

**Emerging Corporate Information
Networks: Regulatory and
Industrial Policy in Japan**

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Executive Summary

- The new industrial framework in place in Japan since April 1985 was designed to promote competition among carriers. Both Type I and Type II carriers can provide telecommunications transport and value-added services.
- Several Type I and more Type II start-up firms have emerged, and NTT, the established firm, has since April 1985 implemented aggressive corporate strategies to cope with the challenges.
- On the user side, progress is being made in the formation of intracompany and intercompany information networks that utilize telecommunications services. Intercompany networks in particular are increasingly recognized as strategically effective; thus, the number of networks of different types – vertical, horizontal, and compound networks – is on the rise.
- Governmental policy toward the telecommunications industry consists of regulatory measures that limit corporate activities and supportive measures that encourage and aid corporate initiatives.
- Among the regulatory measures, those applicable to Type I carriers are the strictest: A permit is required for a Type I carrier's entry and exit, and pricing and other conditions for provision of services are regulated. Evaluations of entry and exit applications give special consideration to preventing excessive competition, and different regulations govern Type I and Type II carriers' conditions for providing service.
- Among Type I carriers, NTT, the dominant firm, is under obligation to provide universal service because of its status as a special company. This requirement not only affects NTT but also will become a major determinant of future regulatory policy.
- The formation of intercompany information networks is expected to accelerate because this growth relates to Japanese industry's emphasis on long-term, continual business relationships, as seen in the frequent formation of corporate groups. Antitrust laws permit the formation of intercompany information networks; however, if these networks are exclusive, they risk limiting competition among corporations. To minimize such danger, policy has attempted to secure interoperability, including measures to standardize communications protocols and measures to aid the development VANS, which provide protocol conversion.
- Public telecommunications policy deals with issues that also concern modern economic policy, such as whether economic efficiency or distributive equity should be given priority. The solution will crucially affect the international competitiveness of Japanese and U.S. industries.

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INTRODUCTION

Two years have passed since the Telecommunications Business Law, which defined a new telecommunications framework in Japan, came into force. The first year witnessed the formation of new companies that have entered the marketplace either as Type I or Type II carriers. Nippon Telegraph and Telephone Corporation (NTT Corp.), the dominant carrier, began its aggressive search for new business opportunities. The government agencies with stakes in the industry, such as the Ministry of Posts and Telecommunications (MPT), the Ministry of International Trade and Industry (MITI), and the Fair Trade Commission, are gradually unveiling their respective policy stances toward the telecommunications industry through their implementation of various measures.

The United States, whose telecommunications deregulation process began before Japan's, has undergone a series of transformations since the 1984 divestiture of the Bell System. New developments in the United States include Computer Inquiry III, progress in equal access issues, and gradual implementation of access charges. New business ventures induced by telecommunications carriers' expansion into new service fields, on the one hand, and by corporate mergers and acquisitions, on the other, are taking place.¹ In addition, an important change is the FCC's May 1986 decision to remove the structural separation requirement for dominant carriers' provision of enhanced services.

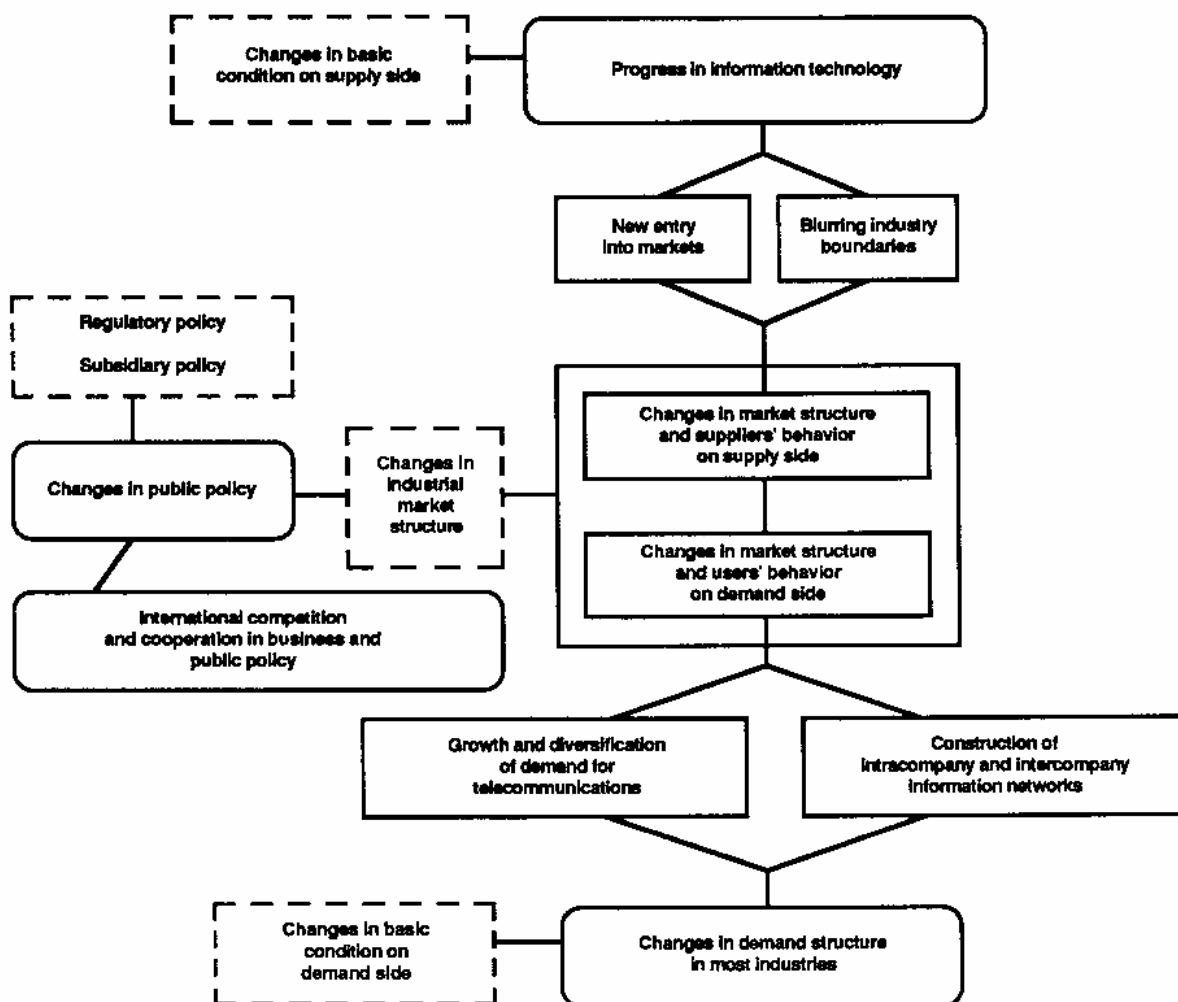
These developments in Japan and the United States stem from: (1) technological innovations,² both in integration technologies such as digitization and networking and in essential technologies such as semi-

conductors, computers, optical fiber cables, radiowave, and others supporting integration; and (2) increased demand for telecommunications services in general and increased diversification of demand, as demonstrated by increased demand for data and video transmission services in addition to conventional voice communication service.

The pattern that has emerged in the telecommunications industry, that is, technological innovations and changes in demand structure bringing about the transformation of an industrial structure, has been observed in other industries. In the telecommunications industry, however, there are three noteworthy differences: First, governments are involved in the telecommunications industry to varying degrees and in different fashions, depending on the country and the timing of involvement. A structural transformation of the industry prompts a government to revise its policy, which influences the direction and tempo of the structural transformation of the industry. Second, information, which is the end-product offered by the telecommunications services to the user, is general input which is incorporated into every business activity. Thus the structural transformation of the telecommunications industry can potentially affect every corporate activity and every industrial sector. Third, telecommunications networks located in each country constitute a global network. The international character of domestic networks means that a change in one country can potentially affect other nations.

It should be helpful to examine some elements of the telecommunications industry before analyzing the industry as a whole: First, this paper will identify changes in the industry's market structure, in both the supply side and the demand side; second, it will examine the funda-

mental structure, policy formulation, and implementation process, with reference to cases of other countries, and, third, it will identify effects of the industry's developments on corporate management and on industrial organization. Figure 1 shows the relationships among factors mentioned in the paper as well as the analytical framework for this study.



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Figure 1

Telecommunications Industry Framework

For several reasons, this research paper examines the current status and characteristics of changes in the Japanese telecommunications industry marketplace as well as related governmental policies: First, the framework of Japanese regulatory policy is unique. The applicability of regulatory measures in Japan is determined by whether a telecommunications carrier owns its own telecommunications facilities. Secondly, the government employs both regulatory and supportive measures toward the telecommunications industry to control corporate activities, in the case of the former, or to encourage them, in the case of the latter. The juxtaposition implies that Japan's telecommunications policy is considered part of Japan's comprehensive industrial policy, which has been directed to major industrial sectors. (Public policy toward telecommunications also includes non-industrial aspects; however, this paper considers telecommunications policy as industrial policy.) And third, the new telecommunications framework, implemented on April 1, 1985, has triggered structural changes in both the supply and demand sides of the telecommunications industry. The supply side of the market is characterized by the emergence of many start-up firms which will operate either as Type I or Type II carriers, while NTT, the established carrier, is aggressively pursuing the policy of new service and new business developments. The demand side has witnessed rapid progress in intracompany and intercompany information networks, the formation of which was accelerated by the liberalization of the telecommunications industry, now permitting a variety of ways to utilize telecommunications services. Fourth, an examination of the relationships between changes in the telecommunications user side and characteristics of Japanese-style corporate management and industrial

organization serve as a case study of the effect of telecommunications developments on corporate management and industrial organization. Furthermore, such an examination may shed light on the impacts on Japan's international competitiveness.

Chapter 2 identifies the characteristics of the new framework for Japan's telecommunications industry. It also analyzes the emergence of newly formed companies and their current status as well as the nature of countermeasures implemented by NTT. In addition, both regulatory and supportive measures of the governmental policy will be examined. Chapter 3 considers changes in corporate management and industrial organization on the user, or demand, side of the telecommunications industry. This chapter examines the formation of intracompany and inter-company information networks which utilize telecommunications services and looks at related impacts on Japanese corporate management and industrial organization. In addition, governmental measures to encourage network formation are elaborated. Chapter 4 summarizes these analyses of the Japanese telecommunications industry. Another analytical framework that seems to be useful for analyzing a particular industry will be introduced, and elements that brought about the structural changes will be reexamined in this light. The concluding remarks deal with a fundamental telecommunications policy issue -- that of how to balance the demands of competition against those of the universal service requirement.

COMPETITION AMONG COMPANIES: NEW PUBLIC POLICY

This chapter analyzes the supply side of the Japanese telecommunications industry in terms of its fundamental framework and evolution, strategic directions taken by new firms as well as by NTT, and the implementation of new governmental policy.

2-1. Fundamental Framework of the Telecommunications Industry

2-1.1. Evolution of the fundamental framework. For more than 100 years, Japan's telecommunications services were supplied by the government directly or by a government-owned public corporation which was granted a monopoly in the market. Nippon Telegraph and Telephone Public Corporation (NTT Public Corp.), founded in 1952, invested in new facilities throughout the post-World War II recovery and high growth periods. One result of such endeavors was the completion of a nationwide communications network in the late 1970s, enabling users to dial directly to anywhere in Japan. In addition, NTT Public Corp.'s R & D in computers, transmission lines, and communications equipment combined with its purchases of equipment contributed to the growth of the Japanese computer and communications industries.

The presence of MPT, the governmental agency in charge of NTT Public Corporation, was overshadowed by NTT Public Corp., which took initiative in the preparation for a nationwide communications network as policy planner and as policy executor. MPT's power in the telecommunications industry was a far cry from being effective.¹ Rather, it was MITI that took an early interest in the potential of the telecommunications industry as an arena in which to exercise its industrial policy.

MITI, which has implemented measures to protect the computer industry and aid its growth since the 1950s, defined its comprehensive policy objective as "information intensification" of Japan's industrial structure in the 1970s,² placing primary importance on the strategic roles of information resources in corporate and industrial activities and the crucial roles to be played by an industry sector that produces, distributes, and processes information resources. This policy implemented by MITI urged the liberalization of the use of network, which was then under the monopoly of NTT Public Corp. Liberalization of the use of the communications network was considered indispensable for the realization of a more efficient network to benefit the user, as well as for the growth of data processing and database service industries.

Circuit liberalization, which was implemented gradually under Phase I Liberalization (1971) and Phase 2 Liberalization (1982), could not be completed because of NTT Public Corp.'s de jure monopoly of telecommunications services.

The issue surrounding the liberalization of network use was debated by two opposing factions: MITI, representing the interest of business users and the data processing industry, and MPT and NTT Public Corp., supporting the existing monopolistic structure for telecommunications services. The restrictions on network use hampered the growth of VAN operators which offer their services to many types of users. NTT Public Corp., on the other hand, quietly made inroads into data processing and other VAN services, which led to NTT Public Corp.'s dominance in the VAN business segment.³

In addition to the issue of the liberalization of network use, which was the strongest driving force behind the reformation of the Japanese

telecommunications industry's framework, increased criticism of Japan's public corporation system was also an impetus toward this reformation. The government decided to raise the issue of the public corporation system, which was implemented shortly after the end of World War II, and set up the Second Ad Hoc Commission on Administrative Reform. The Commission's recommendations included proposals to transform NTT Public Corp. into a "special company" and to transform the monopolistic supply system in telecommunications services. The recommendations of the Commission became the basis for the government's proposal for the Nippon Telegraph and Telephone Corporation Law and the Telecommunications Business Law, submitted to the Diet.⁴ The enactment of the Laws prompted the formation of a new industrial framework.

2-1.2. Characteristics of structural framework. The new telecommunications industry framework, as of April 1985, is based on: (1) the Telecommunications Business Law, which defines the scope and method of governmental regulation of Japanese telecommunications industry; and (2) the Nippon Telegraph and Telephone Corporation Law, which sets forth certain restrictions on NTT Corp., a "special company" whose stock is owned by the government.

To summarize, the Telecommunications Business Law stipulates that the ownership of telecommunications facilities or the absence of owned telecommunications facilities determines the applicability of regulations. Second, the telecommunications carriers are divided into Type I carriers -- those who own telecommunications facilities -- and Type II carriers -- those who must borrow facilities. Type II carriers are further divided into Special Type II carriers, who supply telecommunications services to many and unspecific users by using facilities that

exceed a defined capacity or who operate international networks, and General Type II carriers, who are Type II carriers other than Special Type II carriers. Third, under the Telecommunications Business Law, regulations designed to control activities of Type I carriers are the strictest. They include authorization of proposed service rates and permission to enter and withdraw from the telecommunications industry. Permission for entry or withdrawal requires a desirable supply-demand equilibrium; that is, suppliers' aggregate capacity should be in line with the prevailing demand level. Fourth, types of services provided by Type I and Type II carriers are virtually identical. In other words, Type I carriers and Type II carriers will be, in effect, competing with each other in all types of services. Fifth, the international telecommunications service segment, which has been the monopoly of Kokusai Denshin Denwa (KDD), now allows others to enter.⁵

Privatization of NTT did not result in a divestiture of the corporation, as in the separation of the "telephone service division" from "other service divisions" or the separation of the "long-distance telephone division" from the "local telephone division." NTT Corp., for the time being, remains the single largest telecommunications service corporation that owns and operates a nationwide network. NTT Corp. is under obligation to supply "universal service" throughout Japan. The company's responsibilities include the implementation of R & D projects encompassing a broad range of telecommunications technologies and dissemination of research results. The degree of governmental involvement in NTT Corp.'s business activities has greatly diminished compared to the pre-privatization period, and the degree of freedom enjoyed by NTT Corp. has increased.

2-2. Strategic Directions of New Firms

2-2.1. Entry of Type I carriers. Type I carriers are either ground-based carriers that utilize optical fiber cables and microwave or satellite-based carriers that operate communications satellites. At present, three ground-based carriers and two satellite-based carriers have been issued entry licenses in the long-distance services market. Table 1 outlines newcomers' businesses.

Daini-Denden, Inc. constructed a microwave communications network in August 1986, between Tokyo and Osaka. Teleway Japan Corp. laid optical fiber cables underground along highways between Tokyo and Osaka in July 1986. Japan Telecom Co., Ltd. laid optical fiber cables along the tracks of Tokaido Shinkansen Railway in May 1986.

Table 1
Type I Carriers Entering the Long Distance Services Market

Items	Daini Denden Inc.	Japan Telecom Co. Ltd.	Telway Japan Corp.	Japan Communications Satellite Co. Inc.	Space Communications Corp.
Value of issued capital stocks (million yen)	8000	9000	8300	13,900	5000
Major investors and their percentage of stock ownership	Kyocera Co. 28.0% Mitsubishi Corp. 2.5%	Japan National Railways 33.4% Public Corp. Mitsubishi Corp. 1.1% Mitsui and Co. 1.1% Sumitomo Corp. 1.1%	Toyota Motors Co. 6.0% Society for Highway Facilities* 6.0% Mitsubishi Corp. 3.0% Mitsui and Co. 2.0%	C. Itoh 40% Mitsui and Co. 30% Hughes Communications 30%	Mitsubishi Corp. 75% Mitsubishi Electric Co. 25%
Facilities	Microwave: 4 systems of 5GHz	Optical Fiber Cables: 2 systems of 400Mb/sec.	Optical Fiber Cables: 3 systems of 400Mb/sec.	Satellites: 2 satellites of Ku band (32 transponders per satellite)	Satellites: 2 satellites of Ka band and Ku band (29 transponders per satellite)
Initial investments for constructing networks (million yen)	40,000	36,900	37,000	82,800	60,000
Initiation of services	Leased circuit services Oct. 1986 Long distance toll services Oct. 1987	Leased circuit services Aug. 1986 Long distance toll services Oct. 1987	Leased circuit services Nov. 1986 Long distance toll services Sept. 1987	Feb. 1988	Feb. 1989

*This is an affiliate of Japan Highway Public Corp. supervised by the Ministry of Construction.

Source: Masu Uekusa, "Denkitushin Sangyo eno Shinki Sannyu to Naibu Sogohojou" (New Entries into the Telecommunications Industry and Cross-Subsidies) in Denkitushin Jigyo no Kongo no Hoko ni Kansuru Kenkyu (Study on the Future of the Telecommunications Industry), Tokyo: Japan Center for Regional Development, Feb. 1986, pp. 14-15.

These ground-based carriers all aim at providing leased circuit services for the Tokyo-Nagoya-Osaka corridor and toll services for users around Tokyo, Nagoya, and Osaka metropolitan areas; the former started in 1986 and the latter should be implemented in the fall of 1987. The three companies share several characteristics. First, all three have targeted the Tokyo-Nagoya-Osaka corridor, the segment with the highest communications traffic level, as illustrated by the fact that approximately half of NTT Corp.'s long-distance revenues are generated in this segment.⁶ Second, the three intend to cut the prevailing NTT Corp.'s communication charge by 20% to 30%. The new firms try to offer lower prices through lower operating costs by using state-of-the-art facilities, and less labor. In addition, the prevailing long-distance charge, which was set at an artificially high level to subsidize local communications, will benefit the new firms. Although NTT is investigating detailed cost data for its long distance and local telephone services, this data can hardly explain the current cross-subsidization within NTT. According to an NTT report, local telephone service revenue accounts for only 24.5% of all traffic revenue, while local traffic volume accounts for 72.8% of the total. These figures show a distortion in the current tariff structure for NTT's telephone services. Third, all three were funded by a variety of corporations such as general trading companies, banks, and communications equipment manufacturers. The number of companies involved in each of the three new firms exceeds 200.⁷ In addition to sharing the potentially huge risks inherent in every start-up firm, the sheer number of co-investors reflects a widespread interest in

telecommunications service and an intention to secure future customers in advance.

Of the two satellite operators, Japan Communications Satellite Company, Inc. owns two satellites built by Hughes Aircraft Co. and will lease or sell transponders to users. Its service is expected to commence in February 1988. The other, Space Communications Corporation, has two satellites purchased from Ford Aerospace. In addition to selling and leasing transponders, it will supply antennas installed at earth stations. Space Communications Corp. is expected to begin operation in February 1989. Both satellite-based carriers, equipped with U.S.-made satellites, will implement nationwide leased circuit service, and both are ventures between major Japanese trading companies.⁸ C. Itoh and Mitsui & Co. own 40% and 30% of Japan Satellite Communications Company respectively. Mitsubishi Corp. owns 75% of Space Communications Corp.

In addition to these five long-distance carriers, other companies are trying to penetrate local and/or short-distance toll service segments. Tokyo Electric Power, which services Tokyo and its surrounding areas, formed Tokyo Communications Network with Mitsubishi Corp. and Mitsui & Co. in February of 1986. Tokyo Communications Network began its leased-circuit service in the Tokyo metropolitan area, as well as a facility-leasing service to Type II operators in November 1986. Tokyo Electric Power, which now owns and operates 1000 km of optical fiber cable communications circuits for administrative duties, is trying to further extend optical fiber cable circuits. In the fall of 1987, it will begin to supply local and short-distance toll services in the high-traffic metropolitan area of Tokyo by capitalizing on its parent's

operational know-how. Besides Tokyo Electric Power, Kansai Electric Power, which services the Kinki region, and Chubu Electric Power, based in the central region, are conducting studies to determine the feasibility of offering similar services in their respective regions.⁹

2-2.2. Entry of Type II carriers. As of October 1986, nine telecommunications carriers had registered as Special Type II carriers. Of these, four are Japanese computer manufacturers or their affiliates. The nine companies, which all plan to offer nationwide data transmission service, include firms that offer simultaneous voice and video transmission service and firms that offer data transmission service between Japan and the United States. Table 2 outlines special Type II carrier businesses.

The number of General Type II notifications has exceeded 300. The figure includes 85 firms permitted, by the 1982 Phase II Communications Circuit Liberalization Decree, to provide VAN service primarily for small and medium-sized firms. The vast majority of General Type II carriers have target customer bases, such as specific corporate groups, specific industries, and specific regions. Services offered by most General Type II carriers include the remote computing and database services that accompany their network service. Their business activities, in fact, are concentrated on remote computing service.¹⁰

Table 2
Special Type II Carriers: Services and Structure

Firms (Networks)	Beginning of Service Provision (Date of Registration to MPT)	Background of Firms	Service Menu	Number of Access Points	Remarks
1. Intec Co. (Ace Telenet)	9/85 (4/85)	Independent information processing company	a, d	65	Introducing Telenet's packet switching technology.
2. Fujitsu Co. (FENICS)	10/85 (4/85)	A division of computer manufacturer	b, d	60	Cooperating with affiliated in- formation processing companies.
3. Nihon Information Services Co. (JAIS-NET)	4/86 (4/85)	Information processing company spun out from Sumitomo Bank	b, d	27	An affiliated company of an influential bank.
4. NEC Inc. (C&C-VAN)	10/85 (4/85)	A division of computer manufacturer	a, d	100	Cooperating with affiliated in- formation processing companies. Tie-in with GEISO.
5. Hitachi Information Network Co. (HINET)	4/86 (4/8)	A subsidiary of Hitachi Co.	b, c, d	8	Cooperating with affiliated companies of Hitachi in information processing business. Tie-in with TYMNET.
6. Joint-VAN Co. (Joint-VAN)	11/86 * (5/85)	Joint venture of information processing companies	a*, c, d	55*	Tie-in with Uninet.
7. Japan E.N.S. (undetermined)	10/86 * (7/85)	Joint venture of Japan Industrial Bank, Mitsui and Co., and AT&T	a*	3*	Revising the plan of introducing Net 1000 as of mid-1986.
8. Oki Net Service Co. (OKI-VAN)	12/86 * (7/85)	Subsidiary of Oki Co.	a*, c	6*	
9. Network Service Co. (TYMET)	10/86 * (11/85)	Joint Venture of Marubeni Co. and TYM-NET	b*, d	17	Introducing TYMNET packet- switching technology.

*Plans are prepared as of mid-1986.

Service classification:

- a. Packet-switching services
- b. Electronic mail services
- c. Resale of leased-circuit services
- d. Data communications and processing services for particular users

Source: Nikkei Communications, April 14, 1986, pp. 34-35, and October 7, 1985, pp. 112-113.

A broad spectrum of industries participate in Type II businesses. Manufacturers, wholesale/retail stores, freight forwarders, and financial institutions -- all heavy users of telecommunications services -- are actively involved. Small firms have a conspicuous presence.¹¹ They are mostly regional remote computing service concerns affiliated with or owned by major computer manufacturers or computer-related spin-offs of user corporations. Many Type II carriers have a limited but well-defined customer base as their target. Among their services, remote computing service is most commonly offered.¹² This heavy concentration in remote computing service seems to have been caused by a set of restrictions limiting the use of communications circuits, which was lifted only in April 1985. Recently, cooperation among Type II carriers is becoming more noticeable. The aim of such cooperative agreements is to utilize economies of scale and scope by linking diverse networks originally intended for specific corporate groups, regions, or industries. Type II carriers that provide international communications, too, have business agreements with U.S. companies including GE, Tymnet Inc., and GTE Telenet.

In addition, the resale of private circuits by Type II carriers is increasing.¹³ The success or failure of such resale will depend largely on the degree of discounts provided to leased circuit users and the level of demand. NTT Corp.'s current discounts for leased circuits are very high. Under the current rate structure for high-speed digital circuits, commercialized at the end of 1984, for instance, users of large capacity circuits can take advantage of exceptionally high discounts.¹⁴ By securing a certain amount of capacity necessary for their own use, a number of Type II carriers resell any idle capacity to a third party.

Targets of such resale activities tend to be corporations belonging to the same corporate group as the Type II carriers, such as subsidiaries and affiliates.

2-3. Strategic Direction of Nippon Telegraph and Telephone Corporation

2-3.1. NTT's strengths and limitations. NTT Corp. continues its dominance in the telecommunications service industry not only as a Type I business but also as a Type II business.¹⁵ It is evident that the position of NTT Corp. allows it to exert the greatest influence on the future course of the Japanese telecommunications industry. NTT Corp. appears to have both strengths and limitations, compared to its newly formed competitors.

The strengths NTT Corp. enjoys include the advantages of being a predecessor. NTT Corp. inherited the nation-wide network and has operated it for a long time. The accumulated operational and technical know-how, coupled with its established brand image among users, greatly benefits the corporation. In addition, NTT Corp.'s facilities which have already been depreciated have lower sunk costs, leaving more room for cutting prices. Furthermore, NTT Corp. has amassed R & D results in telecommunications and computer fields. NTT Corp.'s full range of value-added and information services, including data transmission, facsimile transmission, video transmission, videotex, and remote computing, in addition to conventional telephone service, enables NTT Corp. to take advantage of economies of scope and to thus offer customers the convenience of one-stop shopping. Furthermore, providing various services would give NTT the flexibility of cost assignment under MPT's ineffective control of cost allocation.

NTT Corp.'s limitations include its responsibility to provide universal service. Unless NTT Corp. somehow eliminates the loss from its local operations, through higher local communications rates, imposition of access charge, or governmental assistance, the emergence of new firms in the long-distance market will inevitably create problems. In addition, there are disadvantages of being a predecessor. NTT Corp. inherited NTT Public Corp.'s facilities and work force. The existing facilities soon will become technologically obsolete. As for personnel, NTT Corp. would have to keep its 300,000 employees on the job because laying off employees would be extremely difficult to justify under Japanese business practices. Thus, although there is a possibility of decreasing its employees through yearly attrition, the retention of employees has been a major operating premise for NTT Corp.

2-3.2. NTT's recent business activities. NTT Corp.'s business activities can be divided into activities relating to the corporate reorganization efforts and those that prepare NTT Corp. to enter new business fields.

NTT Corp.'s internal reorganization began at its inception, involving the removal of the old, functionally divided department system and the introduction of a sector system based on the type of business. Each business segment, such as telephone service, telecommunications network, advanced telecommunications service, and data communications, now has its own business sector. In each of the 11 regions of Japan, a regional headquarters is responsible for telephone and other operations in its region. The business headquarters and regional headquarters are positioned as profit centers, and they are authorized to enter new business fields and form their own subsidiaries. Overall corporate strate-

gic policies are formulated by the newly formed Corporate Strategy Planning Headquarters and Engineering Strategy Planning Headquarters. With regard to NTT Corp.'s R & D activities, the reorganization of the existing Electrical Communications Labs has resulted in spinoffs such as the Software Production Technology Institute.

The reorganization is designed to enhance operational efficiency, which is a prerequisite to cope effectively with challenges of competitors and to respond better to users' needs. It also aims at instilling profit and cost sensitivity into each employee.

NTT Corp. can begin new services by offering them directly or indirectly through subsidiaries. NTT Corp.'s new services include: High Speed Digital Transmission Service (October 1984), which uses optical fiber cables; New Packet Services (April 1985), which facilitates direct access from telephone circuits to the packet switching network; and PBX Dial-In Service (November 1985), which allows direct dialing to individual extension telephones. In addition, NTT Corp. is planning to offer voice storage services, including voice mail, and teleconferencing service, which enables users at more than two locations to converse simultaneously. NTT Corp.'s aggressive service diversification can be interpreted as part of its corporate strategy in two ways. First, facing the inevitability of competition in high-traffic business, NTT Corp. began offering high-speed, large-capacity circuits to business users in advance of its competitors.¹⁶ Second, NTT Corp. has placed priority on diversified information services.¹⁷ NTT Corp., which has been supplying VAN and remote computing services for a long time, positioned itself to compete effectively in the value-added, information

services business, which it believes will become strategically important.

NTT Corp.'s aggressive pursuit of new business opportunities since April 1985 is evidenced by its large number of subsidiaries and the scope of businesses they represent. Between April 1985 and January 1986, NTT Corp. formed 31 subsidiaries. NTT Corp.'s aggregate investment amounted to 7.6 billion yen. Of the 31 subsidiaries, NTT Corp. owns the majority shares of 15 subsidiaries. Major services offered by them include software development and sales, VAN and other network services, and development, sales, and consulting services relating to communications systems.

The offering of new services through subsidiaries is expected to continue in the future. Development of value-added, or information services is given primary importance. Formation of subsidiaries to offer software development and network services reflect this corporate strategy. In addition, NTT Corp., which itself has amassed managerial know-how, is very active in enlisting other corporations' resources. The formation of joint ventures with other organizations implies such an intention.¹⁸ NTT Corp. has also indicated its plan to develop international business. Although NTT Corp.'s business activities are restricted to the domestic telecommunications services by law, it hopes to develop international business through its subsidiary. Among the subsidiaries of NTT, the formation of a joint venture between NTT Corp. and IBM Japan, Nippon Information and Communications Corporation, in December of 1985, shocked not only domestic computer manufacturers but also the Japanese government.¹⁹ The co-venture with IBM is considered a de-

cisive move for NTT Corp. from the strategic perspective of developing international markets by capitalizing on others' managerial resources.²⁰

2-3.3. NTT and new firms. NTT's past actions affecting new firms have displayed two conflicting tendencies of cooperation and competition. Cooperative actions include assistance provided to Type I carriers in the form of technical cooperation. The technical cooperation ranges from dispatch of a few engineers to its Type I competitors, to technical engineering consultation. In addition, NTT Corp. has allowed a few carriers the convenience of installing switching and other equipment in NTT Corp.'s facility plants.²¹ Second, NTT Corp. has shown some "compromising" attitude with regard to the problem of interconnecting its circuits to others' circuits. It is stipulated that the carriers cannot refuse interconnection of circuits owned by other Type I carriers and that interconnection agreements are subject to authorization by the Minister of Posts and Telecommunications. Agreements have been reached on the assignment of telephone numbers for communications services to be offered by the new firms and on the formula to allocate costs arising from the modification of switching equipment required for interconnection. When the circuits of a non-NTT carrier are used, a four-digit number will be added to the ordinary telephone number. The modification cost will be borne by the new firms as well as by NTT Corp. The press reported that NTT Corp., which initially insisted that the entire cost be borne by the new firms, agreed to share the costs as part of its mission to aid the growth of start-up firms.²² The most controversial issue in the interconnection debate, imposition of access charges, is still being negotiated between NTT Corp., which demands others bear

partial costs of local communications subsidy, and all others, which refuse them.²³

NTT Corp.'s willingness to compromise seems to stem from its fear of corporate divestiture -- separation of the telephone service sector from all others or separation of local operations from long distance operations, which is plausible if NTT Corp.'s de facto monopoly remains uncorrected.

Regardless of any prevailing circumstances, NTT Corp. must successfully compete with new firms, especially in light of the universal service obligation and preservation of its 300,000-member work force. One of the tactics employed by NTT Corp. is to make new services ready before others do. The accelerated pace toward completion of an optical fiber network that transverses the Japanese archipelago, which in turn accelerates the preparation for the high-speed digital transmission service, reflects this tactic. The other major strategy is to diversify its services, especially in its value-added, information service sector and to diversify its business, as signaled by NTT Corp.'s array of new services and formation of numerous subsidiaries.

2-4. Public Policy Issues and Positions of Government Agencies

2-4.1. Public policy framework: regulations and assistance. The governmental policy toward the telecommunications industry is divided into measures restraining corporate activities and measures designed to encourage corporate initiatives. Major regulative policy includes MPT's policy based upon the Telecommunications Business Law and the Fair Trade Commission's antitrust policy in accordance with the antitrust laws.

Measures assisting business are directed to telecommunications service concerns and computer/telecommunications equipment manufacturers, database designs and software development, and R & D in telecommunications and computer technologies. Forms of assistance include direct expenditures, low-interest loans, and preferential tax treatments. Such assistance is administered by MPT and MITI, the former being basically responsible for telecommunications and the latter for computer, software, and database industries.²⁴

It is worth mentioning that the juxtaposed use of restraint and assistance measures to guide corporations toward a desirable direction is a typical maneuver prescribed in Japan's industrial policy.

2-4.2. Regulations concerning entry and pricing. Among many regulations based on the Telecommunications Business Law, regulations controlling entry procedures and tariff determination affecting Type I carriers are the most powerful limitations on corporate autonomy. Official reasons for entry control are:²⁵

- (1) Concern over excess capacity;
- (2) Concern over the potential for destructive competition resulting from the difficulty of converting telecommunications facilities for other use;
- (3) Concern over the consequent disruption of stable supplies of telecommunications service, which is an integral part of the orderly functioning of personal and corporate activities.

Although the extent of potential disruption of telecommunications services is arguable, this reasoning demonstrates an implicit character of the governmental policy. In the history of Japan's industrial policymaking, the above "logic" -- free competition can lead to ex-

cessive facilities and trigger cut-throat competition, thereby disrupting the stable supply of basic commodities and services on which the nation's economy is said to be dependent -- has often been cited as the basis for the government's regulatory measures for a number of industries. MITI's regulatory policies, prescribed for steel, petroleum-chemical, and synthetic fiber industries, which prevailed until the 1960s, for instance, emphasized the control of corporate capital investments in facilities.²⁶ Such regulations required forecasting of future demand, which rarely turned out to be accurate. While MITI's regulations were merely "guidance" measures without the power of legal enforcement, the telecommunications regulations concerning entry can be legally enforceable and hence more powerful. In fact, a satellite-based Type I carrier has been refused authorization on the basis of the government's concern over excessive supply capacities.²⁷

Type I carriers' rates for telecommunications transport service and value-added services are regulated.²⁸ Rates are computed according to a formula based on costs and fair return. The fair return is derived by multiplying the rate base by the rate of fair return, and the tariff policy adopted a range of rate of fair return by defining its ceiling and floor. The measure is designed to allow the carrier some flexibility in its pricing while minimizing excessive profits as well as cut-throat pricing. In addition, the tariff policy adopted a set of standards, according to which overhead and common assets are allocated to each of the different service segments, such as the telephone service segment and leased circuit segment. This is identical to FDC (fully distributed cost) pricing.²⁹ The regulations are deliberately designed to help new firms smoothly enter the marketplace. One such measure is

that new firms can use a 5-year basis in computing their tariffs, as opposed to the 3-year basis allowed to the existing firm for existing services. By extending the period, MPT intends to moderate the impacts of cost and revenue fluctuations on new firms' business.

2-4.3. Regulations based on antitrust laws. Although antitrust laws are not specifically designed to affect the telecommunications industry, the telecommunications industry became subject to the antitrust laws for the first time in April of 1985, when NTT Public Corp.'s de jure monopoly came to an end. NTT Corp. still holds dominant positions in both telecommunications transport service and value-added service fields. For these reasons, the direction of the telecommunications industry is closely monitored by the Fair Trade Commission.

Potential infringements of antitrust laws include attempts to limit competition between NTT Corp. and other Type I carriers. Such attempts include NTT Corp.'s attempt to block new firms' entry (such as by means of unfair price discounts) or, to reverse the situation, its competitors' joint action to form a cartel. In addition, NTT Corp. can potentially misuse its superiority established in telecommunications transport service to gain a foothold in value-added and other service areas. NTT Corp.'s attempted price squeeze to affect Type II carriers in the value-added service segment of the market and its unfair packaging of telecommunications transport and other services are some examples.³⁰ Type II carriers have already voiced their concern over a price squeeze.³¹ In the terminal equipment market, an incident of unfair packaging practice has been reported.³² Furthermore, there is concern over potential impacts on competition posed by NTT Corp.'s penetration into new business segments. The press reported that the Fair Trade Commission is currently

investigating the nature and extent of impacts on telecommunications service and computer fields posed by the venture formed jointly by NTT Corp. and IBM Japan.³³

2-4.4. Assistance policy. Measures administered by MPT to assist telecommunications carriers include low-interest loans for facilities, land, and buildings and preferential tax treatments such as shortening of property life in computing depreciation and partial abatement of municipal tax.

MITI administers assistance to computer, software, and database businesses. Among measures for computer manufacturers are: R & D aids for the development of Fifth Generation computers, a low-interest loan to Japan Electronic Computer Corporation, and low-interest loans to finance manufacturing of the Fourth Generation computers. Low-rate loans are also administered to develop software and to finance database facilities.

It is noteworthy that aids for R & D in telecommunications technology are intended to be promoted by an agency, set up by the government in October of 1985.³⁴ The agency, whose capital and loanable funds come from the government, will provide favorable financing for corporate R & D activities and will invest in R & D organizations. Table 3 outlines MPT's and MITI's subsidiary policies toward the telecommunications industry.

Table 3

Assistance Policy toward the Information Industry of Japan

Measures	Funds Committed in 1986 (million yen)	Remarks	Amount (million yen)
General Account			
MITI			
1. Aids to research and development of computer technology	10,753	Subsidy for ICOT (Institute for New Generation Computer Technology)	5491
2. Promotion of database and software development	1439	Subsidy for IPA (Information Technology Promotion Agency)	1260
3. Promotion of computerization and information networking in particular regions	67	Research and study on "New Media Community" project	60
4. Promotion of international co-operation for computerization in less developed countries	305	Subsidy for CICC (Center of the International Cooperation for Computerization)	239
5. Research on information technology standardization and security improvement	69		
6. Assistance to computerization and networking in small and medium-size firms	12,450 (a)	Subsidy for leasing computer and other information equipment to small firms	10,000 (a)
MPT			
1. Research on technological development in new media	38		
2. Research and study for planning and implementing telecommunications policy	72	Research and study for improving security of data communications networks	57
3. Promotion of information network construction in particular regions	21	Research and study on "Teletopia" project	
4. Promotion of international cooperation for telecommunications	48	Assistance to telecommunications business in less developed countries	46
5. Research and development of satellite communications technology and radio frequency technology	730		
Government Investment and Loan Program			
Information Technology Promotion Agency	4600 (b)	Promotion of general application program development Research and development of new system for software production	1400 (b) 2800 (b)
Japan Development Bank	205,000 (c)	Loan to computer, database, software, and telecommunications businesses Loan for computerization and information networking in particular regions	85,000 (c) 120,000 (c)
Hokkaido Tohoku Development Corp.	135,000 (c)	Loan for computerization and information networking in particular regions	135,000 (c)

Table 3 (continued)

Small Business Finance Corp. and People's Finance Corp.	41,000 (c)	Loan for computerization and information networking in small and medium-size firms	41,000 (c)
Export-Import Bank of Japan	110,000 (c)	Loan for importing telecommunications equipment	110,000 (c)
Japan Key Technology Center	21,700 (d)	Investment in organizations for promoting research and development of information technology, or information networking in particular regions	12,500 (c)
		Loan for research and development of information technology	5700 (c)

Notes: (a) The amount includes assistance for introducing hi-tech equipment other than computer and information equipment in small and medium-size firms.

(b) The amount shows the investment to IPA from the Industrial Investment Special Account.

(c) The amount shows the total size of the loan including loans to other projects.

(d) The amount shows the investment and loan for this center from the Industrial Investment Special Account, and investment from Japan Development Bank.

Source: Nikkei Computer, April 14, 1986, pp. 93-98.

2-5. The Telecommunications Industry and Public Policy: A Comparison between Japan and the United States

2-5.1. Telecommunications industry characteristics and problems.

Recent developments in the telecommunications industries of Japan and of the United States share many similarities. First, the emergence of new firms in telecommunications service markets has started in Japan, while the market in the United States has already accommodated a number of service carriers. Second, both U.S. and Japanese markets had been dominated by either de facto monopoly (United States) or de jure monopoly (Japan) prior to respective market liberalizations. The former monopolies' dominant status in the markets remains unchanged even after liberalization.³⁵ Third, in both markets, competition between companies, especially between the dominant carrier and the rest, is changing the status quo of the supply side.

NTT Corp., as Japan's dominant carrier, also differs from its U.S. counterpart in some ways. First, NTT Corp. still owns and operates a nationwide network serving all across Japan, whereas AT&T separated itself from local network operations as part of the breakup of the Bell System. Second, NTT Corp.'s business activities are governed by a set of regulations based on its legal status as a special company with one third of its outstanding stock owned by the government. NTT Corp., for example, is obliged to provide universal service, a requirement which AT&T does not have to satisfy. Third, NTT Corp. has dominated the market not only in its telecommunications transport service segment but also in its value-added, information service segment, penetrating the latter in advance of the new firms.³⁶ AT&T's VAN services, on the other hand, were heavily restricted by Computer Inquiry I and, only after the Justice Department's modification was AT&T permitted to begin VAN service indirectly through its subsidiaries. Since other telecommunications firms had established nationwide VAN service in AT&T's absence, AT&T was a latecomer when it finally began its VAN services.³⁷ Fourth, NTT Corp. does not have manufacturing facilities, unlike AT&T. Finally, except for restrictions imposed on NTT Corp. because of its special company status, NTT Corp. is on an equal footing with its competitors in terms of applicable regulations. AT&T, on the contrary, must cope with heavier regulations than its competitors.

Japan's major cities form a line along the Pacific Coast, concentrating Japan's communications traffic in a few geographic areas or in long-distance communications among these areas. The present tariff structure that allows cross-subsidization between local and long-distance operations has prompted new firms to concentrate their penetration ef-

forts on these areas or these long-distance segments. Several new firms have announced their intentions to provide long-distance services for the Tokyo-Nagoya-Osaka corridor. Some are expected to start servicing Tokyo and its surrounding areas and Osaka and its surrounding areas.³⁸

In addition to those industries represented by companies already in the telecommunications market, other industries are expected to expand into the market: Major Japanese computer manufacturers are producing communications equipment and semi-conductors as well as computers. They also own affiliates and subsidiaries which handle software and data processing. Their close business relationships with optical fiber and other cable suppliers developed into the formation of corporate groups. Computer manufacturers' advantages are their experience in and potential for producing hardware and software necessary for telecommunications network design. Another major industrial group expected to expand into the telecommunications market is electrical utilities. They already own and operate vast networks to distribute electricity in their service areas and operate their own communications networks for administrative purposes. Electrical utilities will take advantage of necessary facilities already in service and their accumulation of experience and know-how in operating the communications networks. Home appliance and office equipment companies too are expected to enter the field. Major manufacturers have their own established distribution routes, which strengthen their marketing ability. The fifth group is a few volume users of telecommunications services. Large corporations in Japan have implemented their own networks for communications with their respective subsidiaries, affiliates, and major clients as well as with companies

belonging to the same corporate groups. (This point will be elaborated in Chapter 3.) Their experience in design and operation of networks will be their edge when entering the market.

According to the expressed intentions of the potential market participants,³⁹ utilities are expected to operate Type I businesses, and computer manufacturers and corporate users will operate as Type II carriers. Home appliance and office equipment manufacturers are expected to expand into the terminal equipment market.

NTT Corp.'s competitive edge in the market seems to depend on three variables. One is whether the current tariff structure that facilitates cross-subsidization will be amended to be more reflective of costs that arise from supplying services. Another variable is the amount of access charge to be paid by market participants. The last variable is the cost borne by users who switch from NTT Corp.'s service to another carrier's service. No matter what the outcomes of these issues, it is apparent that the universal service obligation, imposed only on NTT Corp., will be of great disadvantage in its efforts to formulate a successful corporate strategy. In addition, the competition with Type II carriers will develop in value-added services and in the sale and resale of Type I carriers' circuits. For competition in the value-added services segment, economies of scope can be achieved by supplying both telecommunications transport services and value-added services, a potential advantage for NTT Corp.⁴⁰ For competition in the circuit sale/resale segment, although resale business is relatively easy to start and thus might, for the time being, effectively compete with Type I direct sellers, resale business would be vulnerable when discounts for large volume users are reduced by Type I carriers. Third, competition with terminal equipment

manufacturers is not limited to competition in the terminal equipment marketplace alone. Functional competition will develop between networks and terminals, both of which can be equipped to satisfy the same needs of users. Data storage and processing, for example, can be handled by both network and terminal equipment. The availability of functional substitutes has an important implication for telecommunications carriers and terminal manufacturers.⁴¹

2-5.2. Characteristics and issues of public policy. This section examines public policy affecting the telecommunications industry from the perspectives of: (1) the fundamental policy framework; (2) formulation and implementation process of the policy; and (3) current issues surrounding the policy. Japanese regulatory policy, which was formulated in accordance with the Telecommunication Business Law, is divided into measures applicable to Type I carriers and to Type II carriers. In the United States, applicability of regulatory measures is determined by the content (types) of services. Although U.S. regulatory policy has been amended as a result of Computer Inquiries I, II, and III, its underlying principles remain unchanged. According to the FCC's order adopted in May 1986, the FCC decided to eliminate the requirement of structural separation for dominant carriers providing enhanced services; however, the FCC withdrew the proposal for redefining the types of services.⁴² The different attitudes indicated by Japan and the United States stem from differences in circumstances under which their respective decisions were made. The United States continues to depend on the 1934 Communications Law as its basis of regulation. Thus, it is a vital matter what types of communications services fall within the common carriage category defined by the Law. Japan decided that it would be

difficult and ineffective to divide communications services by content (type), especially with the highly advanced integration of computers and communications increasing the possibility of substitutability communications services.⁴⁶ This recognition of the environment surrounding the telecommunications industry resulted in a new regulatory framework that is not based on types of services. Computer Inquiry III can also be interpreted as an inevitable consequence of changing technological environments as well as of the changing market structure after divestiture. It is evident that Japan had the latecomer's advantage of being able to examine and learn from the United States, which was ahead of Japan in implementing new regulations.

In general, in Japan the central government and the ruling political party, the Liberal Democratic Party, assume the most important roles in the formulation and implementation of policies. The roles of municipal governments, minority political parties (the legislature), and the judicial branch are, in reality, frequently minor.⁴⁴ The public policy directed to the telecommunications industry is no exception. This pattern differs greatly from that in the United States, where the legislature and judicial branch exercise large degrees of influence, and the jurisdiction of the federal government and that of the states are clearly divided. In the process of policy formulation and implementation in the U.S., each of these governmental groups exercises its respective prerogatives.⁴⁵ The multi-dimensionality of the process, while functioning as a check-and-balance mechanism, can lead to almost incessant policy changes.

In Japan, the enactment of the Telecommunications Business Law and the privatization of NTT Public Corp. appear to have strengthened the authority of MPT.⁴⁶ Regulatory measures imposed on Type I carriers

regarding entry procedures and tariff determination serve as tools to control Type I carriers' decisions on investments, types of services, and tariff. In addition, through such control, Type II carriers can be indirectly controlled. The privatization of NTT Public Corp., which had, in effect, planned and implemented telecommunications policy, drastically affected the status and roles of the corporation in the Japanese telecommunications industry. Its move to form a joint venture with IBM Japan is recognized as a symptom of the changing status and roles of NTT Corp., which had long aided the growth of domestic computer and communications equipment suppliers through joint undertakings of R & D activities.

The position and status of MITI, too, seem to be changing. MITI implemented its protective policy aiding the growth of the computer industry in the 1950s. Since 1970, data processing and database service industries were added to its roster. However, as these fields and telecommunications have become more integrated, MITI's sphere of influence has expanded. MITI, in addition to its assistance measures, has implemented a series of policy measures that benefit the user side (especially corporate users, such as MITI's measure that encourages the formation and implementation of networks designed by users for their own use. Such measures will be discussed more fully in Chapter 3).

A number of policy areas warrant attention, although this discussion is limited to the effect of competition on the supplying of universal service and issues concerning its impacts. The continuation of the monopoly, on whose premise the tariff policy allowing cross-subsidization was implemented, functioned as the means to sustain cross-subsidization,⁴⁷ which the introduction of competition would endanger. The services benefiting from cross-subsidization would be affected, unless some

measure, such as a rate increase and governmental assistance, is prescribed. The introduction of competition is expected to hit Japan severely, because the major source of subsidies has been revenue from very limited long-distance segments. The debate over the implementation of the access charge, which would be paid by new firms to NTT Corp., concerns the carrier access charge. With regard to the customer access charge, NTT Corp. announced its desire to raise its local communications charge. MPT, however, seems unwilling to authorize the increase for the time being. Furthermore, according to a report, MPT, when it makes a decision on the access charge, will be partial to the new firms, since encouraging their growth is part of MPT's mission.⁴⁸ Thus, the circumstances surrounding the access charge in Japan resemble the ENFIA stage (Exchange Network Facilities for Interstate Access) tariffs in the United States.⁴⁹

IMPACTS OF TELECOMMUNICATIONS INDUSTRY GROWTH
ON THE CORPORATE WORLD: TRANSFORMATIONS OF
CORPORATE MANAGEMENT AND INDUSTRIAL ORGANIZATION

This chapter analyzes impacts of the growth of the telecommunications industry on telecommunications users from several perspectives. Telecommunications industry development has encouraged varied business applications of telecommunications services. This paper, however, focuses on emerging business computer network use of telecommunications networks. First, impacts of telecommunications industry growth on corporate management, including the decision-making process, organization, and competitive strategies, will be discussed. Second, impacts on the nature of inter-company competition and cooperation will be examined. Last, governmental measures to control such impacts will be considered. The above perspectives are intended to shed light on major changes in corporate communications users and in the public policy affecting business users. The discussion will emphasize how these changes affect "Japanese-style" corporate management and Japan's industrial organization.

3-1. Impacts on Corporate Management

3-1.1. "Information-intensive" corporate management. Large volumes of information of enormous variety flow within corporations and between corporations and their environments. The flows of information between the corporation and its environments include inflows of information about competitors' behaviors and technological developments, as well as information to and from its suppliers, dealers, financial institutions, and others with whom the corporation does business. The intracompany flows

of information are divided into intradepartmental flow -- information flows only in a particular department, be it production, sales, finance, or R & D -- and interdepartmental flows between different departments. Control of information flows is a vital part of corporate management. In other words, corporations must address the issues of: (1) how to design and operate channels necessary for collection and processing of information for intracompany and intercompany communications, and (2) how to take advantage, efficiently and effectively, of the information accumulated through such channels.¹

The above questions, which have long challenged the corporate world, appear to have become more urgent recently, in view of several new developments. First, changes in the demand pattern are seen in many product areas. In long-established product markets, diversification of demand began to be noticed as the increase in wealth began to be distributed more fully. In the new products category, an increasing number of new products are designed to satisfy a particular niche; thus, the size of demand for each product is relatively small. In other words, a transition from the mass production/general merchandising phase into the limited production/diversified merchandising phase, is taking place.² Second, a number of corporations became aware of the necessity to diversify their business, and many are actively pursuing the diversification strategy. The structural transformation of the demand pattern, as represented by demand diversification, depressed the growth of many established business segments, but it also created new business opportunities for corporations. In such a changing business climate, corporations are pursuing the policy of utilizing others' managerial resources (such as business agreements, joint ventures, mergers, and acquisitions) in addi-

tion to their internal resources in an attempt to diversify. These developments have compounded the necessity for effective collection and use of information about corporate environments as well as efficient internal processing of information. Third, new developments seen in the telecommunications industry have provided a number of effective means for corporate management to cope with the changes. Technological progress in computers, terminal equipment, and hardware and software for telecommunications circuits has facilitated the formation of intracompany and intercompany information channels and has contributed to their increased efficiency. An example of a product that combines and utilizes computer, terminal equipment, and communication circuits is the computer on-line network in use for intracompany communications.

Thus, changing external environments and the lower costs of collecting and processing information have placed increased significance on information. Such shifts in both demand for and supply of information are a major impetus behind the formation of information-intensive corporate management -- corporate management which utilizes large volumes of diverse information. Technological developments in telecommunications have several effects. First, an integrated system utilizing computer, terminal equipment, and communications circuits can replace conventional systems utilizing other media (replacement effect). Installation of automation systems such as office automation (OA), factory automation (FA), and store automation (SA) systems, when combined with a local area network (LAN) that integrates many systems, can realize more efficient (cost-effective) corporate management. Such replacement takes place basically as a general reaction to the change in relative prices of resources (input) to be utilized.³ Second, the formation and use of a

state-of-the-art integrated system composed of computers, terminal equipment, and communications circuits will expand business opportunities in both existing and new businesses (growth effect).⁴

3-1.2. Impacts on Japanese-style management. The increased emphasis on information use in corporate management ultimately affects internal decision-making mechanisms and corporate structure.⁵ Conversely, the existing decision-making process and corporate structure also affect the direction and nature of information intensification. Before analyzing such interrelationships, however, we should consider the characteristics of Japanese-style management:

- (1) Decision making in Japanese management is triggered by the lower stratum of managers and reaches the upper structure gradually.
- (2) Importance is placed on informality in decision making and information exchanges.
- (3) Middle managers play an important role in decision making and implementation.
- (4) Skills are accumulated through on-the-job training.
- (5) Priority is placed on the establishment of long-term, continual relationships with clients, suppliers, and financial institutions.

Numbers 1 through 4 above characterize the internal decision-making process and the corporate structure inherent in Japanese corporations. Number 5 reflects the traditional importance placed on long-term perspectives in Japanese management practice.

The bottom-up decision-making system involves more participants than does top-down decision making; those involved have more opportunities to

share information. The information that ultimately reaches top management is limited in terms of volume and quality, as the information is condensed at each stage of the decision-making process. Yet the system has the benefit of reducing the volume of information required for the top echelon to make the ultimate decision.

The necessity of an internal information network would be less pronounced in the bottom-up decision-making process than in the top-down system under stable corporate conditions, for under such conditions the limitations on top management's use of information would be less critical.⁶ In fact, the informal practice of information exchanges and the importance of conflict mediation do not discourage the formation of a formal information network. Informal information systems are expected to continue to play an important supplementary role in the network, as discussed in a recent commentary on informal management information systems.⁷ Important roles are assumed by the middle manager whose section or department forms a basic unit in the decision-making and implementation process. However, while information may travel freely among the units involved in decision making, information provided to those who are not involved might be restricted to the information necessary to conduct business with them. Thus, there is a force opposing the formation of a wider information network.⁸

Japanese management emphasizes on-the-job training of employees, whether blue collar or white collar, who by assignment rotate among diverse fields and are expected to accumulate broad expertise. This not only facilitates each employee's accumulation of experiences but also serves as a forum and process of ongoing information sharing, which adds flexibility to Japanese corporate management. The on-the-job training

itself does not cause any harm to the information intensification of corporate management. Merits of on-the-job training, however, will be reduced by it. For instance, the superiority of the flexible manufacturing system of Japan, which is largely attributable to each blue-collar worker's possession of broad expertise, will gradually disappear as computer-controlled machinery perfects the flexible manufacturing system (FMS).⁹

The emphasis on long-term continual business relationships is reflected in the relations between, for example, a large manufacturer and its subcontractors, between a large manufacturer and its wholesale and retail dealers, between a bank and its major corporate clients, and between members of a corporate group. The long-term continual relationships between corporations encourage the formation of intercompany information networks, and intercompany network formation reinforces the trend of long-term business relationships.

Thus, the formation of an information network is both encouraged and discouraged by different aspects of the Japanese corporate management. Yet in the ultimate analysis, it is stimulated by yet another major aspect of Japanese management. Decision making in Japan consumes a tremendous amount of time. The long duration necessary to make a decision is incompatible with today's fast-changing corporate environments. The formation of an information network can be an attempt to minimize this liability in the Japanese decision-making process. So an increasing number of Japanese corporations have chosen to take advantage of intra- and intercompany information networks, which still allow them to preserve the strengths of Japanese-style management.¹⁰

3-2. Impacts on Industrial Organization

3-2.1. Corporate competitive strategies and intercompany information networks. Generally speaking, the corporate information network has undergone several distinct developmental stages. Stage 1 was characterized by the introduction of computers that perform simple computation and regular administrative duties such as payroll, tabulation of production and sales data, and management of personnel files. At Stage 2 a series of computer-aided management systems designed to perform specific duties or functions were developed, including production, sales, purchasing, finance, and cost management systems. It is at this stage that the on-line capability was added to some of the systems. Stage 3 was represented by the integration of the systems developed at Stage 2. The completion of an integrated on-line system can be interpreted as the formation of an intracompany information network. Stage 4 witnesses the formation of an on-line information network connecting with other corporations, hence the formation of an intercompany network.

In Japan's major industries and corporations, Stages 1 and 2 took place from the second half of the 1950s to the first half of the 1960s. Stage 3 began in the second half of the 1960s and lasted throughout the 1970s. Japan is now undergoing the fourth stage of development.¹¹ The following examples of three industries -- steel, automobile, and banking -- illustrate this process.

Major steel manufacturers computerized simple computation functions in the 1950s. After automating regular administrative duties, they initiated development of on-line production management systems in the second half of the 1960s. By the end of the 1970s, intracompany on-line information networks connected headquarters with plants, sales offices,

and research labs, and intercompany on-line information networks connected them with their affiliated concerns, including key distribution bases and processing centers. In addition, on-line networks that link them with general trading companies are being formed to exchange order and delivery information. Thus, major steel manufacturers are forming intercompany information networks built upon existing intracompany information networks.

Major auto manufacturers began to automate simple computation and regular administrative duties in the second half of the 1950s. In the 1970s, on-line systems for production control were designed and developed. The second half of the 1970s saw much progress in intracompany information networks, which integrate production, sales, purchasing and other management systems. Today, auto manufacturers are in the process of forming an intercompany information network that connects them with parts suppliers, auto dealers, and freight forwarders who have established long-term, continual business relationships with the manufacturers.

The banking industry's progress in the implementation of on-line networks can be divided into three distinct periods. The first period, between the second half of the 1960s and the second half of the 1970s, was characterized by each bank's attempt to implement the on-line processing of deposit and remittance services. In this period, the on-line processing of foreign exchange and loans had yet to be implemented. The second period that lasted until the first half of the 1980s witnessed rapid advances in the formation of on-line information networks. Each bank formed a comprehensive on-line information network that integrates deposit, remittance, loan, and foreign exchange on-line processing. It

is also in this period that CDs, ATMs, and other automated machinery were put into service. Furthermore, progress in the formation of the inter-bank information network resulted in the creation of the nation wide on-line network for remittance processing, called the Nationwide Banking Data Communications System, of which all financial institutions are members. For inter-bank deposit processing, each banking group including the groups consisting of money-center banks and regional banks, formed an intra-group on-line network. In the third period that began in the second half of the 1980s, the banking industry found itself in a different corporate environment with the free utilization of communications circuits and the deregulation of the financial industry. So the banking industry is currently undergoing expansion of the on-line network. Corporate banking services, which can be implemented by the formation of on-line networks between a bank and its corporate customers, are one example of such expansionary efforts.

Thus, intercompany networking is a major trend today¹² as corporations become aware that the effective use of intercompany information networks is a crucial factor in competing successfully in the marketplace. Intercompany information networks will strengthen the ability to compete by facilitating the collection and utilization of demand trend data and other customer-related information, by shortening the time required to produce and to deliver, by reducing the size of inventory, and by making borrowing and fund utilization more efficient. Following are some examples of intercompany information networks and their effects on the competitive positions of a few Japanese and U.S. corporations.

First is the case of Japanese automobile manufacturers.¹³ In this industry the issue of how to efficiently produce and sell limited quan-

titles of enormously diverse products, in line with the diversification of customer demand, is the key to a successful competitive strategy. Such requirements prompted the formation of information networks with dealers and suppliers. Mazda Motors, for example, plans to implement an on-line data network that links it with 300 parts manufacturers and other Mazda materials suppliers by the end of 1988. When fully implemented, Mazda's network will, according to the plan, cut the time required to execute part and supply delivery by up to 75%. Toyota Motors' plan, which is now under consideration, to form an on-line network with its dealers and suppliers, predicts that the on-line network with its dealers will reduce the processing time necessary to ship automobiles by three days. It also predicts that the execution of parts delivery, which now takes four days to process, will be further reduced.

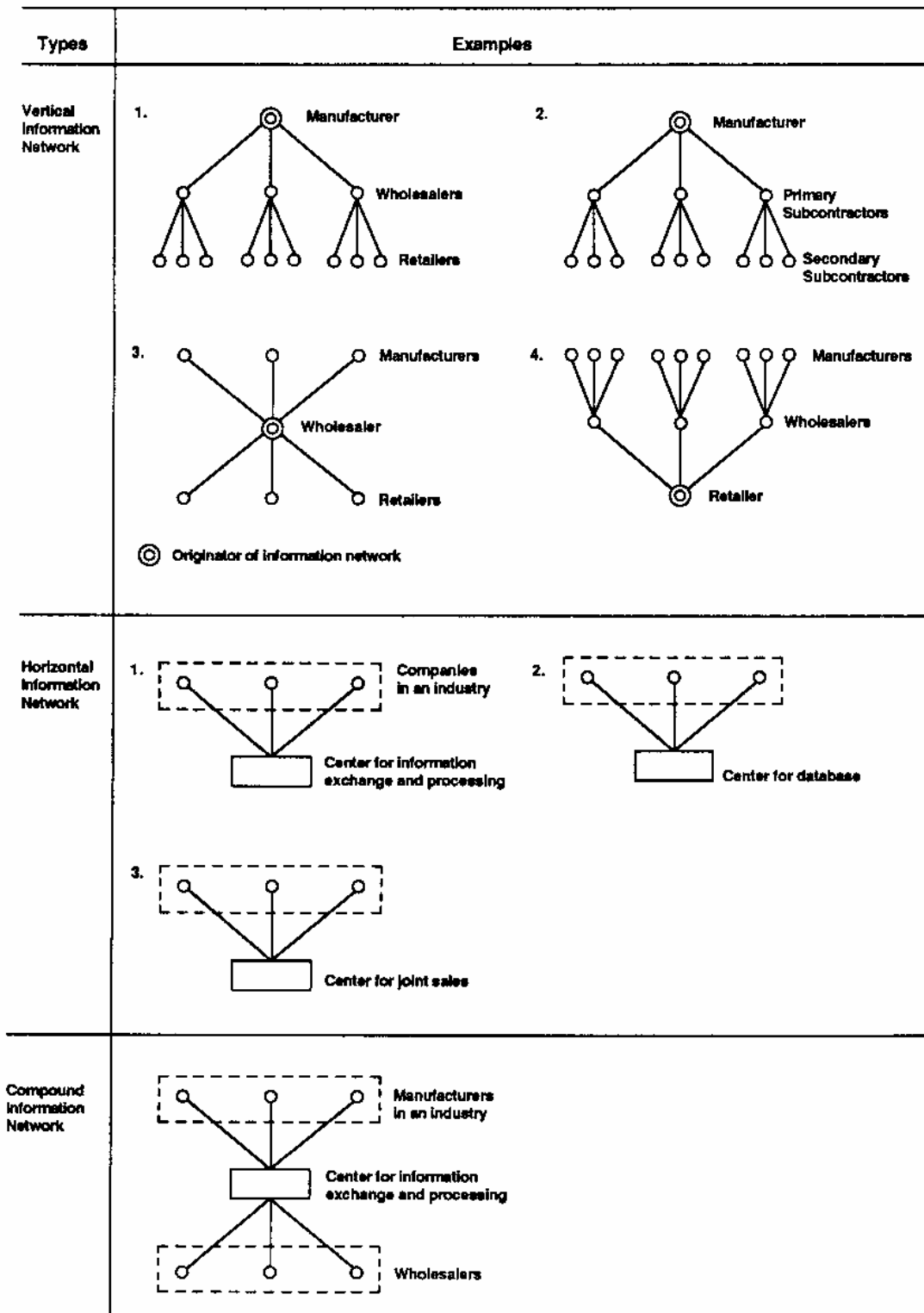
In the United States, several cases of increased competitiveness attributable to the implementation of on-line systems have already been reported. For example:¹⁴

- (1) American Airlines was the first to implement an on-line flight reservation system with travel agents.
- (2) In the pharmaceutical industry, American Hospital Supply Corporation formed an on-line system with purchasing departments of hospitals.
- (3) In the financial industry, Citicorp and Merrill Lynch established a large-scale on-line network connecting them with corporate clients, and providing a cash management service that utilizes the network.

3-2.2. Intercompany information networks. Intercompany information networks can be either networks for corporations belonging to the same

industry or networks for corporations belonging to different industry groups. The former are called "horizontal" networks and the latter are known as "vertical" networks. In addition, a "compound" network has the characteristics of both horizontal and vertical networks. Figure 2 shows three types of intercompany information networks.

Examples of existing horizontal networks in Japan include a shared network for exchange settlement called the Nationwide Banking Data Communications Network, whose members are financial institutions all around the country, and a shared database storing production statistics and other data which is generated by the Japan Steel Association for steel manufacturers. A network formed by a steel or automobile manufacturer to connect itself with other network members or affiliated firms, such as parts suppliers and distributors, is an example of a vertical network. The network to be formed jointly by toiletry goods makers to link themselves with a number of distributors is an example of a "compound" network. In the "vertical" configuration, each of the competing corporations forms its own network; thus, competition between networks operated by competing companies will ensue. In the horizontal and compound configurations, corporations directly competing with each other must share the same network.



Source: MITI. Industrial Policy Bureau, Kigyo Joho Network (Information Networks in Business), Tokyo: Computer Age Co., 1985, p. 119.

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Figure 2

Types of Intercompany Information Networks

For corporate competitive strategy, the vertical network, whose formation is unilaterally initiated by the "core" corporation for its own sake, can give the corporation a competitive edge, whereas the horizontal and compound networks rarely offer any competitive edge to their members. Advantages of horizontal and compound networks include the sharing of costs and expenses among many members. In the vertical configuration, firms that belong to two or more vertical networks with no interoperability must bear the cost burden. A parts supplier whose clients include Automaker A and Automaker B, for example, may have to subscribe to two networks and, hence, invest in two sets of terminal equipment.

Some of these issues surrounding intercompany information networks are illustrated in a case study of the Japanese toiletry industry.¹⁵ One leading manufacturer, Kao, which established a wholesale subsidiary for its product line, has had an exclusive distribution channel. After implementing an on-line system with its wholesale subsidiary, Kao is now expanding the network to the retail level. Kao's intercompany information network is a typical vertical network. Other leading manufacturers, whose distribution routes to retailers are through independent wholesalers, decided to challenge Kao by jointly forming a shared on-line system that links the manufacturers with wholesalers. The network planned by them is a "compound" network. In addition, the Japanese subsidiary of Proctor and Gamble is forming its own vertical network. Since proposals to create such networks were all unilaterally initiated by the manufacturers,¹⁶ the wholesalers' association demanded standardizations (e.g. uniform code, format, and communications protocol) to

secure inter-network operability. Bowing to this pressure, the manufacturers adopted uniform standards.

This example suggests four characteristics of intercompany information network development. First, intercompany networks of different configurations can be established in the same industry group. Second, an intercompany information network implemented by one corporation can prompt its competitors to establish their own. Third, when two or more networks co-exist, the problem of interoperability will surface. Finally, trade associations may assume a crucial role in initiating network standardization efforts.

3-2.3. Intercompany information networks and industrial organization. Intercompany information networking affects industrial organization, which in turn influences the direction and speed of information networking. This section considers (1) the type of corporations that initiate intercompany information networking; (2) impacts on intercompany specialization (functional specialization); (3) impacts on competition between firms; and (4) the influence of Japan's industrial organization on intercompany information networking.

In general, corporations that promote intercompany information networks are leaders in their business relationships. Steel and automobile manufacturers, for example, have taken the initiative in planning vertical networks. In "horizontal" or "compound" configurations, which require coordination of conflicting interests represented by many firms, the corporation that takes the initiative is the most powerful one in the group. General trading companies and banks in Japan merit special attention in this context. General trading companies have traditionally acted as organizers who create business opportunities by matching com-

panies in diverse fields.¹⁷ Banks are crucial in the implementation of intercompany information networks, because every business transaction ultimately involves monetary settlement; banks, through their lending policies and ownership of corporate common stocks, can exert influence on corporations. At present, general trading companies are planning intercompany networks for the steel and textile industries, and banks have established communications subsidiaries (classified as Type II telecommunications carriers) which are attempting to form and operate intercompany information networks.¹⁸

The formation of intercompany information networks may result in changes in intercompany functional specialization. The party that assumes a leading role in the formation determines the nature of such changes. One extreme example is the formation of a network initiated by a manufacturer to link it directly with retailers. In this case, a role traditionally assumed by wholesalers, namely, the channeling of information between the manufacturer and retailers, is incorporated into functions of the network. A network designed to bypass wholesale distributors could also be initiated by large retailers, such as supermarket chains and department stores.¹⁹

The formation of intercompany information networks can both stimulate and depress intercompany competition.²⁰ The vertical network, which introduces a new tool into the competition with other companies, can lead to fiercer intercompany competition. The development of computerized reservation systems in the U.S. airlines industry is a typical instance of using the vertical information network in a competitive strategy. In this case, American and United Airlines built their systems, Sabre and Apollo, in the 1970s, and they are said to have captured

41% and 39% of the total computerized travel agency market, respectively, because they computerized first.²¹ Generally speaking, in the case of vertical networking, the competition would increasingly assume the character of inter-network competition, for the networking tends to strengthen and reinforce business relationships. An excessive solidification of business relationships, however, can slow competition. Such solidification of business relationships might ensue when information networks, with no interoperability, make entry and exit very costly.

In horizontal and compound networks, which are shared and owned by competing firms, the direct effect of information networks on competition is minimal, though conflicts relating to network formation and operation may arise. A network based on the premise of equal access by all members will stimulate competition because each business will be able to put the shared information to use in its own way.²² In this case, intercompany competition could be hampered when the imposition of strict rules governing entry and exit from the information network can effectively exclude certain firms from using the network.

Japanese industrial organization emphasizes the maintenance of long-term, continual business relationships between specific corporations. In steel, automobile, electric equipment (including computers and telecommunications), and textile industries, such relationships exist between a leading manufacturer and its suppliers and processors and between a leading manufacturer and its wholesale and retail distributors. The existence of corporate groups, each of which has a general trading company or a bank as its core, has been sustained by long-term, continual business relationships among the group members,

with such benefits as reduced costs in doing business and steady income flow.²³ In any case, the presence of corporate groups in Japan is exerting a major influence on the nature and speed of intercompany information network formation. Formation of information networks, especially the "vertical" networks, is expected to increase at an accelerated rate.

Hurt by such problems as sluggish productivity in the manufacturing sector and short-sighted corporate planning, a few U.S. manufacturers are attempting improvements. In the U.S. auto industry, for example, the manufacturers' use of subcontractors seems to be changing. U.S. automakers have traditionally relied less on subcontractors for necessary parts than their Japanese counterparts (as one study indicates, the percentage of parts produced in-house by one U.S. manufacturer is twice that produced by Japanese manufacturers).²⁴ According to a report, auto manufacturers will purchase more goods from subcontractors rather than producing them themselves and will establish long-term relationships with more than one subcontractor by abandoning their traditional policy of selecting one subcontractor with which a short-term contract is concluded each year.²⁵ Furthermore, to shorten the time required for subcontractors to deliver necessary parts, the "just-in-time" method is being implemented. The policy shift seen in the U.S. auto industry is in accord with their Japanese counterparts' strategic direction, which emphasizes long-term, continual business relationships and implementation of systems that facilitate the limited quantity production of widely differentiated products.²⁶

3-3. Policy Issues and Public Policy Affecting the User Side of the Telecommunications Industry

3-3.1. Policy issues concerning information networking. According to MITI's forecast, the current trend of forming intracompany and intercompany information networks is expected to continue and spread rapidly into diverse fields. Governmental policy is to encourage the formation of information networks, and to make certain that information networks will not limit competition between corporations. These two objectives are emphasized, first, because the sheer number of computer and terminal equipment manufacturers, coupled with each manufacturer's attempts at product differentiation, has resulted in a lack of interoperability. Second, regulations governing interface between networks have not been clarified because of the prolonged presence of the monopoly in the telecommunications service market. The problem was compounded by delayed development of conversion technologies and delay in the proliferation of VANs, which can function as converters. Third, this lack of interoperability necessitates redundant facility investments, with most of the burden falling on small and medium firms. In fact, the government is aware that the lack of interoperability between networks has a negative impact on progress in information networks, and that redundant facility investments will ensue from the lack of interoperability. Fourth, and of special concern, intercompany information networks are implemented independently by each long-term corporate group. The question of whether the presence of corporate groups, viewed as peculiar to Japanese industrial organization, limits intercompany competition is of interest to the government and especially to the Fair Trade Commission, which executes antitrust laws. Thus, governmental policy concern over the

competition-limiting potential of intercompany networking stems from concern over the presence of corporate groups.

Several measures promote corporate information networks. The standardization measure²⁷ involves standardization of communication protocols and standardization of business protocols. A second measure encourages protocol conversion technologies. The assistance is directed to both hardware and software development. A third measure provides assistance for VANs, which are capable of converting communication protocols. A fourth measure is designed to reduce, for small and medium firms, the financial burden imposed by the formation of information networks.²⁸

To cope with the competition-hampering effect of intercompany information networks, the government regulates corporate activities in accordance with antitrust and other relevant laws.

3-3.2. Current trends in public policy. Measures to achieve protocol standardization are being carried out concurrently by MPT and MITI. MPT's standardization efforts, which aim at standardization at the communications processing level, is primarily based on the OSI Reference Model. MPT has already standardized protocols for communication between computers (implemented in 1980 for lower-layer functions of the OSI Model); for facsimile communication (G-4 facsimile, implemented in 1985); for personal computer communication (in 1984); for the Japanese language telex (1983); and for electronic mail (1985).²⁹ Moreover, the user side, anxious to form corporate information networks, has initiated unconcerted standardization efforts. Such efforts to standardize protocols, which are separately administered by each industry, are being supported by MITI.

MITI concerns itself with business protocol standardization as well as with communications protocol standardization.³⁰ Business protocol standardization involves invoice and other forms, merchandise codes, corporate codes, message conversion formats (telegraph formats and recording formats), and other protocols necessary for processing transactions. MITI hopes to achieve as much standardization as possible. MITI relies on trade associations to mediate between corporations with conflicting interests in protocol standardization. Trade associations in Japan have traditionally assumed the role of information channels between corporations and the government and have served as forums for mediation among corporations.³¹ Furthermore, MITI has formulated guidelines for business protocol standardization, which include basic principles, model proposals, and implementation procedures. MITI is encouraging standardization based on its guidelines by providing a financial incentive.³² MITI also began offering low-interest loans for systems design, protocol development, and facilities. This policy -- releasing a set of guidelines and luring corporations to conform with the guidelines by offering an incentive -- is a typical method of the Japanese government to achieve a desirable policy objective.

Varied industrial sectors are progressing toward standardization.³³ In the financial industry, uniformity of transmission-control protocol and formats has been achieved for interbank automatic cash transfer systems and for corporate banking systems between banks and their corporate clients, as well as uniform formats and codes for the Nationwide Banking Data Communication System. In the wholesale/retail industry, standardization of invoices, codes, formats, and transmission-control protocols is in progress, and the number of corporations that adhere to these pro-

protocols is rising. The steel industry has completed the standardization of invoices, codes, and formats for their systems linking with general trading companies. The industry is currently standardizing transmission-control protocols. These industrial sectors are among those that have made the greatest progress in standardization. Other industrial sectors are also actively pursuing standardization by setting up groups to discuss standardization matters in their respective trade associations.

Another way to achieve interoperability is through protocol conversion. To encourage development of conversion technologies, MITI aids development of interoperable database systems and general application programs and offers low-interest loans for conversion program development. In addition, MPT has a low-interest loan program for facilities and program development directed to carriers of VANs, which have a conversion capability. In sum, MITI's and MPT's policy to facilitate the implementation of intercompany information networks is being carried out through their measures for protocol standardization and protocol conversion.

For the small and medium firms wishing to gain access to intercompany information networks, MITI, in an attempt to reduce the cost burden for such firms, offers low-cost financing for purchases of equipment as well as preferential tax treatments including a special depreciation method and tax deductions applicable to computers and terminal equipment.

The Fair Trade Commission is primarily concerned with the effects of intercompany information networks on competition and particularly with the networks' potential to endanger competition. It has already

completed a study on the effects of intercompany networks on the state of competition. The study³⁴ concluded that, although the Commission at present found no evidence of antitrust infringements and competition-hampering effects in the operation and utilization of intercompany information networks, the FTC would make certain to prevent or remove any potentially harmful elements by closely monitoring business activities. The study also pointed out some potential trouble signs, such as the practice of restricting business activities of network members. This would include unfair regulations governing entry to and exit from the network, restrictions designed to prevent competitors' access to the network, and unfair restraints placed on members' business transactions. Another trouble sign would be the expansion and strengthening of a particular corporate group, attributable to the formation of a vertical information network. A third trouble sign would be any activity that can limit competition, such as excluding certain corporations from joining the horizontal network.

In the United States, debate over the competition-limiting effect of intercompany networks developed into lawsuits, concerning an interbank electronic funds transfer system, which has grown rapidly since the second half of the 1970s. The suits dealt with the question of whether the commercial banks jointly operating the system violated antitrust laws when they denied network access to other financial institutions. This U.S. case is an illustration of the third trouble sign described above.³⁵

STRUCTURAL TRANSFORMATION OF THE TELECOMMUNICATIONS
INDUSTRY AND PUBLIC POLICY: SUMMARY, CONCLUDING
REMARKS, AND POLICY IMPLICATIONS

This chapter summarizes structural changes in the telecommunications industry and in governmental policy and considers the policy implications. Using an analytical framework, the second part of the chapter re-examines elements that promote such structural changes and notes their effects. The last part examines the fundamental issue that surrounds governmental telecommunications policy: that of economic efficiency vs. distributive equity.

4-1. Structural Changes in the Japanese Telecommunications Industry and in Governmental Policy: Summary

To summarize the structural changes in the Japanese telecommunications industry and in governmental policy:

- (1) The new industrial schema that came into force in April 1985 was designed to promote competition among carriers. Both Type I and Type II carriers can provide telecommunications transport and value-added services.
- (2) Several Type I and more Type II start-up firms have emerged, and NTT, the established firm, has implemented aggressive corporate strategies to cope with the challenges since April 1985.
- (3) On the user side of the market, progress is being made in the formation of intracompany and intercompany information networks that utilize telecommunications services. Intercompany networks in particular are increasingly recognized as

strategically effective corporate tools; thus, the number of networks of different types -- vertical, horizontal, and compound networks -- is on the rise.

- (4) Governmental policy toward the telecommunications industry consists of regulatory measures that limit corporate activities and supportive measures that encourage and aid corporate initiatives. Therefore, this policy can be interpreted as being part of the overall industrial policy of Japan.
- (5) Among the regulatory measures, those applicable to Type I carriers are the strictest: A permit is required for a Type I carrier's entry and exit, and pricing and other conditions for provision of services are regulated. Evaluations of entry or exit applications give special consideration to preventing excessive competition, and regulations differ that govern Type I and Type II carriers' conditions for providing service.
- (6) Among Type I carriers, NTT, the dominant firm, is under obligation to provide universal service because of its status as a special company. This not only affects NTT but also will become a major determinant of the future course of regulatory policy.
- (7) The formation of intercompany information networks is expected to accelerate because this growth relates to Japanese industry's emphasis on long-term, continual business relationships. Antitrust laws permit the formation of intercompany information networks; however, if these networks are exclusive, they risk limiting competition among corporations. To minimize such danger, policy has attempted to

secure interoperability, including measures to standardize communications protocols and measures to aid the development of VANs, which provide protocol conversion.

Structural changes and governmental policy toward the Japanese telecommunications industry as described earlier indicate major trends that became conspicuous during the first year of the new regulatory framework. The components of the framework, the Telecommunications Business Law and the Nippon Telegraph and Telephone Company Law, will be reviewed in 1988 and 1990 respectively. Structural changes in the telecommunications industry and related issues inherent in governmental policy toward this industry are important considerations.

In the analysis that follows here, Michael E. Porter's analytical framework¹ for specific industry structures will serve as the basis for examining the structural transformation of the telecommunications industry. Second, implications of the public policy are examined, in view of the close relationship between the public policy and the structural transformation of the telecommunications industry. Third, similarities and differences between the Japanese public policy and that of the United States will be considered.

4-2. Structural Transformation of the Telecommunications Industry: Another View

According to Michael E. Porter, an industrial structure is shaped by five forces:² threat of new entrants, threat of substitute products or services, bargaining power of buyers, bargaining power of suppliers, and rivalry among existing corporations. His analytical framework is designed to explain the structural transformation of a specific industry by focusing on these five forces, which represent conflicting interests

of various industry participants.³ We can look at the telecommunications industry in this light.

Threat of new entrants. Technological innovations in communications technologies, such as communications satellites, microwave, and other transmission technologies, reduce the sunk cost of business activities. The lower cost of input -- including communications satellites, microwave, optical fiber cables, switching equipment, and computers -- is part of the cost of supplying telecommunications services and thus reduces the amount of capital required to commence business operations. In other words, technological innovations have the effect of easing entry into the telecommunications industry. The lessening of entry regulations also reduces entry barriers. Demand for telecommunications services, on the other hand, is expected to grow further, especially in a few high-density communications traffic areas. The growth potential of the demand side is the major factor encouraging participation of new firms.

Threat of substitute services. Technological innovations in the telecommunications industry, because they make the supply of diverse services possible, imply the increase of services that can substitute for one another, and thus, competition among different services will develop. A purchaser's specific need is satisfied by any one of the services with different production methods and different supply systems. The need for information storage, for example, can be met by a service provided by the network, a terminal that has the added storage feature, or an off-line service utilizing discs. Thus technological innovations provide an increasing degree of substitutability.⁴

Bargaining power of buyers. The efficient use of telecommunications services requires strategic planning by corporate managers. In addition to reducing communications costs, corporations are now faced with the urgent necessity to create intercompany and intracompany information networks as part of their competitive strategies. This raises their sensitivity to the supply of telecommunications services. The fact that some business users have the capability of supplying telecommunications services themselves (forward integration) enhances users' bargaining power. The bypass operations of corporations that own their telecommunications facilities not only demonstrate their potential but also imply that their potential is realizable. The bargaining power of residential users primarily rests on their ability to influence the policy formulated by the government's regulatory agencies and the legislature. The different route through which residential users exercise their bargaining power should be noted. Yet regardless of the users' particular channels of influence, an increase in suppliers, coupled with an increase in substitutable services, improves the bargaining power of both business and residential users.

Bargaining power of input suppliers. The bargaining power of input suppliers basically depends on the number of purchasers. The transformation of the telecommunications service market from a monopolistic one to a competitive one means the transformation of the input market from a monopsonic market into a competitive market where there are now more purchasers than before. Competition among purchasers would increase the bargaining power of input suppliers. Competition in the telecommunications service market, however, raises the service operators' sensitivity to the costs of factors of production, thus

weakening the bargaining power of input suppliers. Furthermore, the internationalization of the input market and emergence of foreign suppliers would diminish the power of domestic suppliers who traditionally enjoyed the closed market.

Rivalry among corporations. As is clear from the transformations mentioned above, competition among corporations appears to be on the rise. These diverse corporate groups in the telecommunications market⁵ can be classified in a number of ways: whether the corporation is a dominant carrier, whether the corporation serves a specific region or all of Japan, whether the corporation offers an array of services or specializes in a few services, and whether the corporation owns telecommunications facilities. Since a corporation's choice of a particular competitive strategy is attributable to the type of corporation, the supply side of the telecommunications service industry has more than one "strategic group," which is defined by Porter as "the group of firms in an industry following the same or a similar strategy along the strategic dimensions."⁶

Thus, the telecommunications industry, which is experiencing structural changes in its two fundamental aspects -- technological innovations and demand -- is undergoing a transformation.

4-3. Public Policy Framework and Its Implications

The public policy measures directed to the telecommunications industry, whether intended to encourage or restrain the industry's structural transformation, influence the direction and speed of the transformation. Though there are both similarities and differences in the Japanese and U.S. processes for selecting and developing policies,

Japan and the United States seem to face similar problems -- the stimulation of competition to expedite the commercialization of the latest technological innovations, on one hand, and the control of negative impacts of competition on the supply system, on the other. In other words, this policy problem can be viewed as a need to balance competition and the universal service requirement.

Japan and the United States differ in several ways in terms of policy selection and policy development. First, the applicability of Japanese regulations is not based on the type of services to be provided and the regional character of service areas, (i.e., whether long-distance or local), which are the basis for determining the applicability of U.S. regulations.⁷ Second, the dominant carrier in Japan is under obligation to provide universal telephone service, which does not apply to the U.S. dominant carrier in the competitive long-distance service market. Third, for policy formulation and implementation, a single governmental agency, MPT, is vested with the greatest amount of authority in Japan; whereas in the United States, authority is shared by the legislative, executive, and judicial branches, as well as between state and federal authorities.

The first difference described above implies that in Japan competition could spread to all market segments of telecommunications services within the existing regulatory framework. It may be inferred that the liberalization of the Japanese telecommunications industry is the most advanced form of liberalization in the world.⁸ In reality, however, barriers to entry and tariff regulations directed to Type I carriers allow the government direct control of Type I carriers' activities and indirect control of Type II carriers' activities through the regulations

placed on the former.⁹ It seems too one-sided to consider the Japanese liberalization as the "most advanced," especially in light of a recent denial made to a prospective Type I carrier.¹⁰

To secure universal service, the government might resort to the suppression of competition among Type I carriers. When customer access charges or governmental aids cannot be implemented, the current practice of cross-subsidy might have to be sustained by other means, such as entry and tariff regulations for Type I carriers.

The possibility of suppressing competition in the United States seems to differ greatly from the situation in Japan. Although the demarcation of services is not clearly specified, a clear division between long-distance and local carriers has been established in the United States. In addition, the multi-dimensionality of the U.S. policy formulation and implementation process allows the conflict of interests surrounding the universal service issue to arise more explicitly, and the subsequent mediation of interests is conducted through overt processes.

In Japan, the policy is implemented through assistance measures provided to the supply-side and user-side corporations, combined with restraint measures. This implies that public policy toward the telecommunications industry resembles industrial policy. Indeed, MPT has advocated changing its role, from being authorities in charge of site operations ("Gengyo Kancho") to being authorities that actively plan and carry out industrial policy ("Seisaku Kancho").¹¹

However, the ultimate issue surrounding the telecommunications public policy is to what extent this public policy, as an industrial policy, can be implemented. This public policy, as an industrial

policy, would have to stimulate supply-side competition and create a supply of a variety of low-cost services. The utilization of diverse and economical services by business users would contribute to the overall efficiency and competitiveness of the economy. Thus, a major objective of an industrial policy would appear to be the attainment of efficiency; however, in the telecommunications industry, the introduction of competition to attain increased efficiency may endanger the prevailing supply system which has allowed the practice of cross-subsidization: The introduction of competition could change the conventional distribution of benefits. In other words, the benefits arising from technological innovations and from the policy shift (introduction of competition) would not benefit users equally.

The two outcomes of technological innovations -- increased efficiency of the economy and the changed distribution of benefits -- have been observed in other industrial sectors. Although the involvement of the government through its public policy sets the telecommunications industry apart from others, efficiency and the distribution of benefits (distributive equity) are two major issues that concern modern economic policy. Thus, public telecommunications policy deals with issues that also concern modern economic policy.

For the telecommunications industry, which has been under the control of public policies for a long time, this problem will more likely be solved through the political process. The solution to the problem -- whether economic efficiency or distributive equity will be given first priority -- will crucially affect the international competitiveness of Japanese and U.S. industries.

NOTES

- 1-1 For the introduction of new services by AT&T, and the development of mergers among its competitors in the long-distance market, see, Wall Street Journal, January 11, 1986, p. 3.
- 1-2 For the impacts of rapidly changing technology on telecommunications industry structures, see, G.W. Bork, The Telecommunications Industry, Cambridge, MA: Harvard Univ. Press, 1981, Chapters 2 and 10.
- 2-1 As for the status of MPT in those days, the section for administering NTT Public Corporation had been occupied by staff delegated from NTT for a long time. T. Tomita, a key member of MPT for reforming telecommunications policy, reportedly said, "We had no substantial influence on NTT Public Corporation, and had been tired with such a status." Hirotsugu Shimoda, "Dokumento, Yuseisho Denkitushin Seisakukyoku" (Document, MPT, Telecommunications Policy Bureau), Nikkei Communications, December 30, 1985, p. 84.
- 2-2 For MITI's industrial policy in the 1970s, see, Ryutaro Komiya, Masahiro Okuno, and Kotaro Suzumura, eds., Nihon no Sangyo Seisaku (Industrial Policy of Japan), Tokyo: Univ. of Tokyo Press, 1984, Chapter 3.
- 2-3 Since the days of NTT Public Corporation, NTT has provided such varied services as packet switching, data transmission and processing, facsimile, teleconferencing, cellular radio telephone, paging, and videotext.
- 2-4 For a detailed historical background of Japanese telecommunications policy, see, T. Musashi, Japanese Telecommunications Policy, Cambridge, MA: Program on Information Resources Policy, Harvard Univ., 1985, Section II.
- 2-5 Although the effects of liberalization on international telecommunications services have not been realized as rapidly as on domestic services, the following recent developments seem to be symptoms of change:
- 1) Two projects for entering the international telecommunications business are being promoted by big trading companies (sogo shosha). According to one of the two, Mitsubishi Corp., Mitsui and Co., and Sumitomo Corp. plan to borrow transponders from INTELSAT through KDD. They have already established the joint venture for doing feasibility studies, and will begin to provide international telecommunications services in 1988. Nihon Keizai Shimbun, May 16, 1986. In another project, C. Itoh arranged that Toyota, GM, C&W, and C. Itoh would establish a joint venture for constructing submarine optical fiber cables between the U.S. and Japan, and for providing international telecommunications

services through its own networks. They were to start the feasibility studies in August 1986, and begin to provide services in 1990. Nihon Keizai Shimbun, June 6, 1986.

2) MPT decided to grant RPOA (Recognized Private Operating Agency) status to international VAN carriers. MPT is accepting applications for VAN carriers' entry into the international telecommunications services market as of summer 1986. Nihon Keizai Shimbun, March 27, 1986.

- 2-6 Nikkei Sangyo Shimbun, March 15, 1986.
- 2-7 82 companies -- for example, banks, security trading companies, sogo shosha, and telecommunications equipment makers -- invested in all three newcomer carriers. Computopia, June 1985, p. 26.
- 2-8 This fact seems to show that sogo shosha are much interested in telecommunications and related business. For the strategy of sogo shosha, see, Nikkei Sangyo Shimbun, April 28, 30, 1986.
- 2-9 The entry of electric utility companies into the telecommunications industry is said to have big impacts on NTT's business. MITI seems to be promoting the entry. Yomiuri Shimbun, March 29, 1986.
- 2-10 According to a survey of General Type II carriers' business, 53 companies out of 81 are providing remote computing services. Nikkei Communications, December 30, 1985, p. 61.
- 2-11 Firms with fewer than 200 employees comprise 62% of all Type II businesses and the sales per year are less than 2 billion yen (\$8 million) in half of all firms. MPT, ed., Tushin Hakusho (Annual Report on Communications), Tokyo: Japanese Government Printing Office, 1985, pp. 207-208.
- 2-12 The sales of remote computing services account for 82% of total revenues. Nikkei Communications (see note 2-10), p. 66.
- 2-13 More than 10 firms began to resell the High-Speed Digital Transmission Circuit Service provided by NTT. According to a forecast on future demand for resale services, 1600 firms will use 2500 circuits by the end of 1986. Nikkei Communications, March 24, 1985, pp. 68-69.
- 2-14 For example, the fee per channel in the case of using 6Mb/sec is one-tenth that of using 64 kb/sec between Tokyo and Osaka.
- 2-15 For example, NTT's market share in remote computing services was estimated to be about 70% in 1982. Nikkei Communications, April 22, 1985, p. 54.
- 2-16 NTT will have provided 1300 circuits to big business users by the time the newcomers arrive. Nikkei Communications (see note 2-13), p. 70.

- 2-17 Hisashi Shinto, president of NTT, said, "The competition in enhanced services markets will be more crucial to NTT's business than basic services markets." Nikkei Computer, March 3, 1986, p. 52.
- 2-18 According to Harrigan, "joint ventures were necessary in the telecommunications industry because of:
- (1) the convergence of computers and telecommunications;
 - (2) shorter product lives driven by rapid technological improvements;
 - (3) huge R&D expenditures made by ongoing and new competitors;
 - (4) intensification of global competition;
 - (5) deregulation of telecommunications;
 - (6) expectations concerning a boom in the office automation equipment industry; and
 - (7) potential breakdown of trade barriers as a result of technological changes and political activities."
- K.R. Harrigan, Strategies for Joint Ventures, Lexington, MA: D.C. Heath and Company, 1985, p. 194.
- 2-19 Japan's Fair Trade Commission began to investigate the influence of this joint venture on competition in telecommunications and related industries. Nikkei Computer (see note 2-17), p. 52.
- 2-20 Shiro Matuo, former general manager of NTT's Data Communications Division, said, "It is necessary for constructing an international information network to keep the interconnectability with IBM's machines and its network - IN." Nikkei Communications (see note 2-10), p. 42.
- 2-21 For example, a reseller of High-Speed Digital Transmission Circuit Services settles its switching equipment at NTT's facilities. See, Nikkei Communications, August 22, 1985, p. 9, and October 7, 1985, p. 103.
- 2-22 The total cost of modifying hardware and software is estimated to amount to 10 billion yen. Nikkei Communications, February 10, 1986, p. 46.
- 2-23 As to interconnecting new carriers' circuits with NTT's local private circuits, NTT decided not to take access charges; however, in the case of NTT's local public circuits, the problem of access charges has not yet been resolved. Nihon Keizai Shimbun, May 16, 1986.
- 2-24 For the competition for hegemony between MITI and MPT in the telecommunications industry, see, E.F. Vogel, Comeback, New York: Simon & Schuster, 1985, pp. 163-166.
- 2-25 For example, see, Akiyoshi Takada, "Denkitushin Hotaisei no Gaiyo (An Outline of Japan's New Telecommunications Order),

Johoutushin-Gakkaishi (Journal of Information and Communication), Vol. 3, No. 1, May 1985, pp. 28-35.

- 2-26 As to MITI's policies toward such industries as iron and steel, petrochemicals, and refineries, see, R. Komiya et al. (see note 2-2), pp. 12-16 and pp. 411-430.
- 2-27 Satellite Japan Co., the third applicant of Type I carriers in satellite communications, was not permitted to enter into the market in July 1985. It is said that Satellite Japan Co. will change its menu of services in order to get MPT's permission. Nihon Keizai Shimbun, May 14, 1986.
- 2-28 Type II carriers are not regulated in their provision of value-added services. This means asymmetrical regulation between Type I and Type II carriers in value-added services markets.
- 2-29 Fully distributed cost pricing is considered controversial among economists. According to Baumol, "Most economists have long been passionate in their rejection of the full-cost pricing criterion. There are many reasons for the strength of their feelings on this matter of which only three will be mentioned here: the arbitrariness of the criterion, the resource misallocation it is likely to produce, and its tendency to undermine the competitive process at the consumer's expense." (p. 181.) W. J. Baumol, "Minimum and Maximum Pricing Principles for Residual Regulation," in A.L. Danielsen and D.R. Kamerschen, ed., Current Issues in Public Utility Economics, Lexington, MA: D.C. Heath and Company, 1983, pp. 177-196.
- 2-30 From the viewpoint of pure economic theory, it is arguable whether foreclosing competition and extending monopoly power from one market to another is profitable for a monopolist. See, P. L. Joskow, "Mixing Regulatory and Antitrust Policies in the Electric Power Industry: The Price Squeeze and Retail Market Competition," and J.A. Ordover, A.O. Sykes, and R.O. Willig, "Nonprice Anticompetitive Behavior by Dominant Firms toward the Producers of Complementary Products," in F.M. Fisher, ed., Antitrust and Regulation, Cambridge, MA: The MIT Press, 1985.
- 2-31 The fact seems to influence opinions among NTT's competitors that the accumulated loss of NTT's data processing business has amounted to 300 billion yen. Nikkei Communications, January 20, 1986, p. 30.
- 2-32 See Nikkei Communications, February 10, 1986, p. 40, and Nikkei Sangyo Shimbun, May 9, 1986.
- 2-33 See note 2-19. It was reported that MPT also intended to develop a guideline for NTT's strategy of investing in its subsidiaries. Nikkei Communications (see note 2-31), p. 29.

- 2-34 This organization, the Japan Key Technology Center, maintains the fund in which the Japanese government has invested a part of NTT's dividends. It is under the supervision of MITI and MPT.
- 2-35 From the viewpoint of contestable market theory, a company's high market share does not always mean it has monopoly power. For contestable market theory, see W.J. Baumol, J. Panzer, and R. Willig, Contestable Markets and the Theory of Industry Structure, N.Y.: Harcourt Brace Jovanovich, 1982. For a critic of contestable market theory, see W. G. Shepherd, "Illogic and Unreality: The Odd Case of Ultra-Free Entry and Inert Markets" in R.E. Grieson, ed., Antitrust and Regulation, Lexington, MA: D.C. Heath and Company, 1986, pp. 231-252.
- 2-36 See notes 2-3 and 2-15.
- 2-37 According to the Yankee Group's research on the VAN service market, AT&T's 1985 market share is estimated to be 8%. Nikkei Communications, April 22, 1985, p. 50.
- 2-38 See note 2-19.
- 2-39 Companies among CATV and railway industries can also enter the telecommunications industry as Type I carriers. It is reported that MPT intends to promote research and development in improving the two-way communication function of CATV in order to encourage CATV carriers' entry into the telecommunications industry as competitors of existing carriers. Nihhon Keizai Shimbun, May 19, 1986.
- The largest railway company, Kinki Nippon Railway Company, decided to enter the telecommunications business as a Type I carrier and to lease its optic fiber cables to other newcomer carriers during the summer of 1986. Nihhon Keizai Shimbun, May 17, 1986.
- 2-40 MPT controls the conditions, such as their fees, for Type I carriers' provision of value-added services. Asymmetrical regulation in value-added service markets between Type I carriers and Type II carriers would be disadvantageous to NTT's competition with other Type II carriers. It is reported that NTT intends to divest its data transmission and processing services division in order to deal successfully with this disadvantage; however, MPT has no intention of permitting the divestiture because of several considerations:
- 1) Because NTT retains the dominant share in the value-added services markets, no regulation of its behavior would weaken competition among Type II carriers.
 - 2) It seems to be more efficient to provide telecommunications transport services with value-added, information services. This means that MPT stresses economies of scope in providing

telecommunications services. Nihhon Keizai Shimbun, May 22, 1986.

MPT was expected to reach a conclusion by the end of 1986. Nihhon Keizai Shimbun, June 26, 1986.

2-41 The demarcation between network and terminal equipment in the regulatory framework also affects competition among carriers and terminal equipment makers.

2-42 According to the FCC News, the FCC's proposals for a revised regulatory framework include "redefinition of the types of activities a carrier undertakes, the elimination of strict structural separation in favor of lesser separation techniques, and the inclusion of a carrier's dominant or non-dominant status as a factor in decision making."

"FCC initiates their Third Computer Inquiry ('Computer III') (CC Docket 85-229)," FCC News, Report No. DC-166, July 25, 1985, p. 1.

The regulatory framework proposed by the FCC seems to be basically unchanged in the following aspects:

1) The present definition of services, basic services and enhanced services, is proposed to change to the new, communications, ancillary-to-communications, and non-communications; however, the regulation would continue to be based on redefined services.

2) Although abolishing the strict structural separation requirement for dominant carriers has been proposed, asymmetrical treatment for dominant carriers would remain in some cases in order to prevent anti-competitive practices by dominant carriers.

2-43 In the process of planning the Telecommunications Business bill, MPT investigated several kinds of regulatory frameworks including regulation based on a demarcation of services, such as basic and enhanced services. MPT is said to consider as crucial which regulatory framework would be most appropriate for the rapidly changing technology in the telecommunications industry.

Mari Shinagawa, "Denkitushin Jigyoho to Denkitushin Shijo no Shorai" (Telecommunications Business Law and the Future of Telecommunications Markets), Johotushin Gakkaishi (Journal of Information and Communication), Vol. 2, No. 2, August 1984, p. 20.

2-44 For details of the process of making industrial policy in Japan, see, Ryutaro Komiya et al. (see note 2-2), pp. 16-21.

2-45 For example, R.G. Noll pointed out the conflicts among the FCC, state regulatory commissions, and other agencies, and their

strategies in the process of deregulation and divestiture in the telecommunications industry.

R.G. Noll, "State Regulatory Responses to Competition and Divestiture in Telecommunications Industry," in R. E. Griesen (see note 2-35), pp. 165-200.

- 2-46 J. Hills pointed out the effects of the privatization and the liberalization on the relationships among MPT, MITI, and NTT:

1) Privatization of NTT Public Corporation would increase MPT's power for controlling and supervising NTT.

2) The more the telecommunications industry is liberalized and the less NTT is regulated, the more powerful MITI becomes in comparison to MPT in planning and carrying out telecommunications policy.

Jill Hills, "Nihon no Denkitushin Seisaku no Imsho" (A Tentative Report on Japanese Telecommunications Policy), Johotushin Gakkaishi (Journal of Information and Communication), Vol. 2, No. 3, November 1984, pp. 84-85.

- 2-47 For example, R. Posner stressed the function of regulated monopoly as a means of cross-subsidizing. Richard Posner, "Taxation by Regulation," Bell Journal of Economics and Management Science, Vol. 1, No. 1, Spring 1971, pp. 22-50.

- 2-48 See Toyo Keizai Weekly, March 15, 1986, p. 46.

- 2-49 For the details of ENFIA, see Carol L. Weinhaus and Anthony G. Oettinger, Federal/State Costing Methods: Who Controls the Dollars, Cambridge, MA: Program on Information Resources Policy, Harvard Univ., June 1986, pp. 38-39, and Concepts: Understanding Debates over Competition and Divestiture, Cambridge, MA: Program on Information Resources Policy, Harvard Univ., July 1987, Section VIIA.

- 3-1 According to H. Itami, "How to accumulate and use information is an essence of current business strategy. Accumulated information in a firm defines its organizational characteristics and strategical competitive edge." Hiroyuki Itami, Keiei Senryaku no Romri (A Logic of Business Strategy), Tokyo: Nihon Keizai Shimbun Sha, 1980, p. 93.

- 3-2 Research on intercompany information networking in the Japanese automobile industry indicates a tendency for the amount of specifications to rapidly increase. In the case of Toyota's "Crown," the number of specifications increased from 322 to 101,088 from 1966 to 1978.

Mari Asanuma, "Joho Network to Kigyokan Kankei" (Information Networks and Intercompany Relationships), in Denkitushin Jigyo no Kongo no Hoko ni Kansuru Kenkyu (A Study on the Future of

Telecommunications Industry), Tokyo: Japan Center for Regional Development, February 1986, p. 80.

- 3-3 As for this aspect of information networking, generally speaking, networking seems not to change the content of information despite changing the information-handling process and information formats. In the case studies by Borchardt and LeGates concerning the effects of communications uses, they concluded that "the seven illustrative cases involving communications uses have involved primarily changes in information-handling processes and format. They have placed relatively little stress on changes in information content."

Kurt Borchardt and John C. LeGates, The Diverse Effects of Communications Uses: A Suggested Diagnostic Framework, Cambridge, MA: Program on Information Resources Policy, Harvard Univ., 1983, p. 43.

- 3-4 Borchardt and LeGates pointed out two different kinds of effects of communications use in the case of parts distribution management. One is an increase in operational efficiency; another is an improvement of effectiveness in business strategy. Kurt Borchardt and John C. LeGates, supra, p. 13. The replacement effect and the growth effect of information networking mentioned in this paper seem to correspond to the operational efficiency and the strategic effectiveness mentioned by Borchardt and LeGates.

- 3-5 For the effects of communications uses on organizations -- for example, on the work force, centralization, de-centralization, autonomy, and power relations -- see Kurt Borchardt and John C. LeGates, ibid., pp. 34-40.

- 3-6 For example, a middle manager endeavoring to construct an integrated OA system in his firm, said, "The top management seems not to recognize the necessity of constructing the data base and MIS, so the bottom-up approach is better than top-down in constructing an intracompany information network." Nikkei OA Nemkan (Nikkei OA Almanac), Tokyo: Nihon Keizai Shimbun Sha, 1986, pp. 55-56.

- 3-7 See, Benjamin M. Compaine and John F. McLaughlin, Management Information: Back to Basics, Cambridge, MA: Program on Information Resources Policy, Harvard Univ., 1986. According to Compaine and McLaughlin, managers need to recognize that traditional management information systems don't cover the entire area of decision-relevant information.

Regarding Japanese management, H. Inayoshi, a staff member of Honda Automobile Co., a firm said to be a leader in using an intracompany information network, pointed out that maintaining the informal information channels would be a crucial problem. Hiroshi Inayoshi, "'Creative Office' Zukuri eno Chosen" (The

Challenge toward Realization of "Creative Office"), Business Review, Vol. 33, No. 2, December 1985, p. 34.

- 3-8 There seems to be a tendency for each section of a firm to be afraid that its bargaining power would decrease through releasing its accumulated information and therefore for sections to deter the intracompany information network from going ahead. Borchardt and LeGates pointed out the cases in which communications use affected the power relations within an organization.

Kurt Borchardt and John C. LeGates, ibid., pp. 34-40.

- 3-9 See, Economic Planning Agency, Planning Bureau, ed., Shin Joho Ron (New Argument on Information), Tokyo, Government Printing Office, 1985, pp. 84-85, pp. 110-111, and p. 133.

- 3-10 It is a controversial issue whether Japanese management styles will change in the future information-based society. According to one forecast, most characteristics of Japanese management will disappear; however, another forecast says that they will remain, because Japanese management seems to have already had so much flexibility that it will deal successfully with its rapidly changing environment.

Masumi Tuda, "Nihonteki Keiei wa Kochyoku teki ka" (Is Japanese Management Style Unflexible?), Nihon Keizai Shimbun, May 24, 1986.

- 3-11 This description is based on research by MITI. MITI, Industrial Policy Bureau, ed., Kigyo Joho Network (Information Network in Business), Tokyo: Computer Age Sha., 1985, pp. 202-227.

- 3-12 According to research on information networks in business:

1) 32% of firms are constructing intracompany information networks; 20%, intercompany networks.

2) The growth rate in circuits used for intercompany information networks (33% per year) was larger than that for intracompany information networks (14% per year) from 1980 to 1983. MITI, Industrial Policy Bureau, supra, p. 22.

- 3-13 Based exclusively on information published in an article by Nikkei Communications, August 22, 1985, pp. 26-31.

- 3-14 See, Richard O. Masson, "Current Research Issues," in F. Warren McFarlan, ed., The Information Systems Research Challenge, Boston, MA: Harvard Business School Press, 1984, pp. 280-282. For these cases and some others, see also: Business Week, October 14, 1985, pp. 108-116.

- 3-15 This case is based on information published in an article by Nikkei Computer, August 22, 1985, pp. 35-38.

- 3-16 As to the strategy of wholesalers in this industry, it is reported that several wholesalers intend to jointly construct intercompany information networks with their related retailers. Nikkei Sangyo Shimbun, April 4, 1986.
- 3-17 Yoshino and Lifson pointed out the function of Japanese sogo shosha in constructing intercompany information networks as follows: "Successful marketing of communication networks requires the participation of a large number of users across a spectrum of different industries, including manufacturing, distribution, and other services. The sogo shosha, by occupying a key position in a particular group of companies, can play a strategic role in marketing a network that can link a number of major companies in the group. " M.Y. Yoshino and Thomas B. Lifson, The Invisible Link, Cambridge, MA: The MIT Press, 1986, p. 256.
- 3-18 As for banks' construction of intercompany information networks:
- 1) Generally speaking, the influence of banks on related companies seems to be decreased by the liberalization of financial services markets. Such a change makes banks attempt to construct intercompany information networks as a strategy for recovering their influence.
 - 2) The regulation of banks by MOF (Ministry of Finance) has had great influence on the direction and speed of banks' construction of intercompany information networks. MOF has promoted step-by-step deregulation; however, in the case of bank point-of-sale marketing, for example, MOF sets a limit to the number of stores with which a bank can interconnect. For this restriction, see Nihon Keizai Shimbun, May 20, 1986.
- 3-19 The tendency for particular functions of an organization to be replaced by information networks is pointed out in the case of intracompany information networks. For example, it is reported that the construction of a network among headquarter and sales outlets lessened the importance of branch offices in the case of an automobile maker. Ikuyo Kaneko, "A Framework for Office Automation," Business Review (see note 3-7), p. 10.
- 3-20 It seems to be a hot issue whether the development of information technology would strengthen competition among firms or weaken it. According to a forecast that stresses its procompetitive effects:
- 1) As information technology develops, every firm can rely on other firms in doing its business, because most resources become so flexible as to be available on the market anytime.
 - 2) Such changes make it easier for every firm to enter into or exit from markets.

For examples of such arguments, see: Economic Planning Agency, ibid., pp. 78-79, pp. 133-134; and Kenichi Imai, Joho Network Shakai (Information Network Society), Tokyo: Iwanami Shoten, 1984, pp. 131-147. As for the network corporation, which is defined in a Business Week article as "a new corporation relying on other companies for manufacturing and many crucial business functions," there seems to be a difference between Japan and the U.S. in evaluating the development of network corporations. While many Japanese economists evaluate them positively, some negative evaluations can be seen in the U.S. For example, a Business Week article says, "New Companies may want to organize as networks to gain agility and cost advantages. What's good for them, however, may not be good for the economy as a whole. If it goes too far, the U.S. could be left without a vibrant manufacturing base." Business Week, March 3, 1986, pp. 64, 71.

- 3-21 See, Charles Wiseman, Strategy and Computers: Information Systems as Competitive Weapons, Homewood, IL: DOW JONES-IRWIN, 1985, pp. 5-7.
- According to Wiseman, "Sabre and Apollo give priority listing to American and United flights when travel agents request information on their computer terminals." Supra, p. 6.
- 3-22 For example, as for the case of compound intercompany information networks in the toiletry goods industry, Mr. Tamau, vice-president of the network operation company, said, "The point of competition among firms will change from getting information exclusively through vertical type information networks to using information creatively in business strategy." Computopia, May 1986, p. 41.
- 3-23 For these hypotheses about corporate grouping in Japan, see Iwao Nakatani, "The Economic Role of Financial Corporate Grouping," in Masahiko Aoki, ed., The Economic Analysis of the Japanese Firm. Amsterdam: Elsevier Science Publishers B.V., 1984, pp. 227-258.
- 3-24 See, Kenichi Imai, "Japan's Changing Industrial Structure and United States-Japan Relations," in Kozo Yamamura, ed., Policy and Trade Issues of the Japanese Economy, Tokyo: Univ. of Tokyo Press, 1982, pp. 61-62.
- 3-25 See, Business Week, October 14, 1985, pp. 94-97.
- 3-26 According to Fortune, Mr. Smith, Chairman of GM, said that with completion of the Saturn Project, customers would be able to get their cars within two weeks from the time of ordering. Fortune, November 17, 1985, p. 34.
- 3-27 Standardization involves the risk of deterring the progress of technology.

- 3-28 Regarding information networks among a big firm (parent firm) and small firms (subcontractors), it is reported that parent firms intend to lessen their subcontractors' burden as follows:
- 1) Parent firms are burdened with a large part of the costs, such as the costs of developing software and leasing the host computer.
 - 2) Parent firms support their subcontractors in training engineers and developing application programs.
- MITI, Small and Medium Enterprise Agency, Planning Department, ed., Shitaukekigyo to Johoka (Information Network and Small and Medium Subcontractors), Tokyo: Tusho Sangyo Chosakai, 1985, pp. 32-40.
- 3-29 See, MPT, Network ka Suishin Kondankai (Council for Promoting Information Network), ed., Johotushin Network (Information Network), Tokyo: Omu Sha, 1985, pp. 166-196.
- 3-30 See, MITI, Industrial Policy Bureau, (see note 3-11), pp. 25-37, 67, 70-71. See also, Nihon Johoshyori Kaihatu Kyokai (Information Technology Promotion Agency), ed., Kigyokan Network to Joho Kankyo (Intercompany Information Network and Its Current Situation), Tokyo: Computa Age Sha., 1986, pp. 81-140.
- 3-31 For the characteristics and functions of trade associations in Japan, see, R. Komiya, et al. (see note 2-2), p. 19.
- 3-32 MITI was entitled to promote intercompany information networking by the reform of the Information Technology Promotion Law in April 1985. MITI considers information networking to be more effective than stand-alone computer uses.
- 3-33 See, Nihon Johoshyori Kaihatu Kyokai (Information Technology Promotion Agency), (see note 3-30), pp. 107-132.
- 3-34 See, Fair Trade Commission, Executive Office, Johoka no Shintenga Kyosochitujo ni ataeru Eikyo ni Kansuru Chosa (Research on the Impacts of Growing Information Network on Competition among Firms), Tokyo: May 1984, mimeograph, pp. 26-27.
- 3-35 See, MITI, Industrial Policy Bureau (see note 3-11), pp. 53-59.
- 4-1 See, Michael E. Porter, Competitive Strategy, New York: The Free Press, 1980, pp. 3-33.
- 4-2 See, supra, p. 4.
- 4-3 See, F. Warren McFarlan (see note 3-14), pp. 282-283.
- 4-4 G.W. Bork stressed that rapidly changing technology blurred traditional industry boundaries in the telecommunications industry. G.W. Bork (see note 1-2), pp. 254-286.

According to J.W. McKie, a tendency for supply substitutability to increase can be seen in some industries other than telecommunications. McKie says that applying the concept of supply substitutability is frequently a useful modification of the market definition, traditionally based on demand substitutability. This modification is particularly helpful in avoiding the error of drawing the boundaries too narrowly.

James W. McKie, "Market definition and the SIC Approach", in Franklin M. Fisher, (see note 2-32), p. 96.

- 4-5 See, Michael E. Porter, (see note 4-1), p. 129.
- 4-6 As for the effects of deregulation on industrial market structure, especially on strategic groups, Byrnes says about the airlines of the U.S., "The industry itself will be transformed from a relatively simple single or dual-group structure to a more complex multigroup configuration." Jonathan L.S. Byrnes, Diversification Strategies for Regulated and Deregulated Industries, Lexington, MA: D.C. Heath and Company, 1985, p. 13.
- 4-7 Instead of this difference, the classification of services is necessary for MPT to regulate the rates of various services. This means that MPT also cannot avoid demarcating telecommunications services.
- 4-8 An example of such evaluation can be seen in Mari Shinagawa, (see note 2-43), p. 15.
- 4-9 In the current situation in which NTT has considerable influence on value-added information services markets, MPT can control the behavior of Type II carriers in these markets by regulating the tariffs for enhanced services provided by NTT.
- 4-10 Whether the regulation of Type I carriers is necessary seems to be a crucial point. While Type I carriers' greater sunk costs than Type II carriers have been emphasized, it has not been made clear whether the markets for Type I carriers' services are so uncontestable as to require restrictive regulation.
- 4-11 The MPT's intention of changing to a policy-oriented agency can be seen in a comment by Teturo Tomita, see, Tuguhiro Shimoda (see note 2-1), p. 84.

