proposal has been attracting attention from the United States, Asia and Oceania, as it represents a regulatory reform that offers the most focused approach in the world in dealing with the convergence issue. Approximately 20 rules and decisions adopted in the past have been integrated into the following six directives (see Figure 3).

① Directive on a common regulatory framework

This directive promotes the establishment of new regulations that manage fixed and mobile communications, CATV networks and diverse other

Figure 3. Info-Communications Policy Concept of the European Union



Source: Nomura Research Institute.

communications services under the framework of electronic communications designed to promote future convergence, create new businesses and establish competitive markets. In order to manage the radio spectrum, a senior radio spectrum policy group will be set up to make proposals to the European Commission on the harmonized use of radio spectrum frequencies in consideration of the economic, public policy, cultural, scientific, technological and social implications related to EU policies.

② Directive for full competition

With regard to basic services, the Full Competition Directive adopted in 1996 required that the special rights of member countries to limit the number of carriers be abolished by January 1998 with the aim of reforming market entry regulations. The directive further requires that regulations on charging policies embrace greater flexibility following liberalization to reduce cost levels by requiring carriers to set cost-based charges.

③ Directive on authorizations and licensing

Since 1997, authorizations to provide electronic communications networks and services are granted on the basis of approvals through notification or registration. Carriers are ensured their rights to offer electronic communications services, to negotiate with other carriers for interconnection, and to submit applications for rights-of-way. Measures will be taken to unify the rules for license requirements and license handling fees that differ depending on member countries.

④ Directive on access and interconnection

In order to promote the opening of monopolistic networks, carriers are required to provide access and interconnection to other carriers for their respective voice and PSTN services in the EU on non-discriminative, fair and transparent conditions and based on objective standards. For example, carriers providing access to digital TV operators are required to provide fair and impartial services. With regard to the opening of local loops connecting subscriber lines with the nearest exchange, competitive carriers are obligated to provide network access in order to reduce the costs of using broadband communications. Such requirements also extend to the authority over issues related to the separation of accounting practices and price controls.

⑤ Directive on universal service

All people in EU member countries have the right to universal service at the same level and the same price. Carriers are required to provide connections to public fixed telephone networks to enable users to access domestic and international telephones, facsimile communications and the Internet. Proposals submitted for ensuring financial resources include the creation of a universal service fund.

⑥ Directive on the protection of telecommunications data
The protection of personal data and privacy is expanded from the telecommunications field to also include electronic communications, such as packet data communications, mobile phone numbers, email addresses, and GPS (Global Positioning System) locations.

As described above, EU member countries have changed their policy directions from control-oriented regulatory systems to rule setting for building better competitive environments with the purpose of achieving complete liberalization in info-communications systems. The United Kingdom in particular has been rapidly developing market opening measures, thus leading the way in advance of other member countries, including France and Germany. As of this writing, the EU regulatory system reforms for info-communications are at the most advanced stage in the world.

IV Emergence of Global Carriers and Their Governance

1 Development of Vertical Integration by Mega-Carriers

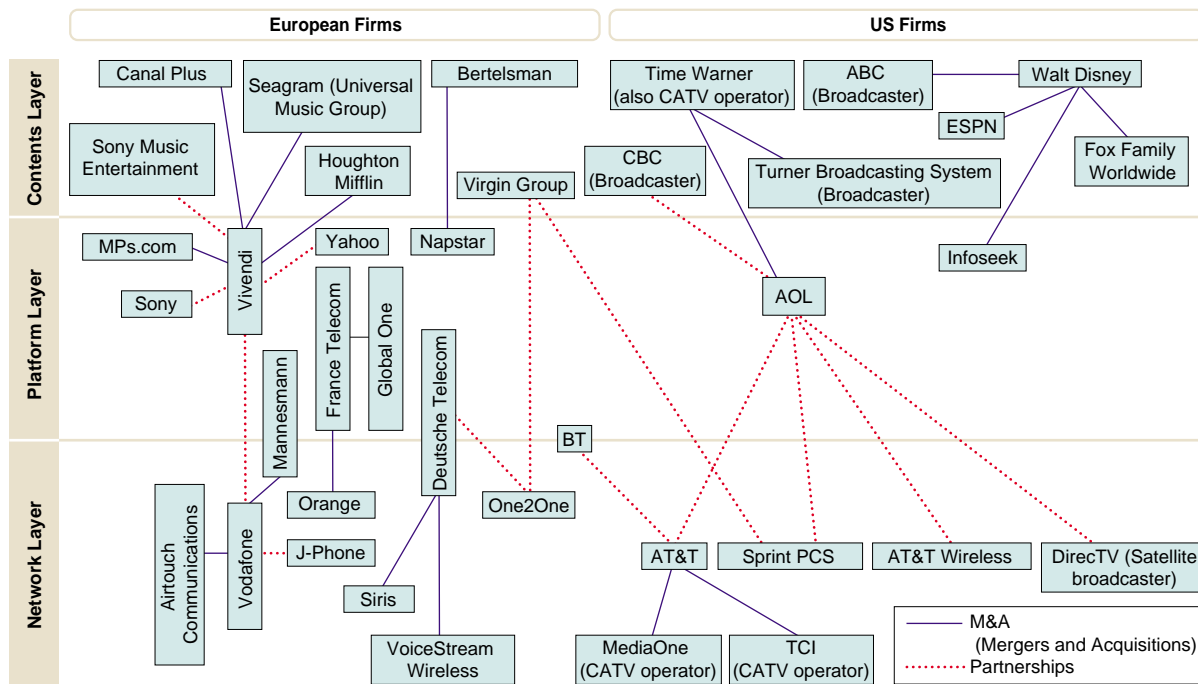
Industrial structures are now undergoing sudden changes due to these convergence phenomena, and alliances and partnerships predicated on competitive policies are emerging on a worldwide basis. These trends extend to the three layers of networks, platforms and contents by involving communications, broadcasting and contents industries. As a result, mega-carriers are moving forward with a series of moves towards major vertical integration, corporate acquisitions, and operating alliances (see Figure 4). This chapter describes the convergence strategies of three representative mega-carriers.

(1) Vivendi Universal

Vivendi Universal, a French general media company, is proceeding with a series of vertical integration moves that have come one after another, such as mergers, acquisitions and alliances to expand its business coverage from upstream areas (contents) to networks. Vivendi announced the acquisition of MP3.com, a US Internet music distributor, in May 2001, and Houghton Mifflin, a major US educational publisher, in June 2001. The company also established Duet, a joint venture with Sony Music Entertainment in the US to handle copyrights in Internet music delivery. Duet further announced an alliance with Yahoo in April 2001. Vivendi has also acquired the huge contents libraries of Universal through its acquisition of Seagram—securing its worldwide ranking as No. 1 in music and No.2 in movies.

In France, Vivendi also owns Cegetel in fixed communications, SFR in mobile communications, and Canal Plus (the largest CATV service provider in Europe) in

Figure 4. Major M&As and Partnerships in World Broadcasting and Communications Industries (As of October 2001)



Notes: AOL = America Online; BT = British Telecom; TCI = Tele-Communications.
Source: Nomura Research Institute.

broadcasting. Through a portal site (Vis-à-Vis) established with Vodafone (UK), Vivendi plans to provide a wide variety of contents via a number of distribution channels.

(2) AOL Time Warner

As AOL (America Online) was the world’s largest ISP with some 26 million subscribers, this merger provided Time Warner with a tremendous opportunity to acquire a huge number of channels to distribute its own contents on the Internet. At the same time, the deal offered AOL not only a wide variety of contents, including video, music and magazine products, but also the second-ranked CATV business in the US and its highly attractive broadband business infrastructure. This means that the establishment of AOL Time Warner was a deal that enabled the three-layered vertical integration of network, platform and contents.

As AOL Time Warner has a particularly strong position in the field of contents, the firm has adopted an “AOL Anywhere” strategy to ensure the smooth distribution of contents. In addition, it has formed technical partnerships with such mobile communications service providers and satellite broadcasters as AT&T Wireless, Sprint PCS and DirecTV, to advance into interactive digital media businesses by establishing the interactive TV platform known as AOL TV and the interactive mobile telephone service called AOL Wireless.

(3) Virgin Group

At present, a number of mobile virtual network operators (MVNOs) are now providing mobile phone services

mainly in Europe by leasing communications networks from other mobile phone operators, as they can operate their business without their own networks and thereby reduce their initial investment. The Virgin Group, a major UK airline company that started with a string of CD shops, has entered the mobile market as an MVNO for the first time in the world. It now has a huge customer base that exceeds one million subscribers—some 15 percent of the customer base of One2One, the mobile subsidiary of Deutsche Telekom from which Virgin is leasing mobile circuits—and has moved into fourth place in terms of sales in the UK market.

The Virgin Group has announced that it would start an MVNO business in the United States by the middle of 2002 by leasing communications infrastructure from Sprint PCS, a major mobile phone operator in the US. Sprint PCS can also expect improved operability in its communications infrastructure by forming a partnership with the Virgin Group. Virgin is also planning to enter the Singapore market in fiscal 2001 and the Hong Kong and Taiwan markets in the first half of 2002. The group is developing its business by accepting subscriber applications at its CD shops and providing music distribution services via mobile phone and other music-related services.

2 Governance of Monopolistic Operations

A problem that is now surfacing as a result of this vertical integration by mega-carriers is the issue of monopolies in their respective markets. In the case of AOL Time Warner, for example, the former Time Warner

had concluded an exclusive agreement with its Road Runner ISP subsidiary up to the end of 2001, making it impossible for other ISPs to provide services by using Time Warner’s cable circuits. However, Time Warner has subsequently carried out circuit opening experiments, set opening standards and promised to open its facilities to other carriers in response to the Federal Trade Commission’s requirement that the company implement the following three measures as a condition to secure FTC approval of the merger between AOL and Time Warner.

- AOL Time Warner shall allow at least one competitive broadband ISP to access its cable systems before launching its own cable services. AOL Time Warner must subsequently provide access to at least two more ISPs within 90 days after its cable service debuts.
- AOL Time Warner shall not hinder the delivery of contents that are provided by competitive ISPs and interactive TV service providers on its networks.
- AOL Time Warner shall offer AOL’s DSL service to all subscribers on an equal basis in every region, regardless of whether they are using Time Warner’s cable broadband services.

The FTC evaluates the direct commercial impact of network opening measures on competition in the light of the anti-trust statutes in the US, while the Federal Communications Commission (FCC) examines whether a merger satisfies the public interest on the basis of its authority to deal with wider issues. When vertical integration measures by major companies are approved, these companies are usually required to provide open access in technical and structural terms as a prerequisite of such approval. As such, open access should be prescribed as a legal requirement in mega-carrier mergers in order to eliminate concerns over the monopoly issue. This may in turn contribute to the formation of healthy competitive markets.

Whether such moves towards vertical integration will be successful or not may totally depend on what sort of

new added values can be provided to consumers. In the first half of the 1990s, mega-carriers such as AT&T and BT were trying to pursue horizontal integration—efforts that turned out to be largely unsuccessful. This was because they were unable to provide true customer value, unlike the situation of the Internet in the later stage. In this sense, the current trend towards large-scale mergers should be regarded as just starting.

V Major Issues and Directions of Reform in Japan

As described above, the rapid development of ubiquitous networks is propelling us towards a new era in which the convergence of communications and broadcasting will become an important industrial policy issue. Along with the progress in economic integration in Europe, the communications and broadcasting areas are also seeing rapid developments towards their integration. Moreover, moves towards vertical integration by mega-carriers are being accelerated. If government responses to these moves are delayed, the Japanese economy is likely to face a considerable negative impact.

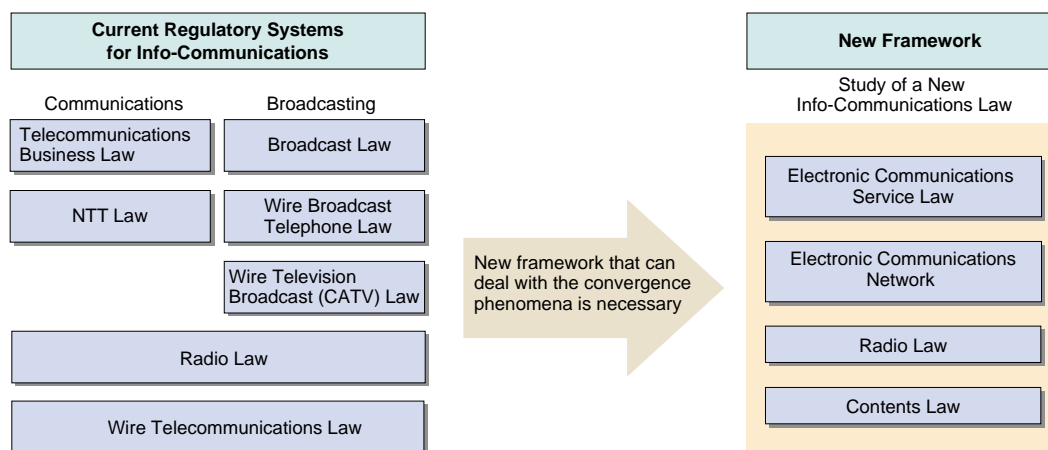
1 Regulatory System Reforms Conforming to Convergence Phenomena

(1) Integration of regulatory systems in dealing with convergence

In the era of convergence involving communications and broadcasting, it is now becoming increasingly difficult for existing regulatory systems that are vertically divided along the same lines as the industries they regulate to effectively expand user benefits. Superficial mending will hardly be adequate to cope with the rapid changes that are taking place.

Currently, Japan’s info-communications industries are being regulated under separate laws enacted to deal with

Figure 5. Example of New Integrated Info-Communications Law



Source: Nomura Research Institute.

each respective business sector: the Radio Law, the Wire Telecommunications Law, the Telecommunications Business Law, the Broadcast Law, the Wire Television Broadcast Law, the Law Concerning the Wire Broadcasting Telephone Business, and the Nippon Telegraph and Telephone Corporation Law. In order to review ways to separate communications and broadcasting activities and realize free and fair competition, however, it is desirable to consolidate these separate laws and regulations into an integrated and comprehensive regulatory system under a new info-communications law (see Figure 5). For example, the European Union's review of communications policies announced in November 1999 includes proposals for regulatory system reforms that can deal with the convergence of telecommunications, CATV and broadcasting on an integrated basis.

Trying to maintain and operate old regulatory systems in the face of technological innovation in the info-communications field is itself a major difficulty. Regulations should be reviewed in a flexible manner and as quickly as possible in response to technological advances and market moves. For instance, Section 11 of the Telecommunications Act of 1996 requires the Federal Communications Commission in the US to review all regulatory provisions every other year. Importantly, both the EU and the United States position info-communications at the center of their international competitiveness in the global economy. In order for Japanese industries to effectively deal with these issues, comprehensive info-communications policies that can promptly respond to the requirements of the times are essential.

(2) System reforms to promote competition relating to networks

Article 6, Paragraph 2 of the Telecommunications Business Law specifies that a Type I telecommunications business provides telecommunications services by installing telecommunications circuit facilities, whereas Article 6, Paragraph 3 defines a telecommunications business other than a Type I business as a Type II telecommunications business. This means that Type I and Type II businesses are basically distinguished by the ownership of circuit facilities.

Accordingly, Type I carriers cannot rent circuit facilities from other carriers in principle, and Type II carriers cannot freely install their own circuits, as they must procure facilities only from Type I carriers. Due to these limitations, it is difficult to construct networks in an efficient manner by combining a wide variety of facilities. Under pro-competition policies, a notification system should be introduced in permitting entry into telecommunications markets and carriers should have a free hand to construct various networks configurations.

Under the current system, moreover, carriers are required to secure rights-of-way from the agencies managing roads and rivers when they install circuits. These procedures are often complex and time-consum-

ing, thereby preventing carriers from exercising full flexibility in constructing networks. Carriers should be allowed to flexibly construct networks, while at the same time they should be obligated to provide certain services and interconnection functions.

As noted previously, the government's IT Strategy Headquarters has been working to remedy these problems through amendments to the Telecommunications Business Law. However, even stronger efforts are needed to promote competition.

(3) Necessity of transparent and pro-competition radio wave policy

Opening a radio station requires a license under Article 4 of the Radio Law. In spite of the fact that roughly 80 percent of the ¥40 billion in radio wave revenues in Japan comes from the mobile phone business, only the 150-MHz bandwidth is assigned for mobile phone usage. And because there are some services with assigned frequencies that are not fully utilized, large differences exist in terms of the efficient usage of radio waves. Accordingly, new evaluation methods must be established in assigning radio frequencies that comprehensively reflect the extent to which they contribute to people's lives. This means reassigning low-use spectrum to new services and promoting measures to make frequency allocations more effective without limiting the usage of the spectrum.

In Europe, as a result of promotional measures for telecommunications interconnection and the adoption of W-CDMA (wide band code-division multiple access) as a major 3G standard, the existing regulatory framework based on state-owned telecommunications monopolies has collapsed and the introduction of market mechanisms is being accelerated in the telecommunications industry. Along these lines, for example, auction systems were introduced as part of the 3G licensing procedures in the United Kingdom and Germany. As major carriers in Europe such as BT, Deutsche Telecom and Vodafone have been active in going after licenses to construct pan-European networks, however, contract prices in both cases have soared.

Other European countries such as France, Spain, Sweden and Norway have adopted a method that ultimately relies on a comparative review by the government as part of the final licensing process. In these cases, the major existing domestic carriers have consistently dominated the 3G license awards, effectively crowding out new entrants and raising criticism over the effectiveness of this method in promoting competition. As both methods offer advantages and disadvantages, however, there seems to be no best approach at present.

Professor Eli M. Noam of Columbia University (New York) has proposed an open spectrum access method that does not require spectrum allocation. This makes it possible to co-use frequencies through techniques that enable the spectrum to be used more effectively, such

as packet switching and spectrum dispersion. Another way to effectively use frequencies is software-defined radio (SDR) technology that enables users to shift among multiple radio communications systems by the use of certain software. This technology can search for unused spectrum by frequency analysis devices and exchange communications by applying the relevant radio system software to such unused bandwidths. SDR will actually enable unlimited use of the bandwidth spectrum. Although verification experiments and standardization efforts are now under way, Japan's current Radio Law does not assume such usage of variable-style terminals—essentially foreclosing the use of this technology.

In any case, the market cannot be activated without new technologies and market mechanisms. Industries without the strength to compete are likely to decline, slip into service quality degradation and negatively affect the nation's economy as a whole. Accordingly, it is very important for securing the competitiveness of Japanese industry in the future to incorporate the incentives to develop new technologies when regulatory systems are designed.

(4) Establishment of an independent regulatory organization to supervise fair competition

The United States and the European Union have suggested that the Japanese government establish a new regulatory agency to be responsible for policy planning and development that is completely independent from the Ministry of Public Management, Home Affairs, Posts and Telecommunications, as such a fully independent agency free of political influence is necessary for the promotion of competition. Within Japan as well, new telecommunications carriers and Keidanren have also expressed their concern over the current regulatory system, in which the government is responsible for the supervision of carrier operations while still being required to own at least one-third of NTT shares.

In Europe and the US, there are many cases in which development policy for certain industries and supervisory authority are separated to prevent political interference. In the European Union, the European Commission is responsible for policy planning while ministries, agencies or independent administrative bodies in each of the member states play regulatory and supervisory roles. The Federal Communications Commission (FCC) in the United States and the Office of Telecommunications (OFTEL) in the United Kingdom are responsible for the regulation of communications carriers (see Table 3). Instead of establishing a new regulatory agency, however, the Japanese government is examining a draft plan to strengthen the authority of the Fair Trade Commission to supervise public utilities as a whole, including telecommunications. In any case, discussions on these plans, including their advantages and disadvantages, are under way.

Table 3. Current Regulatory and Supervisory Organizations for Telecommunications

	Policy	Supervision
Japan	Ministry of Public Management, Home Affairs, Posts and Telecommunications	Ministry of Public Management, Home Affairs, Posts and Telecommunications
US	Executive Office of the President	Federal Communications Commission
UK	Ministry of Trade and Industry	Office of Telecommunications
Germany	Ministry for Economy and Technology	Federal Posts and Telecommunications Regulation Agency

Source: Nomura Research Institute.

2 Focusing on Radio Technology: A Key to Convergence

NTT DoCoMo is planning to inaugurate FOMA, the world's first W-CDMA 3G service by the end of fiscal 2001, with a limited speed of 384 Kbps at first but a planned maximum 2 Mbps in the near future to enable high-speed communications. However, the development of other new technologies is rapidly progressing to realize low-cost, IP-based, high-speed radio Internet connections that can significantly exceed the speed of FOMA—and without the need for existing telephone lines. These technologies include various radio LANs, such as IEEE802.11b, which has a transmission speed of 11 Mbps using the 2.4-GHz bandwidth (a radio LAN standard developed by the Institute of Electrical and Electronics Engineers); IEEE802.11g, with a transmission speed of 20 Mbps using the 2.4-GHz bandwidth; and IEEE802.11a, offering a transmission speed of 54 Mbps on the 5-GHz bandwidth. In addition, major chip manufacturers and small ventures are all competing to develop the “combo chip,” a radio LAN chip that can be used for both the 2.4- and 5-GHz bandwidths and multiple modulation systems.

A number of other technologies have also become the target of development efforts. These include software-defined radio technologies that can shift frequencies and communications systems by the use of software, radio access systems with speeds of 100 Mbps or more that can be used within a building or at hot spots, and next-generation Bluetooth (short-distance radio LAN) systems. As part of these efforts, universities, users, communications carriers and manufacturers in Japan set up the Multimedia Mobile Access Council in 1996 to promote a high-speed radio system plan. As a result, it is likely that downstream transmission speeds to terminals may be increased to between 50 and 100 Mbps.

However, this improvement relates to mobile communications environments only. At hot spots within public facilities or railway stations with heavy pedestrian traf-

fic, for example, the introduction of radio LAN-type communications systems with transmission speeds of 100 Mbps or higher can be considered. This is a new generation of mobile communications that consists of fourth-generation mobile phones and radio LAN-type access.

The key to these new technologies can be found in their high adaptability to customization. Users will be able to install the desired communications technology in their phones by the introduction of software-defined radio technologies, which have a high affinity for the Internet as they can support IPv6. Other possible technologies would include the high-security functions necessary for mobile commerce (electronic commerce through mobile phones), and a seamless integration with Bluetooth, digital broadcasting and other media.

SOMA Networks (US) has developed SOMAPort, a communications device to carry out radio communications with connection devices that support various communications networks. The use of this device enables users to communicate at a high speed in the 5- to 10-Mbps range. As the device uses a frequency bandwidth that does not require a license, anyone who owns a SOMAPort device can operate a radio communications business at low costs.

Ultra Wideband (UWB) is a radio communications system developed by Time Domain (US) that transmits and receives data signals that are dispersed over an extremely wide bandwidth of some 1 gigahertz. As the data are transmitted over each frequency in the band at an extremely weak noise level, they do not result in any mutual interference with signals from other radio devices that use the same bandwidth. The device, which also consumes less electric power, is equipped with high-precision radar functions and achieves a communications speed of some 40 Mbps—exceeding that of both Bluetooth and IEEE802.11b. Moreover, the device can fix positions more accurately than GPS equipment.

These new radio-related technologies such as IEEE802.11b, SOMAPort and UWB, are likely to introduce drastic changes in the world of radio communications that has so far been dominated by mobile phones. The Starbucks coffee shop chain in the US and a fast food chain in Japan have installed radio LAN facilities in their shops to provide trial communications services. MobileStar and other US firms have already started their communications services by using radio LAN systems at airports, railway stations and other places with a high concentration of users.

The time has now come in which mobile phones are not the only radio service for consumers. This means that communications technologies are shifting from the carrier model to a vendor or user model. Although Japan's current communications policy mainly focuses on dealing with the interests of communications carriers, Japan is likely to fall behind the United States again in the de-

velopment and use of info-communications systems if this shift is not taken into account.

3 Improving Contents Distribution Systems and Promoting Vertical Integration and Partnerships

Current digital contents can be replicated without suffering any loss in quality, making it easier to use them for multiple purposes. In Japan, however, the rules related to copyright handling concerning contents distribution and the multiple use of copyrighted materials are not well developed. In actuality, despite the high demand for the distribution of broadcast programs via broadband systems, contents produced primarily for terrestrial wave broadcasting cannot be used by other media—including satellite broadcasting or the Internet—because of copyright-related problems.

In the case of television dramas, for example, the related copyrights involve a number of parties, such as TV stations, music copyright owners, original authors, scriptwriters and actors. Contents for broadcasting are not originally produced for Internet distribution or satellite broadcasting, and TV stations are not granted any rights for such multiple uses. In short, TV stations cannot freely distribute such drama programming through the Internet. Because of this complicated and troublesome situation in which many copyright-related issues must be resolved, a large volume of image contents cannot be easily distributed.

Accordingly, a database should be established to include copyright-related information, such as who holds the ownership rights to a product, and under what conditions a usage license can be acquired (for example, an agreement stipulating the conditions for licensing fee payments, and arrangements covering the percentages of such fees distributed to the production company, the original author, the scriptwriter and the actors). To this end, it is necessary to develop uniform mechanisms by standardizing the license information form and assigning an identification number to each content product so that the copyright-related information can be expressed on a numerical basis. In order to realize smooth contents distribution, the establishment of simple copyright processing rules that can protect all rights-holders is required.

Moreover, as differences in the ability to supply good-quality contents are directly linked to the competitive strength of those involved, the contents industry tends to lead to partnerships and participation that have little affinity in terms of the types of business involved—thereby permitting the generation of duopolistic industrial structures by diverse players. Mergers such as the cases of AOL Time Warner and Vivendi Universal and the strategic moves by Microsoft towards contents production all indicate that these firms are paying attention to the power inherent in the control of contents. In

the future, it is likely that CSPs (communications service providers) may strike a deal with ISPs or use search engine services to converge their technologies, leading to moves towards new and diverse forms of vertical integration and partnerships.

Moreover, the promotion of contents production may become an important factor in the development of these industries. Securing contents funding from outside investors is now a common way to finance film production in the US movie industry. From the viewpoint of investors, however, investments in contents production in Japan may involve considerable risks because of the highly inadequate budget management practices in the industry. While there are some financial institutions—including the online securities firm MONEX—that are providing contents funding products, such investments have been far from satisfactory.

In Korea, the government picked the image industry as a top-ranked export field along with semiconductors, electronics equipment and automobiles, and has established various investment funds through which institutional and individual investors can provide funding

for contents production. According to the Korean Cinema Restoration Committee, exports of cinema contents in 2000 reached more than ¥800 million—some ten times over the figure for two years ago. It is essential that Japan also adopt a policy to promote the development of contents-related industries through the efforts of the entire nation.

The continuing and successful progress of these convergence phenomena calls for speedy reforms in not only business strategies but also regulatory systems. Establishing an open and global framework that will allow private industries to develop on the basis of fair competition is an urgent policy issue.

Takeshi SHINOHARA is chief consultant at NRI's Center for Knowledge Exchange & Creation. His specialty includes strategies for info-communications technology.

Yasutake OKANO is deputy chief consultant at NRI's Info-Communications Consulting Department II. His specialty includes info-communications law and info-communications technology policy.

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Inquiries to: Corporate Communications Department
Nomura Research Institute, Ltd.
E-mail: nri-papers@nri.co.jp
FAX: +81-3-5255-9312