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**On a Desirable Industrial Organization and a Desirable Regulatory Framework
in the Age of the Convergence of Telecommunications and Broadcasting**

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Contents

- I. Introduction and summary
- II. Telecommunications and Broadcasting Industry in Japan
 - A. Organization of the industry
 - B. Regulatory framework
 - C. Convergence of technology and services
 - D. Problems
- III. Functional Division of Communications Services
- IV. Regulatory Objections
 - A. Promoting competition and other objections
 - B. The “range” of regulation
- V. Examples
 - A. Local competition and local loop unbundling (LLU)
 - B. Supply of spaces for wireline and wireless transmission

I. Introduction and summary

This paper presents a proposal for a desirable industrial organization and a desirable regulatory framework for converging services in telecommunications and broadcasting (**communications**) in view of the Japanese case. In general, converging services are those of close substitutability from different sectors or industries. Examples are POTS, mobiles, and IP-telephony in telecommunications; and terrestrial, cable, and satellite services in broadcasting.

The paper starts with a short summary of the Japanese case with regard to convergence. It then proceeds to explaining a method for constructing a desirable industrial organization and a desirable regulatory framework for converging services. We consider two attributes of a communications activity: the first is the location of a communications activity in the network considered as a planar graph (such as access lines, routers, and trunk lines) and the second is the location of a communications activity in the network considered as a stack of functional layers (such as infrastructure, IP, network services, and contents). Thus, the entire communications activities will be classified as entries in a two-dimensional matrix.

The paper then discusses criteria for desirability. The most important one is to create and maintain competitive markets with level playing field. Other criteria such as providing universal services, exploiting scale-scope economies, and minimization of regulatory costs are also considered.

A regulatory framework is an assignment of a mode of regulation (such as competition with free entries, price-cap regulation, and regulated monopoly) to each of the communications activities. A desirable regulatory framework may be chosen among possible frameworks by weighing the properties of each of them according to the desirability criteria. In other words, the paper intends to present a target for desirable regulation and industrial organization without taking into account historical data. Difficulties arising from the presence of converging services are overcome by separating theoretical analysis from historical consideration.

In the remaining part of the paper, the present regulatory framework and the

present organization of Japanese communications industries is expressed in terms of the model developed in the first part of the paper. In short, the present framework of Japan has been formed based on the distinction of communications activities according to service providers; in particular, it still drags the old-time monopoly by NTT and NHK. The paper discusses about a possible path along which the present framework may be transformed gradually into a desirable one in terms of two examples.

II. Telecommunications and Broadcasting Industry in Japan

A. Organization of the industry

The organization of the telecommunications industry in Japan is determined by the 1985 Telecommunications Business Law; it recognizes two categories of carrier providers: type I and type II. They are distinguished by their facilities, not by their services. Type I carriers are those operating with physical transmission facilities; type II carriers are those without transmission facilities. In effect, a type I carrier can offer every service a type II carrier can, but not vice versa. Type I carriers are regulated by the MPT (Ministry of Posts and Telecommunications)¹ in entry-exit, service provisions, pricing, and other aspects.

The dominant (type-I) carriers in Japan are those of the NTT group. NTT Holding Company owns two regional companies, NTT East-Japan and NTT West-Japan. They are “Special Companies” under the NTT Law and are regulated by MPT more heavily than other type I carriers. NTT DoCoMo, a mobile operator, earns a dominant portion of the group’s income today. The total number of type-I carriers in 2000 is 343, most of which is of NCC (new common carriers). Further, there are approximately 900 type-II carriers in 2000. Speaking very roughly, NTT receives 90% of revenues in the local and access markets, and about one-half in other markets (log-distance, international, mobiles, private lines, etc.).

Such a structure of the telecommunications industry in Japan is an outcome of

¹ On January 1, 2001, the bureaus of MPT were integrated into “Somusho (Ministry of Public Management, Home Affairs, Post and Telecommunications.” For simplicity in this paper, we continue to use the term **MPT** to indicate the regulatory body of the Japanese Government for posts and

its history since 1985, when NTT was privatized. At that time, a deadline for considering a restructuring of NTT, which was in one price, was set to be the end of the 1995 fiscal year, i.e., March 31, 1996. MPT pursued divesting NTT starting 1985. It failed twice in its attempt to achieve this: first in 1985 and then in 1990. The 1995 fiscal year deadline thus seemed to be the last chance for MPT to achieve its long pursued goal: divesting NTT. On the NTT's side, opposition to its divestiture was strong on the ground that NTT would be most efficient when staying as a single entity. MPT's position to this was that the monopoly power of NTT, particularly the bottleneck monopoly in subscribers access services, was slowing down the speed of the development of the Japanese telecommunications industry; a division of NTT would introduce more competition and the speed of growth of the industry would be greater.

The nationwide debate on dividing NTT started in the fall of 1994. In December 1996, MPT and NTT effectively reached an agreement on a plan for restructuring NTT. Its outline was as follows. (1) NTT shall be divided into three corporations: NTT Long-Distance, NTT East-Japan, and NTT West-Japan; a holding company will be established to possess all of the shares of the three companies. On one hand, NTT East-Japan and NTT West-Japan together with the holding company shall be "special companies" to be regulated heavily by MPT. (2) On the other hand, NTT Long-Distance, together with other NTT group members including NTT DoCoMo, shall be under no strict regulation of MPT. In particular, NTT Long-Distance shall be allowed to enter into the international telecommunications market. This was implemented in June 1997.

In the local and the access markets, contrary to the objective of the 1997 restructuring of NTT, the monopoly power of NTT has continued to prevail. NCCs competing with NTT in these markets are those providers backed by the electric power companies. The leader is TNet, serving in the Tokyo Metropolitan and the nearby areas; its share in the local market, however, still stays at a low level. There is a possibility that effective competition is developed in the local (not access) markets by

telecommunications, which is now a part of Somusho.

this group of NCCs. Competition could be accelerated by the implementation of the interconnection provisions introduced in the new 1997 Telecommunications Business Law. However, it will take some more time for significant competition to be developed in the local markets. One reason is that it takes time for the NCCs to lay down transmission facilities (optical fibers). Another reason is that NTT could cross-subsidize its local services from its access services, since MPT failed to recognize the need for separation, structural or accounting, of the two operations.²

The broadcasting industry in Japan is controlled by the Broadcasting Administration Law. It recognizes a special entity, the Japan Broadcasting Association (NHK), which has a nationwide network for terrestrial broadcasting by TV and voice with the power to charge subscription fares uniformly from the public. The government controls the annual budget of NHK, but NHK has a great deal of freedom with regard to the choice of the contents it broadcasts.

There are four (or five) commercial terrestrial broadcasting networks operating under this Law. A small number of key broadcasting stations, located mostly in Tokyo, produce and supply a large portion of the network contents, which are distributed by, local stations, of which the number in 2000 is 127. Almost all of them operate on advertisement revenues.

In addition to terrestrial broadcasting, cable and satellite stations are in operation, too. They are still small in size when compared with terrestrial broadcasting, but they are growing.

In December 2000, a new digital broadcast service by commercial providers was started in Japan with a broadcast satellite. Although whether this new business will succeed or not in the future is not known, people in Japan can now enjoy, if so wish, 5 to 20 free SDTV channels (or 3 to 10 HDTV channels) compared to 2 to 10 SDTV channels available previously.

All of the broadcasting operations in Japan are regulated by MPT under a

² This statement on the possibility of cross-subsidization presumes the continuation of NTT's monopoly in its access operations. If this monopoly is broken by, say, rapid development of wireless access, then true competition may emerge in both the local and the access markets. We may be observing such a

licensing scheme. MPT assigns radio spectrum in a discretionary way and (essentially) free of charge. Consequently, new entry into the broadcasting business is strongly restricted.

Out of the total revenue to the broadcasting industry in Japan, 20% goes to NHK and the remaining 80% to the commercial stations. Further, the value added produced in the telecommunications and the broadcasting sectors in Japan was approximately 2.2% and 0.4% of her GDP in 2000, respectively.

B. Regulatory framework

The main agency of the Japanese government to regulate telecommunications and broadcasting (**communications**) is MPT.³ The Fair-Trade Commission (The Antitrust Commission) is supposed to play more significant roles than it is now in promoting fair competition and in handling anti-trust matters. In reality, the Commission acts only fragmentarily in the area of communications. The Ministry of Construction comes into play, when the right of way for communications is requested in public spaces (such as roads and rivers) it administers. Further, the copyright of the contents is handled by the Ministry of Education. The roles played by such ministries other than MPT, however, is weak and limited. This is partly because, in Japan, there is an implicit understanding that, for each private entity, there should be one and only one public agency having the power to control (thus to regulate) it. Similar understanding may be seen in other countries, but Japan is one of the countries in which this understanding works most strongly.

Thus, MPT is considered as the organization which almost exclusively deals with matters arising in the communications industry.

A similar understanding works within MPT itself. MPT has two bureaus, the Telecommunications Bureau and the Broadcasting (and Policy) Bureau. The former handles all matters falling in the area of telecommunications, and thus controls telecommunications providers such as NTT, NTT DoCoMo, and other NCCs. The

process today.

latter handles broadcasting, and controls NHK and other broadcasting stations. As a consequence, even the administration of radiowave spectrum is divided into the two bureaus depending upon whether a spectrum band is used for telecommunications or broadcasting.

C. Convergence of technology and services

The remarkable advancement of information technology (IT) in recent years has changed the environment and the substance of the communications industry. Extensive applications of digital technology to communications activities have made possible new services which was beyond imagination in old days.

A notable trend is the convergence of telecommunications and broadcasting services. It is possible, at least technologically, for a telecommunications operator provides a broadcasting-like service by using its networks. It is also possible for a cable operator to provide telecommunications-like services by means of its coaxial cable network.

The advent of the Internet has intensified this trend. The Internet may be considered to perform a function which has the capabilities of both telecommunications and broadcasting. It may be considered to include (and hence can substitute) both telecommunications and broadcasting functions. Example are IP-telephony, contents streaming, e-mails, etc., within the presently available technology. Once the next generation Internet is fully developed, it is possible that it dominates all of the communications activities.

From the standpoint of a telecommunications provider or of a broadcasting operator, such changes appear as the emergence of close substitutes of the service it is providing. Thus, it is natural for such incumbents to attempt to protect themselves from the new-comers by using various means including monopoly powers, cross-subsidization, natural or legal barriers to entry.

³ However, see footnote1.

D. Problems

The regulatory system in Japan, as explained above, is experiencing difficulties with the trend of the convergence and other changes. Since the division of the regulatory responsibility (i.e., the jurisdiction) is based on the distinction whether the provider belongs to telecommunications or broadcasting, the government is helpless in regulating activities which is on their boundary. Recently, MPT created a set of new definitions of services such as “telecommunications with broadcasting elements (such as Internet voice radio)” and “broadcasting with telecommunications elements (such as two-way broadcasting using what is called Communications Satellite broadcasting (CS broadcasting)).” Such is a patch-work solution, which will incur high regulatory costs in the long run. A systematic solution of the problem is called for.

There are many other examples of regulatory complexities which have arisen from the trend of convergence in a broader sense (i.e., not limited to the convergence of telecommunications and broadcasting). One is the case of the “L-mode service” to be provided by the NTT Regional Companies. It is their Internet-like service similar to NTT DoCoMo’s i-mode, which utilizes the Companies’ access and trunk networks. There was a long dispute as to whether MPT should, or should not, allow the NTT Regional Companies to provide such an Internet-like service on the networks they have monopoly power. A compromised and complicated solution was finally adopted to allow the NTT Regional Companies to provide the L-mode service, starting the summer of 2001, with a number of restrictions. Implications of this solution are that (1) NTT encountered a great deal of regulatory uncertainty having incurred high cost to it, and (2) the customers of NTT are forced to pay higher prices for the services of NTT including, but not limited to, the L-mode service. This case indicates clearly the need for an all-out overhaul of the regulatory system and the organization of the communications industry in Japan.

III. Functional Division of Communications Services

In order to deal with the problems having arisen in the regulation and competition in the Japanese communications industry, we first attempt to make clear the

criteria for desirable industrial organization and desirable regulatory framework.

We first observe that the problems have arisen from the fact that, for historical reasons, the target of regulation tends to be a provider, not the function or the service in question. In old days, the function of a provider was simple; one provider supplies only one service. Today the number of services is increased and one provider supplies many services. Further, the convergence of different services having been supplied by different providers adds complexity to this situation.

This observation suggests that we should consider “services”, not providers, as the basic component for industrial organization and regulation. The question immediately following from this is how to define a service for this purpose. In general, a service is defined by designating a set of attributes (properties) to it. So the question becomes: what are appropriate attributes of a service? My answer to this question is given in the following.

I propose to use a classification scheme of communications services in which are used two attributes arising from horizontal division and vertical division. The scheme is shown by Figure 1. A simplified version is given by Figure 2.

Horizontal division is a classification scheme of telecommunications and broadcasting services based on the location in the network of information transmission considered as a planar graph; examples of entries in the horizontal division are access, local exchange, broadcast, inter-exchange, etc.

Vertical division is a classification scheme of telecommunications and broadcast services based on the location in the network considered as a stack of functional layers (of which the order given in Figures 1 and 3 coincides with the direction of payment for services, i.e., the direction along which the value added is formed). Examples of entries in the vertical division are infrastructure, transmission cables, IP services, one-stop shopping, etc.

Horizontal division is a traditional scheme for classifying telecommunications and broadcasting services. Vertical division has emerged as a consequence of the advancement of digital technology. By combining horizontal and vertical divisions, one can form a classification of telecommunications and broadcasting services into a

two-dimensional array of cells as shown in Figure 1. It may be called a functional division of telecommunications and broadcasting services.

It is noted that the convergence of telecommunications, broadcasting, and other communications services means that technological boundaries having separated them in the past has become unclear because of the advancement of digital technology. In terms of Figure 1, it is nothing but the increase in the substitutability of one service entry for another service entry in the same horizontal layer of the Figure. For example, IP broadcasting comes from the use of optical fibers for radio spectrum in the layer of transmission media. Internet access services provided by cable operators are made possible by substituting coaxial cables for telephone lines in the layer of transmission media.

IV. Regulatory Objections

A. Promoting competition and other objections

We next consider the objectives of regulating the communications industry. As stated, if indirectly, in the Telecommunications Business Law and the Broadcasting Administration Law of Japan, the ultimate goal of regulation is to promote the welfare of users of communications services. What we seek here is (intermediate) objectives useful to achieve the ultimate goal.

It is widely agreed upon that the following are such intermediate objectives:

1. Promote market competition by
 - a. freeing entry and exit,
 - b. maintaining level playing field, (e.g., by means of unbundling, interconnection provisions, etc.)
 - c. removing restrictions on prices, services, etc.
 - d. preventing unfair or unjust conducts, and
 - e. minimizing the “evils” of monopoly.
2. Establish provisions for universal services,
3. Assist forming standards, and
4. Apply industrial policies for sectoral growth.

The functional organization of a regulatory body means to structure it according to the goals stated above.⁴ Needless to say, conflicts may arise between some of the regulatory objectives (and thus between bureaus organized according to them). A hierarchical structure for resolving such conflicts, case by case, would be needed.

B. The “range” of regulation

A key issue in applying the scheme such as represented by Figure 1 is how to form a **range of regulation** by grouping services.

In order to promote competition and maintain level playing field in the age of convergence, we need to establish institutional as well as technological substitutability between services in the same layer of Figure 1. This implies that the market of a service which is an entry in Figure 1 needs to be opened up to a new entry of other services in the same layer. In the ideal situation, a separate market may have to be established for each service entry in Figure 1, and each market may have to be operated competitively.

In the reality, of course, establishing a separate market for each service in Figure 1 may not be appropriate. A realistic regulation should allow some of the services in Figure 1 be supplied jointly, not separately. For, otherwise, it would be difficult to invest for starting a new service; some cross subsidization between services is needed for investing in a new service. However, if excessive cross subsidization between services or combination of services is allowed, particularly when some of the services are supplied under monopoly, the market may no longer be competitive or fair. Public regulation for promoting fair competition cannot allow such an outcome. For these reasons, a realistic regulation must be an outcome of compromise; there seems to exist no theoretical solution that can distinguish what combination of services (and cross subsidization) is good from what is not good for fair competition.

⁴ See, e.g., Martha A. Garcia-Murillo and Ian MacInnes, “FCC Organizational Structure and Regulatory

V. Examples

A. Local competition and local loop unbundling (LLU)

One of the most difficult problem in promoting competition in telecommunications industry arises from the presence of monopoly in local loops (local accesses). In the scheme proposed in this paper, this problem is dealt with by (1) identifying the monopoly element in the local loop, (2) separating the other elements from it and applying competition to them, and (3) regulating the monopoly element appropriately. This is illustrated by Figures 4 and 5.

In Japan, the problem of local competition is closely related to the issue of divesting (dividing) the dominant provider, the NTT group. The present scheme suggests that NTT should be divided, at least in accounting, into entities one of which operate on the infrastructure of the local loops, and the others be freed from regulations.

Let us consider the issue of local loop unbundling (LLU) in telecommunications and in broadcasting in more detail.

The issue in telecommunications arises in relation to the service entries shown in a rectangle in Figure 1; they are optical fibers, communications poles, conduit, tunnels, and underground spaces. A local loop operator provides with local access by combining these services. To bring in competition into the market of local loops, therefore, it is conceivable to establish separate markets for some of these services. In particular, a market for transmission media may be separated from that for infrastructure and common spaces. It means that, for example, local access providers be separated into two entities (at least functionally, i.e., in accounting) one of which provides tunnels services (infrastructure provider) and the other of which provides optical fiber services (cable provider). The difficulty of new entry may remain with the infrastructure market, whereas the cable market may be exposed to new entry and competition.

The access issue in broadcasting is related to the service entries shown in Figure 2; they are orbital spaces, satellites, radio spectrum, STB, channel administration, and one stop shopping (billing). The difficulties of this issue arises from the fact that

Convergence," *Telecommunications Policy* 25 (2001). 431-452.

these services are vertically integrated and supplied by a single operator, e.g., BskyB in UK. It is seen that there are two sources of monopoly power in this vertically integrated operation; one comes from the service in the layer of transmission media, i.e., radio spectrum, and the other comes from STB with the capability of channel administration and billing. From this observation, it seems clear that, in order to promote fair competition here, it is necessary to separate the market for transmission services by means of radio spectrum from the market for customer services by means of STB with channel administration and billing. Without some such separation, effective competition will never become a reality.

Finally I would like to propose a way to move from a state in which fair competition is blocked by some combination of services under monopoly (State M) to a situation in which some separation of the services is achieved for fair competition (State C). The point is that once-and-for-all transition from M to C may be harmful to users, because the presence of transition cost may force the monopoly provider to raise the price of services. It is possible that users may object, for this reason, to transition itself. One needs a gradual transition from M to C.

The baseline is separation of services and an open and equal access to each service. A regulatory body, however, can give a relief to a monopoly operator for a limited length of time. A way to do this is to establish a “monopoly tax.” The monopoly provider can apply for a relief by choosing a particular time period for relief and accepting a monopoly tax. The tax schedule is to be pre-determined by a public regulator; the rate of tax should be higher as the length of relief becomes longer. The point of this proposal is to give a monopoly provider an opportunity to adjust itself to move from state M to state C gradually by paying a monopoly tax.

B. Supply of spaces for wireline and wireless transmission

One of the reasons that public regulation is called for in the communications industry beyond the level observed in other industries is that the use of some public space (such as land, airspace, and radio spectrum) is indispensable for communications. The supply of such public spaces is always under monopoly, causing problems in the

promotion of competition.

In the scheme proposed in this paper, the problem of appropriate supply of public spaces should be solved by employing a particular mode, auction. This is illustrated by Figure 6.

Observe the presence of a layers structure of the infrastructure services of communications, which is constructed on public spaces. Figure 6 shows the case of transmitting information over channels in optical fibres. That is to say, the service of information transmission uses, as an input to it, the service produced from a channel, which in turn uses (the service of) fibers, which uses a conduit or a duct, which uses a tunnel, which uses the service of the space located underground. The present scheme suggests that, at one of the layers of this structure, the supply of its service should be provided by auction in order to realize open competition at all levels above that layer. On the other hand, the services below that layer may be supplied under regulated monopoly or by the government.

For the case of radio spectrum, this scheme implies that radio spectrum should be supplied by auction. Another example is the case in Japan in which optical fibers are being constructed in sewage spaces. Many local governments are planning to provide them free of charge (or only at a nominal charge). The present scheme suggests that the owner of the fibers should be regulated so as to supply the service of the fibers by mean of auction