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**Change and Continuity in Japan's
Telecommunications Policy**

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I. Introduction

Like the other major industrial economies, Japan reformed its telecommunications policy in the mid-1980s. If the U.S. reform was user-driven by free market passion, and the European reform was an effort to use regulatory policy in the service of producer subsidy and European integration, Japan's reform was characteristically developmental. Eschewing both the American penchant for divestiture and extreme deregulation and the predominant European commitment to monopoly infrastructure provision, Japan developed its own unique approach in preparation for the information-based economy of the next century. This paper examines the changes in Japanese telecommunications policy and explores the subsequent impacts on Japanese industry.

Despite the changes in Japanese policy, there is significant continuity with past practices in the new post-reform environment. For example, the liberalization of Japan's telecommunications regime did not lead to less government intervention in the telecommunications industry. On the contrary, the government has actually become more involved in the promotion of the industry, albeit in different ways than in the past. More loans and tax incentives are now being funneled to industry through various government channels. At the same time, Nippon Telegraph and Telephone (NTT), though now privatized, is left integrated to provide the necessary infrastructure for advanced services and equipment. Ironically, the only real break from the past is that the Ministry of Posts and Telecommunications (MPT) now has a set of legally sanctioned regulatory instruments to influence the industry if that is necessary.

To set the stage, the next section of the paper begins the analysis by looking at Japan's pre-reform industrial policy in telecommunications. For the past thirty years, Japan's publicly-owned, national telecommunications carrier, NTT, has pursued the goal of developing and deploying an efficiently operating universal telephone system throughout Japan. This ambitious goal, however, has been inseparable from another role as Japan's technology promoter in informatics through a combination of network development, R&D subsidies, stable and large procurement, cost-plus pricing, and export subsidies.

Section three details Japan's telecommunications reform. As in other economies, the initiative for reform came from the business community and its institutional spokesman, Keidanren (Japanese Federation of Economic Organizations). The most important objective of the business community in this reform was to create more opportunities for its member firms to become ever more intimately involved in

this high-growth industry. However, it was feared that, if allowed to continue, NTT's monopoly in both voice and data communications would deny the business community the direct participation in advanced networking considered essential in the information economy of the next century. Inevitably, NTT became the primary target of the community's attack. By the summer of 1982, Keidanren threatened to introduce competition in all segments of telecommunications and even to break up NTT into regional operating companies, as in the United States.

NTT, while opposing its own break-up, had to accept the introduction of competition in telecommunications. In turn, however, NTT demanded its own privatization to set itself free from the existing government's control over its investment and labor management decisions. This battle between NTT and the business community was intensely waged, implicating three more powerful political actors in the process, MITI (Ministry of International Trade and Industry), MPT, and the Liberal Democratic Party (LDP), Japan's governing party. The costly political battle for control over the emerging information industry was broken only by the intervention of the ruling party.

The fourth section then analyzes the immediate effects of liberalization and the nature of the new regulatory regime. Growing competition has increased pressure to provide a variety of telecommunications services, including provision of leased lines for an explosion of private corporate network demand. However, a still integrated NTT is, with government support, building an advanced telecommunications infrastructure which would support new services and the new generations of terminals necessary to exploit the services. NTT's service vision of an intelligent broadband infrastructure that can simultaneously support portable communications (dubbed PVI for personal, video and information services) is not much different than similar visions in other countries. Contrary to much hype at home and abroad, the expected time frames for realizing the PVI network are not much different than in other countries. Current projections would realize the PVI about 2015, not significantly different than the scheduled U.S. RBOCs project for replacing copper with optical fiber in the U.S.

The fifth section presents the case for institutional continuity in Japan, examining the government's role in the new industry. While MITI seems as strongly committed as ever to the development of Japan's information-technology industry, through subsidies, loans and special tax credits MPT has also begun to employ industrial policies to promote the growth of the sector. MPT's policies emphasize the development of key telecommunications technologies (e.g., optical devices, artificial intelligence (AI), video communications, satellites), the diffusion of "new media"

NTT developed and installed C-12M, Japan's first coaxial cable, which had an improved capacity of 2700 telephone circuits. Improved cross-bar switches, C-12 and C-13, followed this innovation. Out of these initial efforts, the now famous system of R&D collaboration involving the so-called "NTT family" firms emerged.⁵ This unique arrangement, which combined both competitive and cooperative pressures among the favored firms, has resulted in successful technological breakthroughs ever since.⁶

Table 1
NTT's R&D Activities

	The 1st Plan 1953-57	The 2nd Plan 1958-62	The 3rd Plan 1963-67	The 4th Plan 1968-72	The 5th Plan 1973-77	The 6th Plan 1978-82
S +	SXS automatic switches XS automatic switches			Electronic switches D10 (1972)	SXS no longer installed anew D20 (1976)	D30 (1978)
T *	Microwave (SF-B1, 4 GHz) Microwave (SF-U, 6 GHz)			Microwave (SF-E, 5 GHz)	Satellite and optical fiber trans- mission tested	
	Coaxial cable (C-4M)	Coaxial cable (PCM 24)		Coaxial cable (C60M)	Coaxial cable (DC-1000M) Coaxial cable (DC-400M)	
Service	Telephone			Data communication systems PDN (public data network) Paging Push-phone	Facsimile	Car telephone New PDN service Electronic PBX

Source: Hirotsugu Shimoda, *Tsushin Kakumei to Den Den-kosha*, pp. 52-53.

+ S represents switching technology.

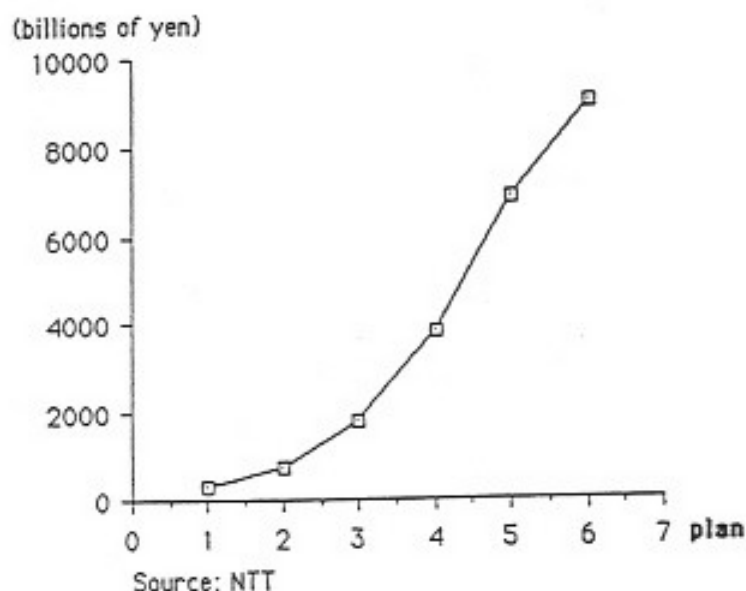
* T represents transmission technology.

5 The "NTT Family" is a huge hierarchical industrial group consisting of several layers. Four of Japan's major electronics houses, NEC, Hitachi, Oki, and Fujitsu sit at its apex, and other equipment manufacturers like Iwasaki Communications Equipment, and Tamura Electric are placed at the middle tier. Below these firms lie two hundred other firms and a string of subcontractors numbering as high as 4000. While the major electronics firms are quite self-contained because of their vertical integration in the production of sophisticated equipment ranging from semiconductors to computers, many small-to-medium sized firms only produce parts for less research-intensive products like cross-bar switches. See Hirotsugu Shimoda, *Tsushin Kakumei to Denden Kosha* (The Communications Revolution and NTT) (Tokyo: Mainichi Shimbun-sha, 1981), Chapter 7.

6 Interview with Dr. Reijiro Fukutomi, Executive Managing Director and General Manager of the Telecommunications Division at Hitachi on Oct. 19, 1988. He was the Chief Engineer at NTT at the time when NTT was developing its cross-bar switches.

NTT's technological achievements between 1953 and 1982 are summarized in Table 1. Interestingly, this summary suggests that apart from the development of fiber-optics technology most of the notable technological advances in telecommunications -- for example, electronic switching and new services like data and facsimile communications -- were achieved during the Fourth and Fifth plans of NTT's network investment.⁷ Moreover, Figure 1 shows that the amount of NTT's network investment aimed at the expansion of its public switched telephone network (PSTN) also increased sharply during the same period. By the end of the Fifth Plan, which ended in 1977, NTT's network investment had reached an average rate of nearly 1.4 trillion yen per year. As illustrated below, the combination of R&D collaboration and NTT's network investment was a critical piece of Japan's remarkable success in electronics as a whole.

Figure 1
NTT's Investment: 1953-82



⁷ NTT's Ibaragi Laboratory successfully developed a mass production technology called Vapor Axial Deposition (VAD) for fiber optics in the late seventies. See *Tsushin Kakumei to Denden Kosha*, pp. 83-88.

NTT's contribution to the development of the Japanese electronics industry came mainly in the area of semiconductor technology. Table 2 provides a brief chronology of NTT's effort in this area, beginning in the mid-1960s.

Table 2
NTT's LSI Development

Year	LSI Development
1965	Research on logical ICs to be used in electronic switches begins
1973	1 kbit MOS memory chip used in D 20 switch, and later in DIPS computers
1975	Research on VLSI begins
1976	The world's first 64 kbit memory chip produced in the "clean room" of Musashino Lab
1977	128 kbit ROM chips completed
1980	Prototype of 256 kbit memory chip produced
1981	64 kbit memory chips used in DIPS-11/45 and NTT's digital switches

Source: Shimoda, Tsushin Kakumei to Den Den-Kosha p. 91

As indicated, LSI development was significantly aided by their subsequent incorporation into NTT's D-series switches and DIP-series (Dendenkosha Information Processing System) computers.

This linkage between components and equipment began with 1 kbit memory chips in 1973. Then, in response to IBM's decision to move up the memory scale, NTT developed the highly touted 64 kbit and 256 kbit VLSI chips (Very Large Scale Integration). In 1975, NTT committed 20 billion yen to a three-year project to develop 64 kbit chips. Research was conducted primarily at NTT's Musashino Laboratory and involved nearly 500 engineers from NTT and three of its "family" firms: Fujitsu, Hitachi, and NEC. The research collaboration was a smashing success. NTT moved on to develop the 256 kbit memory chips in 1977. However, at MITI's request, the project subsequently merged with the ministry-led "VLSI Project Research Association," thereby involving Mitsubishi Electric and Toshiba in addition to the

NTT-family firms mentioned above. As expected, this new project also proved successful in 1980.

Although MITI provided important leadership in this venture, it was NTT that developed significant advanced processing technologies -- such as high-definition electron beam lithography, capable of drawing circuits as narrow as 0.5 microns on the surface of a chip.⁸ More important, NTT incurred most of the "pre-competitive" basic R&D expenses required in these projects, leaving the equipment manufacturers free to pursue specific applications and production in a competitive fashion. In addition, and perhaps most crucially, NTT assigned production to the member firms based on their past performance while using massive, on-going procurement as an incentive for product development.⁹ In this way, NTT established the linkage between R&D collaboration and network investment. For example, it is reported that Fujitsu's computer M380 series, announced in 1981, was at least 90% identical to the NTT computer labeled DIPS 11/45.¹⁰ The obvious implication: Fujitsu had simply used the production line that it had developed for NTT to produce its own commercial computers. The same mechanism was also at work for the production of D-series switches, the most recent D-70 switches included.¹¹ Hence the idea behind NTT's procurement and technological development was to provide the manufacturers with sufficient economies of scale, critical to their initial investment. Moreover, NTT's cost-plus procurement -- much like procurement by NASA or the U.S. Department of Defense in the U.S. -- transferred the cost of product development to NTT, in effect, functioning as interest-free loans to the equipment manufacturers.¹²

In short, prior to the deregulation of Japan's telecommunications industry, NTT, backed by huge R&D spending and network investment, was a key industrial engine helping to promote the Japanese electronics industry to the position of preeminence it enjoys today.

As Japan liberalized in its telecommunications industry, there is a crucial question as to whether liberalization and NTT's privatization will deprive NTT of its ability to

8 Ibid., p. 92.

9 Thomas Hout and Ira Magaziner, Japanese Industrial Policy (Berkeley: Institute for International Studies, 1981), p. 108.

10 Tsushin Kakumei to Denden Kosha, p. 67.

11 William H. Davidson, "Japanese Telecommunications Policy," Telecommunications Policy (June 1987), pp. 158-159.

12 Michael Borrus, James E. Millstein, and John Zysman, "Trade and Development in the Semiconductor Industry: Japanese Challenge and American Response," in John Zysman and Laura Tyson, American Industry in International Competition: Government Policies and Corporate Strategies (Ithaca: Cornell University press, 1983), p. 216.

services (e.g., videotex, cable TV), and the construction of advanced telecommunications infrastructures (e.g., promotion of Broadband Integrated Services Digital Networks B-ISDN). NTT's elaborate plans for PVI remain a very important component of the MPT strategy, acting as a structure for development of key technologies, diffusion of enhanced services, and the creation of a national advanced terminal market.

Finally, the concluding section evaluates the Japanese government's effort to usher in an "advanced information society" by examining the growth of the industry itself. The evidence shows that Japanese users are experimenting with a variety of new services and networks that mirror the evolution and organization of production in the domestic Japanese economy. Aside from indirectly stimulating these private developments, policy has been especially successful in moving toward the future only where NTT itself has taken the initiative, for example, MPT's effort to stimulate R&D in telecommunications and investment in infrastructure. But NTT's own central role is under attack from new competition who have taken up to 50% of long-distance revenues along the densely populated Tokyo-Nogoya corridor. Japan's distinctive trajectory toward an information-intensive economy thus seems to be promoted by government policy and backed by competitive domestic industrial investment in a manner remarkably reminiscent of Japan's economic past.

II. Japan's Hidden Industrial Locomotive: NTT Prior to the Reform

In the past, NTT assumed an indispensable role in Japan's "industrial locomotive," helping to develop the computer, semiconductor, and telecommunications industries as part of its effort to build Japan's communications infrastructure.² Initially, NTT busied itself with importing advanced technologies from abroad.³ Cross-bar switching equipment, for example, was imported from Kellogg Corporation in the United States, and both microwave technology and coaxial cable technology were purchased from STC in England. In the mid-1950s, however, NTT began its own R&D effort, mainly to improve on the imported technologies.⁴ As a result, in 1962

2 Nikkan Kogyo Shinbun Tokubetsu Shuzaihan, *INS Koso to Sangyoshakai e no Inpakuto* (The INS Vision and Its Impact on an Industrial Society) (Tokyo: Nikkan Kogyo Shinbunsha, 1984) pp. 60-64.

3 Susumu Nagai, "On the Deregulation Process in Japanese Telecommunications," a conference paper presented at the Pacific Basin Telecommunications Conference held at Hosei University in Hachioji, Tokyo from October 28 through October 30, 1988. pp. 2-3.

4 *Ibid.*, p. 3 and pp. 5-6.

continue playing its developmental role. How has NTT's technological leadership been affected by the introduction of competition? The answer turns on the nature of reform.

III. The Reform

In Japan, the telecommunications industry was rapidly deregulated as a result of legislation during the first half of the last decade. This sets apart the Japanese experience from that of the United States, where the process of deregulation was an incremental one that extended over a few decades and ended suddenly with a judicial settlement.

The new information age in Japan did not begin until the end of the 1970s, with the establishment of NTT's nationwide automatic dialing system. For the first time in NTT's history, the waiting list for telephone installations was completely eliminated, and calls could be connected instantly anywhere in the country. However, with completion came crisis -- NTT was suddenly confronted with the prospect of slow growth in the future. By the late 1970s, NTT's annual growth rate was already beginning to decline.¹³ NTT could no longer afford to look at its faltering future with blithe optimism. Instead, it decided to look for ways to expand its business. Its solution was INS, a vision of an integrated digital network that could deliver voice, video, data and image communication throughout Japan and that would permit NTT to occupy the predominant position as Japan's infrastructure provider for the information age.

As early as the mid-1960s, computing and communication technologies began to merge and the demand for data communication, albeit initially confined to the banking industry, increased to an appreciable level. However, up until 1971 (under the provisions of the 1953 Public Telecommunication Law) privately leased circuits could only be used for information management within the physical confines of the head office. Not surprisingly, MPT came under pressure from the business community and from MITI to lift bans on the shared use of leased circuits and their interconnection with NTT's public network. The resulting amendment allowed, for the first time, inter-

13 Nikkan Kogyo Shimbun, *INS*, pp. 51-56. William H. Davidson provides a comparison between NTT and the Bell System in terms of revenues and output per employee in "Japanese Telecommunication Policy," pp. 149-150. According to Davidson's figure, NTT's return on total assets for the fiscal year 1984 was only 1.7% as compared to 6.10% marked by Pacific Telesis for the same year.

firm data communication among users in a considerable business relationship. However, prohibitions against using leased circuits for third party communications, including valued added network services (VANs), continued. The provision of VANs remained reserved exclusively for NTT which, in contrast to AT&T, was permitted to provide data processing and other non-voice information services.¹⁴ In fact, NTT had been providing data-transmission services since 1968 and facsimile services since 1973. By the early 1970s, NTT had installed two hundred data-communication networks¹⁵ and, by the end of that decade, it offered both circuit- and packet-switching services on two dedicated networks.

Yet, in the early 1980s, facing mounting pressure from the business community and MITI, NTT's VAN monopoly began to crumble. In 1982, the Public Telecommunication Law was further amended to liberalize VANs for small-to medium-sized corporate users. Predictably, this failed to satisfy large corporate users who saw private data communications not only as a means to improve their market position, but also as a potential high-growth business into which they hoped to branch. Indeed, high information-dependent users, like the banking and insurance industries, in addition to declining industries such as steel and shipbuilding, spearheaded liberalization in their make-or-break search for new industries.¹⁶ All these large users demanded leased lines that could be used for large-volume and high-speed communications in both voice and data. According to a survey taken in the fall of 1984, on average a corporation with a working capital of 28 billion yen spent about 500 million yen annually on telecommunications, out of which 35% was spent on the use of leased lines. This expenditure was expected to rise in the next five years by 21.2% for telephone and 32.7% for data services.¹⁷ Moreover, each industrial group was intending to develop their private system into a network capable of providing integrated services. For example, the Mitsubishi Group set up a special project team to integrate VAN and new media services through satellite links.¹⁸ In short, the business community began to see

14 Robert Harris, "Telecommunications Policy in Japan: Lessons for the U.S.," Business and Public Policy Working Paper No. BPP-35 (University of California, Berkeley: July 1988), pp. 6-12.

15 Nagai, "On the Deregulation Process in Japanese Telecommunications," p. 6.

16 For instance, Shin Nihon Seitetsu (New Japan Steel) is planning to raise a profit of 800 billion yen by 1995 in information and communication processing, and electronics. See Hirotsugu Shimoda, Saikyo no Nettowaakaa NTT Data no Sogyosenryaku (The Corporate Strategy of NTT Data: The Most Powerful Networker) (Tokyo: Jistugyo-no-Nihon-sha, 1988) pp. 85-87.

17 The Information and Communication Committee of Keidanren (Japan Federation of Economic Organizations), Tsushinjigyo Kigyoka-Mondai Chosa Saishuhokoku (The Final Report on the Survey of the Coporatization Issue in Telecommunications) (November 28, 1984), pp. 6-9.

18 Hiroshi Kawase, Shindenden to INS Kakumei (NTT and INS Revolution) (Tokyo: Kyoikusha, 1985) pp. 116-120.

NTT's monopoly in large-scale, value-added network services as an obstacle to their search for more efficient use of available technologies.

However, it took Keidanren to articulate the views of these users and to put telecommunications reform on the LDP's agenda. Toshio Doko, as the former Chairman of Keidanren, began to press hard for the deregulation of Japan's telecommunication industry in the Ad Hoc Council on Administrative Reform or the so-called Rincho. This Council was set up by Prime Minister Zenko Suzuki in 1981, primarily to suggest measures aimed at balancing the government's budget without raising taxes. In general, it called for a reduction in public spending, the curtailment of bureaucratic red tape, and the privatization of public corporations. On the issue of telecommunications reform, the Rincho's Third Report, which was submitted to the government in July 1982, gave the following recommendations:

- (1) introduction of competition in long-distance services;
- (2) freedom to provide private value-added network services; and
- (3) the privatization and divestiture of NTT.¹⁹

Keidanren's influence on the Rincho process ensured that these American-style proposals directly reflected the interests of the business community led by the Mitsui, and Mitsubishi Industrial Groups, which had lobbied to put an end to NTT's monopoly in large-scale VAN services and to introduce fair competition in the emerging information industry.²⁰ The business community pressed for fast action as NTT's Information Network System (INS, Japan's ISDN) project was almost ready to be launched. In other words, Keidanren's greatest fear was that should the restrictions on the use of private networks and VAN services continue, INS could further reinforce NTT's preeminence in the emerging information service sector. Therefore, Keidanren moved quickly to ensure that deregulation in telecommunications precede the deployment of NTT's INS services. Keidanren's memorandum on "NTT's INS Vision" (*Nihon Denshin Denwa Kosha no Kodojoho Tsushin-Sisutemu (INS) Koso ni tsuite*) reveals the essence of Keidanren's decision:

...NTT's role is to provide as a common carrier an ISDN that can be used for all purposes, data, image, and voice included. A vigorous growth of advanced

19 Jill Hills, *Deregulating Telecoms: Competition and Control in the United States, Japan, and Britain* (Westport, Connecticut: Quorum Books, 1986) pp. 138-153.

20 Kawase, pp. 107-110. Keidanren also threw its weight around in the matters related to the appointment of the NTT's top management. It is commonly believed that at the time of NTT's privatization Keidanren tried to oust Vice President Kitahara, who led NTT's technical elite. Only when Kitahara and his supporters mobilized the Tanaka faction, the hotbed of the LDP's Telecommunication Zoku, did the Kitahara faction survive the intervention by Keidanren.

information and communication sectors, where technological innovation is now being intensified, requires free competition in the private sector...It would be [then] problematical if the INS Vision of the 21 century would be promoted while these constraints (e.g., the use of leased lines) on the private sector are kept intact...We think it absolutely necessary to implement all the recommendations made by Rincho, including the lowering of charges, and freedom in the industrial use of leased lines before the implementation of INS begins.²¹

Large business users were not alone in demanding liberalization. As the market for data processing rapidly grew, the delicate balance between the Communications Industry Association of Japan (CIAJ) and Electronics Industry Association of Japan (EIAJ) began to shift in favor of competition in telecommunications. In Japan most of the leading computer houses, such as Fujitsu, NEC, and Hitachi, are also the key telecommunications-equipment manufacturers.²² Within the electronic equipment industry, it was widely believed that the market for public switches and transmission equipment would only grow at a snail's pace, now that NTT's national PSTN had been completed. By contrast, future demand for host computers and various data-processing terminals, including personal computers, was expected to skyrocket, and group-wide communication networks (e.g., the "Third On-line System") would further stimulate that demand.²³ Given this situation, the equipment manufacturers feared that if NTT retained control of the VANs market, the growth of the terminal equipment market would be stifled. Thus the Japanese electronics firms, including those long dependent on NTT's market, came to support liberalization of the VANs market, although they risked competition from foreign computer firms. Their shift of allegiance from NTT to private users was aided by their confidence that they would be internationally competitive, and also by their calculation that if the liberalization of VANs was not reciprocated by Japan, they might be kept out of the American market.²⁴ Thus, even

21 Joho-shori Kondai-kai (The Advisory Council on Information Processing) of Keidanren, "Nihon Denshin Denwa Kosha no Kodo Joho Tsushin-Sisutemu (INS) ni tsuite" (Memorandum on NTT's INS) (November 19, 1982), pp. 1-2. Author's translation.

22 Wako Keizai Kenkyo-jo, "Nihhon no Joho Sangyo Tettei Kenkyu (The Study of the Japanese Information Industry)," *Computopia* 22, 259 (April 1988), p. 23. For instance, the total sales of Fujitsu' telecommunications equipment in the first half of 1987 was 126.3 billion yen, out of which 105.3 billion was sold to NTT.

23 The Third On-Line System was the Japanese Banking Industry's implementation of corporate-wide information network.

24 Shimoda, *Tsushin Kakumei to Denden Kosha* p. 155-156. pp.16-17. This was due to its unfortunate historical lineage associated with the Ministry Communications, one of Japan's superministries of industrial development which, during the interwar

prior to liberalization, they began to intensify their research activities mainly to make their application software more competitive. Politically, therefore, the electronics firms joined large business users in their battle against NTT's monopoly in VANs.

No explicit commitment was made to the Rincho's reform proposals by the LDP until the fall of 1983. The Communications Section of the LDP's Policy Affairs Research Council (PARC) had traditionally supported the MPT's view that deregulation be avoided at all costs. But as the ministry's younger bureaucrats, including Mr. Koyama, the new head of its Telecommunications Policy Bureau, began to realize that industrial restructuring could raise the status of the Ministry of Posts and Telecommunications from that of a mundane postal agency to a heroic policy agency like MITI, its supporters in the LDP also began to endorse liberalization.²⁵ Ryutaro Hashimoto, chairman of the LDP's Administrative and Financial Affairs Committee, finally declared the LDP's commitment to the Rincho proposals. Negotiation began among the key players including NTT, MPT, Keidanren, and MITI, with the LDP playing the role of an honest broker among these players. MITI was a key participant in this debate on telecommunication reform. Having successfully achieved the so-called "Japanese miracle," MITI found it necessary to redefine its bureaucratic mission for the future in the late 1970s. MITI decided to promote high-technology industries such as telecommunications, biotechnology, and new materials as its new mission.²⁶ While MITI had been involved in the promotion of Japan's computer industry, the telecommunications industry was traditionally within MPT's jurisdiction. In order to bring the telecommunications industry under its bureaucratic control, MITI needed to redraw the boundary between the two industries leaving MPT only the traditional telecommunication services to regulate.²⁷ It therefore entered the negotiations on behalf of the pro-competition business community.

Faced with opposition from both the business community and MITI, NTT realized that it could not win by insisting on the status quo. Like MPT, NTT began to explore the possibility of change and searched for a solution satisfactory to both NTT

²⁵ Johnson, *MITI, MPT and the Telecom Wars: How Japan Makes Policy for High Technology*, BRIE Working Paper 21 (Berkeley, Berkeley Roundtable on the International Economy, University of California, Berkeley, June 1986.), pp. 16-17. This was due to its unfortunate historical lineage associated with the Ministry of Communications, one of Japan's superministries of industrial development which, during the interwar period, had become 'a cockpit of ultranationalism and militarism.' During the Occupation, therefore, the SCAP dismembered the ministry into the ministry of Postal Affairs and the Ministry of Telecommunications (the latter was later transformed into NTT in 1952).

²⁶ *Ibid.*, pp.10-13.

²⁷ *Ibid.*, p. 13.

and the business community. The answer was found in linkage between the industry's liberalization and NTT's privatization.

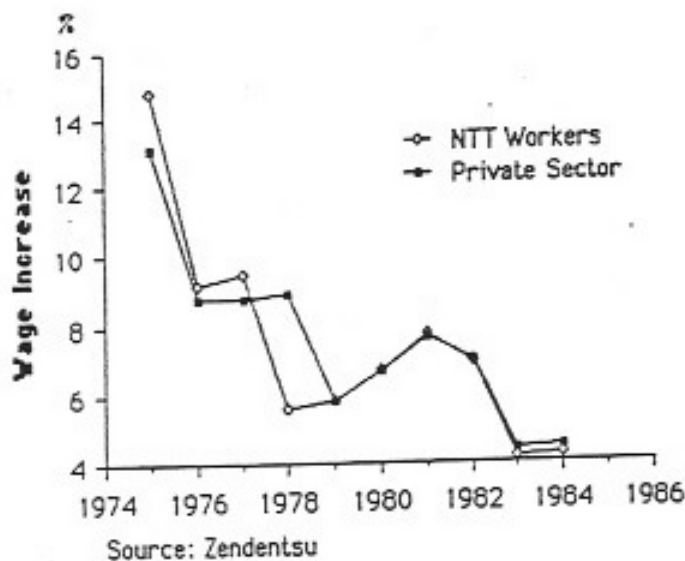
From NTT's management standpoint, the government's stifling regulatory grip on its corporate autonomy was more of a problem than competition in the provision of value-added services. Indeed, as a regulatory agency, MPT was closely monitoring and controlling NTT's investment decisions, which often delayed the introduction of new services and products. Much to NTT's dismay, it sometimes took as long as two years to obtain approval to provide new services. Thus NTT found itself severely handicapped at the very time when it needed to expand into new services in order to stem the decline of its revenue growth in basic telephone services. Given NTT's bureaucratic overload, it was thought that NTT's future would parallel the deficit-ridden JNR (Japan National Railways), if new lines of business did not absorb excess labor at more reasonable costs. In the mind of NTT's new president, Hisashi Shinto, the solution to this problem required the freedom to operate in new businesses, hence the privatization of NTT.

Privatization was expected to solve yet another nagging problem. As a public corporation, NIT was deprived of the right to determine the working conditions of its own workers. Legally, it was the National Diet that was ultimately responsible for the communication workers' wages because they were placed in a category comparable to public-sector employees. But, in reality, wages and other conditions were negotiated as an integral part of the annual process of nation-wide wage negotiation called *Shunto* or "Spring Labor Offensive," which had initially begun with eight labor federations in the private sector in 1955. Therefore, wage levels for communications workers -- like those workers in the other public corporations and national enterprises were coordinated closely -- with those of workers in the private sector. But, since wages for the communications workers were set according to the recommendations of the Public Corporation and National Enterprise Labor Relations Commission without the direct involvement of NTT's management and Zendentsu (All Japan Telecommunications Workers' Union), no consideration was accorded to the differences in productivity level between communications workers and other public enterprise employees.²⁸

²⁸ The Japanese Institute of Labor, *Labor Unions and Labor Management Relations* (Tokyo: Japan Institute of Labor, 1986) p. 36; Gerald L. Curtis, *The Japanese Way of Politics* (New York: Columbia University Press, 1988), p.215. Prior to the privatization of the telecommunications industry in Japan, Zendentsu, the All Japan Telecommunications Workers' Union was an important member of Korokyo, the Council of Public Corporation Workers' Union that was at the heart of the Sohyo, the General Council of Japanese Trade Unions. Zendentsu was therefore closely tied to the JSP (Japan Socialist Party).

At first, Zendentsu did not understand the benefits of privatization. But as time passed, Zendentsu came to see privatization as a means to harmonize wages of the communication workers with those of other public corporation or enterprise employees. Zendentsu calculated that if NTT was privatized, it could gain its autonomy with respect to wage determination, a critical issue since the incident of "Black Income" (*Yami Kyuyo*) of 1956.²⁹ Figure 2 shows that the workers' annual wage increase fell below the average in major private firms for the first time in 1978 and again in 1982.

Figure 2
The Annual Wage Increases of the Communications Worker



²⁹ In 1956, NTT had tried to reduce the number of workers through rationalization in an effort to increase the wages of the workers within the budget limit set by the Diet. However after deliberation, the Diet, ruled that NTT would not be allowed to raise the wages of its employees through rationalization.

Although the second dip was not as serious as the first, it tried the union's patience more because the government froze the National Personnel Authority's wage recommendations as part of its austerity program in that year. This tipped Zentsu in favor of privatization in the hope that it would release the union from the cumbersome obligation to harmonize income. Evidence shows that mutual understanding between NTT's management and the union was firmly established by the end of 1983.³⁰

It is important to stress here that the enormous potential associated with the future of the telecommunications industry made possible this convergence of interests that underscored the "cooperation between labor and management" (*roshi kyochosen*). Corporate autonomy through privatization was important to the union because it could ensure NTT's commercial future. That is, if privatization encouraged revenue growth, wages would potentially increase as well. Without that incentive, however, it would have been difficult for the union to agree to NTT's privatization.³¹ But the telecommunications industry was a growing industrial sector, and NTT was apparently well positioned to compete in the emerging VAN market. Thus Zentsu agreed to accept both liberalization and privatization, provided that NTT's breakup was avoided, that competition was introduced moderately, and that NTT's universal service obligation was kept intact.³²

The trade off of privatization for liberalization became the basis of negotiation mediated by MPT and MITI between NTT and the business community. With the understanding that NTT's breakup would be reconsidered in three years, the business community agreed to NTT's proposal for liberalization and privatization. Thereafter, MPT drafted the legislation for Japan's telecommunications reform. But MPT's draft still gave increased authority to MPT, permitting it to regulate VANs through licensing and notification requirements. It was therefore, not wholly satisfactory to MITI.

In March 1984, just before the new telecommunications bills were ready to be submitted to the National Diet, MITI issued a counterproposal requesting the complete removal of regulations on VANs. In pressing its demand, MITI relied on the support

³⁰ Zentsu (All Japan Communications Workers' Union), *Zentsu Rodo Undo-Shi* (The History of Zentsu's Labor Movement), (Tokyo: Zentsu, 1988), p. 987. The Record on the Collective Bargaining of December 23 and 24, 1983 clearly states this basic understanding between NTT and Zentsu; "... job security, and expansion of businesses are the crucial issues, and we have to do everything to secure them...From this perspective, we are prepared to take the following measures: (1) retraining of the workers so that they can make necessary adaptations to the technological advances and complexity of the emerging INS infrastructure; (2) changes in the management styles of the company that can adapt to the intensification of competition and the expansion of the scope of competition; and (3) redeployment of the workers in new networks facilities."

³¹ Interviews with former NTT officials and officials from Zentsu.

³² *Deregulating Telecom*, p. 144.

of sympathizers in the Commerce Section of the PARC LDP's (Policy Affair Research Council) like Tsuyoshi Noda, Chairman of the Commerce Section, and Yoshio Hayashi, an influential member of the Commerce Section. Faced with this frontal challenge, MPT also mobilized supporters in its defense -- particularly those LDP members associated with The Federation of Diet Members Concerned With New Media chaired by Shin Kanamaru, one of the most influential "dons" in the LDP's postal "policy faction" (*zoku*). When it became clear that a final agreement between the two ministries could not be reached before the scheduled submission of bills, the decision was left to the four top leaders of the LDP: Susumu Nikaido (Vice Premier), Rokusuke Tanaka (Party Secretary), Masayuki Fujio (Chairman of the PARC), and Shin Kanamaru (Chairman of the Executive Council). After discussion, they decided to leave the drafting of the final proposal to the Vice Chairman of the PARC. Although the postal *zoku* was pressured to make certain concessions in this process, including the removal of restrictions on foreign participation in the operation of Special VANs, the final draft clearly gave MPT what it had desired: the authority to regulate new entrants in the Special VANs market by making it necessary for them to register with the ministry.³³ The outcome proved that MPT had many influential political allies willing to protect its interests. More critical to the future of Japan's economy, MPT's victory gave MPT an interventionist capability to broadly define the development of a significant portion of Japan's information industry.

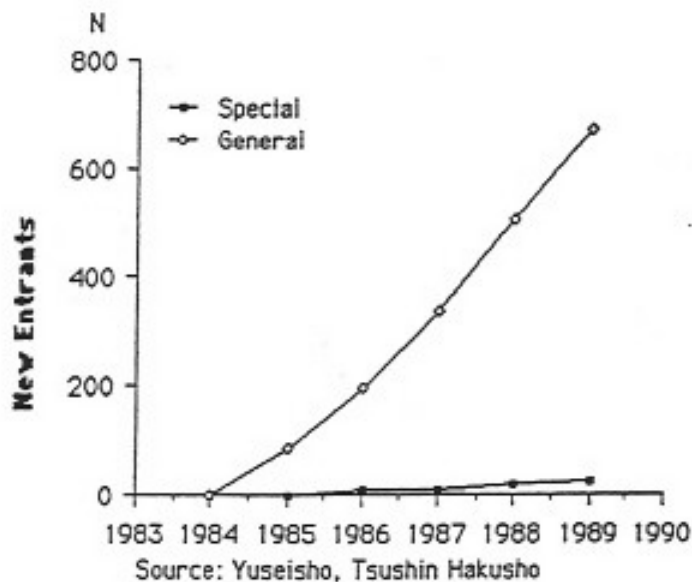
The new bills were submitted to the Diet for approval in April 1984, and passed by both Houses at the end of that year. In April 1985, the laws came into effect, privatizing NTT, and introducing competition in all segments of the telecommunications industry. While, NTT would have been more auspiciously placed to enter new services as an unchallenged private monopoly, it was clear from the beginning that such a lopsided solution would only invite a more radical counter-proposal from the powerful business community. NTT has thus settled for the second-best solution: liberalization and privatization in both value-added services (so-called Type II) and common carrier services (so-called Type I). In the political maneuvering, MPT had succeeded in extending its regulatory power over both type of carriers, and to a lesser degree, over Type II carriers.

³³ Takashi Inoguchi and Tomoaki Iwai, *Zoku-giin no Kenkyu* (The Study of Zoku in the LDP) (Tokyo: Nihon Keizai Shimbunsha, 1988), p.223. The distinction between 'special' and 'general' VANs is described in the next section.

IV. The Impact of the Reform and a New Regime

The effects of liberalization on the Japanese telecommunications industry were felt immediately. New carriers entered the common carrier business (Type I carrier) and more lines were leased from these carriers to private "users" providing value-added services (Type II carrier). The number of new entrants for Type II carriers is shown in Figure 3.

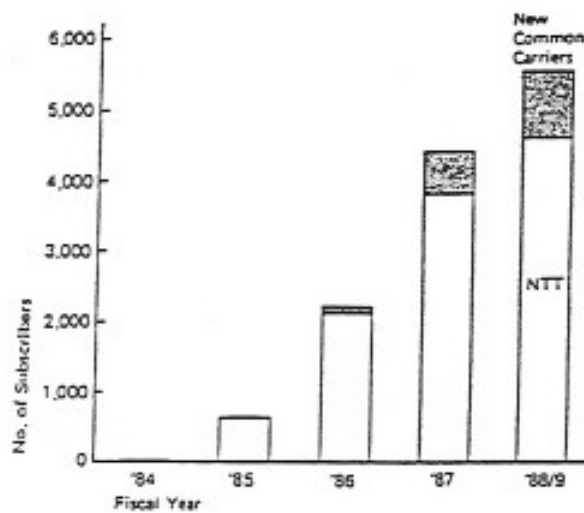
Figure 3
New Entrants



Prior to 1985, NTT and KDD (Kokusai Denshin Denwa) were the only Type I carriers. By 1988, the number of Type I carriers had risen to 39 (a majority of these, 22, are pocket pagers service providers.) NTT faces competition in long-distance services mainly from three carriers -- Daini Denden Inc., Japan Telecom Company, and Teleway Japan Corporation -- and in regional services from four carriers -- Tokyo Telecommunications Network Company, Lake City Cablevision, Osaka Media Port Corporation, and Chubu Telecom Company. Similarly, KDD has been challenged in

international services by two carriers: International Telecom Japan and International Digital Communications, Inc. More importantly, with the exception of international carriers, most of these new Type I carriers began providing leased or private line services for business communications before switched telephone services. The immediate effect of competition in this area was the increased availability of leased lines for large business users rather than lower prices for long-distance and international calls. Figure 4 shows this effect very clearly.

Figure 4
Growth of High-Speed Leased Lines



The number of leased circuits for high-speed digital transmission began to rise sharply in 1985 and by the end of September 1988 reached a total of 5,500 subscriber lines, 17.2% of which were owned by the long-distance companies competing with NTT.

This is exactly what the most ardent proponents of reform, the large corporations, wanted, namely more flexibility and control over their own communications for high-volume data transmission. Moreover, given their ability to exploit excess capacity in their networks, many of these large corporations began to provide value-added services as well. As shown in Figure 3, the number of Type II carriers began to rise rapidly after the reform and by 1988 reached 658.

Only 23 of these 658 are so-called Special Type II carriers, which provide large-scale inter-industrial data communications on a national and/or international basis.³⁴ There are even fewer carriers offering international VAN services; out of 23 Special Type II carriers, only 13 provide international services. Therefore, the majority of new entrants are so-called General Type II carriers, which operate on a much smaller scale, usually within a single industrial sector. While it is difficult to assess accurately the size of the Japanese VANs market -- e.g. resale of leased lines is counted as value-added services -- it is without question growing rapidly, as was intended by the reform. MPT claims that by the end of 1987 the Japanese VANs market reached one trillion yen [and that by the end of 1991, the figure should triple]. Though resale of leased lines still dominates the market, other services such as data processing, file transfer, data-base access, personal computer communication, and electronic mail are reportedly increasing in demand.³⁵

The largest beneficiary of the reform has thus far been the business community, which hoped to enter the growing information service sector and to put the new communications technologies to strategic use. MPT has been an important ally of the

34 Because of their scale, the provision of services by special type carriers requires registration by MPT. A planned restriction on the foreign ownership of Special Type II carriers has been removed, provided that NTT's network remains integrated. See Tetsuo Kondo, *Terekomu Kaikoku* (The Opening of the Nation: The Telecommunications Reform) (Tokyo: Computer Age, 1984), pp. 213-214. Representative Kondo Tetsuo, former Chairman of the Communication Section of the PARC explains:

"...In my judgment, even if at present the Japanese VAN providers cannot match their American counterparts (in sophistication), I am confident that they will soon be able to compete effectively, knowing their willingness, capacity, and intensity of effort to do so. Above all, for some time to come, our nation's only Type I carrier operating on a national scale is NTT, whose management style is also now changing (for the better). Therefore, if American service providers want to do their business in Japan, they are still required to lease communication circuits from NTT...If NTT offers VAN services under the newly emerged conditions (giving NTT more corporate autonomy than previously allowed), and on the basis of the technologies and experiences acquired by its Data Communication Division, NTT will definitely be in a much more advantageous position than its foreign competitors who are not familiar with NTT'S national network....Having calculated in this manner, we decided not to have these foreign capital restrictions (on large-scale VAN operators)...(underlining added).

35 Yusei-sho Nettowaaku-ka Suishin Kaigi (The MPT-affiliated Conference on the Promotion of Networks) ed., *Zusetsu Nihon no Nettowaaku* (Japan's Networks: Graphic Presentation) (Tokyo: Kompyutaa Aiji-sha, 1987), p. 61.

business community. It has generally responded favorably to the business community's demand that competition between NTT and its commercial rivals be "fair and effective" by enacting various pro-competitive regulatory measures. Such measures have included:

- 1) the provision of ID information regarding NTT subscribers to other Type I carriers;
- (2) the disclosure of NTT's settlements of accounts (to narrow the scope of internal cross-subsidization);
- (3) the public dissemination of NTT's R&D results;
- (4) restraints on NTT's subsidiaries;
- (5) restrictions on NTT regarding the manufacturing of equipment;
- (6) the promotion of "by-pass" technologies like microwave transmission.³⁶

It is important to note that the kind of competition introduced by MPT in Japan's telecommunications industry is not a "laissez faire" type of competition. Rather, it should be characterized as "managed" competition.

This distinction is best illustrated by comparing Japan's new telecommunications regime with the United States'. The major differences between the two regimes are:

- (1) NTT was not divested of its local networks;
- (2) NTT was not precluded from providing enhanced services; and
- (3) NTT was protected from ruinous network competition.

Unlike the divestiture of AT&T in the United States, Japan did not follow the model of horizontal separation, which would have broken NTT up into several regional holding companies. Even though this issue is not yet completely settled, the majority view is that Japan should preserve NTT's national communication network in an integrated form. For sometime, NTT will be Japan's only Type I carrier with a nationwide network and is to be considered too important to the development of Japan's new telecommunications infrastructure to risk weakening its market position.³⁷ NTT's break-up would end the inter-regional cross-subsidization crucial to Japan's "universal service." Since a nation-wide construction of broadband ISDN is important to the

36 For the last item, see Nihon Keizai Shimbun (February, 1986), p. 5. MPT permitted NTT's competitors to use broadband microwave transmission to bypass local exchanges within 14km of their diameter. See also Keidanren, Denki Tsushin Jigyo-ho no Minaoshi ni Kan Suru Iken (Keidanren's Views on the Revision of the Telecommunications Business Law) (Jan. 12, 1988) and "Keidanren's Views on the Telecommunications Laws" KKC Brief, No. 47 (March 1988; Japan Institute for Social and Economic Affairs).

37 Interview with an NTT official, Oct. 19, 1988. This view was also supported by Zentsu. Interview with a Zentsu official, Nov. 10, 1988. Strictly from the union's perspective, NTT's network integration was regarded as critical to the prevention of lower wages in deficit-ridden regions should nation-wide cross-subsidization be ended.

growth of the information-service and terminal-equipment markets, NTT and its political allies have argued that cross-subsidization should continue and, therefore, that NTT should be maintained as a single entity. They also have contended that were NTT pared down to a collection of small companies, each company would be "too small to carry out R&D with long-term strategic implications for the country,"³⁸ and more dependent on foreign equipment suppliers.³⁹ For these strategic reasons, the telecommunications reformers decided not to break up NTT.

Second, unlike in the United States, the regulatory division between Type I and II carriers has been determined by the ownership of network facilities rather than by the types of services provided. Type I carriers are differentiated from Type II carriers in that they own their networks, not that they provide basic services. Because the carriers are not defined by their level of service, they have greater flexibility to determine which services should be provided to the public as a "universal service" and which services should be provided as special services to a limited number of users. Japan has generally recognized that it is unwise to place specific services into fixed regulatory categories since technological innovations are expected to produce a flurry of new services and network technology is moving rapidly in the direction of service integration.⁴⁰ Thus, NTT and its supporters argued that a new regulatory regime should be flexible enough to give the carrier the freedom to decide an optimal combination of services for itself. Admittedly, more than 80 percent of NTT's revenues still come from the provision of telephone services. Yet, with its growth rate slowing, NTT has been forced to cultivate new lines of business in order to grow. NTT has thus insisted that it be allowed to provide new information services in addition to telephone services and that certain new services be provided universally. The equipment industry has also insisted that nation-wide penetration for certain services is critical to moderate the costs of terminals. In effect, through the classification scheme, the reformers deferred service definition to the market.

From NTT's perspective, this flexibility is desirable. It allows NTT to avoid the regulatory burdens that encumber Type I carriers elsewhere, and provides more competitive business communication services because NTT can create Type II

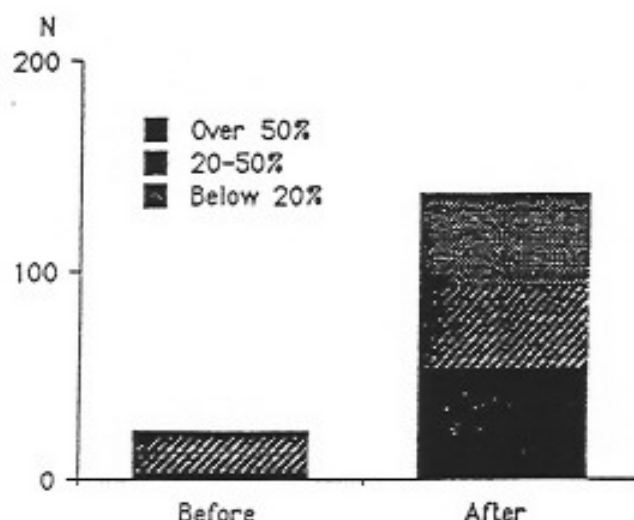
38 Interview with an NTT official, Oct. 19, 1988.

39 *Financial Times*, London (December 11, 1989).

40 Indeed, today's "enhanced" services may become tomorrow's "basic" services, depending on the size of their market. Just as telephone services once regarded as an 'enhanced' service, at the height of telegraphy, electronic mail, now regarded as an "enhanced" service, could someday become a basic service. Therefore, any listing of specific services to be regulated either requires constant rewriting of the list for faces a broadening gap between regulation and market dynamics, or in the U.S.

subsidiaries to provide these services. Figure 5 shows a marked increase in the number of NTT subsidiaries after the reform.

Figure 5
Growth of NTT's Subsidiaries



Source: Denki Tsushin Shingikai's Report of March 18, 1988

Most of these splintered firms provide VANs and software services, unrestricted by universal service obligations and harmonization of charges. The idea behind this strategy is to create an industrial conglomerate or Keiretsu group similar to that of Mitsui, Sumitomo, and Mitsubishi. A loosely integrated NTT Group was expected to meet the challenge from its competitors more effectively.⁴¹ The most controversial case of this type of Keiretsu re-integration was the divestiture of the Data Communication Division of NTT in July 1988. Despite MPT's aborted attempt to re-regulate this new company, the company now operates as a Type II carrier free from MPT's regulations.⁴²

⁴¹Shimoda, *NTT Deita no Sogyo Senryaku*, pp. 159-162.

⁴² Interview with a former NTT official, Nov. 18, 1988. Two additional advantages are expected to follow from this separation. One is that NTT Data can now provide better work incentives for its software engineers, for the company can now provide higher salaries for these engineers than would be the case had it remained within the parent company. The other is that this separation, involving nearly seven thousand employees, can be argued to be an adequate response to the suggestion that NTT's horizontal breakup is a precondition for effective competition with the company.

Finally, the control over new entrants to the common carrier market -- normally a corporate decision -- has been left to the ministry on economic and social grounds. NTT has argued that it could be forced to abandon its "universal" provision of certain services, including the telephone service, if "excess competition" in the common carrier business leads to "cream-skimming" of the most profitable routes and customer. Again, because the national extension of ISDN is considered so important for the growth of new information services and terminals, both NTT and MPT have insisted on managing competition on the basis of "supply and demand" in Type I carrier business. This is essentially why only a limited number of long-distance carriers have been "licensed" to compete with NTT. Therefore, penetration of NTT's ISDN services.

Tetsuo Kondo, an influential member of the LDP's Communication *Zoku* has emphasized this strategic linkage.

...I would like to promote this idea of INS aggressively. One should rely on INS to expand the domestic market (for its services and equipment) deliberately. This will create an incentive to develop advanced technologies ranging from communications to computers, and as a result the Japanese equipment suppliers will be well prepared by the time the demand for ISDN services takes off globally...The critical factor that supported the overseas sales of Japanese cars was the creation and expansion of their domestic market (that had preceded their exports)... Therefore, I propose that we repeat a similar success by creating and expanding the domestic market (for the advanced telecommunications equipment) by using the concept of INS strategically and manipulatively...Only then can we expect to see a marked improvement in the international competitiveness of the Japanese telecommunications equipment industry.⁴³

V. A Role for Industrial Policy

The Japanese experience diverges from the American experience in yet another way. Unlike the American government, the Japanese government has actively combined regulatory reform with industrial policy, thereby encouraging NTT and other carriers to provide the infrastructure necessary for new information and communication services. Indeed since the reform, MPT has succeeded in rising in stature to challenge MITI in information-technology policy. The pattern of MPT's industrial intervention has shown striking similarities to that of its rival.

43 Kondo, pp. 229-230.

Like MITI, it started by seeking consensus within the industry on overall telecommunications policy. In 1983, MPT merged the "Roundtable on Telecommunications Policy" (*Denki Tsushin Seisaku Kondankai*), a private advisory body of the Ministry, with the "Postal Services Council's Telecommunications Division" (*Yusei Shingi-kai Denkitsushin Bukai*) into the "Telecommunications Council" (*Denkitsushin Shingikai*)⁴⁴ in order to build an institutional platform. This Council held numerous meetings and, based on the consensus among its members, issued the "Long-Term Vision of Telecommunications in the 21st Century" (*21seiki ni itaru Denkitsushin no Choki-koso*), calling for further liberalization and promotion of the telecommunications industry.

MPT proceeded to formulate policy with industry representatives in order to translate the vision into reality. In November 1984, the Council produced a report called "The Information and Communications Industry of the 21st Century" (*21-Seiki no Joho-Tsushin Sangyo*), which suggested ways to induce the growth of the telecommunications industry, identifying urgent policy issues and proposing "enhancement policy" (*kodoka-seisaku*) in telecommunications.⁴⁵ Specifically -- in light of an emerging pluralistic network environment -- it stressed the need for massive investment for technological development, despite low demand-predictability. The report also stressed the need for guidelines at three different levels: technology, network system, and service.⁴⁶ Detailed guidelines were subsequently drawn up by the Council and issued as "The Vision for the Enhancement of Information and Communication" (*Denkitsushin Kodoka Bijon*) in June 1987. The medium- to long-term economic and technological assessment provided in these guidelines has since been the basis of MPT's industrial policy.

Moreover, the Council urged MPT to employ financial incentives to induce private-sector investment in risky areas. Consistent with the guidelines, the Council identified three possible areas for MPT's active involvement. They were:

- 1) technological development;

44 Morizumi, *Joho Tsushin Rikkoku e no Ketsudan* (The Decision to Become an Advanced Economy of Information and Communication) (Tokyo: Bizinesu-sha), pp. 26-27.

45 The identified policy issues were: the vision assessing trends in technological development and market growth, effective competition among carriers, designation of the telecommunications industry as a "strategic" industry, enhancement of the financial basis of the software and CATV industries, promotion of new media through Teletopia model cities, development of database and software programs, training of system engineers and network consultants, and internationalization of the equipment industry. See Section of Chapter 3 in the Telecommunications Council, ed. *21-Seiki no Joho Tsushin Sangyo* (The Information and Communication Industry of the 21st Century) (Tokyo: Nihon Keizai Shimbun-sha, 1985).

46 *Ibid.*, Section 2 of Chapter 3.

- (2) infrastructural development; and
- (3) regional development.

A brief look at each area will suggest the extent of MPT's plans and policies.

In response to the Council's recommendation, MPT set up a research institute called *Kokusai Denki Tsushin Kiso Gijutsu Kenkyo-jo* (Advanced Telecommunications Research International, or ATR) in 1985, mainly to lead research in opto-electronics (e.g., optical device, optical integrated circuits (IC), optical switch); man-machine interface (e.g., human cognition and artificial intelligence); video communication systems (e.g., interactive cable TV, video switching, and storing); automatic language translation for voice services; and large-scale communication satellites to be used in VANs, mobile communication, and personal communications.⁴⁷ In addition, MPT established *Kibangizyutsu Kenyukaihatsu Sokushin-Sentaa* (the Key Technology Center, or the KTC) to provide low-interest loans to the industry, facilitating private investment in the development of these technologies.⁴⁸ More specifically, the KTC's aim was to encourage joint R&D ventures among multiple companies and to promote application's research by individual companies. The amounts of loans in each category are listed in Table 3. While investment money flowing from the Center for both types of projects increased, from 4 billion yen in 1985 to 28 billion yen in 1990, the major portion of these loans has been used to promote R&D collaboration. ATR Labs were among the first joint R&D companies to receive loans from the Key Technology Center.⁴⁹

47 Ibid., pp. 135-136. Personal communication enables one to receive and send information, be it data or voice, regardless of one's location through the use of an intelligent network capable of tracking the called party.

48 Kawase, p. 146. The activities planned by the Key Technology Center are financed by various sources, including Japan Development Bank, private business firms, the sales of NTT stock shares, and various governmental financial institutions. See also Kawakita, p. 158.

49 Apart from low-interest loans, MPT has also used tax incentives to encourage private investment in the development of these technologies. MPT has mainly relied on two tax laws, namely, *Zoka Shikenkenkyu-hi Zeigaku Kojo Seido* (the Tax Deduction System for Additional Research Expenditure) and *Kibangizyutsu Kenyukaihatsu Sokushin Zeisei* (the Key Technology R & D Promotion Tax System) to provide such incentives.

Table 3
The KTC Loans For R&D
(billions of yen)

	1985	1986	1987	1988	1989	1990
Amount						
Joint	2	12.5	17.3	19.2	20.2	21.7
Separate	2	5.7	7.7	7.0	6.4	6.3
Total	4	18.2	25.0	26.2	26.6	28.0

Source: MPT

Second, the Council's Report emphasized the importance of building a new telecommunications infrastructure, that is, installing fiber optic cables, satellite earth stations, digital switches, satellite dishes and power source facilities. Accordingly, in 1985, MPT requested an allocation of loans from the Japan Development Bank (JDB) to promote investment in these network facilities. In response, JDB prepared large loans on easy terms for this purpose. For instance, in 1987, JDB earmarked 42.9 billion yen for the up-grading of the communications infrastructure (as compared to 6.1 billion yen for the promotion of cable TV and videotex services) at the low interest rate of 5.1 percent.⁵⁰ Because of its network dominance, particularly in local services, NTT is most likely the beneficiary of these loans.

In addition to low-interest loans, MPT has also used various tax incentives to promote network investment.⁵¹ For example, the Ministry has used "The Tax System for the Enhancement of the Energy Sufficiency of the Economy" (*Keizaishakai Enerugii Kiban Kyoka Zeisei*) to induce the rapid installment of time-division electronic switches. To achieve a nation-wide penetration of digital telephones and PBXs (private

50 Gekkan Doyu-sha, *Sho-cho-betsu Seisaku oyobi Nasionaru Purojetku: 21-seiki he no Shisaku Yoran, 1990-nenban* (The 1990 Handbook of Ministerial Policies and National Projects Toward the 21st Century) (Tokyo: Gekkan Doyu-sha, 1990), p. 187.

51 MPT, *Tsushin Hakusho*, (Tokyo: Okura-sho Insatsu-kyoku, 1988) pp. 56-57.

branch exchange), the standard legal timetable has been considerably shortened for these types of equipment.⁵²

In a final area, the Report found the need for industrial policy to promote new media such as NTT's CAPTAIN and cable TV to help spur regional development in Japan.⁵³ In response, MPT launched the so-called Teletopia program.⁵⁴ It was designed to introduce telematic services in a limited number of pilot cities, anticipating that once demand for these services was created in the pilot cities, it would spread to their neighboring areas. Regional governments reacted enthusiastically to Teletopia because it held the prospect of new subsidies for regional development. When MPT originally announced the plan in the fall of 1983, more than 100 regional governments immediately expressed interest. The Ministry narrowed down the number first to 52 and eventually to 20, even though it originally had planned to designate only ten.⁵⁵ The number has continued to grow since, and, as of 1988, a total of 63 communities had been designated as Teletopia "model cities."⁵⁶

MPT used loans from the Key Technology Center and the Japan Development Bank (JDB) to induce private-sector investment (especially by carriers and equipment suppliers) in the necessary communication facilities: of particular incentive was the creation of the so-called "No-Interest NTT Loans" at the JDB in September 1987. These loans were funded by the sale of NTT's stock much in the same manner as those dispersed by the KTC. For example, in 1987, the Ministry requested an allocation of 55.6 billion yen worth of "no interest loans" from the JDB for the Teletopia program alone.⁵⁷ In addition, as in the promotion of R&D and infrastructure-building, MPT directed various tax incentives at the Teletopia program. In particular, the "Teletopia Fund," created by the Ministry, has played an important

52 Ibid.

53 CAPTAIN is the abbreviation for 'Character And Pattern Telephone Access Information Network System,' and is an interactive videotex system developed under the joint auspices of MPT and NTT. Its commercialization began in November 1984, and it is now being used for various purposes such as bank account displays, teleshopping, seat reservations for train and flight services. CATV stands for Community Antenna Television, which actually began originally in those areas where reception of broadcasting signals was difficult, but is now used as an interactive media serving various narrow-casting purposes (e.g., news, pay TV).

54 The scale of MPT's Teletopia is much larger than that of MITI's New Media Community. The average investment in one model city for 'Teletopia' is 15 billion yen while the corresponding figure for one 'New Media Community' is only 1 billion yen. See Kawakita., p. 151.

55 Ibid., p. 123. Political calculation behind the government's designation for the model cities is also suggested by Kawakita, pp. 147.

56 MPT, *New Era* (Sept. 1, 1988) No. 71, p. 7.

57 *Sho-cho-betsu Seisaku oyobi Nasionaru Purojekuto*, p. 187.

role in providing debt guarantees and interest payment subsidies on loans taken out for Teletopia-related projects.⁵⁸

In May 1986, the Ministry also proposed the "Private Participation Promotion Law" (*Minkatsu-ho*) to promote the local diffusion of new technological options and services. For this purpose, two projects were initially created: "Telecom Research Parks" and "Telecom Plazas." Telecom Research Parks referred to those research facilities aimed at the development of telecommunications technologies and the diffusion of technical knowledge. "Telecom Plazas" referred to those facilities aimed at promoting the actual use of "new media" services through training of communication engineers, displays and hands-on operation of "new media" terminals.⁵⁹ As of December 1989, two research facilities, including ATR International, had been designated as "Telecom Research Parks," and as many as eight "Telecom Plazas" had been designated.⁶⁰ In 1987, the Ministry added the so called "Teleport" to the list. "Teleport" refers to a facility used for the reception and transmission of high-speed data and image communications, including a satellite earth station linked to "intelligent buildings" equipped with LANs and teleconferencing facilities.⁶¹ Thus far, the city of Osaka has been authorized to build such a facility. The most recent proposal by the Ministry is the so called "Multi-Media Tower" equipped with antennas for cellular mobile telephones, paging, and microwave transmission and broadcasting.⁶² Two sites have also been selected for this project.

In carrying out these mini-projects, the Ministry has used financial incentives to induce local investment. The incentives have ranged from "No-Interest NTT Loans" to various tax incentives (ranging from a complete to a 50 percent investment deduction for local taxes) and subsidies (at five percent of the total investment).⁶³ In 1987, for example, the Ministry allocated no-interest loans of 8.06 billion yen for these model projects.⁶⁴

58 Denkitsushin Sangyo Renmei Chiiki Johoka Purojekto Tiimu, Chiiki no Johoka o Ishidan to Jujitsu Saseteiku tame no Teigen, (A Proposal to Promote Regional Informatization), JIIF Report No. 0-006, (Tokyo, Denkitsushin Sangyo Renmei, 1989), p. 85.

59 Sho-cho-betsu Seisaku oyobi Nasionaru Purojekuto, pp. 182-185.

60 Yusei-sho (MPT) ed., Asu no Chiiki-shakai to Terekomyunikeeshon (Tomorrow's Regional Communities and Telecommunications) (Tokyo: Denkitsushin Kodoka Kyokai, 1989), pp. 31-32.

61 Johotsushin Sogo Kenkyu-jo, Johotsushin Nenkan '90 (The 1990 Annual of Information and Communication) (Tokyo: Johotsushin Sogo Kenkyu-jo, 1989), pp. 549-552.

62 Johotsushin Nenkan '90, pp. 544-545.

63 Asu no Chiiki-shakai to Terekomyunikeeshon, pp. 53-54.

64 Sho-cho-betsu Seisaku oyobi Nasionaru Purojekuto, p. 187.

In sum, since the telecommunications reform, MPT has come to play an industrial policy role in Japan. But the question remains: how significant is this shift? We can measure this indirectly by looking at credit allocation to the telecommunications sector in the reform period. We take the JDB as a proxy for policy-directed credit allocation, since JDB has played that cornerstone role in post-war Japanese industrial policy. We examine changes in the pattern of its money-lending activities to see whether the allocation of credit has followed telecommunication policy changes. The hypothesis is that if MPT's industrial policy has become important, then the allocation of credit should have changed to favor the telecommunications industry and MPT's specific goal for it during the last decade.

Table 4
JDB's Responses to the Government's Policy Change

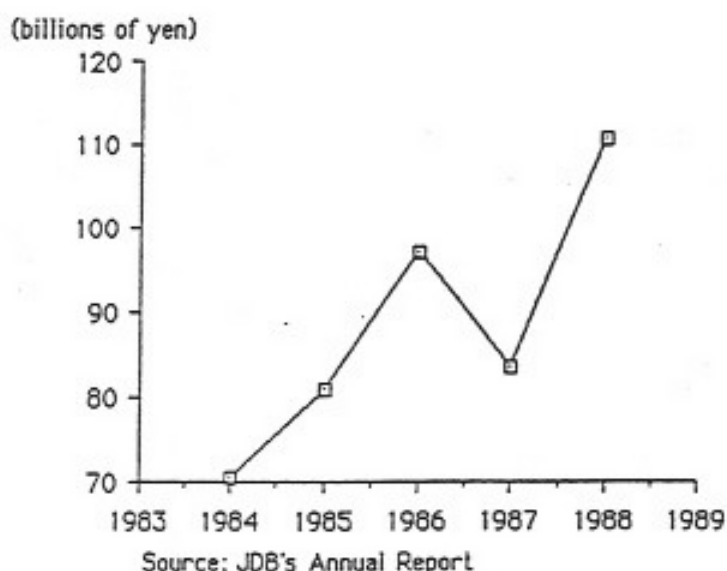
Period	Government policies	JDB's responses
The early 1950's	Reconstruction and self-sustenance of the economy	Reconstruction and modernization of the basic industries (e.g., shipping and iron & steel)
The late 1950's-early 1960s	Encouragement of heavy and chemical industries Closure of regional gaps	Fostering of infant and new industries (e.g., machinery and electronics) Responses to regional problems
The late 1960's-early 1970s	Promotion of social development Construction of welfare society	Promotion of national land development and social development Encouragement of basis for economic and social development Technological Development (Promotion of domestic computer industry)
The late 1970's-early 1980s	Stable growth of the economy Enhancement of daily living	Ensuring of economic security (e.g., Conservation of resources and energy) Improvement of living environment
The late 1980s	Construction of creative and stable society Peaceful and stable international relationships	Promotion of development of original technologies (e.g., information technology) Encouragement of international industrial cooperation (e.g., foreign investment in Japan)

Source: JDB, *The Japan Development Bank Annual Report 1988*, p. 6.

Table 4 shows the overall priority changes in the government's industrial policy from the early 1950s to the present and the JDB's responses to these changes. As one can see, the emphasis in Japan's post-war industrial policy has shifted from the promotion of key industries like coal mining, iron, and steel during the fifties to machinery and components in the sixties and then to high-tech industries, including information technology and telecommunications, during the eighties.

This policy shift from capital-intensive to knowledge-intensive industries can also be demonstrated by measuring changes in the allocation of credit within informative. Figure 6 provides a rough indicator of such change.

Figure 6
JDB's Loans For the Development of Information-Related Industries



First, it is clear that the greater portion of JDB loans has been used for the promotion of technological advancement. Second, and more importantly, most of the credits are

allocated to the development and diffusion of information technology and telecommunication goods (shown as IT in the graph), including computer, data-processing, and communication equipment. In 1989, for example, IT's share reached 67 percent of the total JDB loans spent on technology. This data, however, is still too aggregate to indicate whether MPT has become a central agency in the promotion of the telecommunications industry.

A third set of data, labeled IP&C, (Information Processing and Communications), is helpful. The data since approximately 1987 shows that more loans have been allocated to information processing and communication technologies than to computers and electronics technologies. In 1989, for example, the figure for IP&C reached 49.9 billion yen, roughly 37 percent of the total information-technology loans. Since 70 percent of IP&C loans are spent on the projects led by MPT, the rapid increase in these loans reflects MPT's new status and power. The key to MPT's successful intervention in the economy would then appear to be financial control, reflected here in JDB loans for which MPT and MITI are competing. The data actually understates MPT's financial power because it does not include loans allocated to regional development projects such as the "no-interest" NTT loans described earlier.

In short, MPT has become a respectable and more powerful bureaucratic player since the telecommunications reform. MPT has followed MITI's model of state intervention. It set a long-term goal for the economy and specific guidelines for attaining that goal. More critically, it made available various financial incentives and encouraged competition to stimulate demand and technological innovation while limiting excessive competition through regulations. In the following section of this paper, we shall tentatively discuss the effects of MPT's industrial policy on the telecommunications industry.

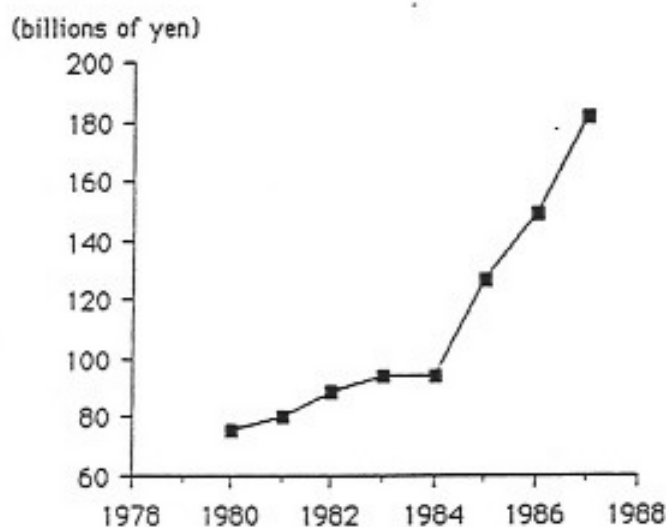
VI. The Effectiveness of Reform

How effective has been the reform of telecommunications and new industrial policies for the development of advanced technologies and of an advanced telecommunications infrastructure? Both are worth a brief look.

NTT began to intensify its R&D activities in the mid-1980s. Figure 7 provides data showing a sharp increase in NTT's R&D spending. In 1986, it spent 149.3 billion

yen, or nearly 2.8% of its total annual profits on R&D projects, and in the following year 181.7 billion yen, approximately 3.2% of its total profits.⁶⁵

Figure 7
NTT's R&D Spending



Source: NTT and Dataquest

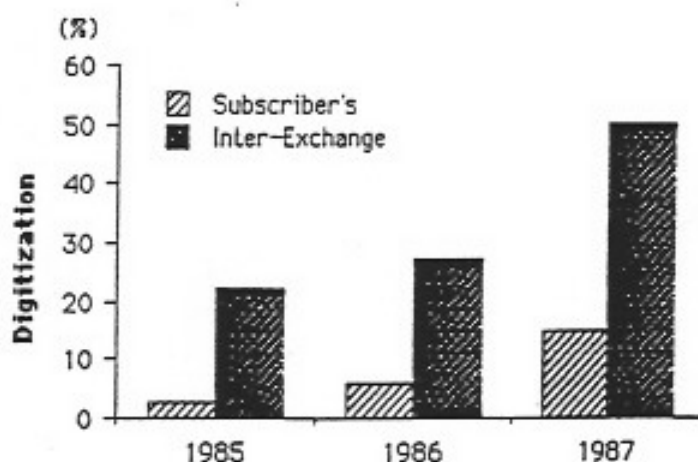
The scale of these expenditures becomes much clearer when compared to the R&D expenditures of other telecommunications research institutes. For example, ATR International, the research institute set up by MPT to advance research in basic telecommunications technologies, allocated 7.0 billion yen of its budget for fiscal year 1988 to R&D, which equals 3 percent of NTT's research budget for that same year. KDD's R&D budget, second only to NTT's, was about 6 percent the size of that budget.⁶⁶ NTT's research has concentrated on such areas as opto-electronics, man-machine interface, large-scale communication satellites, speech synthesis and recognition, photonic switching and optical multiplexing, and radio communication systems.

⁶⁵ In an interview with an NTT official.

⁶⁶ MPT, *Tsushin Hakusho* (Tokyo: Okura-sho Insatsu-kyoku, 1989), p. 324.

If the reform has spurred R&D spending, it has accelerated infrastructure-building even more. For example, since the mid-1980s, NTT has procured and installed progressively more digital equipment. NTT began to increase its network investment around 1985 after allowing it to decline in the early part of the decade. The major portion of the investment was spent on the installation of digital switches and transmission equipment. In 1987, about 225.6 billion yen was spent on the purchase of digital transmission equipment, 165.1 billion yen of that on digital switching systems.⁶⁷ Figure 8 indicates the speed with which NTT was rapidly digitizing its telephone network.

Figure 8
NTT's Digitization Effort



Source: Denki Tsushin Shingikai's Report of March 18, 1988

While in 1985 only about 3 percent of local exchanges had been digital, two years later this figure had reached 15 percent, and by 1990 it had reached 34 percent.⁶⁸ Although the Japanese figure is low in comparison to France and Canada -- where respectively 50.5 percent and 24.0 percent of local exchanges were digitized by the beginning of 1987 -- it compares favorably to the digitization rates in the United States and the

67 *Kanppo* (News within the Bureaucracy) No. 18520, (Nov. 16, 1988), pp. 27-28.

68 MPT, *New Era*, No. 105 (February 1, 1990), p. 3.

United Kingdom, which had reached 15.6 percent and 10.7 percent respectively by the beginning of 1987.⁶⁹

Progress toward NTT's infrastructure vision for the advanced information society, the Information Network System (INS), has also been impressive. The professed aim of INS is to create a fully integrated, nation-wide digital communications infrastructure, linked by broadband fiber optic cables and microwave equipment. INS is Japan's comprehensive vision of Broadband-ISDN. In essence, INS aims to put a digital broadband infrastructure in place in anticipation of its uses, while simultaneously developing those uses through model programs and pilot projects targeted at business and residential users. INS is intended to give NTT and Japan an edge in understanding and developing future telecommunications applications and the products with which they will be implemented.⁷⁰

INS was originally intended to unify and integrate the four major communications services networks operated by NTT -- each of which developed as an independent entity. These networks include the PSTN (wire and radio), the telegraph (telegram and telex) network, digital data networks (DDX), and a digital facsimile network. As in other industrialized countries, growth in Japan's PSTN subscriptions is slow but stable at about 3% annually. This contrasts with the annual decline of subscriptions for the telex network since the mid-1970s (vs. continuing telex growth in Europe), as users shift to the facsimile and data services delivered over the PSTN, DDX, and FAX networks.

Over the PSTN, NTT offers three types of data services: a facility service (in which NTT supplies both leased circuits and data equipment), a leased circuit service, and a public network circuit service using PSTN telephone lines. An analog facsimile service is also available over the PSTN, as is a leased circuit video-conferencing service started in 1984. The separate DDX networks offer both circuit-switched (DDX-C) and packet-switched services (DDX-P), with the latter inaugurated in 1979 and the former in 1980. DDX is fully digital, as is the FAX network. As mentioned earlier, use of NTT's data communications services grew rapidly during the 1980s. Leased data communication circuits averaged 15-25% annual growth, and subscriptions

69 These figures are provided in *Denki Tsushin Shingikai (Telecommunications Council), Denki Tsushin Jigyo-ho Fusoku Dai-2 Jo ni Motozuki Kojiru beki Sochi, Hosaku no Arikata ni tsuite (On Measures and Policies to be Adopted on the Basis of Annex Article 2 of the Telecommunications Business Law)* (March 18, 1988), Reference-p. 11.

70 This was the judgment of the U.S. National Science Foundation's Japan Technology Evaluation Program (JTECH) in *JTECH Panel Report on Telecommunications Technology in Japan*, (Science Applications International Corporation, May, 1986). See Chapter Two in Particular.

for the DDX and FAX networks doubled or tripled annually. In addition to these networks, NTT initiated a video network in 1987. An integrated network was to evolve from the gradual unification of these independent digital networks and with the PSTN digitization.⁷¹

As the backbones, NTT is currently implementing a fiber-optic trunk network, with plans to replace 60%-70% of the total trunk network with fiber optics by 1995. NTT is also aggressively revamping the local loop network by digitizing it and installing fiber optics -- with perhaps 10% of local exchange lines fiber-optic by 1997. There are, of course, major hurdles that must be cleared to fulfill the vision, including reduction in the cost of fiber optics, the problem of commercial uncertainty in regards to ultra-high-speed and high-volume transmission, and the retraining of NTT's workforce.⁷² More recently, due to new technological advances and market opportunities, the INS vision has been expanded to include "intelligent" and "mobile" services, a vision called VI&P (Visual, Intelligent and Personal). Examples of VI&P services include: a three-dimensional, high-definition visual communications service, a machine-translation service, confidential intelligent communications services, and a portable directory number service that connects calls regardless of party locations.⁷³ NTT predicts that by the year 2005 there will be 20 million pocket-telephone users, 20 million electronic-mail subscribers, 5 million visual-telephone customers, and 20 million digitized subscriber access lines.⁷⁴ By fiscal year 1995, NTT intends to bring the share of revenues from these non-conventional services to 25 percent of its total revenues. To accomplish its long-term and medium-term objectives, NTT has earmarked 8.8 trillion yen, or 63.8 billion dollars in capital investment for the next five years and is planning to invest about 200 billion dollars over the next twenty years to complete the development of its broadband network. If completed by 2015, NTT would achieve its broadband network about 5 years earlier than current Bell plans in the United States.

As the main architect and executor of this long-term vision, NTT could continue to play an important developmental role for the Japanese telecommunications industry. First, NTT's huge network investment will likely create a market for INS-related

71 Several parallel projects -- some of them intended eventually to be incorporated within INS -- are also underway to develop equipment and services that can take advantage of the INS infrastructure. These include interactive visual communications networks (NTT's Video Response System or VRS), integrated voice-data and voice-video equipment, optical scan document terminals and fast mini-faxes, optical instrumentation and control systems for industrial and office applications.

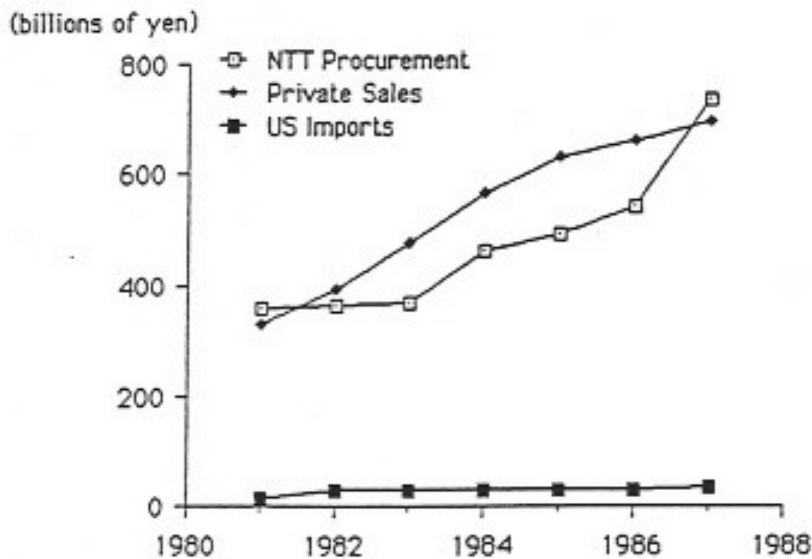
72 Interview with an NTT official, Nov. 16, 1988.

73 NTT, *NTT Annual Report 1990* (Tokyo: NTT), p. 9.

74 *Ibid.*, p. 11. The following data is also taken from this report.

products and services approaching \$250 billion in the next century. Many of the growth areas in the equipment market -- ranging from multi-functional telephones to G-4 facsimile, TV telephone equipment, and teleconference systems -- will be largely induced by new service opportunities, while infrastructure transformation will steadily support the demand for electronic switching equipment, code transmission equipment, and radio communications equipment for some time to come.⁷⁵ Second, NTT's basic R&D will continue to benefit the whole industry.⁷⁶ Indeed new opportunities have expanded the so-called "NTT family " to include firms that previously were outsiders such as Mitsubishi Electric and Toshiba.⁷⁷ Figure 9 shows NTT's procurement.

Figure 9
NTT's Procurement and Stable Domestic Market



Source: Denki Tsushin Shingikai and CIAJ

75 *JTECH Panel Report*, pp. 3-4.

76 The CIAJ is now demanding a revision of the NTT law to stipulate explicitly that NTT maintain its leadership and uphold the obligation of public disclosure in areas of key technologies from the perspective of national interest. Interview with Deputy Director of the Technical Division, CIAJ on Nov. 8, 1988.

77 *INS Koso to Sangyoshakai e no Inpakuto*, p. 216-218. For instance, on NTT's relations with the semiconductor industry, Mr. Kitahara says, "...Digitization means using more LSIs, and I believe that in an intense competition it is difficult for small-to-medium sized firms to compete on an equal footing with big firms. But all I can say is if these small firms go into low-volume production of differentiated products based on their capacity to add their own software, their survival will be guaranteed...(in order to do this), joint groups of semi-conductor manufacturers have to be created...(around) NEC, Hitachi, Fujitsu, Toshiba, Mitsubishi Electric, and Oki Electric," (p. 217).

First, NTT's 11% increase in investment in 1987 brought its procurement to more than half of the industry's total annual domestic output for that year. This means that NTT's procurement market remains the largest domestic market for telecommunications equipment in Japan. Second, NTT's increased procurement has not dampened, and may have spurred private investment in telecommunications equipment. Third, equipment imports, particularly from the United States, have not substantially increased.⁷⁸ This suggests that Japan's domestic equipment industry has benefited most from the market expansion made possible by new investment.

NTT's INS vision promised to lavish the industry with subsidized R&D projects and to produce a secure domestic equipment market. This prompted the investment in R&D and production equipment necessary to develop Japan's future telecommunications infrastructure.

In sum, the prospect of competition in telecommunications led NTT to conceive a grand network-evolution strategy, called INS, in an effort to fend off its own dissolution and establish position in new markets. Because the implementation of the INS concept required the equipment industry's collaboration, NTT intensified its R&D effort and increased its network investment to attract that industry's cooperation. This has permitted NTT to maintain a developmental role post-reform. NTT would have been stripped of its ability to play any industrial-policy role had the reform demanded its breakup into regional operating companies. Finally, the success of MPT's industrial policy remains contingent on NTT's actions. In effect, MPT has depended on NTT for the successful implementation of its industrial policy.

VII. Conclusion

The Japanese experiment in regulatory reform of telecommunications boasts continuity amidst change. Common-carrier communications have been opened to domestic competition, and the VANs market has been opened to both domestic and foreign competition. Reform has also opened the door to competition in international telecommunications services, altering KDD's status as Japan's tiny sole provider of such services. As a result, several new common carrier entrants have begun to build and operate competing domestic networks; several others are waiting in the wings.

⁷⁸ Also corroborated by Japan Economic Institute's (JEI) U.S. - Japan Competition in Telephone Equipment (February 10, 1989), p. 4. The imports of the United States telecommunications goods to Japan made up only 0.9% of Japan's total supply in FY 1987.

While the number of privately leased lines has soared, the VANs carriers have also become numerous, though mostly small in scale. Taken as a whole, liberalization has provided a substantial competitive ferment within the industry. In some cases, businesses are making very sophisticated use of private networks and VAN services to deliver increasing competitive advantage to their markets.⁷⁹ Companies ranging from trading houses to trucking companies, from parts distributors to financial houses, are using an ever increasing amount of network facilities and services to analyze, interpret, and respond to data collected on-line about customer needs and market trends. Coinciding with this development, the private sector now accounts for about 30-35% of the \$10 billion telecommunications equipment market in Japan.

MPT, which has successfully established its regulatory authority over the new carriers, has proceeded to promote technological development, infrastructure development, and service diffusion using an array of conventional policy devices similar to those used by MITI in the promotion of other industrial sectors. Based on its new authority, MPT has facilitated the formation of consensus, which has led to a series of long-term visions as well as policy guidelines. MPT has also induced the industry to follow its guidelines by providing the⁸⁰ industry with subsidies, tax incentives, and low-interest loans. But the Japanese style of deregulation, which is essentially the outcome of two political bargains -- one between NTT and Zentsu, and the other between NTT and the business community at large -- has allowed NTT to keep its national network and use it to provide enhanced services, while at the same time safeguarding it against "excess competition." The intent behind this arrangement is to facilitate the provision of integrated services on a national scale, a precondition for a nation-wide diffusion of information technology. Additionally, the judicious coordination of deregulation and the government's industrial policy has allowed NTT to play its traditional role as Japan's "industrial locomotive" more vigorously than ever before. NTT has intensified its R&D activities to an unprecedented level, and has begun to increase its network investment to re-integrate a wider circle of equipment suppliers into its orbit. Conversely, the success of MPT's industrial policy has depended upon NTT. Thus, for issues upon which NTT and MPT did not concur, such as in the diffusion of specific "new media" services, -- MPT's industrial policies failed.

As long as INS evolves to ensure NTT's future success -- against the unenticing backdrop of its slow revenue growth -- as a dominant information-technology company,

⁷⁹ The following paragraph is based on data in "Japan sets an example with automated services," *Financial Times*, October 23, 1987, p. 18.

⁸⁰

Japan will remain committed to the diffusion of ISDN services and equipment. But the most pressing question today is whether NTT will be able to carry out its long-term vision in the midst of the often-talked-about NTT break-up. Despite the pro-competitive MPT policy-makers support of NTT's breakup and the business community's interest in ensuring "effective competition" within the industry, the first regulatory review by the government in March 1988 deferred a decision on NTT's break-up until the next review. Since more than 60% of NTT's shares are still held by the government, the Ministry of Finance was reportedly forced to intervene because of fear that NTT's break-up might precipitate a further fall in a market of rapidly declining stock prices. Since the instability of the stock market is expected to continue into the foreseeable future, the likelihood of NTT's breakup is slim. But, more importantly, if the MPT recognizes the importance of NTT's ability to lead the industry through R&D and investment, the notion of NTT's breakup will only be used as a political threat to force NTT to do more to promote competition.