

A Consideration of Competition in the Traditional Telephony Market, and Transitions from Network Innovation

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1. The Long-Distance Communications Business in the Telecommunications Industry

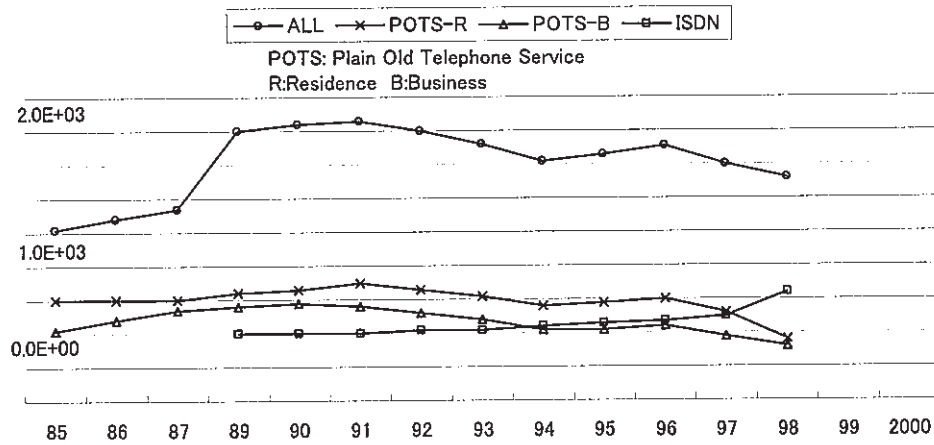
1.1 Dynamic Analysis of Demand for Traditional Telecommunications (Landlines)

Nippon Telegraph and Telephone Public Corporation (NTT) was privatized as a result of the first information-communications reforms in 1985, but it continued to exercise considerable market power. Market competition was promoted under public utilities restrictions at the beginning of liberalization; for example, Japan's regulatory authority promoted a competition policy by exercising asymmetrical regulation. In this paper, I analyze the competition policies of the traditional telecommunications industry, examine the traits of Japan's Telecommunications Business Law (hereafter, "the Business Law") during the first communications reforms, and consider the policy factors inherent in revisions in the Business Law.

The traditional telecommunications industry expands the market scale by enhancing competition in the long-distance communications field that involves landlines (i.e., household phones); it is facing a "turning point" of sorts by virtue of the provision of internet provider (IP) technology. Let us take a closer look at trends in the use of traditional landlines.

Yuichi Takahashi outlines trends in landline use before and after the proliferation of Internet use,¹ analyzing landline proliferation trends via a calculation: "the constant k was subtracted in the first year of all years, and the same k was added in the latter half of the year, and that led to the adjustment in which the varieties square sum of the pure increase should be minimized". In this case, the result was that " $k = 22; 900$ for office work, and $k = 407; 700$ for housing."

According to Figure 1.1, the pure increase in landlines used in offices and residences has been shrinking; on the other hand, however, ISDN (INS64) began to show a net increase tendency, so both balances are feasible. Nonetheless, the sum of the net increases in landlines and ISDN was 891,000 as of March 1997, and 353,000 as of September 1997. These figures indicate that the rate of net increase is shrinking.



(Source) NTT DATA and Takashima (1998)

Figure 1.1 Increases in the Number of Fixed-Telephone Subscribers

The model of Miyajima and Cho is known to be useful in examining the spread of landline telephones between 1953 and 1991; this can be calculated via (1):

$$\log\left(\frac{D_t}{M_t}\right) = \alpha + \beta \log I_t + \gamma \log P_t + \delta \log D_t \quad (1)$$

where D_t is the demand for fixed (landline) telephones at time (t), M_t is the population, P_t is the set-up fee for a fixed telephone, and I_t is the real per-person gross national product (GNP).

A feature of this model is that it shows how network externality is a strong function of the spread of landlines; it is made clear by understanding the assumptions inherent in the same model in Table 1.1.

Table 1.1 Assumptions of the Miyajima and Cho Model

Parameter	Basic Fixed Charge Not Included	Basic Fixed Charge Included
Constant Term: α	0.83 (5.31)	0.94 (3.03)
Income: β	0.25 (2.48)	0.25 (2.49)
Facility Contribution Charge: $\gamma 1$	-0.015 (-1.09)	-0.015 (-1.11)
Basic Charge: $\gamma 2$	-	-0.010 (0.43)
Number of Subscribers: δ	0.69 (11.79)	0.68 (11.14)
DW Ratio	1.21	1.21
R ²	0.81	0.81

Another model is that of Asai, Oniki, and Kuriyama (hereafter, the “Asai model”). The accuracy of the Asai model is higher than that of the model of Miyajima and Cho, in terms of analyzing the data of all 11 regions from 1955 to 1991. This is shown by the mathematical expression in (2):

$$\frac{D_{it}}{H_{it}} = \alpha + \beta \log\left(\frac{I_{it}}{H_{it}}\right) + \gamma \log P_t + \delta \text{Dummy} \quad (2)$$

where D_{it} is the demand for fixed telephones of the region i , I_{it} is the real per-person GNP, P_t is the set-up fee for a fixed telephone, and H_{it} is the number of households in the region.

With this model, a dummy variable is used after dividing the whole dataset into the following four periods, thus allowing us to see changes in the proliferation trend for landlines: the first period, 1955–1967; the second period, 1968–1970; the third period, 1971–1976, and the fourth period, 1977–1991.

In the Asai model, the variable that measures network externality—which is used in the Miyajima and Cho model—is not adopted, but (3) measures the elasticity of the charge and is derived from the expression in (2).

$$\varepsilon = \frac{\partial \log D_{it}}{\partial \log P_t} = \gamma \frac{H_{it}}{D_{it}} \quad (3)$$

As for elasticity, when the spread advances beyond (D/H), elasticity declines. The estimated result of the Asai model is as follows.

Table 1.2 Results of the Asai Model

Constant Term: α	3.51 (32.29)
Income: β	0.48 (0.42)
Facility Contribution Charge: $\gamma 1$	-0.17 (-12.16)
Basic Charge: $\gamma 2$	-0.17 (-6.809)
Dummy 1: $\delta 1$	0.21 (11.71)
Dummy 2: $\delta 2$	0.37 (19.40)
Dummy 3: $\delta 3$	0.60 (29.47)
DW Ratio	1.2986
Adjusted R^2	0.9848

When the model of Miyajima and Cho and the Asai model (Table 1.2) are compared, the following can be assumed. In the Miyajima and Cho model, the elasticity of the charge has no influence. It is thought that elasticity changes with the time series, as the Asai model dynamically divides the measurement period into four periods. In the Asai model, the elasticity is inversely proportional to the spread with the dummy variable adoption, and decreasing.

In addition, their analyses of the effect of network externality differ. In the model of Miyajima and Cho, network externality is thought to impact the spread more than the charge or income, but in the Asai model, demand for the landline can be explained even when network externality is not considered.

As for analysis of the spread factor for broadband—which is explained in the latter half of this paper—these models serve as useful references, where the time-series spread model is not built in, but only the static factor is analyzed; this is because it is difficult to collect data concerning the spread of this service. However, it has been found that broadband's elasticity with regard to the charge and income differs from that for landlines.

1.2 Supply Structure: Market Demarcation and Business Segment

As shown in Table 1.3, for the telecommunications market in Japan, a business division has been set up according to the Business Law, to provide a competitive framework and market demarcations.

As shown in Table 1.3, the Japanese telecommunications market has been divided into two types: type 1 telecommunications carriers (hereafter, type 1 carriers) and type 2 telecommunications carriers (hereafter, type 2 carriers). Type 1 carriers have their own exchange and transmission facilities, and they provide telecommunications services. Type 2 carriers, on the other hand, do not have their own exchange and transmission facilities, but instead use type 1 carriers' facilities, and run telecommunications businesses. Whether a company does or does not have its own

facilities is assumed to be a competitive-domination requirement, and so strict restrictions were imposed on type 1 carriers, rather than on type 2 carriers.

Table 1.3 Categories of Telecom Carriers, and Regulations

Regulation Target	Entry	Charge	Customer	Facilities
Type 1 Carrier	Permission	Permission	Citizen	Own
Special Type 2 Carrier	Register	Notification	Business (Large)	
Type 2 Carrier	Notification	Not Regulated	Business (Small)	No Facility

There were originally no business segments pertaining to long distance, international, regional, satellite, or mobile (including PHS) business, units that are generally demarcated by the Law. At that time, Japan's Ministry of Posts and Telecommunications (MPT; today's Ministry of Internal Affairs and Communications) made these divisions vis-à-vis the range of discretionary power, based on the kinds of telecommunications labor involved, their aspects, the business segments involved, and the telecommunications equipment involved, as described in a company's request for admission, as per the Business Law, Article 9. As a result, in the telecommunications industry—where dominant-subordinate relationships among competitors are controlled by whether or not a company owns certain facilities—the Business Law enabled the construction and operation of facilities to be performed more efficiently, so as to mitigate overlap in carriers' telecommunications facilities.

The type 1-type 2 carrier typology requires a context, if one is to understand forms of competition therein. The business segment that offers ideal conditions for promoting competition and creating restrictions in the telecommunications market is that which advocates the possession of telecommunications facilities as a standard; this is set forth by the MPT in the aforementioned telecommunications reform bill decision (1984). In addition, the MPT divided type 2 carriers into special type 2 telecommunications carriers² and general type 2 telecommunications carriers.³

Although the establishment of this business segment was led by the MPT, this business segment and ideas concerning the promotion of competition differs markedly from that put forth in the report from the second temporary administrative council. The second temporary administrative council concerning the introduction of competition developed a policy that limits the open (competitive) area to the backbone segment; it is a so-called long-distance communications segment. This segment, insisted upon by the temporary administrative council, described later, was thought to be the main locus of competition in the telecommunications market, during the initial stage of liberalization.

However, the intention of the MPT—which was to provide a framework for bill maintenance and restrictions—differs markedly from this; it was one that aimed to

create the most open competition system, including the introduction of competition to all business fields. That is to say, it meant to liberate regional communications, including the backbone, mobile telephones (but not landlines), and all other telecommunications industries. This complete introduction policy with regard to competition, as indicated by the MPT, was found to be the most advanced competitive market, at least compared to the competitive situation in telecommunications in other countries at that time. However, we believe that the intention of the MPT was different: that the MPT preceded the second temporary administrative council and advanced telecom liberalization because it was aiming to expand the market scale of the telecommunications industry and become a policy authority.

In addition, the external pressure to liberalize the telecommunications market, which was expected to expand in terms of market scale, was always looming.

As for market liberalization itself, since the competitive direction was not completely clear, toward the introduction of a proposal containing the upper limits for foreign investment in type 1 carriers (such as NTT) made by the second temporary administrative council, it can be said that the MPT was puzzled as to the relationship between telecommunications and national security; they pushed for foreign-affiliated entrepreneurs' admission to the Japanese market, from the viewpoint of cultivating Japanese new-entry entrepreneurs in the early stages of competition.

It is clear that the United States influenced foreign-capital restrictions vis-à-vis type 2 carriers. As for special type 2 carriers, the MPT set up a licensing system, with less than 50% of all applicants being granted a license; furthermore, as for general type 2 telecommunications carriers, the MPT set up a notification system (i.e., submission of the facilities' outlines and business plan reports).

However, as shown in Table 1.2, influenced by trade friction between the United States and Japan at that time—especially in the automobile industry—which represented a serious financial problem, the restrictions inherent in the MPT's proposal were relaxed by the political powers of the day (i.e., as a Liberal Democratic Party decision); the Japanese government considered the intentions of the U.S. government, which had strongly hoped for entry into the Japanese telecommunications market. After all, the foreign-capital restriction vis-à-vis special type 2 carriers had been virtually abolished, and a registration system introduced in its place. (However, a strict notification system, resembling a licensing system, was involved.) For general type 2 carriers, a relaxed notification system (which was almost possible to enter under liberalized conditions) was taken.

Each company's possession of telecommunications facilities defined whether it was part of the type 1 or type 2 carrier business segment, as defined in the reform bill; however, the U.S. open pressure was focused on type 2 carriers—for which

foreign-capital limitations had been virtually abolished—because foreign-capital sources to type 1 carriers were limited. Therefore, after it shifted to the reform bill, discussion between the United States and Japan did not end at defining “special type 2 carriers” and “general type 2 carriers.” In particular, the United States—which tried to spread Value-Added Network (VAN) service among special type 2 carriers on an international scale—demanded clarification of the quantitative criterion of “large scale and for many” that was a Business Law-based condition for special type 2 carrier status; the MPT responded with the concrete answer that more than 500 lines (1,200 bps) would need to be involved.

Bearing in mind this background regarding business segments when Japanese telecommunications were liberalized, these changes were not made on just one basis of service. When this aspect is compared to that of the United States, there is a great difference in the business segment service, in terms of basis and size. The first reason for this difference originates in the MPT’s restrictions to the telecommunications industry, by restricting service providers to those only from Japan.

Second, even though it had been liberalized, because this business generates considerable publicity, the type 1 carriers owned facilities and provided long-distance communications (i.e., the “backbone”) and regional communications services, and so it was necessary to be cautious about procedures concerning business development, at least in terms of granting it importance. Thus, in terms of project licensing, a license obligation was imposed on type 1 carriers, and a registration system was imposed on type 2 carriers. As for service stipulations, the license system was imposed on type 1 carriers, and the notification system was imposed on type 2 carriers. As one can see, given the strength of the restrictions placed on the business segment, in the telecommunications industry at the time it was liberalized, any competitive advantage originated in the possession of facilities.

The business segment for type 1 carriers and type 2 carriers was abolished in April 2004. In the case of the Japanese telecommunications industry, a strong restriction had been imposed on the ability of type 1 carriers to own facilities—at least until the Business Law was revised, as described later.

However, technical innovations overrode such restrictions. For example, in the case of an Internet Service Provider (ISP) business, companies can use the backbone network or facilities owned by existing carriers when it expands its business; that is why it can provide advanced service, including data communications, even when it does not own large-scale facilities. Therefore, restrictions based on the ownership of facilities are dysfunctional.

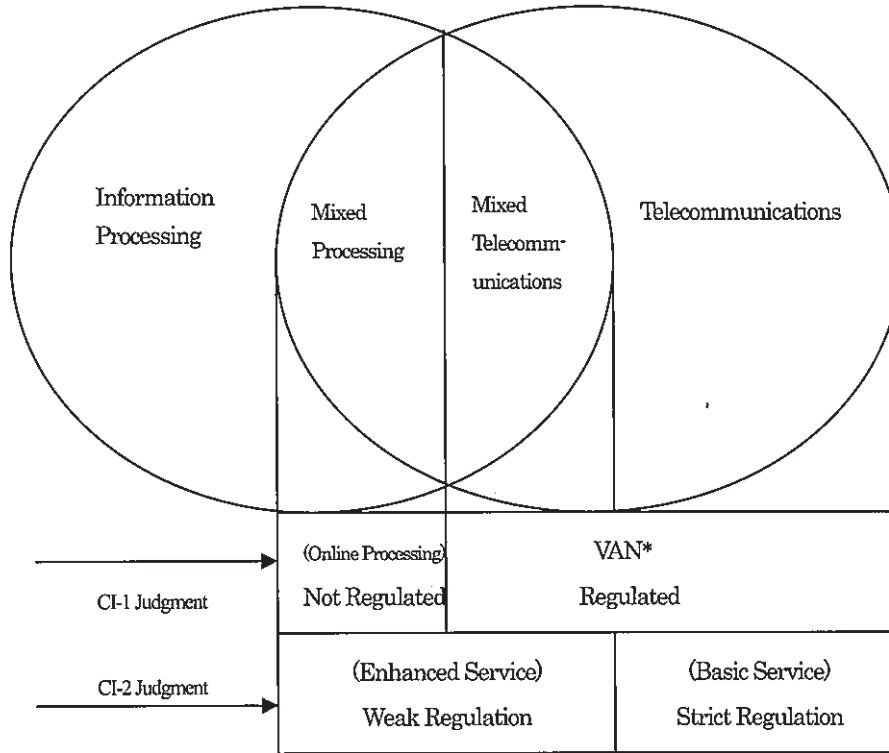
This has already been executed in the United States, which has been left searching for the possibility of spreading data communications to the public. The U.S. Federal Communications Committee (FCC) paid due attention, from early days, to TCP/IP

technology that enables data communications. In addition, the FCC foresaw the fusion of computers and communications—as embodied especially by data-processing terminals—and started to view services in these terms. For this reason, it executed the first computer investigation decision (CI-1), in 1971 (see Figure 2.1).

It is what is subject to regulation that becomes problematic here. At the time of CI-1, the development of information technology was in the spotlight, especially with regard to the fusion of telecommunications services and computer improvements, where data communications created a new demand in terms of packet-exchange systems, etc. Existing telecommunications carriers pushed their business into the areas of data communications services; as a result, new maintenance needs arose, as did competition among carriers, which only served to enhance service and promote facility-borrowing among telecommunications carriers. This is why the FCC executed multiple investigations and revisions of the restriction, as described above.

Given this background, the subject of regulation (service) in the United States obviously relates to basic communications. Data communications based on the fusion of computer technology and communications correspond to communication-processing or information-processing and are therefore less likely to be strongly regulated (see divisions in Figure 2.1). As seen in Figure 2.1, discussions of the communications division, as prompted by the occurrence of data communications, started with the first computer investigation decision (CI-1); as a result of that decision, the division between mixed communications and mixed processing was made at the boundary of communications and information processing. The FCC then sought to answer to this unprecedented phenomenon in which computers and communications were fused; following CI-1, VAN—the first service to involve the fusion of computers and communications—was placed in the area of mixed communications, and was therefore subject to regulation.⁴

Afterwards, the FCC integrated mixed processing and mixed communications, and therefore became exempt in CI-2 from regulations, as an enhanced service.



*VAN: value-added network

Figure 2.1 Regulation and Services

The VAN business came to be subject to regulation via CI-2; from there, the fusion of computers and communications proliferated, and the spread of data communications advanced rapidly in the United States.

2. Business Segment and Competition

2.1 Business Segment Based on the Possession of Telecommunications Facilities

As seen in the foregoing paragraph, in terms of business segments and the liberalization of communications in Japan, restrictions applied to companies differ between those with communications facilities and those without. This section considers the influence that business-segment type can have on competition.

First of all, as for the division between type 1 and type 2 carriers, competition that developed in the market hinged on incentive regulations, as seen among type 1

carriers who already have competition. An incentive regulation is a method of giving a certain range of discretion to carriers, so that they can allocate resources appropriately. There are a few different kinds of incentive regulation. The rate of return regulation and the price cap restriction are especially important in the traditional telecommunications field. At the beginning of competition, monopolistic firms should achieve a service offering based on the Ramsey price (i.e., average cost). Then, a charge restriction is applied, and the regulator observes a disruption between the current price level and the average cost. This is the summary cost method, and it aimed to improve management efficiency in NTT and other new companies at the beginning of competition. In addition, the rate of return regulation is led by the summary cost method.

The property K (rate base) is a standard of the rate of return calculation for the rate of return regulation. The rate of return ρ is calculated by taking the weighted average of the interest rate, and the profit margin as the weight of the capital structure ratio, following (4):

$$\rho = \frac{D}{K}i + \frac{E}{K}\pi \quad (4)$$

where K is capital, D is borrowed capital, E is equity capital, i is the interest rate, and π is the earning rate.

Although the capital structure ratio is a numerical value on paper, i and π are the real interest rate and stock profit margin, respectively, and both fluctuate; therefore, profit, more so than business rewards, can be obtained through improvements in management efficiency.

When the rate of return is determined, the charge p is as (5):

$$p = \frac{C_L + K\rho}{Q} \quad (5)$$

where ρ is the fair rate of return, C_L is business expense, and p is the charge.

The price cap restriction (i.e., price cap regulation) was adopted as a charge restriction method, following the rate of return regulation. However, this does not restrict the upper bound of the charge; rather, it restricts the upper bound of the rate of change of the charge. This can be shown via the following expression:

$$\frac{P_{t+1} - P_t}{P_t} \leq PRI - \chi \quad (6)$$

where P_t is the current price of the charge index circulated from the communications fee, which is the target of regulation; P_{t+1} is the charge index after a charge advance; PRI is the index-number-of-prices rate of advance; and χ is the assessed value of an efficiency-of-management coefficient.

The service offering associated with the charge tariff that met this requirement was imposed on companies. In addition, when such companies improved their management efficiency in line with this authorization charge, they could enjoy the surplus as a reward. However, when they could not achieve management efficiency improvement χ , they suffered a loss.

Such an incentive regulation related to pricing competition; it could be interpreted as a constant advantage for users, but when the competitive structure was examined, obviously monotonous competition became apparent. In order to clarify differences in service quality among companies, some new services were created in intelligent network (INs), but it is difficult to say, whether or not they functioned as service demand factors.

As for type 2 carriers, in the business field, it can be said that various business sectors (e.g., finance, trading, railway, electricity, newspaper, publishing, and broadcasting) other than telecommunications carriers resold the lines, and could therefore offer diverse and low-priced services. However, the market scale did not expand much in terms of either supply or demand.

Type 2 carriers can be developed by creating integrations with the network wherever companies of various business categories other than telecommunications carriers resell added value that bears their company characteristics. Therefore, it was thought that they could contribute to the development of the telecommunications industry by being allowed active service. In the United States, VAN service was created for the development of the portion of telecommunications industry that supplied added value, and VAN companies offered original data-communications service. Given this perspective, it can be said that the VAN business, which served as the precedent in the case of the United States, and type 2 carriers in Japan found themselves in a similar place, in terms of their supply form within the telecommunications industry.

However, the type 2 carriers in Japan did not develop greatly, compared to the VAN businesses in the United States, which achieved some positive results. It can be guessed that the following Japanese-specific circumstances relate to this difference. The type 2 carriers in Japan felt that liquidating too-large facilities was a burden, and a twist existed in the competitive structure, as seen among type 1 carriers that could

not advance their cost-cutting initiatives and among type 2 carriers that could not resell lines except those to objects limited by restrictions, although they saw they inherent potential.

Actually, many of the customers of type 2 carriers were companies. These companies were affiliated companies that were capitalizing and counterparty companies, so it cannot be denied that the pool of targeted customers was extremely limited.

Especially, given that the second-generation business carriers were able to provide the usual data-communications services, depending on the business category to which the carriers' parent organizations belonged, as previously stated, the expansion of their market scale was expected to exceed that of the type 1 carriers; however, the objects for service were limited to specific usages in business communications, given restrictions in the resale of lines. Therefore, they could not expand their market scale under restrictions based on business divisions.

2.2 Type 1 Telecommunications Carriers and Market Segment: The Case Study of Long-Distance Telecommunications Carriers

The carriers division was defined according to the possession of facilities, as per the Business Law, and there were considerable problems in promoting competition. Let us examine the competition policy of the type 1 carriers, while focusing on long-distance communications carriers—that is, those whose levels of competition were assumed to function the most effectively.

The MPT classified businesses and segmented the market, according to the type of telecommunications service a company offered, its section, and the telecommunications facilities it owned, as per Article 9 of the Business Law; the MPT also allocated first-class carriers in each market (international, long distance, regional, satellite, mobile, etc.).

The long-distance communications market has been a focus of intense attention since the beginning of the installation of the fourth group of the second temporary administrative council. As mentioned, the liberalization of telecommunications in Japan had significantly influenced the economic world; the Federation of Economic Organizations, for example, believed that a company should enter the long-distance communications market wherever a high rate of profit was expected.

Moreover, the Japanese National Railway—whose privatization was urged more than that of NTT—was highly expected to enter the telecommunications industry. That is to say, telecommunications networks were scheduled to be constructed by making effective use of the unique properties of the Japanese National Railway (e.g., the railway telephone); these networks would be privately and jointly owned by the Japanese National Railway and NTT. Naturally, the government had an ulterior

motive: to enter the telecommunications market and hold an operational company, but keep it separate the Japanese National Railway, which was plagued by chronic deficits.

The government also tried to coerce the Ministry of Construction, which was able to construct the network on the expressway, and the Japan Highway Public Corporation into entering the long-distance communications market. Concurrently, the economic world (i.e., the Federation of Economic Organizations) set aside one company as the participation company via a union of controlled firms, and opposed the Japanese National Railway and Japan Highway Public Corporation (Ministry of Construction) plan that the government recommended. The Federation of Economic Organizations was planning to construct the network needed to handle long-distance communications by combining satellites, fiber-optics, and microwaves. However, while the Federation of Economic Organizations was tweaking this plan, Diani Denden Inc. (DDI), joined by Kyocera, Secom, and Ushio—all of which showed remarkable progress at that time—already started its business in this area, in May 1984. However, when each of these companies started in the telecommunications business, unlike the Japanese National Railway and the Japan Highway Public Corporation, it did not have the network infrastructure needed as the foundation of a telecommunications base. The effectiveness of this project was therefore doubted at that time.

In cases where there was no substantive infrastructure in place, it was MCI Communications Corporation that entered the long-distance telecommunications market, as well as other common carriers (OCC), at the time when telecommunications were liberalized in the United States; it was MCI on which Kyocera had been modeled. When MCI entered the U.S. long-distance communications market, it did not have an infrastructure that could be as effective a network as was needed, and so it converted radar technology used during World War II and used microwaves as the backbone communications network. This is a communications method that bears a low cost burden, by virtue of the base station involved and the allocation of microwaves; it also serves as the basis of present-day mobile phone communications. Wireless telecommunications, including microwaves, are advancing greatly in terms of sophistication; they are expected to achieve a high level of practical use and become the successor to broadband systems, as described in the latter half of this paper.

As DDI had virtually no infrastructure in place, it had no choice but to use this type of network. However, just prior to the liberalization of telecommunications in Japan, for type 1 carriers, it seemed an absolute requirement to have a fiber-optics network when providing leased-line service; this was because the main market of type 1 carriers was thought to comprise data communications service (dedicated line network) consumers, not landline service consumers. On the contrary, just as

telecommunications were becoming liberalized, it was not data communications services but long-distance landline services to which the market most readily reacted.

As is known, by examining the realities of competition among type 1 carriers, the start-up companies back then knew they were entering the market at a time when certain competition factors—including facilities and regulations—were unstable. Although electric-power systems existed and maintained the potentiality of other telecommunications technologies, they were divided into regional groups, and each regional company (for nine companies in total) managed its electricity business independently; it was therefore difficult for these nine companies to integrate and start working together in the area of long-distance communications.

The competitive advantages of the telecommunications business, at that time, were wrought by the facilities involved; a network on a nationwide scale was needed for entry into the long-distance telecommunications market, as it would serve as the company's communications backbone. Therefore, there was no doubt that the Japanese National Railway and the Japan Highway Public Corporation could serve as powerful start-up corporations. However, the electric-power system corporations offered electric power not only to networks on a nationwide scale, but also to virtually every household, using self-owned power networks. Therefore, they had the potential to form a self-owned telecommunications network that operated on a nationwide scale, without the need to connect to NTT user lines; this was later raised as being problematic. However, the electric-power companies were highly independent as regional companies, and so they found it difficult to reach consensus in business matters.

Administrative interests, in addition to the aforementioned managerial factors, resulted in the electric-power companies relinquishing their plans to enter the long-distance telecommunications market. The MPT, which seized the authority to grant permission to potential players in the telecommunications industry—and which also considered the effects of communications liberalization on government-office policy—was afraid that the electric-power companies, under the jurisdiction of the Ministry of International Trade and Industry, would expand their influence to the telecommunications industry. However, afterwards, the electric-power systems advanced into regional communications and are now offering a wide array of services, including broadband.

A tug-of-war soon took place between two administrative bodies with respect to this line of business, following the liberalization of telecommunications: the Ministry of Economy, Trade and Industry (the former Ministry of International Trade and Industry), which valued the wealth of information wrought by an expansion in data communications, and the Ministry of Internal Affairs and Communications (formerly the MPT), which valued telecommunications itself, in terms of innovation in information and communications technology.

According to these backgrounds, in this situation, the electric-power companies found it impossible to enter the long-distance communications business, but they did enter the regions (i.e., cities) that needed subscriber lines. They started with authorization of Tokyo Electric Power (the Tokyo Telecommunication Network [TTN] was established in March 1986) to use the electric-power network that fed into the subscribers' houses. However, the MPT was still afraid that the electric-power companies might threaten its discretionary power in the telecommunications industry. Therefore, many of the people with concerns at that time talked about the possibility of there being a contract executed among them, wherein they would promise not to enter the long-distance communications business, even though the MPT had permitted them to enter telecommunications at the local level.

Considering the entry situation that many start-up companies faced, the MPT tried to make it so that only one company would enter the business and compete with Kokusai Denshin Denwa Co. (KDD); the MPT did so, taking into account the scale of the international communications market, and basing decision separations among working areas. However, confusion arose here. At first, the general trading companies were planning to jointly establish International Telecom Japan (ITJ), based on the idea of there being one company, but this caused problems with the British government, owing to the intention of Britain Cable & Wireless (C&W) to enter the international communications business. At first, Itochu Corporation, which formed a component of the general trading companies group for the ITJ establishment, withdrew from the group and worked to establish International Digital Communications (IDC), which was associated with C&W. To avoid friction with the British government, the MPT expanded the entry frame to the international communications market for two companies; thus, ITJ and IDC obtained authorization in November 1987. Then, three companies, including KDD, came to compete in the international communications market.

The market segment of type 1 carriers such as this actually served the purpose of helping to develop companies: type 1 carriers were obligated to own telecommunications facilities, so they would be able to construct other facilities efficiently and anticipate a cost advantage that could ameliorate cost burdens. As the telecommunications business is influenced by technical innovation in the rapidly advancing information-communications field, it needs a number of things: an exchange of terminals; improvements and diversifications in hardware, including network facilities; and the maintenance of existing network technologies, including software development. In addition, rapid technological innovation stimulates communication-related demand, and it encourages service diversification among suppliers. In line with this, as the market segment that related to the existing network, this was not an altogether inappropriate competition policy; however, it was meaningless in terms of both TCP and IP.

This market segment—namely, the business segment—was a competitive framework that the MPT, as the regulator, had discretionarily set. However, the market segment actively promoted technological development; it was not based on dynamic competition that pressed the advent of new technologies and services. Start-up companies were allocated to, and restricted by, the business-segment paradigm, and so they had no choice but to engage in forms of competition set up by the regulator.

3. Modern Value of Communications Sovereignty and Relation of Foreign Capital Restriction

3.1 Communication Sovereignty and the Internationalization of the Telecommunications Industry

There is the concept of “communication sovereignty” in international business development, in the telecommunications field. “Communication sovereignty” refers to management’s ability to make decisions vis-à-vis telecommunications carriers; moreover, the integration of telecommunications technology is positioned as a matter of national sovereignty, because it is thought that the telecommunications industry influences the politics and economy of a country, including its national defense and security. As part of this idea, the foreign capital restriction has been imposed exclusively on telecommunications carriers in other countries; however, this idea is bearing greater weight, owing to technical innovation. It became possible to offer Internet and international communications—which had been otherwise difficult to apply to each country’s framework when restrictions were applied—thanks to the development of satellites and mass submarine cables, even though providers were not necessarily international telecommunications providers within the country.

In the face of this situation, the abolition of the foreign-capital restriction was discussed, together with contradictions inherent in the business segment.

When the Kokusai Denshin Denwa Co. Law (hereafter, the KDD Law) was enacted, based on the idea of communication sovereignty, investment rights other than those of the Japanese were not allowed in Japan. However, it became difficult to completely maintain the idea of communication sovereignty, especially as technical innovation took place; restrictions on foreign capital were therefore eased in the international data communications business arena after the 1970s. This was because foreign-capital restrictions were thought to interrupt national interests with respect to developing the communications industry internationally.

According to this policy, the foreign-capital restriction to KDD (currently KDDI) was abolished at first; later, companies other than NTT were subject to a constant foreign-capital restriction that was ultimately abolished.

This abolition of foreign-capital restrictions was related to trade liberalization in the World Trade Organization (WTO) system during the Uruguay Round in the 1980s. Global competition in the telecommunications field mainly concerned hardware, including switchboards and transmission lines; this was symptomatic of the telecommunications industry's focus on facilities at that time. It was essentially prohibited for telecommunications companies in third-party countries to compete in the telecommunications field in certain countries. However, with the telecommunications industry as per the WTO system, the movement toward economic liberalization—led by the former socialist countries—took place worldwide, and developing countries also sought to use telecommunications technologies for industrial development.

Thus, the attempt to construct the telecommunications infrastructure as a social foundation and later enhance it was embraced by the former socialist countries, including advanced and developing countries alike. Capital from advanced countries served as a large support for countries whose telecommunications infrastructures were inadequate, and so foreign-capital restrictions were relaxed. That is, during the proliferation of the telecommunications industry in developing countries, the introduction of foreign capital was not completely denied; rather, it was considered a conduit to change, and so the main telecommunications companies in the United States and Europe began to undertake large-scale investment on a worldwide scale.

Japan's liberalization of communications started in 1985; after that, the world faced the end of the ideological struggle inherent in the Cold War, and it looked to take part in economic competition on a worldwide scale, based on the market mechanism. Therefore, in developing business activities on a worldwide scale, in order to use management resources, the use of telecommunications technologies was valued, and the importance of the grounds of a business segment—that is, domestic versus international—was weakening. In what follows, I analyze the chain of events leading to foreign-capital deregulation in the telecommunications industry in Japan, as well as problems inherent in a regulatory structure that focuses on the business segment.

3.2 Formation of the International Communications Market

The positive introduction of foreign capital backs up the telecommunications industry, wherever business development is urged on a worldwide scale. Especially in terms of restrictions, this has meant the obsolescence of service divisions that had become a fetter; similarly, seamless functionality—including technology, serviceability, and charge-setting, the third of which was a feature of telecommunications—was obstructed. When telecommunications services were efficiently operated on a worldwide scale through the introduction of foreign capital,

immediate revisions were necessary in service divisions that otherwise obstructed seamless functionality.

This service division is already nonexistent in the current market; however, at that time, its existence needed to be reviewed carefully, because it was known to possibly have a great influence on supply-and-demand adjustments in the business segment, prompted by the discretion of the MPT and in its subsidiary market. The MPT and various telecommunications companies thought it inevitable that a management foundation would be established, based on information resources; this was because the globalization of economic competition had been foreseen since the beginning of liberalization.

The service division functioned as a protection restriction when KDD was established in 1952; it also functioned in a market based on supply-and-demand adjustments, as led by the MPT, when telecommunications were liberalized. However, the service division could not help but be affected by changes in the business environment. In line with this kind of change, the MPT started to undertake a form of competition among long-distance or international start-up companies—namely, KDDI and NTT—that was related to the abolition of the service segment and a review of the business segment.

The MPT's basic policy regarding competition was as follows. The business segment relating to start-up companies was not defined by the Business Law; rather, it was specified within the range of discretionary power, based on the MPT's restriction policy (i.e., supply-and-demand adjustments). Therefore, when the service division was abolished, the MPT needed to determine how to categorize the long-distance or international start-up companies who needed to institute the best measures, depending on the market situation at the time. As KDD and NTT are the dominant companies, the competition framework—including the business segment, for start-up companies—depends on KDD's and NTT's positions in markets that are affected by the abolition of the service division.

In addition, the market scale of the international communications market is not overly large. According to the MPT report, the sales statistics in fiscal year (FY) 1992 were as follows: the domestic regional or long-distance communications market, 7 trillion yen, and the international communications market, about 300 billion yen. The state of the international communications market is very different from the monopolistic situation of KDD at the time when the service division was defined, affected as it was by the entry of start-up companies and foreign telecommunications companies owing to foreign-capital deregulations. As a result, KDD's profits fell, because KDD's service division was limited to the international communications market. Therefore, the abolition of the service division—and thus granting KDD permission to enter the domestic long-distance market—led to deregulation measures that helped improve KDD's profitability; it also led to stronger demands for the

prompt revision of the KDD Law.

Next, let us ask: what did NTT think of the abolition of the service division? Although the MPT pressed KDD to revise the KDD Law with the aim of abolishing the service division, it took quite the opposite tack vis-à-vis NTT. In short, the abolition of the service division was a kind of deregulation that would remove the division between domestic and international service. Therefore, in circumstances where the scale of the international communications market was shrinking, KDD's domestic entry into the long-distance communications market led to a mutual and open competition policy that permitted NTT to enter the international communications market; it did so, in July 1999.

However, if NTT were to enter the international communications market, KDD's profitability in the same market would be further reduced, because NTT's size and management resources in the telecommunications business are much larger than those of KDD.

The MPT believed that the abolition of the service division would lead to NTT's entry into the international communications market, and so the MPT used the following techniques to resolve this contradiction. First, the MPT revised the KDD Law in the process of abolishing the service division, and it allowed KDD to enter the domestic market ahead of NTT. The MPT raised the corporate division problem at the second temporary administrative council; then, after reaching a conclusion with regard to this problem, it came up with the idea of abolishing the service division in terms of time difference. In this way, the NTT Law was revised so that NTT could enter the international communications market.

3.3 Economic Efficiency in the International Communications Market

The big problem inherent in the concurrent opening of both the long-distance and international markets relates to economic efficiency in the international communications market: there, a 23% charge difference between KDD and start-up companies was seen—a scenario different from that seen with the domestic market, where the charge difference in 1994 was up to 1%. Let us examine this gap in terms of the demand curve of the international communications market. In this case, as the competition strategies involve expansion and network charges, the approximate demand function that start-up companies face is as shown in (7):

$$D_c = \alpha_0 - \alpha_1 P_c + \alpha_2 P_n - \alpha_3(1 - \theta) \quad (7)$$

where D_c is the demand function of new common carriers (NCC), α_0 is a constant number, P_c is the charge to NCC, P_n is the dominant undertaker's (i.e., NTT's or

KDD's) charge, θ is NCC's network rate, and $\alpha > 0$.

In this case, the higher the start-up companies' networking rate is, compared to that of NTT subscribers, and the wider the charge gap is, the more demand will increase for start-up companies' services.

If the networking of start-up companies in the international communications market increases, and the charge gap is reduced, the numerical value of $(1 - \theta)$ shrinks. At this time, the approximate demand curve that KDD faces is as shown in (8):

$$D_k = \alpha_0 - \alpha_1 P_k + \alpha_2 P_c + \alpha_3 \delta_k \quad (8)$$

where D_k is the demand function of KDD, α_0 is a constant number, P_k is the charge to KDD, P_c is the charge to NCC, and δ_k is the branding impact of KDD.

On the other hand, NCC takes the corporate activity of (9):

$$D_c = \beta_0 - \beta_1 P_c + \beta_2 P_k + \beta_3 \delta_c \quad (9)$$

where δ_c is the branding impact of NCC, D is the demand curve of KDD, MR is the marginal revenue curve of KDD, and MC is the marginal cost curve of KDD.

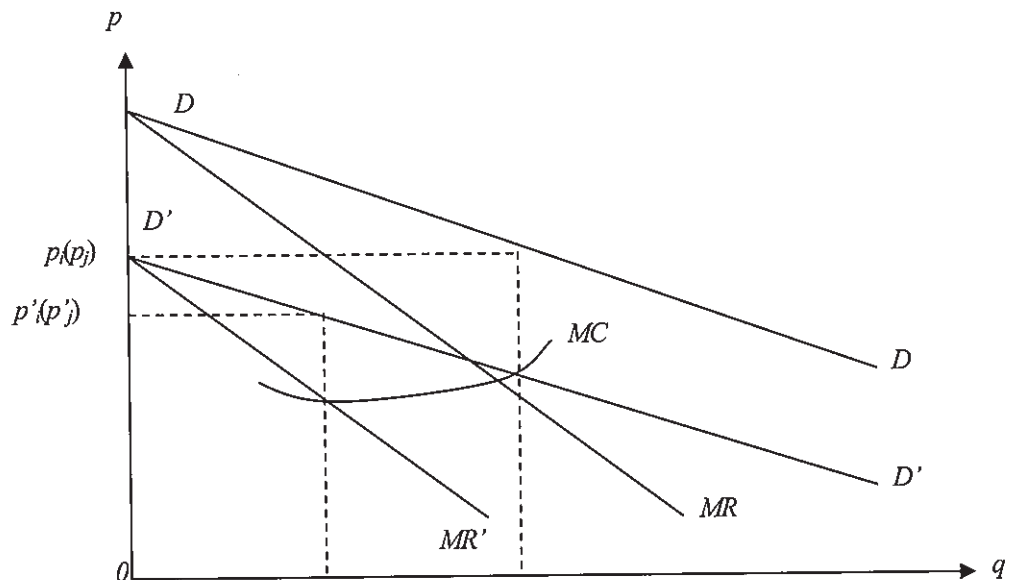


Figure 3.1 Demand curve of the international telecommunications market

As shown in Figure 3.1, if the start-up companies' charges fall and become considerably lower than those of KDD, the demand curve of KDD will descend from DD to $D'D'$. In addition, the marginal revenue curve will descend from MR to MR' . To prevent this, KDD has no choice but to lower the charge.

3.4 Kokusai Denshin Dena Co., Ltd. Law Revision

As demand in the international communications market began to decrease to the utmost limits, it became necessary to push KDD to enter the domestic market; at the same time, however, there was no choice but to allow NTT to enter the international market, as previously stated. For this to occur, the MPT needed to revise the NTT Law. On the other hand, the Ministry of Finance expected that the selling of NTT stock would provide some economic recovery relief. For all these political reasons, the MPT supported the revision of the NTT Law.

In the 1980s and 1990s, stock-market prices were steadily dropping; as a last resort, the government took measures to boost stock prices by offering NTT stock to foreign capitalists who held abundant funding sources.

The government started to revise the NTT Law to ease the foreign-capital restrictions; likewise, the government considered revising the KDD Law, and submitted a report to this effect in September 1991. This proposal stated that it was necessary to reconsider the fact that foreigners were completely prohibited from holding stock in both NTT and KDD.

Furthermore, on the grounds that "the foreign capital ratio was 20% or less in licensing of radio stations in the United States and in shareholdings in Canada, and there was no foreign capital restriction in Britain, but the foreign capital was completely excluded in Germany and France, so less than one-fifth of the foreign capital ratio was suitable," the NTT Law and the KDD Law were revised in 1993.

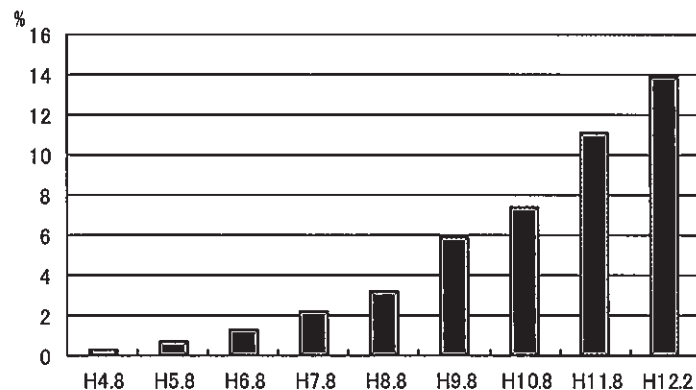


Figure 3.2 Increasing foreign capitals in Japan (2010)

These were the new stipulations of Article 4-2 of the 61 Act; based on these, on the condition that foreigners' "rights to vote couldn't be more than one-fifth," the "foreign capital restriction was eased"¹ and the entry of foreign capital for investment in telecommunications companies was permitted. Afterwards, moves to deregulate foreign-capital investments and abolish divisions rapidly progressed; foreign-capital restrictions vis-à-vis type 1 carriers other than NTT were abolished in January 1998.¹¹ According to an industrial communications basic report by the Ministry of Internal Affairs and Communications, the introduction of foreign capital into Japan's communications industry and related industries was ongoing. According to the type of business involved, as previously mentioned, there were many foreign capital introduction ratios for businesses related to ISPs, because TCP/IP networks are not limited by borders (Figure 3.2).

In the United States, the FCC abolished, in November 1995, foreign-capital restrictions to telecommunications companies, based on mutual market liberalization. In telecommunications, foreign-capital restrictions—imposed by virtue of communication sovereignty in the age of the monopoly, before liberalization—changed greatly, owing to the worldwide move to liberalize communications, in the 1980s. This trend can be seen in the move to a free economy under the WTO system, which was seen in the Uruguay Round—whose starting point was the end of the Cold War, after the 1990s. Japan's telecommunications also headed in the direction of foreign-capital entry, without exception.

4. Competitive Structure of the Long-Distance Communications Market during the Market-Creation Period

4.1 Progress of Competition/Stagnation of Competition: Competition Realities in the Long-Distance Communications Market

This section focuses on the long-distance communications business and the maintenance of competitive conditions—which was the single biggest purpose of communications liberalization—while deregulation, including the privatization of NTT, was performed. It also analyzes the formation processes therein and the competition realities.

The market creation period discussed in this section took place in 1993–1994, during which symptoms of limitations came to be seen in the competition effect. This became clear while focusing on rate competition in the long-distance communications market, on account of reductions in the burden of depreciation vis-à-vis companies' facilities, and the scale of the long-distance market since the first information-communications reform in 1985.

Competition afforded by Japanese communications liberalization expanded, centering on the long-distance communications market; it was there, after all, that the largest profits were expected. However, with innovations in information-communications technologies came “the death of the distance,” and the social role and function of traditional telecommunications companies faced a turning point.

Start-up companies in the long-distance communications market were protected by asymmetry and charge restrictions since the onslaught of competition; they were therefore able to expand supply and demand scales by expanding service areas and placing charge restrictions. However, such market environments did not last long. As a result of monotonous competition caused by charge reductions and the homogeneity of service offering and quality among companies, the scale of the long-distance communications market failed to expand. For this reason, the start-up companies' profitability decreased.

The long-distance telecommunications companies, which developed rapidly in the early period of liberalization, had to change their business structures dramatically during the information-communications reform period and the Business Law revision period, owing to the spread of new network technologies. They frequently took part in corporate consolidations, and so there are now no extant companies that exhibit the management form of that time. The flow and the outline of the three Japanese telecommunications reforms that led to the Business Law revision can be seen. The single largest purpose of the second information-communications reform was to rebuild NTT; at that time, business separations (i.e., involving the data communications and mobile telephone sections) and service divisions (i.e., regional and long distance) were executed. However, these reforms are considered a part of transitional policy in the transition stage of telecommunications structures, and so a detailed analysis is not provided here. Instead, especially noteworthy is the third information-communications reform, as well as the full-scale market competition that came in the broadband market with the revision of the Business Law—the latter of which was affected by a situation where supply-and-demand adjustments in the market were abolished as a matter of competition policy.

Three long-distance type 1 carriers were planning to start business, including the approval of projects and the building of facilities. At first, Japan Telecom Co. Ltd. started a leased-line service between Tokyo and Osaka in June 1986; then, a little later, two other companies started offering the same leased-line service in the same zone.

Subsequently, all three companies were providing (long-distance) landline service between Tokyo and Osaka by September 1987. They were able to provide leased-line and landline services at rates about 20% cheaper than those of NTT, because the promotion policy for start-up companies was based on the charge restriction

established by the MPT, and this functioned well.

In the meantime, the start-up companies continued to steadily expand the market scale, and received benefits from the charge restriction. After a while, as the MPT assessed that the management of these start-up companies as being “on the right track,” the charge difference between NTT and the start-up companies dwindled to only 5% by around 1995, although the charge restriction was being maintained. The demand for long-distance communications that centered on landline service was already saturated, and so start-up companies had no revenue base by which they could reduce prices and further enhance their competitiveness, especially with respect to countering the depreciation of backbone communications facilities.

By making the charge difference between existing companies and start-up companies a matter of policy, the long-distance communications market encouraged start-up companies to develop themselves further; in this way, the service areas continued to expand, and DDI and Japan Telecom Co., Ltd. completed their nationwide proliferation at the end of 1992. After that, Teleway Japan Corporation completed its nationwide spread in March 1995. (Because of this lag, Teleway Japan Corporation diverged greatly from the other two companies in terms of customer acquisition.) DDI and Japan Telecom Co., Ltd. each achieved a single fiscal-year surplus in FY1988, and the two companies swept away their cumulative losses, achieving more solid results than expected in the long-distance communications market.

When one sees the share (i.e., sales base) of the long-distance communications market in FY1994—in which the limits of charge reductions were starting to be seen—the market scale was 1.95 trillion yen, of which NTT’s long-distance department occupied 66%, and start-up companies occupied 34%. (DDI occupied 15.3%, Japan Telecom occupied 14.5%, and Teleway Japan Corporation occupied 4.2%.)¹²

The growth (i.e., earnings) of each start-up company was remarkable in view of their sales in FY1994, but how one reviews the market scale of the long-distance communications market itself is important. Communications liberalization was a movement that mainly aimed to form a competitive market, and this promoted active competition by introducing charge reductions; it also sought to expand the scale of the telecommunications market (including long distance), stimulate the economy, and provide technical development and new services within a virtuous circle.

However, while the sales of long-distance start-up companies increased, the scale of the entire long-distance communications market did not expand. In other words, the lowering of charges roused a demand for communications, and service providers could not expand the market scale to meet this need.

As for competition in the long-distance communications market, charges were returned to consumers as a function of competition, and the market scale of the

start-up companies did not expand, despite their market share having expanded. Therefore, the companies that had received the favor of a charge restriction lacked the desire to develop various competitive features, like unique services or revolutionary discount services.

As for service rates, there was a difference of about 100 yen (per three minutes, in daytime hours) between NTT and start-up companies, according to the restriction; it was therefore very meaningful to show this difference to customers. However, in or after 1993, when competition was cooling down, NTT's daytime rate (for three minutes) was 180 yen, and that of start-up companies was 170 yen; therefore, any competitive edge based on this difference had nearly lost its meaning. Also, the discount services that each company, including NTT, offered were not appealing to customers, because those services had become virtually indistinguishable across companies.

One of the reasons why telecommunications service that centered on landlines did not become more diverse during the time the telecommunications market was founded (from 1985 to 1993–1994) was that there were differences between domestic and foreign prices, from an international perspective (see Table 4.1). As seen in Table 4.1, the price difference between Japan and the United States with regard to telephones and leased lines was as follows: the price in the United States = $1/2 \times$ the price in Japan.

When similar communications liberalization was executed in the United States, both the VAN service and the quantity discount service grew in diversity. The reason for this was that the rate in the United States was set originally lower than that in Japan. Therefore, it was not so much that the U.S. companies had lowered their prices, but rather that they had expanded the market scale by rousing customer demand for telecommunications through a diversity of services and prices.

Table 4.1 Charges for Long-Distance Calls

	Japan	United States
Telephone 1993	170 yen/3 minutes	96 yen (US\$0.8)/3 minutes
Leased Line 1995	1,670,000 yen/month Tokyo–Osaka (1.5Mbps)	825,000 yen (US\$6,800)/ month/ Same distance as Tokyo–Osaka (1.5 Mbps)

Source: Japan Telecom and MCI Corporation, 1993

Moreover, in the case of the telecommunications business, the ratio of utilization is important to companies. Companies are always confronted by the problem of depreciation, because the provision telecommunications services depend on the use of telecommunications facilities. Therefore, they need to continually increase their usage frequency and reduce their costs, if they are to efficiently construct and

maintain telecommunications facilities.

If the tariff (i.e., the service rate) falls because of competition, the unit price in providing the telecommunications service will inevitably increase. Therefore, in a situation where the charge reduction is growing, type 1 carriers that bear costs associated with the construction and maintenance of telecommunications facilities need to rouse consumer demand, increase usage frequency, and promote boosts in traffic.

Table 4.2 Increasing Ratio of Average Telephony Traffic between FY1988 and 1993

Distance Stage	Increase in average number of calls	Increase in average calling time
Message Area	0.95%	2.12%
<100 km	4.40%	5.23%
>100 km	4.33%	5.40%
Average	2.11%	3.41%

Source: Ministry of Post and Telecommunication, 1993

As shown in Table 4.2, traffic increased. (The average rate of increase among all distance divisions was 3.41%.) However, because of the unit-price reduction, that traffic increase did not promote the usage frequency that would have covered discounted traffic; as a result, the scale of the long-distance communications market (i.e., demand) decreased.

The stagnation factor inherent in the long-distance communications market lay in its competitive structures. The demand scale expanded with the expansion of offer areas on a nationwide scale, but it can be said that competition in the long-distance communications market substantially ended because of a decrease in the elasticity of demand.

4.2 Competition and Restriction in the Long-Distance Communications Market: Factors Leading to Stagnation in Competition

In the long-distance communications market, expansions in the supply and demand scales functioned as part of a virtuous circle until around 1990, bringing forth increases in company profits. Also, both the uniform charge reduction and the uniform discount service expanded as part of competition policy. Masao Honda believes that the contributing factors lay in the regulation problems, summarizing them thus:¹³

The division of type 1 and type 2 carriers. As a result of this division, type 1 carriers lost their motivation to develop services, because stronger restrictions were imposed on them than on type 2 carriers, even with

respect to the same service type.

Companies that could compete with NTT in providing these services comprehensively did not come to the forefront, on account of segmented business divisions.

Start-up companies were restricted by uniform regulation.

Negotiations among companies involved principles relating to access charges (interconnection), so rules for conflict resolution were not clear, and the adjustment period was prolonged.

The use of communications lines was severely restricted. (Connections from leased to public lines were established in 1995, and connections from public to leased to public lines were established in 1997.)

Regarding the existence of the NTT Law and the KDD Law: bad effects stemmed from regulatory agencies, which in turn intruded on business affairs.

Following the mid-1990s, demand for communications services could not be roused, even with price reductions; the market scale shriveled. One of the reasons for this is that each start-up company neglected to partake in positive service development, which was protected by controlled restrictions. Account settlements for start-up companies (including DDI and Japan Telecom) ended in March of FY1993; this phenomenon is shown concretely in Table 4.3.

Table 4.3 Comparisons of Operating Ratio
(New Common Carriers, FY1993)

	DDI	Japan Telecom
Operating ratio*1	44%	39%
Operating earning rate*2	19%	18%

(Source) Facts and Figures FY1993

In the long-distance telecommunications market in FY1993, DDI had 250 billion yen in sales, slightly exceeding that of Japan Telecom. The business expenses of the two companies are calculated as shown in Table 4.3: both companies were investing 40% of their real sales amount into business expenses. Many of these expenses comprised selling expenses, such as advertising and agency incentives.

In addition, those expenses included costs associated with collecting service charges, because at that time each company had to collect charges individually. However, in terms of operating profit margin, both companies boosted their business profits—which was almost 20% of the sales amount—despite the fact that they had spent large amounts of money on business expenses. This numerical value was high, compared to those of other industrial organizations.

In fact, the financial affairs of start-up companies at this time assumed business structures in which the more they invested, the larger the business profits they received. Therefore, when they invested aggressively in facilities and human resources, the expansion in the supply scale roused demand, which in turn gave rise to an increase in profits. However, the success of this technique also gave rise to a lack of management efficiency among start-up companies; this was one of the factors that contributed to the aforementioned price gap between domestic and international services. It can be said that this phenomenon was inconsistent with the idea of communications liberalization in the early days. In the long-distance communications market, it seems that consumers were able to enjoy constant advantages that were wrought by charge reductions. However, had the start-up companies improved their management efficiencies, they could have corrected the price gap and achieved a service offering with an even lower price.

In this regard, we cannot categorically blame those companies for inefficient management. On the other hand, it is also true that the regulation was protected. Originally, the worldwide dominant telecommunications industry (i.e., landlines) was established through a technique in which toll communications covered the deficit in local communications; the landlines in Japan in the Dendenkosha period were managed in the same way. Therefore, when communications liberalization occurred in each country, covering the deficit in local communications became an issue; in order to resolve this problem, a rebalancing adjustment of local and toll communications rates was implemented.

When the deficit in local communications could not be compensated for, the government provided financial support; if a company still could not eliminate its deficit, even with government support, it asked new companies and consumers to share the burden.

During Japan's communications liberalization, maintaining local communications became an important issue, based on competition in the long-distance communications market; new companies were covering the local portion of costs with access charges (i.e., interconnection fees), but still, the deficit in local communications was not eliminated; NTT used profits from toll communications to cover its deficits.

If the public utilities restriction were applied to telecommunications, the generation of this cost becomes important, industry-wide; it is therefore necessary to make the mechanism of the level decision function correctly. This is shown as follows by Tetsuzo Yamamoto.¹⁴

NTT is assumed to be X , and the start-up company (of long-distance services) is assumed to be Y . To simplify this problem, it is assumed that these two companies are competing in the long-distance communications market. The total of the usage charge in the regional communications network is as per (10):

$$Q = q_0 + q_1 + q_2 \quad (10)$$

where Q is the traffic, q_1 is the local traffic of X , and q_2 is the long-distance traffic of Y .

A cost function is as follows when it assumes that the cost of others of X —for example, research and development expenditure—is constant at this time. First, the cost of the local call of X is set to (11):

$$C_0 = c_0 Q + k_0 \quad (11)$$

where C_0 is the cost function of the city connection of X , c_0 is the marginal cost (access service by X : medium input goods), and k_0 is the common fixed cost for local communications network construction and a conduct of X (access founder cost, research and development cost, universal service cost, and others).

Then, suburban (long distance) connection of X is set to (12):

$$C_1 = c_1 q_1 \quad (12)$$

However, C_1 is the cost function of the long-distance service of X , c_1 is X 's marginal costs (last service of X), and q_1 is the last service quantity of output (long-distance traffic of X).

Furthermore, the long-distance traffic of Y is calculated as per (13):

$$C_2 = c_2 q_2 \quad (13)$$

where C_2 is the cost function of the long-distance service of Y , c_2 is the cost function of the long-distance service of Y , and q_2 is the last service quantity of the output (the long-distance traffic of X).

I set access charge as a ; $TC(q_0, q_1, q_2)$ is the total cost that the service offer of a local network takes. Then, the mean incremental cost AIC_y of Y is shown in (14):

$$AIC_y = [TC(q_0, q_1, q_2) - TC(q_0, q_1, 0)]/q_2 \quad (14)$$

where q_0 is the quantity of output of the access service (medium input goods) by X (local traffic that happens in conjunction with long-distance connection).

AIC_y is the mean value of the total cost in the case where Y provides (or does not provide) service. If the access charge is determined by this, I set to (15) from a cost function:

$$AIC_y = c_0 + c_2 \quad (15)$$

The access charge is set to (16):

$$a = c_0 \quad (16)$$

At this time, Y is exempt from a joint cost burden. When Y provides service independently, the required cost SAC_y is set to (17):

$$SAC_y = TC(0,0,q_2)/q_2 \quad (17)$$

If the access charge is determined in this way, I would mention that (18) has materialized:

$$SAC_y = c_0 + k_0/q_2 + c_2 \quad (18)$$

At this point, I will mention that access charge (a) becomes as shown in (19):

$$a = c_0 + k_0/q_2 \quad (19)$$

At this time, Y pays all the joint costs.

By the way, similarly, AC_y —which is also a cost that mitigates further cost, according to Yamamoto—is affected by the influence of difference Δc service (final goods) of X and Y , which I can express as shown in (20):

$$\Delta c = c_1 - c_2 > 0 \quad (20)$$

If Δc determines the access charge, the access charge to Y is shown via (21):

$$A = AC_y = p_1 - c_1 = p_1 - c_2 - \Delta c \quad (21)$$

The access charge becomes equal with the difference between the charge in the long-distance (toll) communications service for X and the marginal cost. However, it is unclear whether or not the joint costs were shared appropriately with this access

charge, owing to the unspecified charge.

There are some ways to calculate the access charge, and the calculation differs according to which way was adopted; therefore, this was an important regulatory issue. NTT had to secure a profit in toll communications, in order to maintain the local network (subscribers' line), which was one of the social/public demands; NTT could not implement a rapid price cut, as a result. I contradict the charge restriction under the rapid technical improvement environment, as discussed in the previous section; there, I address the problem of the current long-term cost increment method, while considering the access charge as part of the charge restriction.

Finally, the regulatory authority—namely, the MPT—was unable to push for rapid price cuts, in view of NTT's situation, the existence of local networks, and the promotion of start-up communications companies.

4.3 Epilogue

This paper argues that the competition policy that has been in place in Japan since the liberalization of telecommunications has not functioned to address the problem of the regulatory structure, nor the influence of technical innovation. As for its relationship with technical innovation, the regulatory structure of facilities of that time—such as restriction divisions—cannot exist to promote a smooth shift to IP technology as the underpinning technology of the *de facto* telecommunications networks. That is because IP networks are abstract networks, and those networks exist by vertically separating the logical layer (i.e., services) from the physical layer (i.e., facilities). This serves as one good reason to revise the Business Law.

Also, in the traditional telecommunications industry, subscriber stations were managed by monopolistic companies, and start-up companies had to pay access charges to monopolistic companies, to cover their capital investment. However, the specific means of calculating access charges could not be approached in terms of the cost burden of monopolistic facilities, given the level of diversification (in, for example, law prices for the relay and connections between landlines and mobile phones). Moreover, the essence of the access charge is based on the premise that the sending side bears all costs.

However, the cost burden structure inherent in recent telecommunications services has diversified, even among consumers. It has prompted the Business Law revision so as to consider the IP technology that constitutes the policy problems that the traditional telecommunications industry faces.

The access charge is an essential problem with regard to restrictions and business development in the traditional telecommunications industry. This paper concludes that the only dysfunction in this system is of a technical and systematic nature—the rectification of which will be realized by a shift to IP-based telecommunications

technology.

Notes

- ¹ Takashima, Yuuichi, "Kanyu Denwa no Gensyou Youin ni kansuru Jossyouteki Kenkyu", *Infocom News Letter*, 1998. (高嶋裕一「加入電話需要の減少の要因に関する実証的研究」 *InfoCom Newsletter*, 1998年1月)
- ² Unspecified Object/Huge/Large International communication
- ³ Business except for Above.
- ⁴ Aoi, Hiroya, *VAN to wa Nanika*, Nihonkeizaishinbunshya, 1994, p.27. (青井浩也『VAN とは何か』日本経済新聞社、1984年、27ページ)
- ⁵ Ideal of Telecommunication in Paris Agreement
- ⁶ Article 11 of Telecommunication Business Law.
- ⁷ Arrangement of Telecommunication infrastructure in developing countries, there were lack of finance, technology and human resource.
- ⁸ MPT, *White Paper*, Ministry of Finance, 1993.
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