THE NEW STRATEGIC COMPLEXITY:

NTT DILEMMAS AND OPPORTUNITIES

by

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ABSTRACT

Japan's 1985 Telecommunications Business Law established competition in the telecommunications industry. Nippon Telegraph and Telephone (NTT), which had been the monopoly domestic telecommunications service provider, now faces competition from new carriers and from its traditional equipment suppliers (NEC, Fujitsu, Hitachi and Oki). With the explosive growth of the Japanese economy, NTT faces excellent market opportunities, but it also faces dilemmas. The newly privatized NTT must position itself to meet both the short-term and long-term earnings expectations of the financial community and foster competition at the same time. If the government does not believe the market has achieved the desired level of competitiveness, it may re-write the Telecommunications Business Law in 1990 (which may call for the "break-up" of NTT).

The thesis examines the nature of the NTT-supplier relationships, and the ways in which competition is altering these relationships, through a detailed study of NTT's product development and product procurement processes. NTT will be searching for new partners.

The paper delineates NTT's strategy options and describes why the current industry structure, with one dominant national carrier, may be the ideal structure for both Japan and foreign companies. Finally, the thesis discusses the implications that the new competitive environment has for American telecommunications firms wishing to sell equipment in Japan.

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CHAPTER ONE

INTRODUCTION AND METHODOLOGY

Japan's economy is in transition. Japan is moving from a protected, closed trading environment to an open market virtually devoid of overt trade barriers. In no industry is this transition being played out with more intensity, tribulation and conflict than it is in telecommunications.

Japan's telecommunications industry has been developed largely through the efforts of one firm, Nippon Telegraph and Telephone (NTT), the focus of this study. NTT provided the technical and financial resources, and a stable, expanding market so that the four members of the "Denwa family" (NEC, Fujitsu, Hitachi and Oki) could grow and prosper. NTT built a "human network" between the companies to ensure cooperation and joint commitment.

For political, but primarily for competitive reasons, these relationships are breaking apart. The four equipment manufacturers are becoming so large and capable that they threaten NTT's leadership of the industry. More important, each is vying with NTT for "account control" with Japan's major business customers. It is the battle for influence over the customers' buying decision that is the most divisive.

NTT is facing new competitors on several fronts. New local, long distance and special services carriers have been given authorization to compete with NTT. NTT's local services

also face the threat of "bypass" from national and international long distance carriers, most notably Kokusai Denshin Denwa (KDD).

By far the most significant threat NTT faces comes from the regulators themselves. The Ministry of Posts and Telegraphs (MPT) is studying, and apparently is leaning toward, the eventual break-up of NTT into many companies. The political environment is also evolving into a competitive one, as MPT and the Ministry of International Trade and Industry (MITI) contend for power.

The thesis

The study of NTT and the Japanese telecommunications market is fascinating and highly relevant to participants in the world's telecommunications markets, but these are not ideal subjects upon which to establish an analytical framework. This thesis is a study in contradictions.

I am not a newcomer to the field of telecommunications. In my twelve years with AT&T, I have held positions in the following areas: international services, product management, sales, network engineering, strategic planning, field operations and human resources.

On the subject of Japan, I was, and still am, a relative novice. Before embarking for Japan, I read through a significant amount of secondary research material on the telecommunications market and on the Japanese people. I went

to Japan with a number of firmly-held beliefs and convictions about the Japanese. What I discovered in Japan was that my logical, cogently-arguable generalizations about the Japanese were merely reflections of my ignorance. The longer I was in Japan, the more confused I became, particularly while involved in the labyrinthian pursuit of identifying what constitutes the "Japanese way" of doing business. The stereotypes quickly faded. As I gathered more data, through interviews, the fabric of the industry story became more colorful, detailed, complicated, multi-leveled, and filled with what appears to the Westerner as contradictions.

NTT itself is faced with contradictions and dilemmas. It is being asked to help increase national competitiveness while at the same time opening its markets to foreign companies. NTT is expected by the financial community to improve earnings while it is directed by the regulators to ensure that competition prospers. It is expected to achieve financial returns on its R&D investments while disseminating technology for the good of the nation. NTT managers can, in the same breath, describe their company as the picture of economic strength and success ("The World's Most Valuable Company"),[1] which also fears for its very survival.

1"The World"s Most Valuable Company," Fortune, 10 October 1988, 92.

The evolving relationships between NTT and its four major suppliers present the most compelling and important story in the industry. It will be interesting to see if these long-standing, cooperative relationships can be maintained in the face of advancing competition. NTT is becoming increasingly uncomfortable with a scenario that positions its most feared competitors as its key suppliers.

I approached the analysis from three vantage points. The first is from a Japanese policy-making perspective. I believe the thesis forwards strong arguments that would support the maintenance of a singular NTT as part of an optimal industry structure that supports both national competitiveness and international harmony.

The second vantage point is that of an NTT executive. I believe NTT, even though currently weakened by the Recruit scandal,[2] can control its own destiny by pursuing appropriate political and competitive strategies.

The third perspective, an admittedly self-serving one, looks at the Japanese telecommunications market from the point of view of a potential American entrant. I believe it is precisely the new political and competitive factors in the market that create excellent opportunities for U.S. firms willing to move quickly and aggressively into the market.

2"First Arrests Made in Japan in Stock Scandal," Wall Street Journal, 14 February 1989, A3.

The thesis is organized into six chapters, beginning with this chapter. Chapter two of the thesis describes the structure of Japan's telecommunications industry and some of the issues shaping the political and competitive agendas. Chapter three describes the NTT organization structure and its product development process, procurement procedures, decision making process, and supplier management policies. Chapter four details the ways in which the relationships between NTT and its suppliers are changing. Chapter five reaches conclusions based upon the previous chapters and highlights key NTT strategy options. The final chapter discusses the implications that the changes in the Japanese telecommunications industry have for American firms.

Methodology

The primary sources of information for the thesis were the dozens of interviews I conducted in Japan during a three week period in January, 1989. I spent one-half day with NTT America in New York and four days with NTT in Japan, three days at the Tokyo headquarters, and one day at NTT's Yokosuka Laboratory. The remaining two weeks in Japan were spent in Tokyo, where I had the opportunity to meet with, among others, representatives of Hitachi, Fujitsu, NEC, Japan ENS (a value-added network provider), Ricoh, and AT&T Japan. I also met with Japan consultants James Abegglen of the Asia Advisory Service and Laurin Herr of Pacific Interface.

I am extremely grateful to NTT for their assistance. They scheduled interviews for me with managers and executives in many key departments of the company, and they provided me with documents and information that have been very useful. Most of the NTT statistics and figures used in this report were provided to me by NTT.

Almost everyone I spoke with asked for anonymity. This is the reason that most of the quotations used in this paper are not identified with a specific individual. In fact, much of the most useful information ("honne") was secured in very informal, private surroundings.

There were many different points of view expressed on the topics and issues covered. I tried to collect as many "data points" as possible on each issue, but getting some of the people to "open up," particularly in the office environment, was at times frustrating. Nevertheless, many other Japanese managers I met with were extremely open and forthcoming, and to them I am grateful. The opinions expressed and the conclusions reached in this thesis, although influenced by the people I met with, are strictly my own, except where noted.

CHAPTER TWO

THE JAPANESE TELECOMMUNICATIONS MARKET

In Japan's vibrant economy, few industries are viewed to be as important to the nation as the telecommunications industry. Both the business community and the government ministries view the telecommunications industry not only as an engine of economic growth, but also as one of the "specialized factors" that will contribute to the future competitive advantage of the nation. "Advanced and specialized factors, which are the most decisive factors of production for national competitive advantage, are created and not inherited by a nation."[1] Continued technological improvements in the nation's telecommunications network are especially vital to the development of strategic sectors of the Japanese economy, such as the data processing industry, which relies upon a communications "backbone" to support its products.

In addition to being a part of the competitive infrastructure of the nation, the telecommunications industry itself is viewed as a critical economic sector.

> "Communications technology will replace automobiles as Japan's leading industry by 1991. That's the prediction being made by Japan's Ministry of Posts and Telecommunications, which has set leadership in communications technology as a national goal. The ministry expects the industry to grow ten percent a year to 75.87 trillion yen (US $579 billion) by

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1Porter, Michael, The Competitive Advantage of Nations, excerpt from Harvard Business School class note 8-389-101, 1.

1991. It's annual growth will add 0.6 percent to gross national product, the total output of a country's goods and services, and create 240,000 jobs."[2]

Telecommunications in Japan is a highly regulated industry, even by U.S. standards, but the scope of regulation is decreasing. Telecommunications had been managed as a department of the government since the 1890's. Then, in 1952, NTT and KDD (Kokusai Denshin Denwa) were formed from the Ministry of Postal Services as monopolies with responsibilities for domestic and international services, respectively. Both monopolies were to be regulated by the newly created telecommunications branch of the Ministry of Posts and Telecommunications (MPT).

In the early 1980's, increasing concern was expressed by members of the business and regulatory communities that the existence of these monopolies would impede Japan's economic progress. It has been claimed that, although Japan's export industries are highly productive, Japan's service industries have borne the social burden of ensuring exporting competitiveness, and hence are only one-half as productive as their counterparts. As Davidson states, "...the communications network segment is essentially a domestic service business, and as such has not been administered in the same fashion as the communications equipment industry."[3]

2"How Japan plays the telecommunications game," Far East Business, November, 1988, 18.

3Davidson, William, "Japanese telecommunications policy," Telecommunications Policy, June 1987, 148.

MITI regulates the communications equipment industry. It is MPT's concern with NTT's influence over the future development of strategic domestic industries, and its contributions to the nation's technical knowledge base through its heavy involvement in research and development, particularly the joint R&D NTT conducts with selected equipment suppliers, that adds the additional regulatory complexity on NTT of MITI involvement. NTT has long had the responsibility to develop strong domestic suppliers of telecommunications equipment. In fact, the four major equipment suppliers have been referred to as the "Denwa family" or the "NTT family," with NTT as the parent and the suppliers as the children. Some, including former Chairman Shinto of NTT, believe this has been accomplished. He has reputedly said that "now is the time for the children to begin paying rent," a reference to the Japanese custom of grown children living with their parents. The evolving relationship between NTT and its suppliers will be discussed in greater detail in Chapters 3 and 4.

With strong domestic suppliers in place, and the need to make more progress in the development of network services evident, political consensus was reached to introduce competition into the domestic telecommunications market. NTT was "privatized" in 1985, and it instantly became the world's largest and most valuable company with a market valuation of about $260 billion. "That's almost twice the combined worth of IBM, General Motors, and AT&T. NTT sits on the largest

pile of assets ($92 billion) in Japan. It's $2.1 billion profit for 1988 also makes it 'ichi-ban,' No. 1, ahead of mighty Nomura Securities and Toyota."[4]

NTT needs to be perceived as encouraging and promoting the entry of a variety of new carriers into the domestic local and long distance markets while maintaining profitability. NTT's survival as a corporation depends upon how well it achieves this balance between now and 1990. The following pages describe the market and the environment from the point of view of NTT.

COMPETITION

Competition was introduced into Japan's telecommunications market with the passage of the Telecommunications Business Law, which took effect in April, 1985. This law allowed new telecommunications carriers to compete with NTT, and it classified carriers into two types. Type I, or facility-based carriers, could provide services utilizing their own facilities. Type II carriers, on the other hand, could provide services via facilities leased from Type I carriers. Type I carriers are closely regulated by MPT, and foreign ownership of a Type I carrier is limited to one-third ("active" management by a foreign entity is prohibited).

4"The world's most valuable company," Fortune, 10 October 1988, 92.

As of December 1988, there were 39 Type I carriers registered, 24 of which are radio paging companies (Appendix 2-1).[5] Also registered were 622 General Type II carriers, which require a mere notification to MPT to begin operating, as well as 23 Special Type II carriers. Special Type II carriers are larger in scale and geographic coverage than general Type II carriers so they are subject to more regulation. Appendix 2-2 illustrates the growth in the number of new carriers.

Growth in market share is another issue entirely. As Table 2-1 illustrates, NTT still holds a 97% share of the leased circuit market and a 99% share of the telephone (local and long distance service) market. NTT lost one percentage point of share in each market in 1987. Although many carriers are registered, few are in operation (Appendix 2-3).[6] Relative market share is one way of determining the level of competition in the market. No one seems sure with what level of NTT market share MPT will consider the market competitive. One NTT manager told me that he believes that NTT can not hold more than 95% of each market if it wants to avoid a re-writing of the Telecommunications Business Law (which could mean a potential NTT "break-up") when this law comes up for reconsideration in the Japanese Diet in 1990.

5Appendices 2-1 and 2-2 and Tables 2-1 and 2-2 are taken from New Era of Telecommunications in Japan, Newsletter of the Telecommunications Association, 1 January 1989.

6Tables 2-4, 2-5, and 2-6 were provided to me by NTT.

Table 2-1

Market Shares for Type I Carriers

(Unit: billion yen)

	FY 1987			FY 1988 (April – September 1988)		
	Leased Circuit	Telephone	Radio Paging	Leased Circuit	Telephone	Radio Paging
NTT	295.4 (98.0%)	4,553.8 (99.7%)	93.3 (98.9%)	163.7 (97.0%)	2,286.8 (98.9%)	48.9 (91.6%)
New Carriers	6.2 (2.0%)	13.3 (0.3%)	1.1 (1.1%)	5.1 (3.0%)	26.3 (1.1%)	4.5 (8.4%)
Total	301.6 (100.0%)	4,567.1 (100.0%)	94.4 (100.0%)	168.8 (100.0%)	2,313.1 (100.0%)	53.4 (100.0%)

Source: *New Era*, 1 January 1989

Concern over possible break-up pervades NTT management thinking. "'Reorganization or breakup could cause many difficult problems and have adverse effects,' says Micchio Takeuchi, executive manager of NTT's strategy planning department in Tokyo. 'If enough competition exists in 1990, we would like to avoid [such drastic action].'"[7]

The Competitors

There are three major domestic terrestrial New Common Carriers (NCCs). Japan Telecom (JT) was the first to offer competitive services in Japan. JT's largest shareholder (33%) is Japanese National Railways (JNR), and JT has utilized JNR's "bullet train" rights of way to lay fiber optic cable along the vital Tokyo-Osaka corridor and other key routes.

Daini Denden (DDI) means "second telephone company," and it was the second alternative telephone company to begin offering service in Japan. Major stakeholders are Kyocera and Sony. Since it has no rights of way, DDI constructed a microwave network.

Teleway Japan (TWJ) is owned by Toyota, the Japan Public Highway Corporation and a number of other companies. TWJ has laid fiber optic cable along Japan's major highways.

Tokyo Telecommunications Network's (TTNet) largest shareholder is the Tokyo Electric Power Company. The most notable aspect of TTNet, which differentiates it from the other carriers, is that TTNet uses the power company's

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7"How Japan plays the telecommunications game," 19.

facilities and rights of way to provide a local service alternative to NTT in the Kanto region (Tokyo metropolitan area), as opposed to the long distance services provided by the other companies. Utilization of TTNet and one of the other NCC's allows customers to bypass the NTT network entirely. There are a total of four NCCs that offer local service.

In addition, the satellite-based carriers, Japan Communications Satellite Company (a venture of C. Itoh, Mitsui and Hughes Communications) and Space Communications Corporation (owned by the Mitsubishi group or "zaibatzu"), plan to begin offering service in 1989. KDD faces competition from two new international carriers. International Telecom Japan (ITJ) is owned by the Mitsui, Mitsubishi, and Sumitomo groups. International Digital Telecommunications (IDC) had a difficult time receiving MPT approval because of foreign ownership. Cable and Wireless of the U.K. and Pacific Telesis of the U.S. (Pactel recently received FCC approval for the venture) are two of IDC's major stakeholders. ITJ is scheduled to begin private line service in April, 1989 and long distance service in February, 1990. IDC is scheduled to begin private line and long distance service in May and October of 1989, respectively.

NTT Response

As stated earlier, NTT's self interest will be served if these carriers succeed. To aid their development, NTT is providing technology and expertise (including the transferring

of managers) to ensure these businesses become successful. NTT is allowing its manufacturers to provide NCCs with equipment that utilize proprietary NTT technology.

The NCC strategy is to price services 15%-20% less than NTT. According to NTT price elasticity studies, there is a significant "break point" in customer willingness to switch carriers when the price differential reaches 20%, but interest is not significant at lower discount rates. This NTT research is evident in recent pricing moves. On February 1, 1989, NTT reduced its standard three minute long distance rate from 360 yen to 330 yen. DDI responded by lowering its rate from 300 yen to 280 yen. The price differential was reduced from 20% to 18%. DDI succeeded in maintaining a discount in the 15%-20% range. NTT succeeded in pushing the discount below 20%.

NCCs are competing on NTT's most profitable routes (the major inter-city routes), leaving NTT to serve the less profitable rural areas alone. Although NTT total long distance market share is currently 99%, according to NTT estimates, NTT market share is only 80% along the nation's most profitable and competitive route, the Osaka-Tokyo corridor.

NTT emphasizes that none of the NCCs have gone out of business yet, and that the profits of the long distance NCCs are well ahead of government projections. As Appendices 2-4 and 2-5 indicate, DDI, JT, and TWJ lost 6.6 billion yen, 4.9 billion yen, and 68 billion yen, respectively in fiscal year 1987. In FY 1988, DDI, JT, TWJ, and TTNet all lost money, but

the combined total was only 23.3 billion yen ($186 million). Projections for FY 1989 show DDI with a net profit of 2 billion yen ($16 million) and JT breaking even. NTT indicated that these 1989 projections were conservative. (The local service, or regional carriers, are having more difficulty. NTT is considering proposing an increase in local rates in order to help the local service NCCs become more profitable).

As a result of healthy competitor financial performance, NTT considers the market competitive. NTT is feeling the effects of NCC "cream skimming" on the profitable routes. Internal NTT projections for 1989 show revenue growth of only 0.3% (vs. 5.8% for 1988) with operating profit declining by as much as 20%.

NTT appears surprisingly sanguine about this revenue situation. According to one NTT manager, "We do not know at what point MPT will consider the market competitive. We can still make a profit if we cut costs and get closer to our customers. If we do these things, a 30%-40% market share loss does not prevent us from making a profit."

Some at NTT want to maintain market share position more aggressively, but according to this spokesman, "politics are ruling now. There is some conflict at NTT in this regard." Any NTT price changes require MPT approval.

NTT's strategy appears to be to "strategically" lose market share. Market share loss is viewed as necessary, so the strategy calls for losing those revenue dollars that are of least value to the firm. NTT recognizes that competitors

are concentrating their efforts on select clients and routes. NTT has initiated a "full court press" in order to maintain its most profitable clients.

Because of political considerations, NTT cannot appear to be too aggressive in pricing its competitive services. Pricing flexibility is also severely limited. But, NTT believes that large users have special requirements, such as reliable service and systems compatibility, where NTT can differentiate itself on non-price variables. NTT recently formed the Integrated Communications Systems Sector to serve the needs of NTT's 1000 largest clients. ICSS focuses on selling equipment and services and on integrating systems. In addition, NTT is investing heavily in the introduction of new advanced services such as Integrated Services Digital Network (ISDN) and other high speed digital offerings.

Economies of dedicated services

The ability to provide high quality leased services and to support private networks is especially crucial to success in the Japanese business market (much more so than in the U.S. market). The economies of leased services are much greater in Japan due to the nature of Japan's geography. In the United States, population centers are widely dispersed across the country--in the north and in the south, in the nation's mid-section and along both coasts. Switching capability and efficiency become critical elements of network optimization. In other words, one cannot draw a "straight" line that

connects all the major population centers of the U.S.. Many dedicated or leased routes are needed to connect them (switching becomes economical).

One can draw this straight line in Japan. Beginning at the northern island of Hokkaido, one can follow a straight route along the Pacific Ocean that goes through Tokyo, Osaka, and then continues to the southern island of Kyushu. Japanese domestic private networks have very highly concentrated "point-to-point" traffic patterns along this corridor, making leased facilities highly efficient. Business demand for leased facilities is very high. In fact, digital services (similar to AT&T's Accunet[8] line of services in the U.S.) are clearly the "star" of NTT's product portfolio.

Digital leased service revenues, from services such as high speed digital circuits and packet switching services, are currently growing at 30%-50% per year. Since NTT currently enjoys a 97% share of this market, this would certainly earn these services a place in the star quartile of the Boston Consulting Group grid (Figure 2-1). An element that undoubtedly adds to the growth of these services is the rapid proliferation of value-added Type II carriers which utilize NTT backbone facilities. Digital services are also the services where "progress" is most visible to business leaders and regulators. The building of these facilities also drive the important NTT construction budget, which provide benefits (patronage) to many elements of Japanese society. The cash

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8AT&T Trademark.

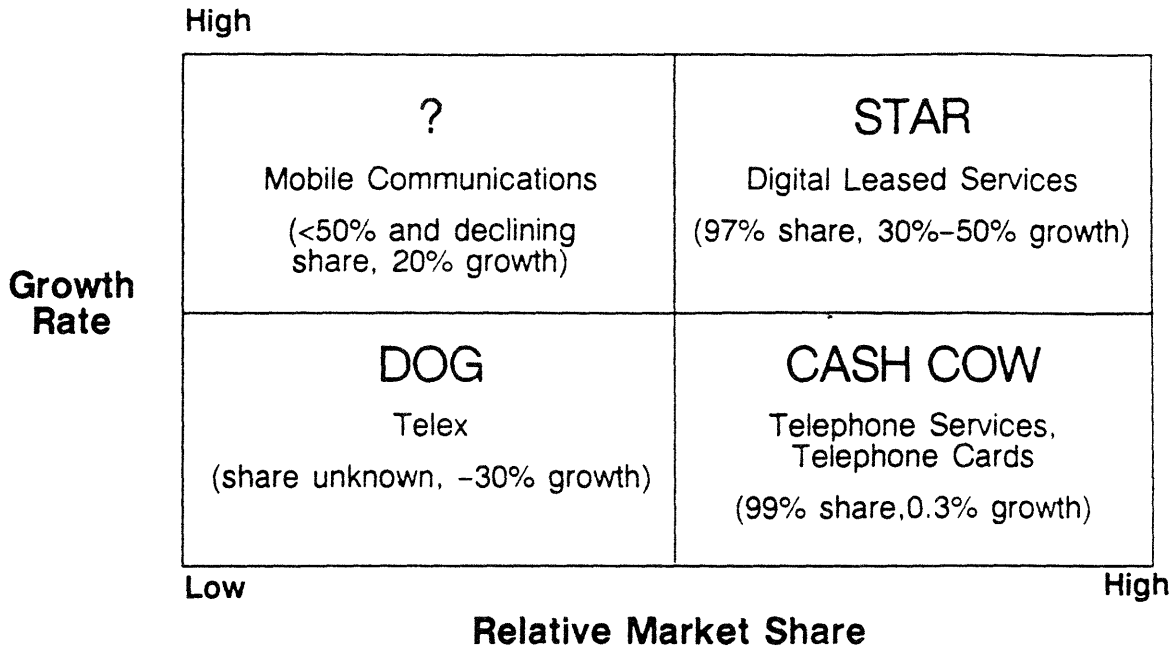
cows that will fund this expansion in digital services are traditional telephone subscriber and long distance services.

NTT will have to maintain a leadership position with its own services, not resold services, if it hopes to use leadership in digital services as its positioning edge with large customers. NTT must also provide outstanding service to the value-added network (VAN) providers, not only because this fast growing market has alternatives (NCCs), but because the parent companies of these VAN subsidiaries are also NTT's large end user customers. The investors in these VANs read like a Japanese "Fortune 100." NTT's largest customers are also, by nature of these investments, competitors. This is an additional layer of complexity that NTT must factor into its target customer analysis.

Competitive advantage

NTT studies show that NCC and NTT transmission quality is roughly equal. NTT's competitive advantage will rely on non-price benefits, such as superior maintenance capability, an extremely important variable in this market, which NTT should be able to provide because of its superior manpower advantages. NTT's new ICSS and NTT Data Communications Sector organizations are an attempt to differentiate NTT by providing end users with valuable consulting services, particularly systems integration expertise. NTT's heavy investment in ISDN technology becomes more strategically cogent given this backdrop. In addition to requiring digital backbone, ISDN

Figure 2-1
THE NTT PRODUCT PORTFOLIO



Source: NTT provided statistics which were placed into the Boston Consulting Group's Growth-Share matrix

provides a "D" or data channel that allows for the more efficient use of integrated access and integrated facilities, a very high value feature in a market dominated by high density traffic and private networks. Barring regulatory problems, the provision of integrated access using the ISDN primary rate interface (1.5 megabit) provides NTT with an important competitive lever.

Other market opportunities

Mobile communications services, such as cellular phones and pocket pagers, are growing rapidly (20% per year), but NTT's market share is declining. New entrants are being attracted by the very high margins on these services, which NTT estimates to be approximately 50%. Telex service revenues are declining by about 30% per year. These services are suffering from the superiority that communicating word processors and facsimile machines have at transmitting kanji characters.

Japan lies far behind the U.S. in the utilization of telecommunications services that link businesses to customers. "Telemarketing" applications have greatly stimulated long distance usage in the U.S. (i.e. WATS, 800 Service, 900 Service), and these applications have provided valuable positioning leverage for companies with the expertise to become telemarketing consultants. NTT has recently established telemarketing subsidiaries, and it is currently working with AT&T and others to explore this potential avenue

of revenue generation. One cultural barrier to the growth of telemarketing applications that differentiates the two markets is the lack of credit card penetration in Japan (which makes telephone retailing a greater challenge for Japanese businesses). Japan's young customers appear to be less averse to credit.[9] NTT has not yet introduced "bulk discount" long distance services, like WATS or Megacom, which could provide the market with some of the stimulus it needs to introduce innovative telemarketing applications. The consumer-to-business communication channel represents a sizable opportunity for NTT to exploit.

International expansion

Large customers are becoming increasingly multi-domestic in their operating orientation, and require international capabilities as a part of their communications "bundle." NTT does not hide the fact that it has eyes for the international market. Even though it is unlikely that NTT will be allowed to provide international services in the near future, KDD and NTT recognize this potential area of conflict, and animosity and competitiveness between the organizations is beginning to surface. Both companies have made proposals to international carriers that would establish account management partnerships without the direct customer involvement of the other. KDD is now connecting large Japanese international users directly to

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9"Japanese Consumers, Long Known as Savers, Catch on to Credit," Wall Street Journal, 10 April 1989, A1.

their network, "bypassing" NTT's network entirely. KDD seems to be fearful of the much larger NTT. NTT appears to look down on their smaller rival, an attitude that is not appreciated at KDD.

With the introduction of competition, both carriers have the option of interfacing with alternative carriers (for the completion of the international or domestic portion of an overseas call), so we might expect to see strange bedfellows created in the next few years. A company that becomes too firmly allied with either NTT or KDD must be concerned about the impact this could have on the relationship with the other.

SUBSTITUTES

To the extent that the industry continues to engage in constant innovation and "creative destruction," the threat of substitutes to telecommunications coming from other industries is minimal. The threat of product obsolescence is constant and pervasive.

THE GOVERNMENT

Telecommunications is a regulated industry in Japan. The role of government is significant with respect to determining the structure of the market and influencing the behavior of market participants. The role of government has no greater bearing on, and is certainly no more complicated for, any player other than NTT.

Intervention in the affairs of business in Japan takes on a different character than it does in the United States.

> "These two differing orientations toward private economic activities, the regulatory orientation and the developmental orientation, produced two different kinds of business-government relationships. The United States is a good example of a state in which the regulatory orientation predominates, whereas Japan is a good example of a state in which the developmental orientation predominates....(In Japan), the government will give greatest precedence to industrial policy, that is, to a concern with the structure of domestic industry and with promoting the structure that enhances the nation's international competitiveness."[10]

Japan views national security in economic rather than in military terms. Because of their strong, constructive role in forming national industrial policy, Japan's ministries have been able to attract the "best and the brightest" from Japan's universities.

> "The civil service in Japan has always been the elite of the elites. Whereas in the United States parents tend to hope their sons and daughters will become millionaires, in Japan the most wished-for position is civil servant, especially MITI or the Ministry of Finance. The reason is that the Japanese view success as a matter of status and power. In Japan's group oriented society, the civil servants are the keepers of the flame for the ultimate group, the nation. In the hierarchy, they are at the top."[11]

10Johnson, Chalmers, MITI and the Japanese Miracle: The Growth of Industrial policy, 1925-1975, (Palo Alto: Stanford Press, 1982), 19.

11Prestowitz, Clyde, Trading Places, (Tokyo: Tuttle, 1988), 112.

The success and importance of government policy is widely debated. Some give MITI a good deal of credit for the Japanese economic miracle. "Japan's MITI has the primary although not the exclusive responsibility for formulating and executing national industrial policy...Japanese industrial policy is the best in the world."[12] Others down play the role of government, and give the credit for Japan's success to other factors, particularly the growth strategies and the competitive fervor of Japan's companies, or "Kaisha."[13] "Not only is the government of Japan demonstrably unable to manage a business, it has also shown no foresight in recognizing the value of new technologies or the probable directions of change in its specific businesses....With the managerial ability and foresight of the Japanese government open to question, its ability to command the private sector has limits."[14]

The Legislature

Japan's parliament, or Diet, is constitutionally the "highest organ of state power,"[15] but in reality it plays a minor role in the regulation of industry. "The bureaucracy makes policy and the Diet merely rubber-stamps it."[16] But NTT, because of its national character, and because of its

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12Johnson, Chalmers, "The Instititutional Foundations of Japanese Industrial Policy," California Management Review, Summer 1985, 66-68.

13Abegglen, J. and Stalk, G., Kaisha, (Tokyo: Tuttle, 1985), 5.

14Ibid., p. 32.

15Johnson, Chalmers, "The Institutional Foundations of Japanese Industrial Policy," 60.

16Ibid., p. 60.

enormous construction budget ($14.4 billion in 1989), plays a major political role. "Big business keeps the Liberal Democratic Party in power by supplying enormous funds to the leaders of conservative factions (whose actual electoral constituencies are normally rural)."[17] The construction industry is considered the most politically active and powerful of the business special interest groups. It is a major contributor to political campaigns. NTT is this industry's biggest customer. NTT is placed in the unenviable position of having to maintain or increase a burdensome construction budget while meeting the cost control expectations of the financial community.

Japan is currently in the throws of a national "regionalization" initiative, which, in essence, is a backlash against the concentration of national assets in the Tokyo and Osaka areas. There is heavy political pressure to redistribute the nation's wealth, so NTT may be forced to make "uneconomic," region-based decisions in order to remain in political favor. That is particularly important because some believe NTT should be broken up into regional companies, similar to the Regional Bell Operating Companies (RBOCs) in the U.S. Regionalization is a major impetus to this break up scenario, especially in light of the greater-than-expected success of the Japan Railway system's regionalization. In addition, new competitors such as Hitachi and Toshiba are

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17Ibid., p. 60.

considered very astute politically and powerful as a result of strong ties to the Defense establishment.

The strongest private political force is the Keidanren (the Federation of Economic Organizations), the main business lobbying body in Japan. The Keidanren was instrumental in putting former Chairman Shinto at the helm of NTT. Business is even more concerned than the ministries that the nation's communications networks are not developing rapidly enough. The leaders of NEC and Fujitsu hold NTT partly responsible for the slow growth of Japan's data processing industry (because of the slow growth in data communications services availability).[18] Shinto was one of the most prominent and powerful business leaders in Japan, and he was able to keep the bureaucratic forces at bay. Some feel that Shinto's demise in the Recruit scandal will allow the ministries to again reassert themselves more prominently in the affairs of NTT, and that NTT is now much more susceptible to divestiture.

The Ministries

Officially, NTT is regulated by MPT. MPT owns 85% of NTT stock. MITI is also vying for control of the information industry. NTT is caught in the middle of a major bureaucratic power struggle. The cultures of the two ministries are uniquely different. "MPT's administrative orientation is conservative, monopolistic, domestic, bureaucratic, labour-intensive, inefficient and driven by political as opposed to

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18Interview with James Abegglen, 1/27/89.

economic objectives....MITI, which has long led Japan's charge into world export markets, is innovative, aggressive, internationally-focused, efficient, capital intensive and market-driven...Severe policy and jurisdictional conflicts between MITI and MPT have characterized this industry for some time."[19]

MITI has been the more powerful of the two, but MPT is no lightweight. "Most of Japan's recent prime ministers and key politicians have managed to serve as its (MPT's) minister at some point in their careers."[20] MPT also controls the nation's enormous ($1 trillion in deposits) postal savings system. MPT has been aggressively reasserting itself. According to Maeno, "MPT's resurgence is often referred to as a 'counteroffensive'."[21] It is unlikely that this competition will subside because the stakes for these ministries are very high in terms of power, prestige, and "amakudari" ("descent from heaven," referring to the tradition where ministers receive high level private sector jobs after government service). "MPT hoped to expand its administrative guidance authority from its telecommunications base into computers and other information areas traditionally MITI's domain. Conversely, MITI hoped to extend into telecommunications....The battle is to lead Japan into the

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19Davidson, W., Japanese Telecommunications Policy, 148-149.
20Prestowitz, Clyde, Trading Places, 116.
21Maeno, Kazuhisa, "Turf Battles and Telecom", Journal of Japanese Trade and Industry, No. 5, 1988, 47.

twenty-first century."[22] MITI exerts influence via its control over technology licensing and industrial standards, and its direction of Japan Development Bank lending. MPT control is much more direct. It oversees NTT's compliance with the law, regulates rates, new service offerings, and new carrier authorization. Its major goals are 1) to foster competition in the telecommunications industry, 2) to stimulate the technological development of the industry through support for research and development, and 3) to reduce trade friction by opening up the market to foreign suppliers.[23]

Promoting Competition

NCC market shares are still small, so as MPT sees it, "it is still hard to say that a situation of healthy competition exists."[24] MPT has recommended a "telecom tax system" that would provide significant tax advantages to the NCCs. The financial incentives take the form of more attractive depreciation schedules, reduced property taxes, and low interest financing (Table 2-2). MPT has also instituted programs that encourage NTT "cooperation" with liberalization.

> "Specifically, it is encouraging smooth interconnectivity between NTT and the new carriers, promoting the upgrading of NTT's analog switches and expediting the public

22Prestowitz, Clyde, Trading Places, 121.
23New Era, 1 January 1989, 13.
24Ibid., 13.

> disclosure of information concerning NTT's technologies and networks. MPT has also prohibited cross-cooperation among NTT's service divisions....It is also calling on NTT to employ fair practices in marketing terminal equipment. By requiring the telecommunications giant to use its strengths in facilities, technology and information fairly, MPT is trying to foster an environment in which all carriers can compete freely and effectively."[25]

In an effort to prevent cross-subsidization, MPT required NTT to spin off its Data Communications Sector. On July 1, 1988, NTT formed the NTT Data Communications Systems Corporation (called NTTD), which was capitalized at $80 million and has a work force of 6,800 employees. NTTD's charter is to provide "data communications services,... develop, maintain, sell, lease and rent computer on-line systems and software, offer research and analysis services, and provide training and consultations in the data communications field."[26]

Some believe that this step is not enough, that NTT should be required to fully divest itself of this subsidiary. NTT competitors became particularly concerned when NTT later created a joint venture with IBM to help strengthen its

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25Ibid., 14.
26NTT Public Relations Department press release, August 1, 1988.

Table 2-2

Tax and Financial Support Measures

Outline
• Corporate income taxes (1) Advanced depreciation deduction allowed for Type I telecommunications facilities acquired with contribution for construction funds. (2) Special depreciation for digital switching equipment. (3) Shortening of useful life for digital PBXs.
• Local taxes (1) Fifty percent reduction in property taxes on depreciable assets used by Type I carriers for business purposes. (2) Exemption from enterprise tax on new or expanded facilities implemented for business purposes by Type I or Special Type II carriers. (3) Exemption from special land possession tax on business facilities of Type I carriers. (4) Exemption from transaction tax on light oil used for power supply purposes for telecommunications equipment implemented by Type I carriers.
• Investments and loans (1) Prime interest rate of 5.1% per annum on funds used to procure facilities for Type I or Type II telecommunications businesses. (2) Loans for import of communications satellites (interest rate of 4.9% per annum).

(Reference)
The total tax deduction provided under these measures was about ¥50 billion in FY '87. The amount of investment and loans made during the period from FY '85 to FY '87 totalled approximately ¥90 billion.

Source: *New Era*, 1 January 1989

software capabilities. NTT's terminal equipment sales force is considered large and formidable, but it is unclear what MPT has in mind when it calls on NTT to be "fair" in this market. Terminal equipment, even telecommunications terminal equipment, is considered the purview of MITI. NTT considers success in the terminal equipment market critical to its end-user strategy, and plans to become more aggressive in this market. It appears NTT is vulnerable to attracting the ire of both agencies if it becomes too successful in marketing terminal equipment.

The NTT balancing act, where it must become an aggressive, innovative and successful private company and one that is "unsuccessful" enough to lose a significant piece of market share quickly, creates a dilemma that penetrates all levels of NTT activity. The fear of break-up is quite evident in discussions with NTT employees. For example, it appears that the objective of NTT America, although officially to make it easier for small U.S. companies to sell to NTT, is primarily to study the effect of divestiture on AT&T and the RBOCs.

One advantage that NTT has going for it is the example provided by the United States, where government deregulation policy had a disastrous effect on the domestic equipment industry. "One result of the AT&T reorganization the Japanese

want to avoid is what many analysts in Japan see as the too-open competitive situation in the United States. They note that some U.S. communications companies now rely on foreign vendors, especially Japanese concerns, for as much as 70 percent of their equipment."[27] If NTT is forced to break up, the company prefers to be split along functional, not regional lines. MPT is scheduled to review the Telecommunications Business Law and the NTT Corporation Law in 1990. The U.S. example may be helpful to NTT because it may persuade MPT to err on the side of caution.

Because services market shares will be the primary criteria used to assess the degree of competition in the telecommunications market, I believe NTT is trying very hard to cooperate with the NCCs to make them successful. I do not believe that NTT views the NCCs as potentially lethal strategic competitors, yet. It appears to be more concerned with the technological power of the strong domestic suppliers (i.e., NEC, Hitachi, Fujitsu) it helped to develop and with the limitations that currently prohibit NTT from competing internationally.

Ensuring a competitive marketplace may not be enough to buy NTT its corporate survival. Regarding the 1990 review of the industry's structure, some question the integrity of MPT's motives. An executive of one of NTT's suppliers said that NTT's greatest threat comes from the selfish desires of MPT

27"How Japan plays the telecommunications game," Far East Business, November 1988, 19.

ministers to secure more "amakudari" positions. Under the current scenario, NTT is obligated to take one minister per year. If NTT were broken up into six regional and one long distance company, each company would be required to take a minister each year. According to this executive, "This is unspoken, but understood by all."

Technology Development

MPT is committed to ensuring the continued technological growth of the communications industry. It closely tracks industry R&D expenditures, particularly those of NTT. In 1985, MPT took proceeds from the sale of NTT stock to establish the Japan Key Technology Center to fund private sector basic research. In 1988, MPT launched its "Telecommunications Frontier R&D Program" with the establishment of the Communications Research Laboratory that will be dedicated to telecommunications R&D. NTT has historically played the role of the "national lab," and it appears that MPT is interested in developing more research capabilities outside of NTT. MPT is supporting the efforts of many NTT suppliers to "wean" themselves from NTT technology dependency.

NTT clearly sees its technology reputation as an asset in its battle to remain whole. NTT continues to increase its R&D budget (up 14% in 1989) and publicize its accomplishments. (For example, NTT is promoting its invention of a digital transmission error-correcting chip around the world.) NTT

recognizes that the three powers--the Keidanren, MITI and MPT--all have a great deal of interest in the industry's innovativeness and technological development. A central point in the discussion of optimal industry structure will be the traditional Schumpetarian argument, that NTT certainly subscribes to, that monopolistic industries can be every bit as innovative as (if not more innovative than) competitive ones.[28] NTT has restructured its R&D organization in order to become more innovative. Its researchers speak of "competing in R&D," a once foreign notion to a company that helped to develop the other firms in the industry. Its success in demonstrating and communicating superior research capabilities and price/performance may be vital to the corporate objective of remaining intact as one company.

International Trade

One other area where NTT is used as a vehicle to promote the government's objectives is in the area of foreign trade. The foreign balance of trade in telecommunications products is skewed heavily in favor of the Japanese. With respect to the U.S., the ratio of Japanese telecommunications exports to imports has improved slightly in recent years, primarily due to heavy U.S. government pressure, but still remains in

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28Schumpeter, J., The Theory of Economic Development, (Cambridge, Mass.: Harvard University Press, 1934).

Japan's favor by a ratio of eight to one. (Japan's export to import ratios with the U.S.: 10.3 in 1985, 8.2 in 1986, 8.3 in 1987, 7.9 in 1988).[29]

There are no tariff barriers to entry,[30] but Japanese markets have many non-tariff barriers that are too complex and controversial to allow for adequate treatment here. In the case of the telecommunications market, the "family relationship" that existed (and still exists in many sectors of the market) between NTT and its key suppliers created a barrier to entry for Japanese, and particularly non-Japanese, companies for many years. The liberalization, and the competitive forces it introduced between NTT and its major suppliers, has opened the NTT market for "second tier" Japanese companies. Trade pressure has opened the market for non-Japanese, particularly American, companies.
With respect to NTT purchases of foreign equipment, procurement has increased steadily from $19 million in 1982 to $275 million in 1988. NTT represents 82% of all Japanese imports of telecommunications equipment. But even this amount represents only 3% of NTT equipment purchases. Foreign suppliers have made only minimal penetration since NTT "simplified its procedures" and opened up its procurement process in 1981.

29"Outline of Communications Industry, '87-'88 Japan," Communications Industry Association of Japan, 1988 brochure, 5 and New Era, 1 January 1989, 8.
30"Outline of Communications Industry, '87-'88 Japan," 1.

I cannot overstate the importance that trade pressure has made in the NTT procurement process. NTT, as an arm of the government, carries the responsibility for correcting this imbalance for the entire market. NTT's procurement process will be described in much more detail in the next chapter. One NTT manager told me privately that U.S. trade pressure is by far the most important reason for NTT purchases of American equipment (more important than price or performance). An executive of a Japanese NTT supplier told me that continued U.S. pressure will be required if American companies hope to compete on equal footing in Japan. He explained this in the context of trying to explain the "Japanese way" of doing business. He explained that those ways, which include strong relationships and interdependencies with other Japanese firms, are difficult to change, but are changing very gradually due to increasing pressure from their "older brother," the United States. This individual believes that this "good stress" is beneficial to Japan because it will force Japanese companies to become even stronger, more efficient competitors (a discouraging thought!). Today, this "good stress" is the key to marketing American high technology goods in Japan.

The area of foreign procurement possesses some interesting characteristics in that it creates a potential battlefield of conflict between the two dominant ministries. MITI is concerned with the health of domestic suppliers. MITI has long used the control of industrial standards as a vehicle to keep foreign suppliers out of Japan. "The control that the

Ministry of International Trade and Industry exercises over the establishment of industrial standards constitutes another industrial policy tool. When a Japanese industry establishes standards differing from other nations, it is automatically protected from invasion by foreign producers without the necessity for a tariff or quota."[31] One reason more foreign suppliers do not enter the Japanese market is the very high cost of "Japanizing" their products. Japan has been under increasing international pressure to adopt more internationally-compatible interface standards. For example, NTT, acquiescing to foreign pressure, recently modified its INS (NTT's version of ISDN) standards to be compatible with CCITT ISDN interface standards.

It is not clear what role the ministries played in this turn-around. MITI is certainly sensitive to international trade pressure, but MPT is not as closely linked to domestic producers, and in public statements, MPT seems to be more of an agent for "global harmony" than does MITI.[32] On the other hand, MPT has rekindled the memory of the "black ships" with respect to AT&T and IBM involvement in the nation's telecommunications industry, while MITI countered by raising the issue of U.S. protectionism if Japan blocked entry to its market.[33] From a foreign producer's point-of-view, it appears that the best market structure scenario is the current one (a single national quasi-monopoly).

31Prestowitz, Clyde, Trading Places, 131.
32New Era, 1 January 1989, 13.
33Prestowitz, Clyde, Trading Places, 290.

CUSTOMERS

NTT has both business and residential customers, and serving both customer groups can at times create dilemmas (lower local vs. lower long distance rates). In this discussion, I will concentrate primarily on the business market, with specific emphasis on the "high end" of the business market. The battle for "account control," with respect to the nation's largest customers, is the emerging battleground that pits NTT against its adversaries.

Japan's list of large, leading-edge, successful companies is a long one. Japanese business customers are world leaders in a variety of market segments, and their presence is particularly strong in information- and communications-intensive industries such as banking and financial services. (Eight of the world's ten largest banks are Japanese). Some may argue that this is partly due to the concentration of the nation's financial system,[34] but none would argue that Japan is not a world banking leader or a leader in many other industries as well.

34Lincoln, Edward, "Financial Restructuring," Japan: Facing Economic Maturity, (Washington: Brookings Institution, 1988), 210.

This demanding customer set makes Japan a key market for any telecommunications company that wants to stay at the forefront of leading communications applications. Japan's customers are well known in the industry for requiring an unusually high level of customization and advanced technology in their products. Because of this customization, close work with customers is required. An additional advantage to maintaining an expensive field force is that close customer contact provides the company with rapid feedback on product quality and product competitiveness. For these reasons, service providers want strong control over the distribution channels. This is the rationale behind the preference large suppliers are showing for selling directly in lieu of having an OEM/supplier relationship with NTT. (I will return to this subject in chapter four.) NTT has seen a significant drop in customer premises equipment (CPE) market share as a result.

To address the large end-user market, NTT established the Integrated Communications Systems Division. The ICSD has responsibility for marketing to Japan's "Fortune 1000." The operations of these firms are becoming increasingly multi-domestic, and a clear need exists to expand their communications networks internationally. It is this restraint on NTT (the prohibition on the provision of international services) that NTT wants most to have removed.

Industrial Groups

A key factor to consider in developing an industrial marketing strategy in Japan is the role of the industrial groups. The six "horizontal" groups are the best known. Three are remnants of the original "zaibatsu"--Mitsubishi, Mitsui and Sumitomo--and the other three are new groups which center around a leading bank--Fuyo, Dai-ichi Kangyo (DKB) and Sanwa. In addition, independent industrial groups have been formed around a large industrial concern, and these groups are vertically integrated in only a single or a few industries.

These groups are characterized by a cross-holding of shares, presidential and various-level management councils, mutual appointment of officers and other key personnel, and intra-group financing by member banks. Through regular meetings, common strategies and interdependencies are defined, and personal relationships among the management teams are established. As Imai describes it, "...while the American industrial system operates by the network of money, the Japanese industrial system operates by the network of people."[35]

All of the major participants in the Japanese telecommunications industry, with the exception of NTT and KDD, are affiliated with one or more of the industrial groups. For example, NEC is affiliated with the Sumitomo group, Oki is

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35Imai, Ken'ichi, "The Corporate Network in Japan," Japanese Economic Studies, Winter 1987-1988, 34.

a member of the Fuyo group, and Fujitsu is a member of the DKB group. Hitachi, Japan's largest electrical and electronic equipment manufacturer, heads up its own vertical group, but participates on the presidential councils of Sanwa, Fuyo, and DKB.

NEC, for example, would be the preferred telecommunications supplier for all companies of the Sumitomo group. It is difficult to compete with a group member for group business. These companies "...are bound together in durable relationships based on long term reciprocity."[36] The price/performance superiority of a new competitor must be substantial to compensate a group member for "breaking" a valuable long term relationship with another group member. The new relationship must be viewed as long term in order to make it worthwhile. Any foreign company that is not viewed as being in the Japanese market for the long term is unlikely to convince a group member to "break ranks."

Some have observed that it appears that NTT parcels out its business among the "big four." According to one NTT manager, NTT wants to be very careful not to appear partial to any one of the companies because it could affect very important business relationships with members of the other groups. Although NTT manages its top four suppliers aggressively, it appears to be cognizant of how much business

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36Gerlach, Michael, "Business Alliances and the Strategy of the Japanese Firm, California Management Review, Fall 1987, 127.

it is giving to each of the four. NTT will not shift supplier market shares so dramatically that it will upset this balance. NTT has a preoccupation with maintaining its independence. It considers this independence a competitive advantage that it has over each of its major rivals in selling to the industrial market.

I have attempted to provide a view of the Japanese telecommunications market that, although cursory and brief, will give the reader an appreciation for the complexity of the market, and the diversity and the power of the multiple external constituencies that make the job of an NTT strategic planner or marketeer difficult.

The "$64,000 question" that the regulators are pondering has to be, "Is this the most efficient and innovative industry structure, and is this structure the one that will lead to the greatest national comparative advantage and the achievement of Japan's other social goals?" Porter believes that a primary determinant of the health of an industry, and its comparative strength when compared to foreign industry competitors, is the achievement of the proper "intensity of rivalry" among domestic industry participants.[37] From automobiles to consumer electronics, intense domestic rivalries have forged powerful Japanese international competitors. Many of these

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37Porter, Michael, The Competitive Advantage of Nations, Harvard Business School class note 8-389-102, p.4.

rivalries have emerged in spite of MITI attempts at industry consolidation.

Even without substantial industry restructuring, strong telecommunications rivalries are beginning to emerge. Equipment producers are making significant R&D expenditures and establishing their own distribution channels in order to move out from under NTT's shadow. They also compete aggressively with one another. The relationships between NTT and its major suppliers, based on strong research and product development partnerships and close human ties, which are threatened by the emerging competition between them, is a story of great significance and interest in this industry. This is the story I will explore in the rest of the thesis.

CHAPTER THREE

THE PRODUCT DEVELOPMENT PROCESS

NTT, as a regulated monopoly, has been used as a vehicle for government policy, and has had, as one NTT manager put it, "a responsibility to develop the Japanese telecommunications industry." Historically, it has played this role through providing technology to those companies that became members of the "Denwa family" (NEC, Fujitsu, Hitachi, and Oki) and by providing the funding for product development work. In the past, NTT carried on basic research at its famed laboratories (actually four laboratories, located in Yokosuka, Musashino, Atsugi and Ibaraki), Japan's "Bell Labs," and provided technology to its family members through licensing agreements. Since NTT had no manufacturing facilities, development was done jointly between NTT and its chosen supplier for a given product. (NTT has always maintained at least two sources of supply for every product). NTT provided the funding, but always maintained control over the technology. NTT owned the designs and the patents. If manufacturers wished to sell telecommunications equipment to other customers, NTT usually allowed this, receiving a royalty of .5%-3% of revenue on each product sold.

This system worked in NTT's self-interest. NTT built four strong suppliers, which gave it access to more than one company capable of producing quality, high technology products in each telecommunications field.

This environment was also advantageous to NTT's suppliers. All four suppliers grew rapidly, buoyed by the profits each made in this closed and captive market. In addition, funds could be used for investing in new productive capacity, because few funds needed to be diverted to R&D. NTT, for reasons of self and national interest, had chosen not to exercise its monopsony power. "The communications equipment market generates the highest returns of any major Japanese industry, and it is the only business where Japanese firms consistently earn higher returns than their U.S. counterparts...It is clear that NTT has chosen not to exercise its natural market power as the primary customer for telecommunications equipment."[1]

As the manufacturers became stronger, and eyed markets beyond NTT, it became clear that NTT ownership of designs and patents limited flexibility and competitive capability. In addition, pressure was being exerted both at home and abroad (particularly from the United States) for NTT to open up its

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1Davidson, William, "Japanese Telecommunications Policy," Telecommunications Policy, June 1987, 151.

procurement process to other suppliers. NTT Chairman Shinto, a free-market industrialist, also pressured NTT managers to seek alternative sources of supply. (One executive expressed his concern that Shinto's departure could mean a partial return to the "Denwa family" system.) For the "family" companies, growing sales to NTT could not be assured.

Growth-oriented NEC was the first to strike out and begin developing its own basic research capabilities. NEC also aggressively pursued other revenue sources, and its percentage of revenues derived from NTT declined from a high of 50% down to today's 10%.[2]

As the Denwa family members began to compete with NTT in the profitable end-user market, and as new "profit" expectations were thrust upon NTT with the 1985 privatization and new foreign trade pressure, NTT was forced to reconsider its product development process. NTT needed to meet customer needs while it reduced costs, shortened up the development cycle, and protected and controlled its vital technologies. The first and most significant changes NTT undertook were to restructure the company into "service sectors" and to reorganize the research and development functions.

2Figures provided by NEC.

The NTT Reorganization

For the purposes of this analysis, I will not provide a detailed description of NTT's corporate restructuring, providing instead a more thorough explanation of the changes made to its R&D functions.

The corporation changed from a functionally-driven structure to an organization consisting of seven service sectors, or profit centers. The "old NTT" had seven "bureaus"--Planning, Plant Engineering, Construction and Installation, Maintenance, Commercial, and Service Administration. The "new NTT" consists of the following sectors:

Trunk Network (provides long distance services);

Telephone (responsible for local service);

Customer Equipment (responsible for consumer and small business systems, like key systems);

Directory (provides telephone directories);

Integrated Communications Systems (a new organization of approximately 1000 employees which serve the complex needs of NTT's largest customers);

Advanced Telecommunications Services (provides advanced "dedicated" services. It is divided into the Leased Circuit, Video and Record Communications, and the Mobile Communications divisions).

Data Communications Services Sector (a 100% owned, fully separate subsidiary of NTT that provides clients with data networks and communications systems, and systems integration consulting services.)

In addition, NTT created over 100 fully and partially owned subsidiaries to develop business in such areas as real estate, value-added networks, and telemarketing (see Appendix 4-4). I will come back to the very important strategic role that the Integrated Communications Systems, "NTT-Data," and the sales organizations play when I discuss the evolving competitive relationship NTT is developing with its key suppliers.

In conjunction with the reorganization, NTT's major objectives or "projects" include improving user segmentation (increasing the focus on sophisticated, large users, that the creation of the Integrated Communications Systems group is designed to help address) and strengthening sales and maintenance staff training (NTT has created Regional Education Centers that are designed to improve the professionalism of NTT's customer interface personnel). NTT also wants to increase software productivity. Almost every engineer I talked to at NTT mentioned the focus on improving software capabilities. NTT expects to hire 1,500 people in 1989 (in

spite of the continued downsizing of the NTT staff). Approximately 200 of these people will be college graduates, and most of these college graduates will work in software development. Another major NTT project is enhancing the R&D/marketing interface. This is the impetus behind NTT's R&D reorganization.

The Restructuring of Research and Development

As mentioned earlier, competitive pressures stimulated NTT's restructuring of R&D, which they did in the summer of 1987. NTT wanted to receive more service and marketing input for the new product development effort. In addition, they wanted to accelerate this effort and improve the communication between the service sectors and the laboratories. Utilizing the new "profit center" structure, NTT also wanted to more effectively allocate resources and costs for research and development to those profit centers that most required this work.

With respect to marketing input, before the reorganization, 92% of the development proposals for new products came from the research labs, 7% were joint proposals with the "service side," or line organization, and only 1% of all proposals were initiated by the service organization.[3] (When asked if this relationship had changed since the

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3NTT provided figures.

reorganization, NTT responded that it had not, that it was still "too early" to expect the benefits to show.) NTT is still "pushing" product innovation. NTT's orientation is not providing the marketplace with adequate opportunity to "pull" or direct new technology development.

The most significant issue NTT is concerned with deals with the speed and efficiency of communication between the labs and the field. In the past, communication took place by a "transfer of documentation" from the research center to the service division. Different people were responsible for development and for field installation and testing. The major organizational change involved the transfer of approximately 700 of the 3,500 members of the Research Center to the field Service Divisions. With these rotational assignments, researchers could see the product development cycle through from its origins in the laboratory to prototype installation, then to field testing and service maintenance, and finally to the process of making further product improvements and refinements based upon actual service experience.

The previous 600-person organization was anchored by a 3,500 person Research Center, which conducted both fundamental research and development work. The remaining 2,500 people were split between the Engineering Department and the Software Engineering Center. These two departments were involved in development work.

The New Structure

The new 2,800 person Research Center is dedicated totally to basic research. The Research Center is comprised of eleven laboratories, each supporting a specific technology with the exception of the basic research laboratory, which is involved in pure research (see Appendix 3-1). Approximately 700 employees have been reassigned to the service divisions, or profit centers. These people are responsible for the development work associated with "competitive" products and services. Not only will benefits accrue due to the familiarity these researchers have with the product technologies, but most importantly, it is hoped that closer contact between these developers (both hardware and software) and the sales organizations (regular meetings are scheduled) will result in shorter development cycles and more creative products.

Development work for the "non-competitive" or "stable" long distance network is carried out in the Network Systems Development Center and the Software Engineering Center. These two development centers, which have a total of approximately 2,000 people, also support the profit centers on an as-needed basis. In the past, it was difficult for service engineers to identify "where to go" in the Research Center to request new product development.

The Network Systems Development Center now serves as this point of entry for network technologies. The reason NTT cites for not putting the trunk network developers in the service divisions, as they did for "competitive services" such as CPE, is that speed is not as crucial in this market. This environment requires a steady, constant, long range approach to development, which is better suited to a centralized development team. This change will have implications for potential suppliers, because, as I will describe later, it gives the NSDC a great deal of influence in supplier selection.

There is one element of the R&D organization not shown in Appendix 3-1. The Operations Support Center has been created, staffed by about 500 people. The Center is involved in development, but its functions focus primarily on operations support for network personnel (particularly in the NTT regions) working on new products and systems. In the old environment, field problems did not get top priority. This new organization was created to give field problems the attention required in an increasingly competitive environment characterized by high-speed, sophisticated services requiring enhanced performance levels. As stated in Chapter 2, NTT cannot compete aggressively in this market on price, so they must be perceived as providing superior service.

The size of the NTT R&D organization has remained constant at 6,000 people. Development was separated from fundamental research and was placed closer to the marketplace. Research spending by NTT has steadily increased, from $1B in 1984 to $1.6B in 1987 (3.5% of 1987 sales). The additional investment in, and the reorganization of, the R&D function, which should result in improved efficiency and market intelligence capability, clearly points to a more central role for R&D in corporate strategy.

Research Objectives

NTT's R&D investment objectives are:

1. To develop leading-edge and basic technologies supporting future telecommunications services (including intelligent processing technologies, such as artificial intelligence; nanoelectronic technologies, such as semiconductors; optoelectronic technologies, which include fiber research projects; and digital network technologies);

2. To foster software technologies that support new technology development;

3. To develop technologies that support market expansion (including mobile communications technologies, information processing technologies, and terminal equipment development);

4. To develop fundamental technologies for INS (ISDN) extension (including high-speed network technologies, transmission systems, satellite communications, and network operating systems technologies).

It is progress in this last area that will most significantly impact Japan's national economic development, and is of most interest to MITI, MPT, and the Keidanren. NTT is publicizing itself as the world's ISDN leader, and if they achieve this goal, NTT can greatly help the development of Japan's data processing, telecommunications and supporting industries. Japan's business and regulatory powers are vitally concerned and interested in the development of the nation's long distance network, particularly in its ability to support evolving high-technology applications. This is a pivotal issue in the NTT "break-up" debate. In this way, NTT's R&D strategy supports the corporate strategy (which is preoccupied with "keep-whole" strategies).

The Decentralization of R&D

The reorganization of R&D was designed to 1) put development work as close to the system user and the customer as possible; and 2) allow the central laboratory to concentrate on fundamental research. Commercialization responsibility now lies squarely with the profit center.

The placement of engineers at the profit center level was designed to improve and speed up the flow of information between the field and the engineer. Some of the development engineers have welcomed the change, which gives them the opportunity to meet regularly with the implementation teams and marketing organizations and to see the market realization of their efforts. Others have not liked the move and prefer the "quieter" surroundings of the central laboratories.

Recruiting

This has implications for the hiring process. NTT will hire approximately 2,000 people in 1989, according to one NTT source. Some 1,500 will be engineers, and the remaining 500 will have business degrees. This represents three changes. First, with respect to the engineers, specifically the 150 or so that will be assigned to the laboratories, most will have backgrounds and interests in software. That will be a change for NTT as it attempts to bring strategically important software capabilities "in house." According to one NTT researcher, the Japanese make excellent hardware engineers, but have difficulty with software because it requires them to "look beyond the goal." In other words, with respect to hardware design, clear goals are usually established (for

example, to increase the capacity by 100%, to reduce the cost by 50%, etc.), which the Japanese engineer can understand and aggressively pursue. The world of software is much more ambiguous and requires "new thinking," which is uncomfortable for many.

The second change, the hiring of so many students with business backgrounds, is reminiscent of AT&T's ambitious hiring of sales people and MBAs in the 1970's in order to catch up to its rivals in marketing capability.

The third change pertains to the type of people NTT plans to recruit for its R&D organizations. Because of the new end-user focus, mobility will be required from the people in the organization. NTT will be looking for a "different person" than it looked for in the past, someone who is flexible and who can move comfortably between the lab and the field. Also, in a departure from NTT tradition and typical Japanese practice, to rapidly inject this change into the company, NTT plans to hire non-Japanese researchers and "experienced" researchers from other companies.

In the next section, I will explain the role that the laboratories and the NSDC play in supplier selection. The role of these organizations is very significant, although, according to one NSDC manager, because of the NTT corporate

and R&D restructuring, their influence may decline over time. He believes the authority for product development decisions, which may in the future translate into influence over supplier selection, is shifting from the engineering organizations to marketing. He said that, although there are benefits to be derived from this "balance of power," it is difficult for "non-technical people to make good technology decisions." Technology strategy is a critical element of the overall NTT corporate strategy. It will be interesting to see if the power behind that technology strategy shifts away from NTT's technology departments. Given the fact that 92% of the new product development ideas still come entirely from the NTT R&D community, technology strategy power still lies firmly with the technical community. This has implications for supplier positioning.

THE NTT PROCUREMENT PROCESS

As a result of U.S. trade pressure, a U.S.-Japan Agreement was reached that opened NTT procurement to U.S. concerns. The new procurement process was implemented in January, 1981, and NTT procurement of foreign products reached $275 million in both 1987 and 1988.[4] The United States

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4New Era, 1 January 1989, p. 8 and 15 July 1988, p. 3.

accounts for approximately 80% of all Japanese telecommunications imports. Appendix 3-2 lists NTT's major foreign purchases in 1987. It appears that the percentage of NTT foreign procurement that is American exceeds 80%. If one were to assume that 80% of foreign procurement went to U.S. concerns, all U.S. companies, eight years into the "open, fair, and non-discriminatory procurement procedures,"[5] account for only 3.3% of NTT equipment purchases ($6.64 billion in 1988).[6] The U.S.-Japan Agreement, which runs for a period of three years, was extended in January, 1984, and again in December, 1986. It expires in December, 1989.

NTT's procurement procedures, which are clearly and extensively documented, are broken down into five categories:

Track I- This covers items that NTT decides to buy "off-the-shelf," that need no modification. Examples are modems, testing equipment, data terminals, and office supplies. Track I is covered by the GATT Code on Government Procurement.

Track II- This covers products that are currently in the marketplace, but requires slight modification for NTT use. Examples are radio equipment and cable.

Track III- The Track III process is put into effect when

5Remarks of Haruo Yamaguchi, NTT Senior Executive Vice President (now President), April, 1987.

6Figures provided by Frost and Sullivan.

the product NTT requires is not available in the market and must be developed. Examples are switching and transmission equipment.

Tracks II-A and III-A- These processes are used when "follow-on procurement" is needed for a product originally procured using Track-I or Track-II. After NTT places an order with the initial suppliers (NTT always selects at least two), NTT may open up the process to other suppliers for future orders.

When NTT decides to procure a product, NTT publishes its requirements in the "Kampo" in Japan, in the Commerce Business Daily in the U.S., and in the E.C. Official Journal in Europe. In addition to providing these notifications, NTT may invite selected firms to bid. To make it easier for smaller firms to bid, NTT maintains International Procurement Offices in Geneva, London, New York and Palo Alto. It allows tenders to be submitted in English. NTT also conducts informational seminars around the world.

The internal product need identification process, which results in product procurement, works in the following way. A product void or need is identified by an NTT department--either the "field" or profit center, the central laboratories, the NSDC or the Marketing department. (Most new ideas are

still "technology driven" and originate in the NTT R&D sectors.) A request for a new product is placed with the appropriate group within the NSDC. The NSDC evaluates the product requirements and potential demand levels, and consults with the Marketing Strategy Department (MSD) regarding the "fit" of the new product request with NTT's overall marketing and product line strategies. If it is believed that the product may be "controversial" in some way (possibly in conflict with corporate or a department's strategy), or if the product is viewed to have significant commercial applicability, the Executive Committee may be asked for a "go, no-go" decision. (The decision making process will be discussed later in further detail).

The NSDC also scans the marketplace for available products and determines whether the Track I or Track II processes can be utilized. If so, the NSDC writes detailed product specifications, which are then forwarded to the International Procurement Office for communication to potential vendors. Vendor bids are then submitted back to the International Procurement Office (IPO), which forwards the bids to the appropriate NTT departments for evaluation.

The "official" selection criteria for Tracks I and II are:

Management capabilities:

- Credit rating
- Company assets (the larger, the better)
- Production and sales record

Technical capabilities:

- Design and manufacturing capabilities
- Product technology
- Price

In the business area, NTT is primarily concerned with stability and reputation. In the technical area, NTT focuses its attention on track record (particularly in manufacturing quality and in cost improvement history, the "learning curve"), advanced technology, and most importantly, on compatibility. Privately, some at NTT have admitted that it is in the area of compatibility that NTT has been "burned" most often with the new procurement process. Compatibility was never a problem with the "Denwa family."

After the bidder submits the required papers that document capabilities in these areas, if required, detailed technical discussions ensue between engineers of the two companies, and these discussions often include factory and/or laboratory visits.

NTT also pledges to protect all patents and technical know-how in this process. These agreements (documents) are usually entered into after supplier selection, but NTT will sign agreements before and during the selection process if requested to do so. NTT noted that foreign companies are "much more concerned", than Japanese companies in this regard. NTT also indicated that a typical Japanese agreement is two pages. Proprietary technology agreements with foreign firms average eight pages. Japanese agreements do not involve lawyers. One NTT manager stated that "We have wondered why Americans want to start fighting (by bringing their lawyers) right from the beginning." This manager explained that the "understanding is more important than the document. If a party breaks the trust he will find it very difficult to do future business in Japan." Nevertheless, as I will explain later, the protection of key technology between Japanese partners is becoming a key issue, in part because patent law is easy to circumvent.

NTT notifies all applicants of the award. The NTT decision making process usually takes two to three months. For obvious reasons, the Track III process takes longer. An additional criterion in the Track III process is the assessment of applicant R&D capabilities.

The initiative for securing NTT business via the Track II-A and III-A processes usually lies with the suppliers (not NTT). If these companies believe they have superior products to the ones NTT is currently using, they should approach the NTT International Procurement Office, which in turn will set up an opportunity for the firm to state its case (usually in the form of presentations to NTT engineers in Tokyo). NTT stresses that "technical superiority" and "technical compatibility" are the most important criteria in product selection.

It is clear that a highly competent technical marketing force is required to sell effectively to NTT. But, the technical cooperation required to sell in the other tracks pales by comparison to the Track III process. This is also the process where the "big money" changes hands and where the reputation is built, and the positioning is achieved, which supports future sales initiatives for business of any "track." The products that have evolved from this track are largely responsible for the nation's development in the area of telecommunications technology. It is also the process that, when examined closely, allows one to witness the nuances of change that are taking place in the relationships between NTT and Japan's other telecommunications powers.

The Track III Process

According to one NTT supplier, because of the research and development work that has been done by private companies in the area of terminal equipment, many products are available on the market, and NTT now uses Track I and Track II predominantly when procuring CPE (large PBX's and "advanced" terminals, such as the ISDN terminal being developed with Data General, are exceptions). Track III is used primarily for "network" technologies such as transmission systems and central office switches. To simplify the description of the Track III process, I will focus my analysis on the network portion of NTT's business.

In the case where the NSDC determines that a new product need cannot be met by existing products, even with modifications, the Track III process may be utilized. The NSDC receives many more new product requests than NTT can develop, so a prioritization process takes place, in consultation with Marketing Strategy Department. If a new product idea "makes the cut," NSDC submits a request to the laboratories for basic research funding and activity. If the underlying technology already exists, then the NSDC, through the IPO or directly, invites companies to participate in joint R&D or simply joint development.

Focusing on basic research

When joint research is required, and NTT enters into a cooperative research venture with a partner, very little "joint" research is actually done in the initial stages. Researchers at the two (or more, as the case may be) companies work separately but meet periodically to discuss progress. This is the case not only because it is difficult to conduct basic research jointly, but also because it is an NTT policy to conduct its research independently. Control over the basic technologies gives NTT bargaining power and control with respect to its relationships with suppliers. NTT permission is required for sale of the products to other companies. As a result, according to an NTT engineer, "Suppliers are doing much more of their basic research in order to give them flexibility." Joint research relationships are becoming more rare, but joint development partnerships are, and will continue to be, extremely important to NTT.

Separating development

According to an NTT strategist, given the fact that NTT does not possess a manufacturing division, it has "no choice" but to continue joint development with suppliers. There is a trend to do as much development "in-house" as possible. Part

of the rationale for the R&D restructuring appears to be to develop the skills to make this possible. Without developers and engineers knowledgeable about field issues, NTT has to rely on supplier development teams to do field work and "commercialization." He explained that the NTT reorganization puts engineers "close to customers" so that "installation, maintenance and marketing" feedback can be integrated into the design with minimal supplier involvement. The same NTT lab engineers who worked with the supplier to develop the prototype are now responsible for field test and installation. As these engineers "recycle" back into the laboratory, this field learning will accumulate, and the initial NTT product designs (pre-prototype) will be more field sensitive. As one engineer put it, NTT would do less joint development and "use the supplier as only a factory."

This concern with technology protection has not been so great as to cause NTT to believe it needs to manufacture its own equipment. The flexibility that NTT has, given the number of strong domestic and international suppliers it now has to chose from, makes it advantageous, from a technology availability and a cost perspective, not to create a manufacturing division. Regarding technology strategy, this gives NTT more options with respect to technology acquisition.

Software and silicon technology have different characteristics than equipment technology with respect to information transfer. Strong arguments can be made for managing all aspects of software and silicon design and manufacture internally. I will discuss this further in the next chapter.

Supplier Management

Both to protect technology and to secure the lowest possible price for equipment, five years ago NTT began to develop a supplier management process that has become remarkably consistent across suppliers and products. The fundamental axiom of their strategy is the selection of multiple vendors.

There is clearly a downside to using multiple vendors. Not only are additional resources required to manage multiple suppliers, but more companies have access to a company's technology and market plans. The potential benefits of manufacturing economies of scale, that one supplier might accrue, are also reduced.

On the other hand, having the ability to "allocate" share among vendors, based upon price and performance, and having the flexibility to continue revising those shares on a continuing basis, gives NTT a great deal of power over

suppliers. As stated earlier, NTT did not previously exert this monopsony power over vendors, but a number of suppliers indicated that NTT now does. After the product is developed and it is ready for deployment, NTT asks each of the vendors it has worked with for a bid (based on the NTT estimated demand level). NTT will then set the price, for all vendors, at the lowest price bid. NTT may also set a lower "target price" that it wants the vendors to achieve. If NTT is not satisfied with the bids it has received from the vendors it has worked with in the joint development process, it could allow other vendors to bid at this stage (this is rare). As another lever, after the initial orders have been purchased, NTT can allow other firms to compete for the business through the Track III-A process. As one vendor put it, "NTT is great at vendor control."

The "burden" of privatization is falling on the major suppliers also. This is one of the reasons that the "Denwa family" members are finding other sources of revenue. NTT needs to lower equipment purchase prices so that it can continue to remain profitable while it allows its network market shares to erode. NTT also needs cash to fund its increasing R&D expenditures. In order to remain intact, some

believe it must maintain its expensive construction programs across Japan. The easiest target for cost reduction is network equipment.

This "burden" on suppliers may be beneficial to the nation. NTT is creating the type of rivalry between strong suppliers that should benefit Japan. According to Porter, the development of "specialized factors" lead to national competitive advantage. "Where do advanced and specialized factors get created and upgraded in a nation? Factor creation is perhaps most strongly influenced by domestic rivalry."[7] An NTT manager said that NTT also will expand the number of "family" members to prevent collusion and intensify the rivalry.

With respect to inefficiencies that could develop from this supplier management process, it is felt that the customized nature of most communications systems allow maximum economies of scale to be achieved at small volume levels. Because of the vast size of the NTT market, NTT orders can be split into many fractions, and manufacturers still have the opportunity to produce at the maximum scale economy.

7Porter, Michael, The Competitive Advantage of Nations, Part II, 2.

Through aggressive supplier management, particularly the setting of "target prices" and the ongoing shifting of market shares based on price/performance, NTT is providing suppliers with incentives to make continued process improvements. In the Japanese market, dominated by inefficiencies created by the "special" business relationships of the industrial groups, it may actually be beneficial to the nation to have an independent, monopsonistic, knowledgeable customer to stimulate process innovation. According to Abernathy and Utterback, strong pressure to reduce cost and improve quality stimulates process innovation. "Though many observers emphasize new-product innovation, process and incremental innovations may have equal or even greater commercial importance."[8] One might argue that natural market forces would not be as effective as NTT supplier management policies are at nurturing this rivalry.

Technology agreements

Technology protection is as much of a concern between suppliers as it is between NTT and each supplier. NEC, for example, does not want to give Fujitsu access to NEC technology. NTT manages this by having separate meetings with the development teams of each company. NTT negotiates with

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8Abernathy, W., and Utterback, J., "Patterns of Industrial Innovation," Technology Review, June/July 1978, 44.

each supplier which meetings can be held jointly and which meetings have to be kept separate. According to one supplier, "many follow-up meetings are required to fine tune the design specifications."

Both explicit and implicit technology agreements are reached. Implicitly, vendors know that breaking any agreement could have serious implications for its reputation as a partner in Japan. Explicitly, NTT uses patents, contracts and cross licensing agreements to control the use of its technology. When required, NTT and all vendors meet together on a project, subject to the agreed-upon information constraints. The "ownership" of the product designs are open to negotiation, and NTT and its suppliers often file joint patents. The typical product development process takes three to six months for small systems and one to five years for larger systems.

Because of the mandated "openness" of NTT's procurement process, particularly the Track III process, NTT finds it very difficult to keep its technology strategy or new product intentions secret. NTT must provide "the world" with detailed knowledge of its new product plans and the underlying technology and architecture. For this reason, many NTT

strategists and researchers want the Track III process modified.

Because of the openness of the process, the NTT strategy is to seek patents for every innovation. Some firms do not apply for patents because doing so is viewed as a way of "tipping your hand" and, even though it may formally protect a key technology, it allows your competitors to see the technology upon which one is developing the next generation of products. NTT's hand is tipped anyway. Patents are not fool-proof. Japanese firms are famous for reverse engineering products and making very minor design modifications in order to get around patent laws.[9] NTT is concerned with the ease with which firms can circumvent patents.

THE DECISION MAKING PROCESS

Earlier in this chapter, I outlined the official criteria NTT uses to evaluate suppliers. The official criteria are generally used. For Track III selection, compatibility, quality, a reputation for research, and responsiveness in resolving problems are particularly important. What is not identified is the vital role that international trade politics and the relationship between firms plays.

The Japanese decision making process has been described

9Cusumano, Michael, The Japanese Automobile Industry: Technology and Management at Nissan and Toyota, (Cambridge, Mass.: Harvard Press, 1985), 67.

as one of consensus, or "nemawashi." Because decisions are reached by consensus, decisions take a long time to make, but they are implemented quickly. The decision making process is usually "bottom up," and recommendations are rarely reversed by top management. According to one manager at NTT, middle management plays the key role in NTT supplier selection decisions.

According to an NTT engineer, Chairman Shinto wanted the supplier selected as early in the process as possible, preferably in the joint research phase. NTT follows one of two supplier selection paths. If a product is viewed as a "long shot," with a low probability of significant commercial success, the responsibility for prototype development (chosing the prototype builder) lies with the laboratory. In other words, the laboratory has control over supplier selection. The suppliers selected in the prototype stage usually get product orders.

Some products never get "realized." An NTT spokesman told me that new suppliers must be prepared to lose money on a few projects to demonstrate their resolve in securing NTT business. One supplier described an instance where his company responded to a Track III invitation, and after

numerous technical discussions, his company was one of the companies selected to participate in product development. A contract covering the sharing of development expenses was signed. The supplier built an "experimental version," which was then modified after NTT changed the specifications. After a successful field test, and more modifications, a prototype was built for further field testing. NTT later cancelled the project, and although NTT covered a substantial portion of the costs, this firm incurred a sizable loss.

Even if NTT does chose to deploy a product, according to one NTT spokesman, there is "no guarantee we will buy from those we do joint R&D with. But, it is almost impossible to chose a manufacturer who was not involved in joint R&D with NTT."

In the second case, where the size of the system or the commercial applicability is deemed to be significant, a more complex supplier selection process is utilized. The central lab gets together with the profit center managers. Both the development team (the ex-laboratory researchers who now reside in the profit center) and marketing people from the profit center get involved. To ensure consistency with corporate technology and marketing strategies, two headquarters

organizations, the Engineering Strategy Planning Department and the Marketing Strategy Department, also provide input.

Sometimes the prototype supplier selection process is bifurcated from the manufacturing supplier selection. When this occurs, the lab's input carries more weight in the prototype selection decision, and the profit center's input carries more weight in the latter. According to one NTT strategist, in the prototype selection process, which takes place before the manufacturing stage, secrecy is an important criterion in the decision. NTT wants to keep its technology or detailed requirements secret from certain vendors, and takes this into consideration when choosing companies to participate in the early stages of the process. Even though marketing people are increasingly influential, the development teams are the most influential in the vendor selection process because of the experience that the development teams, in the profit centers and in the NSDC, have in dealing with suppliers.

The power of the NSDC can work against new vendors. According to one manager there, "Compatibility with existing systems is difficult for new companies. Older suppliers have a better chance of being selected because of compatibility.

International standards, like CCITT, are not enough. They only describe the network/user interface, not the interface to other equipment in the network."

The International Procurement Office (IPO) acts as a "foreign vendor advocate" within NTT. This office tries to get foreign vendors considered for projects. The IPO is not a decision maker, but can be influential. Dr. Tachikawa, President of NTT America, is a respected engineer. The IPO role seems to be similar to that of a corporate telecommunications group in a typical large U.S. corporation, that of gatekeeper. They cannot guarantee success, but they can guarantee failure.

Most of the key selections are brought to the Technical Committee for review. The committee is chaired by Executive Vice President Iwasaki. The head of the Engineering Strategy Planning Department serves as vice chairman of the committee. The IPO participates, but does not have committee membership. All of the organizations listed in the two right-hand columns of the NTT organization chart (Appendix 3-3), with the exception of the Regional Headquarters, Building Engineering, the Training Institute and the hospital, participate. Highly significant awards are reviewed by the NTT Chairman and President.

From this process, approved vendors are selected. Based upon field volume predictions, initial contracts are consummated with these vendors. The IPO negotiates contracts with foreign vendors. Future shares of NTT purchases are determined by the regions. Based upon product performance (outages, meeting delivery commitments, etc.), the regions chose their own equipment. Suppliers need to be very concerned about ongoing product performance and the level of post-sales support provided to region personnel.

The technical departments of NTT, particularly the product development organizations, are the most influential in the vendor selection decision. The selection of a manufacturer is usually all but made when a prototype builder is selected. One product developer told me he meets with supplier development engineers every week. Another told me he has friendships with researchers in other Japanese companies through his memberships in technical committees and organizations. As I will discuss in the next chapter, NTT exchanges researchers with its key suppliers. Strong relationships at all levels of the NTT organization, particularly at the technical (research and development) level, are required to market successfully to NTT.

A short case history: Northern Telecom

I do not know exactly how Northern Telecom (NT) was selected by NTT to provide the DMS-10 digital switching system. From what I can piece together, the award seems largely attributable to the efforts and the personal chemistry of two men, NT Chairman Edmund Fitzgerald and NTT Chairman Hisashi Shinto. Shinto was interested, for political and competitive reasons, in opening up NTT procurement to foreign suppliers. Fitzgerald was determined to have his corporation become an NTT supplier. Fitzgerald is reported to have traveled to Japan, to visit Shinto, every month for four years!

This is not an example of the competitively-driven NTT shortening of the product development cycle. It is unreasonable to assume that new partnerships, particularly new foreign partnerships, will be more efficient than tried-and-true relationships. The NT story illustrates the dedication required to become a trusted supplier to NTT (or to any large Japanese company, I am told).

Seven years ago, NTT determined it had a "hole" in its switching machine portfolio in the sub-10,000 line category. That was problematic for NTT because it had an obligation to bring new digital services to rural and remote areas. An

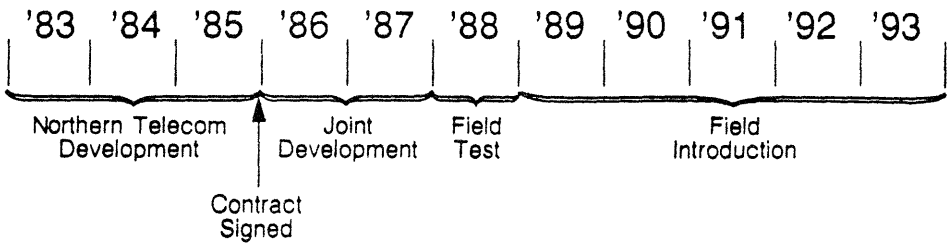
agreement between NTT and NT was reached in January, 1983 (Track III) to work together on the development of a small digital "central office" switch. For the first three years, NT developed the product alone in the U.S. According to an NTT engineer, "The first three years were easy, we had little interface." (See Figure 3-1 for a project timetable). NTT signed a contract with NT and Hitachi for three switches each in January, 1986.

For the next two years, 1986 and 1987, NTT and NT were involved in joint development. It was a period characterized by "many facsimile messages" and regular trips between the U.S. and Japan. According to the NTT engineer, "With the fax messages, there were very many misunderstandings over those two years. Face-to-face meetings were very important." Three times a year the NT researchers would travel to Japan, and three times a year the NTT researchers would travel to the U.S.

The joint development effort, according to the engineer was "very difficult. We had problems with language, culture and business understanding....Japanese suppliers have many years of experience. They know NTT's needs and Japanese customer needs, including feature differences. This was a difference between a Japanese supplier and Northern Telecom.

Figure 3-1

NTT/NT DMS - 10 Joint Development Timetable



Source: NTT

If we asked for a special Japanese feature, Northern Telecom kept asking 'Why? Why do you need?' This was a big problem."

The engineer indicated that over time these problems were overcome, that he considered it a valuable personal experience, and that he has a "good sense" from the project. He also believes further work with NT will be "much quicker. We have learned from each other. Northern Telecom learned how to think in NTT, how to process in NTT."

NTT began field testing six DMS-10s in March, 1988. During this period, NT had 30 trained Japanese nationals available for assistance. 250-500 NTT people were trained in field installation and maintenance. According to the NTT engineer, it is usually a problem with internationally-procured equipment to get sufficient resource support, especially for small orders. In 1988, the contract for six systems still was considered a small order. NTT has been impressed with NT's level of resource commitment. The five year field introduction begins in 1989, and NT is expected to receive orders totalling 1.5 million lines ($250 million).

The costs to Northern Telecom have been significant. The development process took 10 years, and including the implementation period, the entire project will consume 11 years. For the dollar value of this contract, NT made what

may be considered an exorbitant investment in time and money by Western standards. By Japanese standards, this investment is not considered unreasonable considering this is a new relationship. The benefits to NT should be significant. According to another NTT manager, "We now have <u>five</u> members of the family."

CHAPTER FOUR

THE CHANGING RELATIONSHIPS WITHIN THE NTT FAMILY

The relationships between NTT and its "family" members (NEC, Fujitsu, Hitachi, and Oki) have been long and mutually beneficial. NTT, in pursuit of its own interests and that of the nation, became the arm through which the ministries carried out Japanese industrial policy in the telecommunications market. NTT provided research funds that allowed these firms to use the plentiful capital, made available through national and industrial group lending policies, to invest in plant and equipment. Most important, it provided a large, profitable market for these firms so that they could grow (the fundamental axiom of the Kaisha)[1] and begin to invest in key basic technologies such as semiconductors. "Historically, sales to NTT have not been on a competitive bid basis, and the profits to NEC have been even greater than the sales volumes might indicate. In addition NEC's prepaid accounts (advance payments from customers) typically amount to as much as $250 million, and NTT's share ranges from 25 percent to 40 percent."[2]

It is also important to keep in mind that the existence of only one national telecommunications equipment customer

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1Abegglen, J. and Stalk, G., Kaisha, (Tokyo: Tuttle, 1985), 5.
2Prestowitz, Clyde, Trading Places, (Tokyo: Tuttle, 1988), 174.

(NTT) made it easy to protect the market from foreign entrants. That was quite important, particularly in the 1970's and early 1980's, when the telecommunications industry may have been on a lower productivity growth trajectory than the booming Japanese consumer electronics, auto and steel industries. "To compete effectively in a particular international market, a company must be at least as productive in that field relative to the national economy as its international competitor is relative to its own economy..."[3] The telecommunications industries in the U.S. and Europe were doing better compared to other domestic industries than telecommunications was doing in this regard in Japan. "Government efforts can support efforts at technology transfer because companies require time--years, if not decades--to learn complex technologies and then establish independent development capabilities. In fact, protection gave Japanese managers the chance to enter new industries, experiment with product and production technologies, and grow, despite the existence of far more efficient and innovative firms in the United States and Europe."[4]

3Bogue, M. and Buffa, E., "Productivity/Exchange Rate Effects in Global Competition," Corporate Strategic Analysis, (New York: Free Press, 1986), 71.

4Cusumano, Michael, "Diversity and Innovation in Japanese Technology Management", in Rosenbloom,ed., Research on Technological Innovation, Management and Policy, (Greenwich, Conn.: JAI Press, Vol. 3, 1986), 144.

The relationships within the family go far beyond the exchange of money, equipment and technology. The exchange of people, in much the same way that "amakudari" solidifies the relationship between MPT and NTT, binds the family members with NTT. NTT executives, near retirement, take senior positions for a few years with supplier companies. The heads of the large NTT sales and service forces at these companies are usually ex-NTT vice presidents. In addition, NTT sends researchers to work at favored suppliers. According to one NTT supplier, "Some of these people are good, some are not so good. You take the good with the bad." Nevertheless, it is considered a key step in the process of becoming an NTT supplier to be selected as a home for NTT people. It signals that NTT views the company as a potential supplier. It is an extraordinary honor (reserved for a very select list of suppliers) to receive an NTT executive.

Because of these relationships, it is still debatable whether true competition among suppliers exists. One non-family supplier I talked to considers the market "allocated." Another provided me with an example where NTT provided as a reason, for not agreeing to market the supplier's superior

piece of CPE, that it would be difficult to teach NTT installers the technology of the new equipment. This supplier did not think this was the real reason. As he expressed it, "there may be background." He surmised that NTT, which is having difficulty maintaining market share in the CPE business, feels obligated to keep those suppliers whole that are dependent on it for distribution. Oki is considered to be the weakest of the big four. Oki is also dependent on NTT as an outlet for CPE. Many Oki employees, including the current President, came from NTT. As another supplier observed, "Do you think NTT will kill its own nest?"

The previous two chapters described how the complex forces behind "privatization" have placed pressures upon NTT, and in turn its suppliers, that are causing the relationships between members of the NTT family to change. In certain areas, such as NTT's "network" organizations, the traditional customer-supplier relationship has been largely unaltered. NTT has business units that now see the "Gang of Four," as they are unaffectionately referred to in some parts of NTT, as the enemy.

Views toward these companies differ not only by NTT department, but also by level within NTT. NTT executives have a clearer "macro-view" of the potential areas of conflict. Executives also understand the areas of mutual benefit and dependency. Managers at all levels, particularly middle-level and lower-level managers, have relationships with these suppliers that run long and deep. Strong relationships have been built between NTT researchers, product developers and engineering managers from headquarters and the regions with their supplier counterparts. Personal and company relationships play an extremely important role in Japanese business.

In addition, compatibility with existing systems is an important, yet difficult to achieve, element of telecommunications equipment performance. NTT managers have said that compatibility is never an issue with the NTT family because they understand NTT requirements so well. NTT managers are also risk-averse, and many prefer to stay with the safe solution. It is said that Shinto, because of his strength as a leader, was able to overcome considerable NTT mid-level manager resistance to accepting new suppliers. One

outsider believes Shinto's departure could result in a movement back to the traditional family system within the NTT network departments.

The suppliers are just as confused when trying to determine their posture with respect to NTT. One manager, who has NTT sales responsibility for a major supplier, said he often feels like he is "in a sandwich." Another major supplier described intense battles within his company between the NTT sales organization and his company's own end-user sales force. I will return to this subject later.

THE NTT FAMILY COMPANIES

There are a number of significant competitors in the large and rapidly expanding Japanese telecommunications market. Iwatsu has the highest market share in consumer telephones and small key systems. Toshiba is a "late-comer," but it is large and formidable (1986 sales $19 billion) with superior electronics competencies. Toshiba has established a separate telecommunications division, and it has recently signed an agreement to market AT&T's System 75 PBX system in Japan. Nevertheless, there are still four dominant equipment

manufacturers in Japan, and these four can attribute their success to the relationships they have enjoyed with NTT.

Oki is considered the "weak sister" of the group. Some believe Oki has neither the technological capability nor the size (1988 sales $3.5 billion, 19,000 employees)[5] to compete head-to-head in a competitive, non-allocated market against the other three family members. Even though Oki maintains the dominant position in analog local line installations (Appendix 4-1), with over 50% of the market, the demand for analog lines is declining rapidly in Japan. Oki holds the number three position in digital line installations, but some doubt whether Oki will be selected to participate in the development of NTT's next generation vehicle. (NTT, with the four family members, jointly developed the D70 digital central office switch, which is the primary digital vehicle being deployed in Japan.) Oki has a weak position in transmission systems (Appendix 4-2), the largest NTT market in terms of dollar volume. Along with digital switching vehicles, this market will remain robust while NTT converts to a digital network. Oki also holds a relatively weak market share position in customer premises equipment (Appendix 4-3).

5Sales and employment figures for Oki, Hitachi, Fujitsu and NEC taken from "The Structure of the Japanese Electronics Industry," Dodwell Marketing Consultants, 1988.

Hitachi is an enormous company (1988 sales $38 billion, 160,000 employees). Even though it holds a much less significant position in telecommunications markets than do rivals NEC and Fujitsu, Hitachi is the world's largest electronics company with visions of becoming much bigger. Hitachi has $5.2 billion in cash and marketable securities, and it has intentions to "buy foreign computer and telecommunications companies that have global sales and distribution networks."[6] The goal of Hitachi's executive vice president, Yasuo Miyauchi, is to "make Hitachi as big or bigger than IBM or GE."[7]

It is Hitachi's size and strength, including its ability to buy market position quickly, that has NTT strategists worried. One NTT manager told me he thought Hitachi was "too big." Hitachi is considered to be very innovative and responsive for a large company. In fact, it is reported that NTT's creation of numerous subsidiary companies was based largely on Shinto's admiration of Hitachi's use of independent subsidiaries as a way of creating entrepreneurship in the firm. Hitachi's strength in computers and in R&D (1986 expenditures were $1.7 billion or 5.9% of sales, much of which

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6"How Japan will spend its cash," Fortune, 21 November 1988, 198.

7Ibid., 198.

is devoted to software engineering), and its strong domestic distribution network (Hitachi maintains a large direct end-user sales force and has a network of domestic sales agents) make Hitachi a formidable potential competitor. These attributes also make Hitachi a valuable ally.

Next to NEC, Fujitsu has the broadest product line of the telecommunications suppliers. It is the largest computer company in Japan, and it is the second largest in the world behind IBM. Fujitsu, because it is the nation's leading computer company, has close ties with MITI.[8] Fujitsu has the largest market share in digital central office equipment and runs a strong second to NEC in transmission systems and PBXs (NEC and Fujitsu dominate these last two markets). Although heavily dependent on the Japanese market, Fujitsu has begun to market telecommunications products in the U.S., and it is building a significant market position in developing countries, particularly in China.

Fujitsu is smaller than Hitachi or NEC (1988 sales $15.7 billion, 95,000 employees). Even so, Fujitsu's strong research and product development capabilities make it a very formidable competitor. Instead of acquiring computer

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8"Ahead on Points: IBM Wins Latest Round in Copyright Fight with Fujitsu," Far Eastern Economic Review, 15 December 1988, 111.

technology externally through direct technology transfers (joint ventures, licenses, etc.), Fujitsu acquired this technology indirectly ("reverse engineering"). This type of technology transfer, although slower, builds strong and lasting internal product development and manufacturing capabilities that direct technology transfer cannot. Even though Fujitsu fell behind its Japanese computer competitors in the 1960's, it has moved ahead of Hitachi, NEC and other computer companies because of these capabilities.[9] As a corporation, it appears that Fujitsu is obsessed with IBM.[10] I believe that its position vis-a-vis IBM, not NTT, will drive the Fujitsu investment and end-user strategies.

NEC began producing telecommunications equipment in 1899 as a subsidiary of AT&T's Western Electric Company. With 1988 sales of $20.9 billion (and 103,000 employees), NEC ranks as Japan's eleventh largest company. Sales of communications equipment account for 32% of company sales. Sales of computers and industrial electronic systems make up 36% of NEC sales.[11]

9Cusumano, Michael," Diversity and Innovation in Japanese Technology Management," 161-162.

10"Can Fujitsu Break Big Blue's Grip?," Business Week, 19 December 1988, 100-102.

11"NEC Vendor Profile," DataPro Research, April 1987.

The NEC story is one of vision and rapid growth. The NEC vision, "Computers and Communications," articulated in the mid-1970's, is based on the integration of computers and information-communications systems. This vision is explained to every NEC employee, including the global implications of the conversion of these technologies, and this "cultural cohesion" has been a great competitive asset.[12] It has allowed NEC to decentralize its decision making process, which is vital when rapid response is needed to a variety of differentiated markets. (Appendices 4-1, 4-2 and 4-3 demonstrate how successful NEC has been across telecommunications product categories.) NEC is equally as successful in related markets, from computers to semiconductors.

NEC has been pursuing a high growth strategy. It has borrowed heavily and invested massive amounts in R&D. "The total of R&D and capital spending far exceeded their profits in 1985-86 and meant they were borrowing heavily or otherwise obtaining new financing to support their operations....Most spectacularly, NEC actually had a negative cash flow for every year from 1982 through 1985: the cumulative amount was $1.2 - billion."[13] For 1986, revenues for computers and

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12Bartlett, C. and Ghoshal S., "Managing Across Borders: New Organizational Responses", Sloan Management Review, Fall 1987, 51.
13Prestowitz, clyde, Trading Places, 168.

communications systems increased 19% and 13%, respectively.[14] NEC is considered the premier company in the industry by most observers, not only because it is first in market share in so many equipment categories (it holds a 40% or better market share in most segments), but also because it is expanding its lead in so many categories. With respect to future market position, NEC is a leader in the fundamental technologies of software and silicon.

NEC has also been the most successful of the family members in marketing outside of Japan. NEC's success in the U.S. is a particularly important element of securing a market position with leading-edge users. (The U.S. accounts for one-quarter of NEC sales.) Oki and Fujitsu have U.S. manufacturing facilities, but NEC's are particularly extensive. NEC employs over 5,000 people in nine plants, and it also has a U.S. research subsidiary. NEC is hiring American software engineers in an effort to increase its software capabilities. NEC should continue to be Japan's strongest global competitor in the field of telecommunications, and it is the family member that has demonstrated leadership, which the others have followed, in becoming less dependent on NTT for technology and revenue.

14"NEC Vendor Profile," DataPro Research, April 1987.

I have discussed reasons why NTT is expanding its group of suppliers. The four family members also have reasons to move away from NTT. As has been explained, these suppliers have historically made excellent operating margins on NTT sales. As one of these suppliers explained to me, NTT's new insistence on a "special price" makes it difficult to generate significant profits from NTT business. The strategies of Japanese companies are growth-driven. "When demand is strong, the kaisha tend toward 'doubling strategies,' by which within a short planning period of two to four years capacity and output are doubled."[15] The growth in telecommunications equipment sales to NTT has been very strong, and that growth is threatened by NTT's new procurement posture.

Slower growth can be troublesome to a firm built on the theme of lifetime employment (which is common to Japan's large enterprises). On the one hand, this provides the organization with great incentives to innovate, to develop new products (to keep people employed). On the other hand, it forces the firm to seek new markets if traditional markets do not grow at a sufficient rate.

15Abegglen, J., and Stalk, G., Kaisha, 7.

In addition, as competition and rivalry heat up between family members, direct end-user positioning for marketplace intelligence and product quality feedback become vital. NTT can no longer be considered a stable, reliable sales channel for CPE. Also, for the first time, the Japanese suppliers have alternative customers to NTT (the NCCs), although it will be a long time before NTT loses significant buyer power in "network" equipment. These market changes are driving a reorientation of the product development relationships between NTT and its traditional suppliers, the most significant change being the bias toward protecting, rather than sharing, technology.

TECHNOLOGY STRATEGY

Technology strategy is emerging as a planning imperative of increased significance for a variety of industries in national and international markets in the 1980s.[16] According to Friar and Horwitch, this emergence has been driven by five forces. The first is a "backlash" against the dominance of pre-1970's-type strategic planning; the second force is the "obvious success of small high-technology firms;" the third

16Friar, J., and Horwitch, M., "The Emergence of Technology Strategy," Horwitch ed., Technology in the Modern Corporation, (New York: Pergamon Press, 1986), 50-85.

force is the high priority given to technology by successful Japanese firms; the fourth is the recognition of manufacturing as a strategic weapon; and the fifth force is the rise of "supportive relevant thinking and research in the fields of strategic management and the management of technology."[17]

The third and the fourth elements are particularly germane to a study of NTT. NTT is a Japanese firm in a high technology industry, and as such, it views competition in technology terms much more than is typical of most American firms. The important and multi-faceted role that manufacturing plays in technology strategy--given the fact that NTT does not have a manufacturing organization and relies on "competitors" for this capability-- makes an analysis of NTT technology strategy unique and complex.

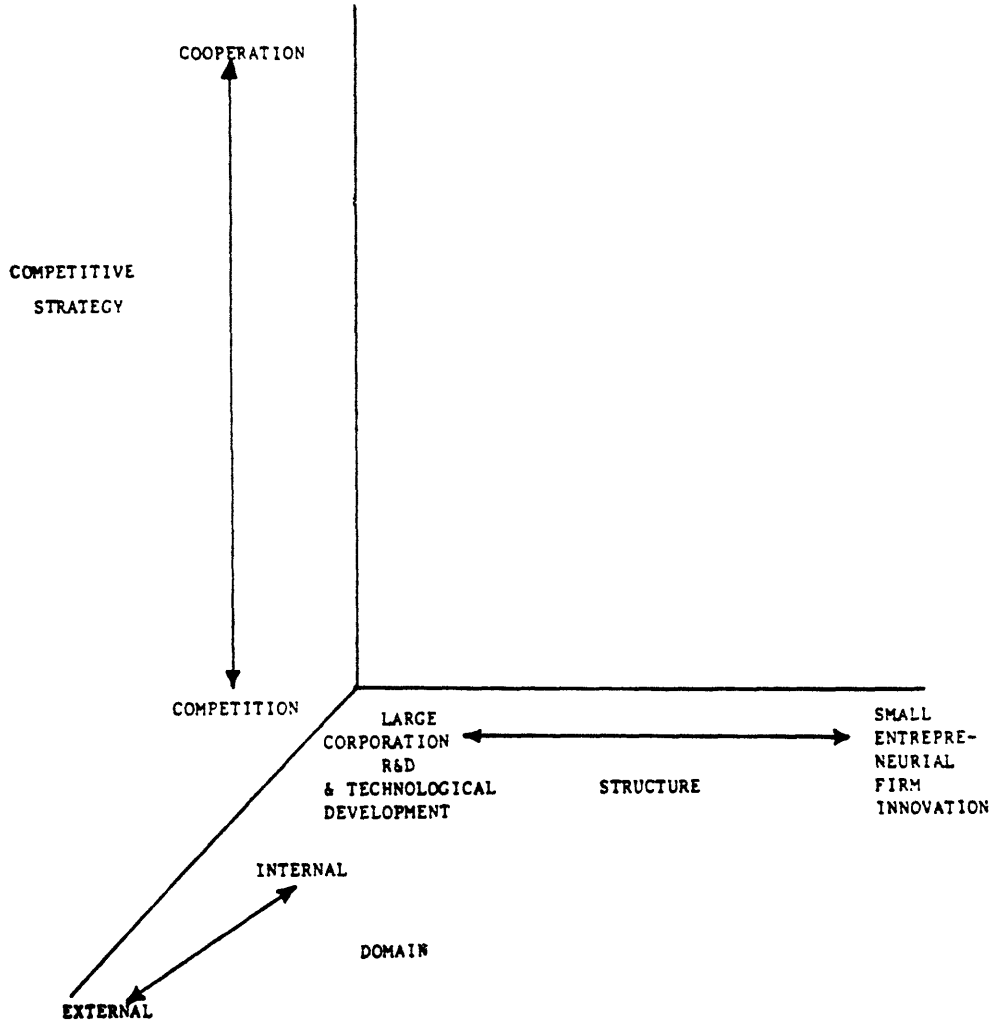
Structure

Figure 4-1 provides a structure by which a technology strategy can be analyzed. In the last chapter, I discussed NTT's strategy with respect to the "structure" axis. NTT, by moving R&D personnel into the profit centers (and closer to the field), is moving from the left end of the axis toward the center.

17Ibid., 52-54.

Figure 4-1

Elements of Modern Technology Strategy



Source: **Friar, John, and Horwitch, M. "The Emergence of Technology Strategy," *Technology in the Modern Corporation*, ed. M. Horwitch, (New York: Pergamon Press, 1986), 58.**

Competition

An analysis of "competitive strategy" is more complicated. Overall, I believe that NTT is moving from a cooperative stance to more of a competitive one. This change is partly necessitated by industry changes brought on by competition. NTT will also bear some costs as it distances itself from its partners.

NTT envisions itself as being in a "technology race." This race is driven not only by competition, but also by company history (NTT likes to view itself as a national research leader), by prestige (in Japan, technological innovations and patents are as important, if not more important, in determining company prestige than are profits), and by its tenuous monopoly status (the need to demonstrate innovativeness to the state in order to remain whole). NTT researchers talk in terms of "competing in R&D."

With respect to competitive strategy, NTT has chosen technology "leadership" over "followership,"[18] minimal integration of "upstream" activities (no manufacturing), and patenting and licensing (legal methods of technology protection) over secrecy. As I will discuss, NTT is

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18Porter, Michael, Competitive Advantage, (New York: Free Press, 1985), 181.

committed to its first strategy, it is reevaluating the second (for specific technologies), and it is "stuck with" the third until it can modify the procurement system.

The most significant element of a technology leadership strategy is R&D investment. NTT is increasing an already significant research budget. It has little choice. Without a manufacturing organization, NTT does not have the capability to follow a leader successfully by building a cheaper or better product (a successful strategy of many Japanese firms). NTT does have the flexibility to procure equipment from a follower, and for terminal equipment, it may use this strategy. NTT is resorting more often to Tracks I and II for many types of CPE. But, with respect to voice and data networking products viewed as key to large customer account positioning (PBXs, ISDN terminals, applications software), NTT will continue to try to stay at the forefront of technology development.

-Network technology

NTT is the leader in core network equipment and systems expertise. NEC is very capable in transmission and Fujitsu is strong in central office switching. But, NTT is the only

Japanese firm with the breadth of technological capabilities required to connect all of the advanced network systems together. Even though the "network" environment is not as competitive as the CPE market, NTT must still concern itself with the rapidly growing technological capabilities of its top suppliers in this market, particularly NEC.

NTT is currently able to control suppliers, to exert monopsony power and secure for itself the "consumer surplus," largely because of its control over technology. NEC, with its growing domestic and international customer base, might be able not only to sell superior technology to NTT competitors, but also may be in a position to dictate the terms and prices in the Japanese domestic market. I am told by NTT sources that NEC transmission equipment is clearly the best in quality, and others receive business only to keep alternative sources of supply open. If NEC can provide and control superior quality and technology, it is in the position to wrestle market leadership away from NTT.

NTT needs to be viewed as the leader in Japanese network technology. Politically, if network capabilities and technology do not continue to improve at their current, or faster pace, NTT is vulnerable to Keidanren and ministry

pressure for break-up. NTT, and the country's leaders, believe NTT has a "social role" to lead the technological development of the nation's communications infrastructure. If NEC is perceived to be driving technology development, not NTT, then break-up is not as risky for the ministries. In addition, NTT is beginning to move aggressively, particularly in the third world, as a network builder. As a competitor for these contracts, NTT will have to compete with the world's best technologies.

NTT network hardware technology is strong, but it is weak in network management technology (software), as evidenced by NTT's purchase of network management tools from AT&T and Cincinnati Bell. That is one of the disadvantages of not having a manufacturing organization. As one NTT manager explained, "Hardware and software are closely related. We cannot make good software without detailed hardware knowledge." According to one supplier, NTT is dependent on its suppliers for customer support, particularly when software is involved. This was confirmed by NTT. To remedy this situation, NTT is investing heavily in software development and in recruiting software engineers.

-Software development

Fujitsu, Hitachi and NEC are all among Japan's leading computer manufacturers (see Appendix 4-5).[19] Each company produces hardware and software. Hitachi was the first in Japan to apply "factory" techniques to software development, and it was quickly followed by NEC and Fujitsu.[20]

Manufacturing techniques were applied to software development to increase quality control and to re-use parts of the software program (severe shortages of qualified programmers existed).[21] There are two basic types of software: basic, or systems software, and applications software. "Applications software sits, at least figuratively, on top of basic operating systems, and performs specific 'user-oriented' tasks."[22]

Systems software requires a highly flexible environment, which does not lend itself well to a factory production approach.[23] (Fujitsu, though, has been successful in using a factory approach for systems software development.)[24] Applications software, on the other hand, is well suited to the factory approach.

19Taken from Cusumano, Michael, The Software Factory, Forthcoming, Oxford University Press, 1990, (13 February 1989 Draft), Chapter 1, p. 36.
20Ibid., Chapters 4, 6, and 7.
21Ibid., Chapter 4, p. 2.
22Ibid., Chapter 1, p. 1.
23Ibid., Chapter 6, p. 20.
24Ibid., Chapter 7, p. 70.

That provides these companies with an advantage over NTT in applications software development, a critical success factor in the end-user market. The manufacturers can apply factory techniques to improve quality, increase development speed, and reduce costs. In addition, manufacturers can achieve scope economies by writing software it can apply to a broad range of products.[25]

The factory approach to software development is not without flaws. The rigidity of a standardized process impedes innovation.[26] But one can also argue that, even though "off-the-shelf" modules limit flexibility, with much of the program already written, programmers have more time to be creative. Each firm must decide where it wants to make the trade-off between quality and flexibility. An NTT manager told me Hitachi produces the most reliable, but the least flexible, software. He said Fujitsu's software is less reliable, but it is much more "soft" or flexible.

-Patents

NTT has historically protected its technology through patents and licensing agreements. Until recently, this

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25Ibid., Chapter 5, p. 76.
26Ibid., Chapter 5, p. 79.

strategy was appropriate. NTT, because it could not manufacture, had to license in order to exploit its technologies. It had little fear of licensees becoming direct competitors. Secondly, because of its monopoly position, NTT had little market vulnerability from patent infringement. According to Prestowitz, "the Japanese patent system offers little protection...the process can take a good deal of time during which the patent can be copied and used."[27] But, the real threat comes from the use of slight modifications to the patented process in order to circumvent patent law. NTT indicated this has happened. NTT has reason to be concerned because some Japanese firms, like Fujitsu, have built their technological capabilities through "reverse engineering." These techniques in detailed technology process analysis build competencies in creative patent circumvention. For example, Toyota has developed advanced capabilities in reverse engineering so that it can pursue a strategy of "...copying parts from foreign cars and changing them slightly to avoid patent violations."[28]

Given the limited protection provided by patents, some firms do not patent aggressively because it "telegraphs"

27Prestowitz, C., Trading Places, 177-178.
28Cusumano, Michael, The Japanese Automobile Industry, 100.

competitive intentions. NTT patents aggressively anyway, and reawards its engineers that secure patents, because the Track III process, required by law for new product development and procurement, broadcasts NTT intentions. For this reason, the researchers I talked to want the Track III process eliminated, but the Track III risks are not the same for all technologies.

-Technology protection options

NTT is changing the way it works with suppliers to protect its technology. NTT's strategies and options depend largely on what type of technology is involved. Technology protection options differ depending on which of the three types of technology (hardware, software, or silicon) that must be protected.

Traditionally, NTT has worked with two or more of its family members to develop a piece of equipment (hardware). (That equipment or system may also include software and chips.) Each manufacturer produced the whole system. NTT is moving increasingly toward component, rather than system, development. NTT will segment a system into many components and will competitively bid and procure each one. Attention is

given to ensure that no one supplier is capable of manufacturing and providing the entire system. Technology protection in hardware is easier because each supplier can be provided with input and output specifications and they do not have to be provided with complete engineering specifications and diagrams of all other components in the system.

On the other hand, technology protection in silicon and software is much more difficult. That is where the capability, the "value added" or uniqueness of a system often resides. Without internal production capabilities, the realization of technical breakthroughs of this type require complete technology transfer to the manufacturer. For example, if NTT develops a new LSI (large scale integrated) chip, every bit about the technology, (the code, design, etc.) has to be provided to potential manufacturers, even in the prototype stage. The Track III process makes this valuable technology public information.

As a result, NTT is learning to develop its software internally and is even producing some of its own LSI prototypes. NTT seems to be pursuing a "black box" strategy. NTT hopes it can keep its most vital information secret (the

"guts" of the system) and provide manufacturers with input/output specs only. For example, NTT now produces the highly sophisticated LSI for the base station controller of its mobile telephone system. Even though the LSI is in commercial use, the LSI is still classified as a "prototype." NTT is prohibited by law from producing products, but it is allowed to produce prototypes. The family members have noticed the change in NTT strategy. (This issue was raised in one of my meetings with an NTT supplier.) It will be interesting to see if any manufacturer objects to NTT's use of its prototypes.

In the near future, NTT's buying power will ensure that it receives the software support it needs from the manufacturers. But NTT may be forced to begin putting more instructions on the chip in order to make it more difficult for the manufacturers to develop superior, compatible applications programs.[29] It has established the NTTS (NTT Software) subsidiary to begin to develop more of its software internally.

NTT is growing increasingly wary of suppliers with superior technology in software or silicon. As mentioned,

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29Cusumano, Michael, The Software Factory, Chapter 4, p. 32.

NEC, Hitachi and Fujitsu are leaders in software production. NEC and Hitachi are major forces in the development and production of semiconductors. "For both Hitachi and NEC, leadership in semiconductors is seen as critical to long term leadership in the electronics industry as a whole. They are prepared to pay what is necessary to maintain their market share and cost leadership position."[30] It is advantageous for NTT to have a strong partnership with such strong producers. But, as one NTT engineer told me, "NEC and Hitachi are too strong."

Referring back to NTT's procurement criteria, NTT clearly prefers large, stable companies. Three engineers I talked to said that NTT would be developing more technology with smaller suppliers. NTT has had some problems with their new partners, not only with compatibility, but also with synergies between research organizations. One researcher explained that NTT has had problems working with companies with inferior technological capabilities. He said relationships between R&D organizations work best when the "technology levels of the different groups are equal." One engineer summarized NTT's changing supplier selection criteria best: "We are looking for a balance between stability and oversize."

30Abegglen, J., and Stalk, G., Kaisha, 37.

-Vertical Integration

In comparing NTT with its suppliers, from a technology capability point of view, the major obvious difference is that NTT does not have a manufacturing unit. That provides NTT with some advantages and some disadvantages.

Regarding the advantages, NTT has great flexibility in supplier selection, so it is never "locked in" to inferior technology or cost structures. In fact, the heavy use of outside suppliers, "outsourcing," is common in Japan.[31] In addition to flexibility, this strategy helps the firm to minimize capital requirements and to spread risk. In the case of economic downturn, because the firm needs less plant and equipment, it has a lower "interest hurdle" to cover. The firm can carry less inventory and need not be as concerned with layoffs. Also, smaller, or "second tier" suppliers in Japan have lower salary structures than the big companies, allowing the firm to cut costs. The four family members are not "second tier" companies, but they extensively utilize small suppliers (also known as the NTT "grandchildren") to gain these benefits.

31Cusumano, M., "Diversity and Innovation in Japanese Technology Management," 157.

On the other hand, the use of external suppliers puts the firm at greater risk with respect to controlling a reliable source of inputs. Quality control can also be more difficult. But these risks are mitigated when strong supplier control systems, such as NTT's (described in the last chapter) and the human network, are used. Toyota is perhaps the best known example of a firm that has successfully decreased internal levels of vertical integration by establishing a tightly knit network of suppliers.[32] To control "the policies of their suppliers regarding quality control, capacity and prices...they relied primarily upon executive dispatches, long term contracts for all or nearly all of a firm's output, loans of equipment or money, and technical assistance."[33] This is very similar to the NTT strategy of supplier utilization and control, but there is one major difference. With the exception of the steel companies (which provide a "commodity" product anyway), Toyota's suppliers are typically smaller and are more reliant on Toyota than are NTT's suppliers (with the potential exception of Oki). NTT's control is more tenuous and relies more on technology control than does Toyota's.

32Ibid., 156-157.

33Ibid., 158.

That brings us to the pitfalls of "de-integration." The major problems associated with the use of outside suppliers are technology protection and the lack of opportunity to develop the technical capabilities that accrue to excellent manufacturing firms. Manufacturing is an element of technology strategy not only because it allows a firm to differentiate itself on cost and quality variables, but also because manufacturing process analysis provides firms with an opportunity to learn technology more thoroughly and to exploit full economic returns from technical innovation.[34] Manufacturing is a critical link in the value chain that exists between the laboratory and the customer.

The technology protection issue has been discussed. Technology diffusion is more difficult to prevent in this environment. Partnership relationships are advantageous in that they bring additional technical capability to the process and some sharing in the financial risk of the investment. But, because of NTT's heavy spending in basic research, it typically carries the "lion's share" of research and development costs. From NTT's point of view, protection is not only a competitive issue. It is a financial one.

34Abernathy, W., and Utterback, J., "Patterns of Industrial Innovation," 39.

Protection is required if NTT is to secure the financial returns on its research investments (which it receives through licensing fees and royalties on its patents) commensurate with the risks.

As mentioned previously, because of the integration of hardware and software technologies and the applicability of factory techniques to software development, possessing manufacturing capability helps a firm develop software skills. NTT is concerned about this competitive disadvantage. It has also been argued that the greatest financial returns to research innovation come from incremental process improvements, not from the initial discovery.[35] Japanese manufacturers have been particularly adept at gaining these economic rewards through continuous process improvement.[36] The honing of these process skills, which come from "cultivating in-house engineering skills,"[37] of which manufacturing engineering is a critical part, not only give the firm economic returns, but also allow the firm to acquire technology more easily from others. As mentioned previously, NTT's "competitors" are likely to be more skilled at adapting NTT's technology than vice-versa.

35Abernathy, W., and Utterback, "Patterns of Industrial Innovation," 44.
36Porter, Michael, Competitive Advantage, 181.
37Cusumano, Michael, "Diversity and Innovation in Japanese Technology Management," 156.

-Competitive posture

In response, as one manager put it, NTT is having "serious discussions of how close we should be standing" to its major suppliers. He also stated it is important to "balance national and NTT interests." It appears that NTT is moving in the "downward" direction on the competitive axis (Figure 4-1). It is trying to internalize as much of the product development process as it can. This posture helps to protect technology, but it has costs.

The trend in modern manufacturing science is toward more integration of the related disciplines of the product development process.[38] Japanese successes in innovation and quality have been partly attributed to this integration of functions, as have some recent American successes (Ford's "Team Taurus" for example). The most simple Operations Research techniques ("PERT" charting, for example) make it clear that parallel processes are "faster" than sequential processes. As has been discussed, NTT wants to speed up the development process, but the new found tendency to "throw designs over the wall" and to, as one NTT strategist put it, "use suppliers as a factory," will not help to accomplish this.

38Hayes, R., Wheelwright, S., and Clark, K., Dynamic Manufacturing, (New York: Free Press, 1988), 303.

The sequential process can also affect product quality and cost. "Many companies have come to appreciate the disadvantages of this sequential approach to product development. Final designs emerging from engineering may be producible only at very high cost. While design expenditures per se may amount to only a small amount of a product's total cost, design determines a huge proportion of producing, testing and servicing costs. Forcing manufacturing to wait to begin its work until a design is released prolongs the development time of a product and may force a company to miss a market opportunity. Often a company is forced to play catch up by implementing numerous engineering changes long after products have been introduced."[39]

"Manufacturable design" and "reliability engineering" are essential elements of product quality. The Japanese "rugby match" approach to design review, as opposed to the traditional U.S. "relay race" method, is given much of the credit for Japanese product quality performance. Equally as important to quality as internal organization structure and teamwork is rapid feedback from customers, which is another reason that NTT and its major suppliers want to maintain direct end-user contact.

39Dean, J., and Susman, G., "Organizing for Manufacturable Design," Harvard Business Review, January-February 1989, 28.

NTT can maintain the advantages of team design by selecting new suppliers rather than creating a more "arm's length" relationship with traditional suppliers. According to an NTT strategist, "The amount of joint development with competitors has decreased significantly. Relatively smaller companies we would work with. Now with larger companies, we would break down the product into smaller parts."

Breaking the system up into many components, separating it among different manufacturers, and providing each with input and output specs, size and performance requirements, etc., puts constraints on each supplier that may or may not be optimal. It makes it impossible for the entire system design team, including all manufacturing departments, to see the "big picture" and make design constraint "trade-off" decisions between components. NTT appears to be adapting the process to the perceived competitive threat from the supplier (as competitor or as seller to competitor). As one NTT strategist put it, NTT "may not give business to suppliers who do too much business with competitors because of the fear of losing technology."

NTT may benefit from adopting a more offensive, rather than a defensive posture toward technology acquisition. The "competitors" may have some advantages in technology acquisition capability because of reverse-engineering skills that come from integrated research, manufacturing and assembly operations. Nevertheless, there is a tremendous amount that NTT can learn from its suppliers, and it needs to think more in terms of using its market power as the dominant customer as a lever to secure expertise from its domestic suppliers.

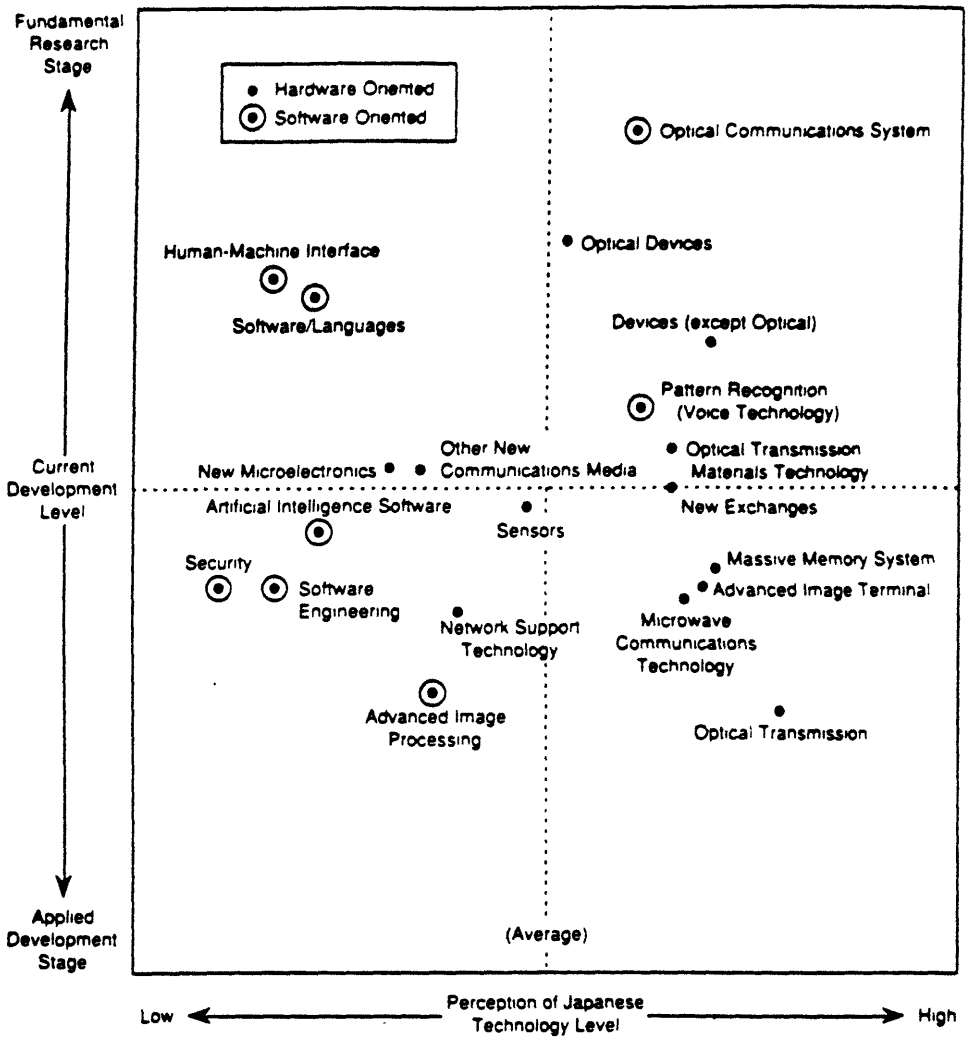
Domain

Even with Japan's strong national effort in R&D, Japanese capability is still "below average" in many telecommunications technologies (Figure 4-2). NTT's weakness in network support and in software-oriented technologies has been mentioned. My discussions with NTT managers leads me to believe that NTT recognizes the need to be more creative along the dimension of technology "domain."

First, NTT has reorganized its R&D function so that it will become more entrepreneurial and capable of "realizing" product ideas that come from interaction with internal and

Figure 4-2

Telecommunications R&D in Japan



Source: ***Japan Ministry of Posts and Telecommunications***

external customers. In fact, it looks as though NTT has patterned its R&D structure after NEC's.[40] But, the most significant changes and future opportunities for NTT appear to be in the area of external technology acquisition (i.e. joint ventures, acquisitions, etc.). There is a world-wide trend toward external approaches to technology acquisition. "Companies that have strong in-house research capabilities have been using, at the same time, more of and a greater variety of external sources."[41]

NTT, as mentioned, is trying to improve its software capabilities by hiring software engineers, both from campuses and from other companies. In addition, NTT has been spinning off subsidiaries at a rapid rate. When technology protection is paramount, NTT creates a wholly-owned subsidiary. When technology acquisition is important, it creates jointly-owned subsidiaries. (Appendix 4-4).

Government pressure to procure equipment internationally has provided benefits to NTT. Its foreign offices, particularly NTT America, help the company track business, regulatory and technology developments in the rest of the world.

40Bartlett, C., and Ghoshal, S., "Managing Across Borders: New Organizational Responses," Sloan Management Review, Fall 1987, 48.
41Friar, J. and Horwitch, M., "The Emergence of Technology Strategy," 73.

To beef up its "global scanning" capability, NTT has assigned roughly 200 managers, from diverse disciplines, to "FAST"[42] groups of three to four people each. These managers have the responsibility, in addition to their regular jobs, to follow world developments in specified technologies and product areas. NTT conducts some joint research outside of Japan and is considering establishing a laboratory in the United States.

Clearly, government restrictions on NTT's international operations hamper efforts to learn from non-Japanese leading-edge customers. But, NTT has an opportunity to leapfrog domestic competitors if it can ally itself with technically sophisticated foreign suppliers. Any supplier will undoubtedly be loathe to give up proprietary technology, but NTT has a sizable bargaining chip that other Japanese companies do not (an internal market for $6.4 billion of equipment annually). Also, NTT can create close research and product development partnerships with foreign firms because they are less threatening to NTT's domestic market position. Even though NTT may be at a disadvantage with respect to its competition in indirect technology transfer (reverse engineering), it appears to have some advantages in securing external technology through direct methods.

42NTT nomenclature.

END-USER STRATEGY

Market Attributes

Chapter two described Japanese customer characteristics and the country's telecommunications market structure. Japan has many advanced customers with leading-edge applications requirements. Customer locations are usually highly concentrated along the "north-south corridor," which stimulates the use of dedicated services, and helps to explain the explosive growth of leased digital services. For service providers, this high concentration of traffic helps to reduce unit provisioning costs (high capacity systems become economical). Difficulty in providing "ubiquity" is a barrier to entry in most telecommunications network markets. "Ubiquity" is easier to accomplish in this market, which lowers a significant entry barrier for both Type I and Type II carriers.

That makes it relatively easy for NTT competitors (which include all four family members) to establish value-added-network (VAN) Type II subsidiaries, which they have lost no time in doing. These VANs are applications-based, and these VANs supplement the competitors' equipment product lines. It is in the large end-user market, characterized by the

integration of CPE with large private voice, data and value added networks, where the competition between NTT and its new competitors is the most keen.

Organizationally, NTT has segmented and is focusing on this market through its new Integrated Communications Systems Sector. NTT's criteria for selecting an account for ICSS management are:

1) Enterprises listed on the Tokyo Stock Exchange, with annual sales over 50 billion yen, which have offices in at least four NTT regions;

2) Enterprises unlisted on the Tokyo Stock Exchange, with annual sales over 100 billion yen, which have offices in at least four NTT regions;

3) Public institutions, government agencies and large organizations in need of communications services;

4) Type II carriers whose operations cover the entire country;

5) All other organizations in need of advanced communication system technology.

Most of Japan's leading corporations have international operations, so they have international communications needs.

My discussions with NTT managers leave little doubt in my mind that NTT sees the lifting of international restrictions as crucial to their long term market success. Japanese customers will use suppliers that can provide global solutions to their communications needs. That market reality is driving the competitive posturing between NTT and KDD. Even though NTT is prohibited from forming alliances with the "second KDD's," one can expect to see closer linkages between NTT and KDD competitors in the future.

The real battle between KDD and NTT will brew over account positioning and control. NTT and KDD will attempt to circumvent their respective restrictions by providing end-to-end global network management for large customers by partnering with the "international carriers" (i.e., AT&T, MCI) to provide these solutions. Each will use their new Japanese competitive alternatives to "bypass" the other to the extent possible. The competition between NTT and KDD will provide opportunities for the new Japanese carriers that a market structure of only one carrier for domestic local and international services would not provide. The NTT\KDD conflict provides a challenge for international carriers. The selection of the right Japanese partner becomes more complex.

Customer Attributes

One American salesman in Japan listed the criteria, in rank order, that Japanese end-users use to select vendors as 1) relationships, 2) problem solution, 3) price, 4) pre-sales support, 5) perceived after sales support, and 6) quality.

-Relationships

To sell successfully to a Japanese multinational, a company must be positioned with that company in Japan. Decision making in these companies is typically highly centralized, with most major decisions being made in Tokyo.[43] "Nemawashi," or group decision making, is used.[44] One Japanese manager I spoke to estimates that approximately 80% of lower-level recommendations are accepted by upper management. American industrial selling philosophy, where being "positioned" with top-level "decision makers" is the key to selling effectiveness, is not entirely transferrable to Japan. Being positioned at all levels (over a long period of time) is crucial in Japan. This favors companies with large sales organizations, like NTT.

43Bartlett, C. and Ghoshal, S., "Managing across Borders: New Strategic Requirements," Sloan Management Review, Summer 1987, 14.
44Ibid., 14.

"Relationships," in the Japanese sense, take a long time to build. One major Japanese supplier to NTT told me that it takes five years, working at multiple levels within the customer organization, to build a genuine relationship with a new industrial customer. The "newcomer" should expect consistent disappointments and losses over this period, but should never give up. Perseverance, and the willingness to lose short term in order to gain profits long term, are qualities that are greatly admired in Japan. On the other hand, and what helps to explain the difficulties associated with courting a new customer is the fact that, just as relationships are difficult to build, they are also difficult to dislodge or break. This represents a built-in "shock absorber" in the market. It is rare for firms to lose or gain significant market share overnight.

Relationships between a sales person and a customer, in the U.S., are often built after a sale. The opposite is true in Japan. The relationship must be established, and found acceptable, before any business is done. In the U.S., the ability of one salesman can make a huge difference in a relationship. The Japanese view relationships more on a

company level, and less on a personal level, than Americans do. Multiple contacts at multiple levels are often required before a relationship is "acceptable."

-Problem solution and product performance

The reason that "relationship" is placed ahead of "problem solution" is that, even though the ability to solve the problem is critical to the sale, often a company must first have an established relationship in order to know the customer's needs well enough to provide a comprehensive solution. This notion applies to selling to NTT as well as to end users. One "family" supplier explained that in prior years, family members knew NTT well enough to know that all NTT requirements were not always included in the written specifications. Suppliers would know if equipment temperature specs were understated. If specs called for 40 degree centigrade operating capability, suppliers would know that 50 degree capability was really needed to operate effectively in an NTT central office, and they would build to the higher standard. Suppliers were expected to know NTT this well, and product performance determined future business share.

Suppliers thought in terms of solving the customer's needs, not in terms of meeting specifications. The new procurement process emphasis on specifications and price may prove problematic for NTT as traditional suppliers change their modus operandi in order to compete with the newcomers.

The high priority given to problem solving makes applications selling key in this market. I have already mentioned the high degree of customization required by Japanese customers. Highly customized products are typical of many Japanese industries.[45] Applications can be placed in two categories, industry applications and company-specific applications. Strength in the first area is usually needed before one can proceed to the next, and strength in both areas is needed in order to succeed in marketing telecommunications applications. Strong customer linkages are required to develop the latter.

Appendix 4-4 illustrates the high number of applications-focused subsidiaries that NTT is establishing. It establishes many of these subsidiaries in partnership with a leader in a particular industry, for example, life insurance. NTT develops the industry expertise required to create effective

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45Abegglen J., and Stalk, G., Kaisha, 49.

systems solutions for that industry. NTT can then utilize its relationship with each member of that industry to create customer-specific applications.

Customization is typically more software than hardware dependent. This is another reason that NTT must improve its software capabilities.

-Price

Price is every bit as important to customers in Japan as it is to customers in the U.S. The intensity of the rivalry in the end-user market, combined with the Japanese preoccupation with market share and relative market position, make price competition in this market keen.

-Pre-sales support

Japanese customers are typically much more technical than their American counterparts. These customers are also much more interested in technical matters, so a sales force must be capable of providing customers with detailed, technical product information. In addition, the telecommunications "buying unit" within the firm is moving toward the "MIS

Director" orientation that so many large U.S. customers have followed. Communications sales people must be proficient in both voice and data technology. Even though NTT has a very large and formidable sales force, which its competitors fear, it is widely believed that many of its sales people are not technically sophisticated enough to sell effectively "head-to-head" against the competition's highly qualified sales teams. This advantage helps competitors offset NTT's superiority in numbers.

-<u>After-sales support</u>

After-sales support is as important in Japan as it is in the United States. In terms of routine maintenance, because of its huge workforce, NTT has a clear advantage over its competitors. But, when software problems arise, NTT must often rely on its vendors to solve these problems. NTT contracts with its vendors for this support before "distributing" its equipment, and vendor responsiveness to NTT is required to keep NTT's business. One large supplier says his company has run into field problems because their response time commitments to NTT (to fix an NTT customer's

software problem) are so short. This supplier's own customers have, at times, had to take a "back seat." This supplier still gives NTT business top priority because, even though this strategy may be "sub-optimal" in the long term, NTT is currently their largest customer. Debates regarding this strategy rage on inside this company.

NTT also realizes that it cannot stay dependent on supplier customer support technology, that it must develop these skills "in-house," because these large suppliers (with the best nation-wide support capabilities) may stop selling certain integral, strategic products to NTT.

-Quality

Quality is placed last, but not because it is the least important. Quite the contrary, quality is extremely important. It is considered a "given" and a condition to "play in the game." Non-performance penalties, both explicit (contractual) and implicit (reputation), are severe.

A high degree of applications customization, combined with high non-performance penalties, makes it vital that a

telecommunications company develop a software organization capable of creating unique, reliable applications solutions. The company that can combine these skills with a sales force knowledgeable in technology and customer needs will be at a distinct competitive advantage.

NTT Offerings

NTT's size is a significant competitive advantage, as is its potential leverage capabilities across telecommunications product categories. Competitive forces have been successful in requiring the separation of NTT's data communications organization as a separate subsidiary. The data subsidiary sells NTT's VAN services and NTT data equipment. They have been very successful, taking 270 billion yen ($2.2 billion) or 80% of the 330 billion yen 1988 VAN market.[46] These results exceeded even NTT's projections.[47] NTT sells an extensive line of products and services to the "high end" market. It sells local and long distance message services, Type I and Type II leased services (including high capacity and packet services), and a broad line of voice and data customer premises equipment. NTT's newly created ICSS organization was formed to manage relationships, including systems selling and

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46Figures provided by Japan ENS.
47Ibid.

product integration, with the largest accounts. NTT plans to develop "National Account Management" capabilities, with all NTT activities (i.e., NTT-I, NTT-Data) with these customers "matrix-managed" by ICSS.

NTT procures the equipment it sells through a variety of original equipment manufacturers (OEMs), most notably the four "family members." NTT is trying to secure more equipment from other vendors, but its domestic alternatives are limited because, according to one NTT supplier, NTT is "locked in" to only a few suppliers because of their superior technology.

Supplier Strategy

The family members continue to sell to NTT and dedicate an inordinate amount of resource to the maintenance of the NTT account. They do this not only because of the value of the NTT distribution channel and for access to NTT technology, but also because of the strength of the "human network" that still binds these companies. These companies are also beginning to put more emphasis on direct end-user selling and on sales to authorized distributors. As stated, there are numerous product-related benefits to maintaining direct customer

contact. This strategy also gives these suppliers more control over their distribution channels and puts them in a better position to achieve "account control." They also recognize the importance of providing global solutions and the need to acquire international channels of distribution.[48] These suppliers provide functionality via integrated hardware and software applications at the customer premise, and they provide network functionality through domestic and international VANS.

One large supplier has a dedicated NTT sales force of 600-700 people. Approximately 400-500 sell telecommunications equipment to NTT, and approximately 200 people sell "in-house" computer hardware and software to NTT. The telecommunications group (usually headed by a former NTT executive), is very powerful within this company.

Internal conflicts between the NTT group and other divisions of the company, according to this supplier, "have been ugly." Another supplier described a process where the company "negotiates" with its end-user sales force what products it can sell to NTT. Short term and long term strategies are clashing in the form of channel conflict.

48"How Japan will Spend its Cash," Fortune, 21 November 1988, 198.

According to one supplier, the corporate strategy group is exerting more power over distribution strategy and is increasingly ruling against the NTT faction. One supplier executive, formerly of NTT, is extremely loyal to his new company and fully supports company decisions, but he still feels torn by old company loyalties.

The movement away from NTT is driven as much by margin pressure (NTT exerting monopsony power) as by end-user considerations. One supplier told me that NTT now gets a lower price than its own dealers do, which creates problems with their dealer network. NTT's weakness in software allows the suppliers to eke out a profit. Suppliers make their highest margins on custom software developed for NTT for use on supplier-produced hardware, and from applications software developed to meet NTT's customers' needs. As NTT begins to develop its own software, these profit opportunities may disappear.

It appears to be more common and "digestible" in Japan than in the U.S. for two firms to be suppliers, customers and competitors all at the same time. American firms (AT&T and the Regional Bell Operating Companies, for example) appear to

have more difficulty understanding and managing these complex relationships. One supplier explained that in cases where his company competes with NTT, a formal "declaration" is made. The supplier announces formally that it will compete directly with NTT in a particular market, but this competition is "strictly business" and it is in no way to affect the overall "understanding" between the two companies. In the new environment, this understanding is becoming increasingly difficult to maintain. Although competition between suppliers and NTT is "understood" at the top (where the exchange of personnel is most prevalent), this supplier admitted that managers at lower levels are having difficulty managing these conflicts. Competition puts a strain on many relationships.

NTT Strengths

NTT's greatest competitive strengths appear to be its ubiquity, its neutrality, the leverage provided by its vast network product line, and its systems integration expertise.

NTT has a presence in every prefecture and village in Japan. It maintains business relationships with customers on many levels, and as an enormous consumer of goods and

services, it has the potential to lever these relationships into sales (what some might label reciprocity). NTT is intent on maintaining its neutrality with respect to Japan's industrial groups. Even competitors see this as an NTT advantage. Although neutrality may be a disadvantage when selling to a customer that is affiliated with an NTT competitor, it is an advantage when selling to "independents." It is an even greater advantage when selling to a customer that is affiliated with a group that is not the group of NTT's competitor.

According to one supplier, "If a company choses NTT, it is easy to get internal consensus." He explained that customers have business associations with many different companies, and that it sometimes creates problems for the customer if they chose an affiliated supplier. For example, a customer might have close ties with a company in the Sumitomo group. If this customer choses Fujitsu, affiliated with the DKB group, over NEC, affiliated with Sumitomo, this could alienate this customer's partner. Chosing NTT carries no such risk.

NTT is the only one of the five "competitors" providing Type I services and NTT dominates the Type II market. This

provides significant competitive leverage in a market which has not yet been weaned from "one-stop-shopping" (as U.S. customers were after the AT&T divestiture). In addition, there has been significant market penetration of high capacity digital services. NTT holds 99% of the access market, and is also spending heavily to develop ISDN technology.

NTT has the opportunity to provide customers with "integrated access," using the ISDN primary rate interface "D" channel to provide the network with information that provides the customer with network functionality and rapid, economic allocation of bandwidth. Because of NTT participation in the CPE, local access, Type I and Type II leased service and long distance markets, NTT has the ability offer the customer significant "hassle-reducing" and economic advantages by integrating ISDN-compatible CPE with Type I, Type II and network services. The introduction of ISDN makes control over the "bottleneck" a more formidable competitive weapon than ever before (assuming no MPT interference).

NTT's "umbrella strategy" is to become the leading systems integrator. NTT has many years of experience selling, connecting and maintaining equipment with a variety of

operating systems from a variety of vendors. Even so, NTT's lack of manufacturing ability puts NTT at a disadvantage when detailed hardware knowledge is required (to write complex applications software). NTT will most likely begin requiring more technical details from equipment suppliers (source code, for example).

In the U.S., computer operating systems like MS-DOS[49] and UNIX[50] have become "defacto" standards. It is reasonable to surmise that the lack of operating system standards has hurt the development of Japan's software industry, even though it may help protect the domestic hardware industry. (If IBM is seen as the chief challenge, it is to the advantage of some hardware vendors to maintain separate standards. NTT pointed out that NEC produces an IBM-compatible PC for the U.S. market, but markets only PCs with NEC operating systems in Japan.)

The lack of consistent operating systems makes it difficult for NTT to build a multi-vendor environment on the customer's premises. NTT's "uniqueness" is in integration and not in equipment, so it is in NTT's interest to maintain a multi-vendor environment. If no vendor provides the entire

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49Microsoft trademark
50AT&T trademark

system, the power on the customer's premises rests with the systems integrator, not the equipment provider. Because NTT is not tied to its own manufactured products, NTT would be able to build "ideal" systems by "mixing and matching" from a wide variety of components. The establishment of industry standards should be an NTT priority.

NTT, if unfettered by regulatory constraints, will hold an excellent competitive position in the end-user market. Its most significant weaknesses are its shortages of qualified sales personnel and software development skills. These weaknesses can be overcome through hiring, training and redeployment. NTT is beginning to develop a subsidiary structure that will give it the required expertise in industry and customer communications needs. NTT is the only company capable of providing "one-stop-shopping" and it is the industry's most experienced systems integrator. NTT's success as an integrator will depend on its ability to encourage the creation of industry standards. NTT appears to be intent on building alliances with non-Japanese firms in order to compete more effectively with unrestricted domestic competitors for control over the multinational account base. NTT, because of

its purchasing power and its ability to grant access to many aspects of Japan's large and growing domestic market, has the leverage to attract the most desirable foreign partners.

CHAPTER FIVE

NTT DILEMMAS AND OPPORTUNITIES

NTT finds itself faced with a complex set of strategic alternatives. NTT has three sets of constituents, the government, its customers and its competitors. Very few NTT strategy options will satisfy all three stakeholder groups simultaneously. (On the other hand, the motives and the memberships of these three groups are not mutually exclusive either.) Because of conflicts inherent in strategies designed to meet the challenge or needs of each constituency, in the new operating environment, NTT will often be caught between the proverbial "rock and a hard place."

THE GOVERNMENT

From a Maslovian hierarchy point of view, NTT is concerned first and foremost with self-preservation. NTT's desire to remain "whole" dominates all other corporate objectives. The Telecommunications Business Law is subject to review by MPT and the Diet in 1990. The fear of break-up has become much more pervasive and acute in recent months in light

of the arrests of NTT executives as part of the Recruit scandal probe. One of my interviewees recently wrote me concerning the demoralizing effect the scandal is having on corporate morale. Chairman Shinto's strength as a business leader was moving the firm away from regulatory domination. Most fear that the regulatory forces--particularly MPT, which is the principal break-up proponent--have been strengthened considerably by Shinto's demise. The integrity of MPT's motives are subject to debate.

There are a number of competing governmental forces, the ministries (MPT and MITI), the Diet (dominated by regional, rural representation), and business special interests (including the Keidanren), which influence the former, that make an Allison "Rational Actor" model[1] inappropriate for an analysis of government behavior. Even Allison's "Governmental Politics" model may be overly simplistic.

Even though most would conclude that NTT has the odds stacked against it, NTT has a few forces moving in its favor. The first, as previously mentioned, has been the effect that the break-up of AT&T has had in the United States. Only the domestically-focused myopic would not recognize the trade

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1Allison, Graham, Essence of Decision, (Boston: Little Brown, 1971).

problems this has created for the United States. Industry structure is not only a balance of trade issue; a decision to break-up NTT also would be an issue of national social policy, of which industrial policy is a subset.

It can be argued that the Bell System was socially conscious, and because it derived a sense of safety from its monopoly power, it carried out a number of non-economic social policies, such as the provision of universal, affordable telephone service. AT&T managed a system of transfer payments, the subsidization of local service, and AT&T employees thought in terms of the public and the national interests.[2]

The increasing popularity of active industrial policy is not only an effort by governments to improve national competitiveness, but also an attempt to mitigate the inherent tension that exists between private sector economic interests and the national interest. This tension is one that fascinates and perplexes regulators and scholars alike.[3]

As described in previous chapters, NTT managers seek to "balance" national interests with those of the firm. In economic analysis, competitive market players are assumed to

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2Von Auw, Alvin, Heritage and Destiny, (New York: Praeger, 1983).

3Schumpeter, Joseph, The Theory of Economic Development, (Cambridge, Mass.: Harvard University Press, 1934), 88.

be "amoral" (not immoral!) in their actions, pursuing purely economic interests. The existence of a paternalistic monopoly, or pseudo-monopoly, driven partly by socially-oriented motives, can provide the government with a supportive ally in the pursuit of national policy. In addition, partnering with a firm that has legitimate market power gives the bureaucracy an effective vehicle through which it can implement policy. For example, through NTT, the bureaucracy can manage trade issues and supplier development through the oversight and direction of NTT procurement activities. A comprehensive study of the ramifications of the U.S. experience, combined with Japan's tendency to prefer market stability[4], is likely to provide the Japanese bureaucracy with enough doubt that they may move cautiously.[5]

The second factor working in NTT's favor is the rivalry that exists between MPT and MITI. If NTT could manipulate this rivalry, it may be able to slow down any government break-up momentum. NTT may actually be able to gain MITI as an ally if it can substantiate the argument that the nation's competitiveness is enhanced by the existing industry structure. A MITI-NTT alliance would be an ironic twist.

4Prestowitz, Clyde, Trading Places, 140.

5"How Japan Plays the Telecommunications Game," Far East Business , November 1988, 19.

MITI has traditionally been the champion of NTT's competitors while MPT has supported NTT. MITI might conclude that the market may actually be healthier with a strong NTT.

Technology Development and Diffusion

NTT has been on a world-wide public relations campaign (ISN, LSI breakthroughs, etc.) to sway public opinion in Japan to believe that NTT is a national technology treasure that should not be discarded. NTT has demonstrated excellence in basic research, and it has provided this technology to Japanese firms strong in applied research. This free-flowing, rapid diffusion of technology has been instrumental in the development of a powerful Japanese telecommunications industry.

NTT's value to the nation goes beyond telecommunications. NTT has been to Japan, as AT&T has been to the U.S.,[6] the "father" of the nation's semiconductor industry. NTT recently led the nation's VLSI effort. The semiconductor industry has been identified, by both nations, as a strategic industry that provides many "spillover" benefits to other industries. NTT is a world leader in semiconductor technology. MITI should be

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6Borrus, M., Tyson, L., and Zysman J., "Creating Advantage: How Government Policies Shape International Trade in the Semiconductor Industry," Strategic Policy and the New International Economics, ed. Paul Krugman, (Cambridge, Mass.: MIT Press, 1987), 109.

concerned with tampering with a company that provides national research leadership in a number of key technologies (identified in Chapter three).

Industry Structure

Beyond the benefits provided by the "altruistic," socially conscious behavior of NTT management, which aid in the implementation of national and international policy objectives, NTT's dominant industry position allows the firm to be less concerned with technology diffusion than a firm concerned with economic survival might be. NTT's large revenue streams help fund the multi-billion dollar annual R&D budgets. These are reasons that support the existence of monopolies on the grounds of superior innovation.[7]

The diffusion issue is particularly germane given the tension that exists between a firm's economic self-interest and the interests of a nation. Government policy makers are faced with a dilemma. Technology protection laws, like patent laws, exist to give firms incentives to innovate, to pursue "first mover" strategies. More protection should mean greater financial returns on R&D investments. But, the

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7Kamien, M. and Schwartz, N., Market Structure and Innovation, (Cambridge, England: Cambridge University Press, 1982), 47.

economic benefits that accrue to one firm often exceed the value of an innovation to society if the innovation is kept by one firm.[8] If NTT pursues innovative, "first mover" strategies (which, as Chapter four describes, they have chosen to do), and then widely license new technologies to other firms, national benefits are maximized.

-Intensity of Rivalry

NTT has developed an industry characterized by strong, capable rivals. These competitors are challenging NTT for dominance and control in some market segments. NTT remains the dominant force in the industry, but it still feels somewhat threatened.

This industry structure may, in fact, be ideal. As stated, NTT is pursuing a strategy of technology leadership. A near-monopoly condition (which allows the firm to invest "monopoly profits" into R&D), where the innovator has incentives to invest and believes that research investments will be recovered, may lead to the greatest level of industry innovation. It has been argued that an "intermediate intensity of rivalry, one in which the innovator is neither

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8Gilbert, R.J., and Newbery, D. M., "Preemptive Patenting and the Persistence of Monopoly," American Economic Review, June 1982, 514-25.

entirely unthreatened by rivals nor severely threatened, may yield the fastest pace of innovation."[9]

NTT's procurement policies stimulate the intensity of rivalry among the firms in the industry. NTT, through its supplier management policies, including dual-sourcing, encourages industry competition. NTT's pressure on firms to continue to reduce costs encourages further process innovation.

NTT also ensures that all rivals stay in business. If the market were left entirely to the discretion of the "invisible hand," it is possible to construct a scenario where Oki would be driven from the business and where NEC would eventually dominate most market segments. NTT's monopsony power, combined with its fear of creating too formidable a rival, checks the power of the industry's dominant manufacturer.

-Barriers to entry

It can be argued that NTT's technology protection policies reduce the national benefits of technology diffusion. It can also be argued that NTT is only selecting different

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9Kamien, M., and Schwartz, N., Market Structure and Innovation, 111.

suppliers, those without developed basic research capabilities, to share its technology with. Driven by competition, NTT is providing the same technology benefits to the "newcomers" that it once provided to the Denwa family members. NTT's willingness to fund a large portion of product development efforts, combined with its ability to provide a large market for a newly developed product, helps to reduce both the investment and the risk barriers to entry. Without this intervention by NTT, the size, market position, and technological capabilities of the top four manufacturers provide a sizable barrier for new competitors to overcome.

Small firms can make significant contributions to the industry. Telecommunications equipment is highly customized, making scale economies difficult to achieve. AT&T, for example, is primarily using custom-developed silicon (rather than off-the-shelf silicon) and flexible manufacturing systems (FMS) in order to meet the specialized needs of the industry.[10] Even with non-customized products, the advent of FMS-based operations is changing the operations research precepts regarding efficient manufacturing scale. "Size no longer provides barriers to entry. The minimum efficient

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10Interview with AT&T Plant Manager, Merrimack Valley, Mass., 15 November 1988.

scale for FMS operations is a cell of roughly six machines and fewer than a dozen people. That's the new reality."[11] MITI has traditionally worked at industry consolidation, but considering the changes in manufacturing technology and the fading borders between telecommunications and other high-technology industries, it may be in Japan's interests to have other firms develop telecommunications capabilities.

Expanding participation in telecommunications is not only an issue of national economic security. Japan, which is in the process of providing for a larger share of its national military defense, has a large number of firms involved in military technology development. Telecommunications technologies play an important role in defense communications, so NTT's revised technology strategy may also improve the nation's military security.

-Developing network competitors

Intense competition in the CPE market currently exists, so NTT has much less to fear from anti-trust obstacles curtailing its CPE activities than it should have from these obstacles interfering with its network activities. As a

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11Jaikumar, R., "Postindustrial Manufacturing," Harvard Business Review, November-December 1986, 76.

result, NTT is encouraging market entry of new Type I and Type II carriers, and it is lending technical and managerial support to the former.

NTT still holds shares of 99% and 97% of the switched and leased network services markets, respectively, and there is only speculation, no one knows, regarding how much market share NTT will need to lose before MPT considers these markets competitive. Some at NTT speculate that "95%" is a key threshold point, but market share may not even be one of the pivotal issues in the decision of whether to re-write the Telecommunications Business Law. Within NTT, the forces that believe continued market share erosion is critical to survival currently have the upper hand. NTT is trying to lose market share "strategically" (maintaining key customers and the most profitable service revenue streams).

The controlled loss of market share is only one element of a cogent regulatory strategy. NTT will have to temper some of its most competitively aggressive programs. NTT can achieve some of its market goals and mollify regulators by pursuing strategies, like the establishment of industry technical interface standards, that support both NTT and

ministry-driven national efficiency and innovation objectives.

NTT's diffusion of technology, active encouragement of new entrants, and ability to provide a ready market, significantly reduce barriers to entry that may have been erected by the creation of the original "family" industry structure. A subdivided NTT may not be disposed toward, or capable of, pursuing its current technology diffusion activities.

NTT's survival might depend on its ability to secure MITI as an ally in the fight against the politically-driven policies of MPT. NTT's highly visible and effective international trade public relations effort, which may help to combat some of the protectionist measures being contemplated by foreign governments against MITI-supported industries, is clearly in MITI's best interests to maintain. Most important, MITI must be convinced that the current path of evolution of the telecommunications industry competition and technological development is best for Japan. The existing industry structure may be optimal for Japan, both now and in the future.

CUSTOMERS

NTT's likelihood of remaining whole hinges upon its ability to convince its customers and the ministries that it is providing the quality and scope of network offerings, the nation's communications infrastructure, that will support continued economic growth (especially critical for industries like data processing that depend upon a viable communications backbone for new product adoption).

The development of advanced domestic and international networks is particularly vital to Japan as it competes with Korea and Singapore to become the communications hub and commercial center of the Pacific Basin. Each country will seek to attract communications-intensive firms by providing "digital connectivity" to domestic and overseas points. World-wide "digital girdles" are being constructed, and nations are competing for access to these facilities. (TPC-3, the new fiber optic cable placed in service in April, 1989, that links Japan and the United States, is an example of a digital girdle.) But a complimentary domestic network is every bit as important as the international connection. It is in Japan's interests to maintain one ubiquitous network builder that can ensure network compatibility across regions

(which also has the "deep pockets" necessary to make non-economic investments in rural regions in order to improve national harmony).

NTT recognizes the need to make publicly noticeable progress in this regard. NTT has embarked on a massive, capital-intensive network digitization program. New services--many offered by new, entrepreneurial NTT subsidiaries--are being introduced at a rapid rate. The importance of succeeding in this effort makes any NTT strategy that relies on new, untested suppliers very risky. In the area of the network, we can expect the traditional family relationships to remain strong for the next few years. NTT will be extremely selective in its choice of new network technology partners.

COMPETITORS

NTT's responsiveness to customers is driven every bit as much by competitive forces as it is by political ones. NTT has responded to these forces by reorganizing its upstream (research and development) and downstream (the Integrated Communications Systems Sector) activities. The R&D

reorganization will help NTT become more responsive to market needs. This is vital in an industry characterized by a number of innovative lead users. The telecommunications industry may be classified as a "demand-pull"[12] environment of technical change. The ICCS marketing structure has been implemented to identify the needs of, and manage the relationships with, NTT's lead users.

NTT will not vertically integrate. NTT believes that, through continuing improvements in its supplier management capabilities, it will achieve the benefits of control usually associated with vertical integration, while retaining the product flexibility and risk-reduction benefits of a non-integrated structure. The only change in this regard will be NTT's attempt to protect technology by internalizing some software and silicon production.

-Competitive assessment

NTT's four competitors are not equal. According to NTT insiders and industry observers, NEC is clearly the most formidable of the four. Its advantages lie in a strong technology foundation (particularly in semiconductors and in

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12Dosi, G., "Technological Paradigms and Technological Trajectories," Research Policy, June 1982, 147.

computers), a wide product line, a leading or near-leading market position in each product area, and an industry-wide reputation for superior product quality.

Fujitsu and Hitachi, although extremely capable, are a cut below NEC. Fujitsu's strengths are advanced data processing and switching technologies and highly-developed reverse-engineering capabilities. But Fujitsu appears to be preoccupied with IBM, not NTT. Hitachi is the largest of the three companies and is strong in fundamental technologies like semiconductors, and it is known for highly reliable software[13], but it is relatively weak in most telecommunications markets. Oki is a considerably weaker competitor than the other three.

NTT is battling these new-found competitors on two major fronts. First, the companies are competing in technology, a critical attribute and differentiator in the Japanese market. Second, they are competing for control of the customer interface.

Technology Competition

With respect to the three elements of technology strategy, NTT has changed the structure of its R&D

13Cusumano, M., The Software Factory, Chapter 4.

organization to be more decentralized and entrepreneurial. With respect to domain, NTT is moving toward the utilization of additional external methods of technology acquisition. NTT's competitors have more skill in using indirect methods of external technology acquisition. NTT, because it can provide wide access to the Japanese market, has the advantage in securing technology through direct methods (NTT is an extremely attractive partner).

In the context of competition, NTT is shifting away from cooperation and adopting a more competitive stance. The absence of a manufacturing organization puts NTT at a technical disadvantage in some areas. Suppliers currently enjoy superiority in applied research and in software development. NTT maintains leadership in fundamental research capabilities.

Chapter four outlined some of the costs and benefits of NTT's technology control and protection programs. On the positive side, NTT has been motivated to develop new relationships and scan the world for leading technologies and capable partners. On the negative side, optimally-efficient organization design requires very close working relationships,

an integrated multi-functional team approach, in the product development process. To protect vital technology, NTT is moving toward sequential design for product development activities. This approach to the process may handicap NTT with respect to product cost, product quality, and in the speed by which products can be introduced and delivered to the marketplace. To be successful in this increasingly competitive environment, NTT must place more emphasis on developing technology acquisition skills so that it gains as much as it loses from close working relationships.

End User Competition

Japan is a geographically concentrated telecommunications market characterized by intense competition for large business customers. Maintaining direct contact with end-users is paramount to market strategies which depend upon a technology or product feature lead ("demand-pull"), superior product quality (rapid customer feedback), or influence over the customer buying process (distribution channel control). As a result, all of the major competitors are focusing more resources on their direct sales activities (and channel

conflict battles are emerging within supplier organizations). A war is being waged for account control.

NTT is attempting to differentiate itself by offering superior service (pre- and post-sales support) to customers and by selling services and products directly to end users (rather than through resellers, e.g. VAN providers). With respect to client boardroom politics, NTT is maintaining strict neutrality with respect to Japan's industrial groups. NTT's most significant competitive lever will be its flexibility to select from the world's best products and its experience in integrating diverse systems, both on the customer premise and within its own network. Continued success in the last area will hinge on NTT's ability to develop and acquire enhanced software capabilities.

-International competition

Most of Japan's key customers have international operations, and the current regulatory limitations on NTT global activities put NTT at a competitive disadvantage. NTT competitors are securing international channels of distribution and can provide international network services

through their international VANs.

NTT is actively courting partners in order to circumvent these operating limitations. It wants to control the client interface even for services it cannot directly provide. NTT and KDD are already battling for account control. It is only a matter of time before they will be providing competing services.

THE NEW RELATIONSHIPS

The relationships between NTT and its suppliers are changing. A "human network" still binds the five companies, and this network tries to maintain the traditional stability and harmony of what were once entirely cooperative, mutually-beneficial relationships. Declarations of intent are made in order to maintain an "understanding" between the firms.

The Japanese appear to be better than Americans at managing the complexities created by competition, but their culture seems incapable of overcoming natural market forces. I do not pretend to understand Japanese culture, but it appears that competition between these firms is tearing at the very fabric of these relationships. It is difficult to judge

how long this human network will be capable of keeping these relationships intact. Culture may temper the emotions, but the war-like rituals of competitive activity are fully transferable between nations and peoples.

Just as the advent of long distance competition forever changed the telecommunications landscape in America, the "opening" of NTT procurement, privatization, and the introduction of new carriers has forever changed the structure of the Japanese telecommunications industry. The industry is still dominated by NTT and the four "family" members, and this domination will erode slowly.

Industry stability depends largely on governmental action with respect to NTT. The context of the debate regarding NTT's future is rich with salient issues of national interest. NTT does not have to assume the role of passive observer. I hope that this thesis provides some cogency to the argument that, although weakened politically by scandal, NTT can take actions that will influence company destiny, even though such a company "balancing act" is difficult and complex.

With NTT's assistance, new Japanese network and equipment suppliers are entering the industry. For political reasons,

foreign firms are now allowed to participate. I believe that NTT will soon realize that the market value of international partnerships exceeds the political value. As competition from family members intensifies, NTT will need to find suppliers and partners with technical and marketing capability equal to or superior to its rivals. Such potential partners exist abroad. The market opportunities for strong foreign entrants are excellent at this time.

CHAPTER SIX

THE IMPLICATIONS OF INDUSTRY CHANGE FOR THE AMERICAN TELECOMMUNICATIONS FIRM IN JAPAN

American telecommunications companies should consider investing in Japan for three primary reasons. First, Japan represents an attractive and stable investment site.

> "The market is enormous, second in size only to the United States. The economy appears to grow rapidly relative to most other economies. The labor force is of the highest quality and available at moderate cost. The infrastructure of banking and other supporting services is fully developed. The currency is stable. The government is exceptionally stable, and sympathetic to private business. The list of positive factors for substantial foreign investment is a long and impressive one."[1]

The second reason to invest is based upon competitive necessity. NTT's competitors are world competitors that are "globalizing" their operations (Appendix 6-1). Because of the strong yen and political factors, NEC, Fujitsu, Hitachi and Oki are establishing manufacturing operations abroad. NEC, for example, is also establishing an R&D facility in the U.S..

These companies are establishing distribution networks in the U.S. The opening of the American market, with the AT&T divestiture, has made U.S. manufacturers who do not compete in

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1Abegglen, J., and Stalk, G., Kaisha, 217.

Japan vulnerable. If a price war were waged in the U.S., Japanese companies would only subject a relatively small percentage of their revenues to margin pressure. An American firm that is totally dependent on the U.S. market would have all of its revenues subject to margin pressure. The American firm could not sustain a protracted price war. In a global environment, the ability to retaliate in a competitor's home market is essential.[2]

The ability to retaliate, according to Hamel and Prahalad,"... refers to the minimum market share the company needs in a particular country to be able to influence the behavior of key global competitors. For example, with only a 2% or 3% share of the foreign market, a company may be too weak to influence the pricing behavior of its foreign rival."[3] Presence in the foreign market must be significant to be effective.

Highly developed distribution channels are becoming the new barrier to entry in many global markets. "Cost advantages are less durable than brand and distribution advantages."[4] Japanese firms are moving aggressively to secure these distribution channels, which they can maintain by "filling the

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2Hamel, G., and Prahalad, C., "Do You Really Have a Global Strategy?", Harvard Business Review, July 1985, 143.
3Ibid., 146.
4Ibid., 146.

pipeline" with a broad range of products.[5] NTT can provide a foreign firm with a distribution channel in Japan of broad scope (semiconductors, business and residential CPE, network switching and transmission equipment, systems and applications software, etc).

Great learning opportunities exist for American firms which operate in Japan. Participating in a competitor's home market provides intelligence with respect to competitor strategies (new product introductions, technology direction through patent applications, investment plans through activities in the local capital markets, etc.). In addition, the Japanese multinational customer base represents the leading edge in international management techniques and, therefore, represents a valuable source of new product ideas, applications and performance feedback. As Pascale states, "...customers don't do the actual inventing, but their inquiries and complaints plant the seeds for improvements."[6] Japan is also a technology learning center. In areas such as superconductivity, Japan is recognized as the leader in both basic and applications research.[7]

5Ibid., 142.

6Pascale, R., "Perspectives on Strategy: The Real Story Behind Honda's Success", California Management Review, Vol. XXVI No. 3, Spring 1984, 70.

7"Japan Keeps a Lock on its Superconductivity Labs," Business Week, 19 September 1988.

The third reason for an American firm to enter the Japanese market is opportunity. As stated earlier, Japan has a large, prosperous domestic market. In the past, access to the market, for American firms, has been difficult. In 1983, NTT's Chairman stated that the only thing NTT could buy from foreign companies was "buckets, mops, and telephone poles."[8] For the reasons stated in Chapter 2, the environment has improved dramatically.

The timing for aggressive movement into the Japanese market has never been better. First, the strong yen, which the Japanese refer to as "endaka," (125-135 yen to the dollar) makes many American products price-competitive in Japan. Second, Japan is interested in reducing trade friction with the U.S.. Third, for the competitive reasons stated in previous chapters, NTT is looking for new partners, particularly foreign partners.

Strong yen

Japanese firms usually prefer to do business with domestic manufacturers because of the dependability and reliability (proximity) of domestic sources of supply. This represents a competitive advantage for the Japanese supplier when competing with foreign entrants.

The rising cost of domestic production, partially attributable to increasing (real) wages, but due primarily to the appreciating yen, helps mitigate this advantage. In fact,

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8Business Week, 9 August 1982, 42.

Japanese producers are moving manufacturing operations, to supply the home market, offshore. This helps to "level the playing field" in Japan. Japan-based manufacturing price/performance is no longer clearly superior.

In an environment characterized by wide fluctuations in exchange rates, American firms enhance their competitiveness by integrating financial and operating strategies. The firm can hedge currency and factor input cost risks by shifting production operations between countries.[9] In this volatile environment, NTT's position is also enhanced by maintaining a variety of international manufacturing sources.

Trade friction

Effective political strategy may yield the highest return on investment of any element of the strategic option portfolio. The trade issue, with its potential implications for ostracization and retaliation, is of great concern to the Japanese. They brought the issue up repeatedly during my visit to Japan. Some were also frank enough to tell me that the trade issue is the only reason American suppliers are considered on many contracts.

Because of Japan's plethora of political stakeholders, a multi-pronged contact strategy is required.[10] To be effective in Japan, a firm needs influence with the ministries

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9Kogut, B., "Designing Global Strategies: Comparative and Competitive Value Added Chains," Sloan Management Review, Summer 1985, 27.

10Prestowitz, C., Trading Places, Chapter 10.

and the Diet. Favorable press coverage, although difficult for an American firm to obtain (unless you are selling fried chicken or hamburgers[11]), is important. But, by far the most effective lever for U.S. firms is pressure on Japan from its own government.[12]

The Japanese will not penalize American firms that take an aggressive, visible stance on trade issues. The Japanese take issue with the fairness of U.S. trade law, particularly "Item 337" (which places the burden of proof for "dumping" complaints on the accused), not with American firms that use it. One Japanese executive told me he thought any American competitor who did not take full advantage of U.S. trade law was being foolish. He went further to say that he did not expect AT&T's U.S. anti-dumping complaint to affect AT&T business in Japan in any way. AT&T is viewed as a firm exercising its competitive options.

The issue that pervades the Japan-United States telecommunications relationship is the enormous balance of trade surplus that Japan enjoys with the U.S. As a result, the most successful American firms in Japan will likely be wholly-owned U.S. subsidiaries that do not manufacture in Japan. One person explained to me that Japanese-manufactured goods, and those marketed in Japan by U.S.-Japanese joint ventures, do not show up on the balance of trade ledger.

11"Off-the-record" remarks by a U.S. Trade Representative, March 1989.

12"Motorola and Japan," Harvard Business School cases N9-388-056, 057.

Obviously, there are reasons favoring joint ventures in Japan, particularly access to channels of distribution. I, personally, for many of the reasons described by Hamel, Doz and Prahalad,[13] believe a firm should enter into a Japanese joint venture only as a last resort. I would add the loss of favored trade treatment to that list. For this reason alone, an American telecommunications firm in Japan should consider "going it alone" and manufacturing elsewhere.

A complimentary issue to this trade issue is the purchase of Japanese goods in the United States by American firms. An American firm wishing to do business in Japan can greatly aid its cause by having a complete (and hopefully, substantial) accounting of all Japanese products it buys in the U.S. (particularly purchases from companies it wishes to do business with in Japan). We might consider this a form of reciprocity. The Japanese would likely view it as a mutually-beneficial international relationship.

-Urgency

Even though the favorable exchange rate and the trade imbalance are likely to aid American firms in Japan for some time, for the following seven reasons, extreme urgency is required for U.S. firms who wish to take full advantage of the market opportunities.

13Hamel, G., Doz, Y., and Prahalad, C. K., "Strategic Partnerships, Success or Surrender," presented at 1986 Conference of Cooperative Strategies in International Business.

First, U.S. firms should move immediately to fill the vacuum created by NTT's new competitive procurement policies (in lieu of allowing new Japanese competitors to be attracted into the market). Second, NTT is in the midst of a massive effort to "digitize" and upgrade its long distance network. It is unlikely that NTT purchases of the current magnitude can be sustained beyond the next five years. Third, it is very important in Japan to be perceived as the first or an early market entrant. In my conversations with the Japanese, the word "newcomer" was often used, and it seemed to carry a negative connotation. Northern Telecom has invested heavily in Japan, and they have taken the lead in capturing this "first mover" advantage.

The fourth reason for urgency has to do with securing markets in developing countries. The Japanese government is currently funding sizable telecommunications projects in developing countries under the auspices of ODA (Overseas Development Aid), and ODA is actively seeking foreign partners for the Japanese participants. The rationale is simple. Yen are used to purchase foreign goods, and this in turn will reduce Japan's balance of trade surplus.

The opportunity to participate in these projects, and national projects (such as the Kansai Airport) provide the American firm with an additional reason to deploy political influence resources in Japan. Beyond the immediate financial rewards from participation, these projects can provide U.S.

firms with opportunities to demonstrate their capabilities and to develop working relationships with important Japanese concerns (including prospective clients). Involvement in these projects should be an element of a firm's entry strategy. It helps a firm build that all-important reputation, in the business and the political communities, and get established in the Japanese market. Perhaps equally important, it helps the firm become more established in the high-growth telecommunications markets of the developing countries. (Building an effective telecommunications network is considered by many newly industrialized countries as a national necessity, not a luxury, in the development of a comparatively competitive economy-supporting infrastructure.) The Japanese government is currently active in awarding these contracts, and European companies have targeted these opportunities, so prompt American action is warranted.

The need for competitive response is the fifth reason to move quickly into Japan's market. Japanese manufacturers are well ahead of their American counterparts in building distribution channels in the other's country. This lead should be particularly worrisome for the Americans because distribution channels take a long time to build, particularly in Japan because of their anti-takeover regulations.

The sixth reason for prompt action is the uncertainty regarding NTT's future. The nation-wide purchasing power of a single monopoly can make a foreign firm a significant player in the market quickly. NTT is actively seeking foreign

partners. It is ironic that just as NTT helped the four Denwa family members get established, NTT is now doing the same thing for their foreign competitors. NTT, in essence, is providing the opening foreign manufacturers need to set up shop in Japan.

The current Japanese industry structure may be the most advantageous for U.S. companies. As long as NTT is regulated (regulation of its policies would likely decrease if it were broken up), NTT procurement can be monitored, and challenged, if not buried in the "mist" of the Japanese way of doing business.[14] The seventh reason American firms should move quickly is the possibility that U.S. government trade policy attention will shift to Europe in 1992. An emerging "Fortress Europe" may become the primary concern of U.S. policy makers. Today, Japanese-U.S. trade problems head the diplomatic agendas of both nations.

For these seven reasons, American firms evaluating Japanese market entry should make their decisions quickly.

THE NTT MARKET

In the first five chapters, I described the market participants, their existing and evolving relationships, and some of the social and competitive issues that define the

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14"NTT Data Communications Disclosure of Procurement," Nikkei Sangyo, 9 September 1988.

context in which the participants operate. An understanding of these issues is of paramount importance for any new entrant.

The need for competitive intelligence is one of the most fundamental axioms of marketing strategy.[15] U.S. international players undoubtedly view the Denwa family members as key competitors. They have a saying in Japan which is "know your enemy's enemy, for they may become your friend." This is the reason why the changing relationships between NTT and its suppliers are so germane to competitive strategy. Although the overall relationships between NTT and the four family members are positive ones, on a market segment-specific level, NTT and these companies are becoming enemies. The NTT connection can provide a new entrant not only with access to the market, but perhaps more importantly, it can provide a firm with a vehicle to remove some of the inherent retaliatory handicaps American firms face when competing with the Japanese.

In addition to understanding the competition, it is also important for new entrants to understand the characteristics and preferences of the marketplace. I have described some of the key attributes of the Japanese business customer. Chapter four described the buying criteria and the nature of business relationships, including "group" affiliations, in the end-user market. Group consensus is utilized, but final decisions are generally made at headquarters in Tokyo.

15Kotler, P., Marketing Management, (Englewood Cliffs, New Jersey: Prentice Hall, 1988), 49-50.

For the reasons described in chapter four, direct interface with end user customers is a competitive necessity. NTT, because of its size, can be considered a market by itself, with unique characteristics and needs. It is this market, or customer, that has been described in the most detail.

NTT as Customer

This thesis has outlined numerous reasons NTT would make a valuable partner in Japan. NTT represents an enormous market with huge purchasing requirements to meet its own internal needs and the needs of its end user customers (a distribution channel for CPE). NTT has outstanding research capabilities and it has access to some of Japan's finest university graduates. NTT, because of its geographic ubiquity, has considerable political influence in the country. It possesses the advantages of neutrality (which it can use to its advantage much as Japan uses military neutrality to further its economic aims), and it has long-standing relationships with a large Japanese customer base.

An NTT relationship is particularly valuable because of the competitive importance attached to economies of scope in this market. With the exception of consumer electronics, most equipment for this market is highly customized. Manufacturing economies of scale can be maximized at small volumes.[16] The

16Interview with AT&T plant manager, Merrimack Valley, Mass., 15 November 1988.

primary scale economy comes from spreading R&D expenditures over a larger volume of product. Economies of scope are more significant. A firm capable of sharing high distribution channel maintenance costs across message services, network equipment and CPE products will have a distinct advantage.

Even though "network newcomers" will require network equipment and expertise, the size of this market is still relatively small when compared to NTT. NTT engineers provide a substantial amount of technical assistance and advice to these companies, so it appears that the NTT engineers are the primary decision makers (for NTT needs) and influencers (for "newcomer" needs) in the network equipment market.

Network equipment tends to be more standard, and hence requires less nation-specific "adaptive development" (although this investment is still significant) than does CPE. For CPE, in addition to network interface differences, feature requirements are often quite different. A U.S. company strong in network technology might consider establishing a network presence first, which can later be used as a financial and organizational launching pad for marketing CPE.

Strategy Development

As chapter three described, relationships with NTT are established through joint participation in product development. Selection by NTT is a competitive process, so successful penetration requires effective assessment, planning and execution. Market intelligence becomes essential. Both

overt and covert customer needs and objectives should be understood. Chapters three and four described the customer's organizational structure, decision-making process, the sources of power and influence, and corporate objectives and motives.

The formal procurement process, because of regulation and international pressure, is quite explicit. Standard procurement follows the Track I and Track II guidelines, and Track III procedures govern product development work. NTT is capable of manipulating the selection of the track to help it select the vendor it prefers. The Track III selection criteria are more vague, and criteria other than those explicitly stated come into play. But, Track III is still far more "open" than NTT would like, which is causing NTT to re-evaluate its vertical integration posture.

NTT has reorganized its upstream functions in an attempt to become more market-focused. Decision making power with respect to partner selection, while moving slowly toward the profit centers and marketing, is still held by the engineers at the laboratories and at the NSDC, particularly at the middle levels of management. NTT field managers, after headquarters selection of partners, hold significant and increasing influence with respect to the market shares awarded to the vendors. NTT managers tend to be risk-averse, and they enjoy the comfort of established working relationships and guaranteed systems compatibility.

A difficult positioning job faces any vendor wishing to do business with NTT. First of all, there is a bias against

new vendors, for good reason when viewed through NTT eyes, which makes it difficult to "break in." But an even greater obstacle, especially for the foreign firm, is the number of client contacts that are required in the NTT organization if one wants to influence all of the players.

Trade and competitive concerns are discussed in the decision making forum, the Technical Committee. The International Procurement Office (which participates on this committee), acting as an advocate, helps to offset the positioning handicap foreign firms face. In addition, the NTT executives who sit on this committee understand the "social role" NTT has accepted to reduce U.S.-Japan trade friction.

A new entrant's chances for selection can be enhanced significantly by understanding NTT's strategic imperatives, decision making process and leverage points. Possible trade-related strategies have been discussed in this chapter, and NTT's competitive concerns were discussed in chapters four and five. The firm that can effectively integrate NTT political and competitive objectives into their marketing plans will hold a competitive advantage. But, for the U.S. firm, the difficulty of developing an NTT strategy pales by comparison to the rigors of strategy implementation.

STRATEGY IMPLEMENTATION

-Build a Japanese company

As an American, it seems unfair that it is so difficult to penetrate the "closed" Japanese society while the Japanese

have a relatively easy time doing business in our "open" society. Life is not always fair. In Japan, "gaijin" (a not particularly complimentary term for foreigners) will always be gaijin. Americans, in the opinion of many, will never be accepted into the inner circles of society where the real business in Japan is conducted.

The "Japanese way" was referred to often in conversation with both Japanese and foreigners. The "Japanese way" is used as a catch-all to explain anything that appears strange to the Westerner. I do not think most Japanese really understand what the Japanese way is, or agree with one another on what constitutes it.

There are ways of doing business that are different, and it does not take a "Japan expert" to notice it. In my opinion, which I must admit has been shaped to a great degree by both Japanese and American "Japan experts," I believe the cultural barriers are too great for a foreigner to penetrate, even one perfectly fluent in the language. The nature of the client contact is different in Japan. Graham asks a good question when he asks, "How much of the trade deficit is caused by thousands of Americans mismanaging face-to-face negotiations with Japanese clients and partners?"[17] Cultural awareness can be taught, but <u>acceptance</u> is even more important than understanding.

17Graham, J., "Deference Given the Buyer: Variations Across Twelve Cultures,"Cooperative Strategies in International Business," ed. Contractor and Larange, (Lexington, 1988).

Many illustrations can be provided that demonstrate the importance of acceptance. I have chosen one. Foreigners are invited to participate in business discussions during the day in office surroundings. The Japanese have a word for this type of discussion. "Tetemae" means formal discussion where the "real meaning" is hidden. Tetemae is often used as a synonym for an office meeting.

"Honne," on the other hand, describes "real intentions" or "real meaning." Honne usually refers to meetings conducted by Japanese men after-hours in a relaxed environment (usually a bar or a restaurant). True social acceptance, even for the fluent foreigner, is extremely rare.

--Japanese staff

To build a Japanese company, you begin with Japanese people. Because of the importance that relationships, at all levels, play in the diffused "nemawashi" decision making process at NTT, a potential supplier would be wise to hire Japanese with the technical expertise and the social contacts necessary to professionally position the firm with the appropriate decision makers and influencers.

The most attractive source of personnel might be NTT itself. Former NTT managers understand NTT's requirements and the decision making process. At first, the firm should ask NTT for lower- and mid-level managers. Once a relationship is established, if a firm wishes to further solidify the relationship with NTT, the firm should request that an NTT

executive be released for a position in the Japanese subsidiary's executive ranks. The firm should also consider hiring employees from NTT suppliers.

I am not advocating the elimination of expatriate managers. It is important to maintain foreign assignments as bases to develop a company's cadre of international managers. Until foreign managers are assimilated into the corporate culture, which may take many years, expatriate managers play a vital role in global communication.[18]

--Company structure

The "ideal" structure for a U.S. subsidiary, according to a number of the Japanese I interviewed, is the IBM Japan organization structure. The CEO is Japanese, the number two man is American, and the vast majority of employees are Japanese.

A Japanese CEO is critical if a firm wants to be viewed as a true Japanese subsidiary and not just an extension of the American operation. A CEO must be Japanese to move in the right executive circles, and preferably, the person selected will have the university background (Tokyo University) that will allow him to capitalize on the ever-important "old school ties."

A foreign firm should not pay top-dollar for a high-powered Japanese CEO without first having significant

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18Kobrin, Stephen, "Expatriate Reduction and Strategic Control in American Multinational Corporations," Human Resource Management, Spring 1988, Vol. 27, Number 1, 63-75.

operational capability in the country. The Japanese would view such an investment as foolish.[19] Relationships are worth little of they cannot be backed up with the ability to meet the customer's needs.

The Japanese are pragmatists. Most large firms have international operating experience, so they recognize the importance of home office communication and influence. The role of the number two man, the expatriate, should be to ensure that adequate corporate resources are provided and to influence the U.S. headquarters to allow the Japanese subsidiary the freedom necessary to compete effectively in the unique Japanese environment.

With respect to the employee base, the use of Japanese nationals increases effectiveness in-country, but it makes global coordination and control more difficult. This creates dilemmas for the strategist trying to use organization structure as a vehicle of strategy. On the one hand, decentralization and local responsibility (a country manager, for example) enhances local market involvement, learning, focus, responsiveness, and local morale. On the other hand, this type of organization structure can impede corporate learning opportunities and market opportunities. Hamel and Prahalad favor a more centralized, coordinated approach, even though they do acknowledge that the organizational problems are complex. "Country managers are poorly placed to assess their global vulnerability. They can neither understand nor

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19Interview with James Abegglen, 1/27/89.

adequately analyze the strategic intentions and market entry tactics of global competitors."[20] Johnson and Johnson, on the other hand, finds that the advantages of decentralization and autonomy far outweigh the costs.[21] Determining the right balance between central and local control is perhaps the most difficult issue of multinational organization design.

--Recruiting

Recruiting high quality Japanese talent is no easy task. The graduates of Japan's top universities prefer either government ministries or large Japanese corporations. IBM Japan, because of their human resource philosophy,[22] has been able to overcome this obstacle. The talents American firms will face from their competitors in the Japanese marketplace are formidable. NEC, Hitachi, Toshiba, NTT, Fujitsu and IBM Japan were all among the ten most popular prospective employers, according to Japanese science graduates.[23] Women graduates face limited career prospects in most Japanese firms, so this presents a talent source opportunity for U.S. firms.

Japanese graduates are interested in careers, not just jobs. I talked with some young Japanese managers at an American firm who were very concerned that they would not be

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20Hamel,G., and Prahalad, C.K., "Do You Really Have a Global Strategy?," 145.
21"Johnson and Johnson (A)," Harvard Business School case 384-053.
22"A Fine Japanese Company," Forbes, 8 April 1985, 39-40.
23Dentsu Japan Marketing/ Advertising Yearbook 1988, 227.

integrated into the "mainstream" of the company. They fear they will always be considered "foreign" employees (without the "full membership rights" in the corporation which can be taken for granted by American employees). It is imperative for a recruiter at a Japanese university (these were graduates of American universities) to be able to describe a career plan for its Japanese managers, including U.S. assignments, if necessary, that demonstrates a commitment to prepare these managers to compete for future high level positions in the company.

Japanese students, much more than their American counterparts, prefer large, stable companies. Significant investments in "bricks and mortar"[24] will be required to demonstrate a commitment to the Japanese market. Perhaps no investment is more visible, nor more critical, than the establishment of a laboratory in Japan.

-Japanese research and development

Decentralized R&D organizations are becoming more common as global competitors seek to meet local market needs and exploit the differing competencies of nations.[25] Liquid Tide, for example, was made possible by the integration of Proctor and Gamble surficant technology developed in Japan,

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24Abegglen, J., and Stalk, G., Kaisha, 239.
25Friar, J. and Horwitch M., "The Emergence of Technology Strategy," 78.

dirt suspension technology developed in Cincinnati, and hard water technology from Europe.[26]

Many reasons can be delineated for establishing an R&D presence in Japan. I will list only a few.

1) Technology leadership

Japan is currently a technology leader in a variety of key technologies. Japan has moved from "imitation to innovation."[27] To compete globally, firms are increasingly moving to external modes of technology acquisition, and even internal approaches are becoming more decentralized.[28] Measured by total expenditures on research or by the number of researchers, Japan ranks third in the world behind the U.S. and the U.S.S.R..[29] Involvement in Japan's research community is essential.

2) Learning

"Learning" is a broad term. Specifically, the elements of learning I am referring to have to do with learning how the Japanese conduct joint research and gain technology from these relationships. It is widely believed that Americans lose more than they gain from partnerships with the Japanese.[30]

26Ghoshal, S., "Global Strategy: An Organizing Framework," Strategic Management Journal, Vol. 8, 1987, 431-432.

27Friar, J., and Horwitch, M., "The Emergence of Technology Strategy," 53.

28Ibid., 72-80.

29Westney, Eleanor, "The Challenge of Japan-Based R&D in Global Technology Strategy," Technology in Society, ed. M. Horwitch, (draft, to be published), 2.

30Hamel, G., Doz, Y., and Prahalad, C.K., "Strategic Partnerships, Success or Surrender?".

Stories abound of Japanese "partners" at the copy or fax machines, sending every piece of information they can get from a foreign partner back to Tokyo. It has been explained to me that the Japanese believe one of the reasons they lost World War II is that the United States had superior intelligence gathering capabilities. We intercepted their messages, broke their codes, and read their mail. They learned from the experience, and now they're reading ours!

It is not hard to understand why the Japanese learn more from joint research projects, given the fact that "most Japanese scientists and engineers have an effective reading knowledge of English."[31] Americans should think in terms of entering these relationships with Japanese-speaking researchers. This is not only a technology acquisition issue. I would expect that NTT researchers would much prefer to do business with firms that have scientists and engineers that speak Japanese. This is one of the most compelling reasons for establishing a lab in Japan.

3) Recruiting

Recruiting has been touched on earlier. To successfully recruit engineers from Japan's leading universities, relationships need to be established between the firm and the academic community. University professors provide information on, access to, and influence with top students. These

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31Westney, Eleanor, "The Challenge of Japan-Based R&D in Global Technology Strategy," 4.

relationships are established through Japan's technical societies, which include researchers from the academic and business worlds, and these "networks" are even more important to maintain in Japan than they are in the U.S.[32] In order to attract the interest of the Japanese technical community and to demonstrate commitment to Japan-based R&D, it may be advisable to put an American scientist with "star status" in Japan for a few years. That could be the fastest way of establishing the network.

There is much U.S. firms can gain, not only by recruiting Japanese engineers, but also by studying how these engineers are developed and utilized by leading Japanese firms.

> "Recruitment from prestige universities, the O-J-T-based career development program, the long period of generalist assignments and the emphasis on managers' abilities to train and inspire their subordinates will continue to be the hallmarks of Japan's engineering elite....'Core' engineering professionals in large companies are groomed to be the chief strategists and tacticians of the innovation process."[33]

An initial strategy may be to acquire NTT researchers on loan to supplement the American research team in Japan. In addition to aiding marketing efforts to NTT, this could provide the firm with the initial contacts needed to participate in the Japanese technical community. Many researchers prefer the laboratory environment to the field

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32Ibid., 7.
33Wersky, G., "How Japanese Electronic Firms Train Their Engineers," working paper, (London: General Electric, 1987), 69.

environment.[34] American firms may have a "window of opportunity" to hire Japanese researchers scheduled for rotation to the field (a common practice among Japanese firms, and a policy NTT is now pursuing).

4) NTT decision making

The technical departments at NTT, particularly the laboratories, are influential in vendor selection when joint development is required. In fact, when commercial applicability is not apparent, the laboratories make the vendor selection decision. Even though marketing is gaining in power, 92% of new product ideas are still generated in the NTT labs. The accessible technical resources of a supplier plays a role in the selection decision. The Pacific Ocean can be a sizable obstacle to accessibility.

5) Prestige

As mentioned in previous chapters, technical prowess translates into marketplace prestige. Many Japanese customers read technical journals and monitor patent applications. The reputation of the laboratory can be used as a sales lever. A limited number of U.S. private laboratories, such as AT&T's Bell Laboratories, enjoy widespread, positive reputations in Japan.

34Westney, Eleanor, "The Challenge of Japan-Based R&D in Global Technology Strategy," 21.

6) Technical sales

NTT's buyers, in all procurement tracks, are its engineers. As described earlier, even in the end-user market, customers are highly technical and want to "talk technology." NTT has been known to use "one hundred people" to close a sale, and many of these people, I suspect, were laboratory people. (When I was a member of AT&T's national sales organization, we affectionately referred to this strategy as "darkening the skies with experts." We relied heavily on Bell Labs personnel, and the technique worked well.) Customers feel more comfortable knowing technical after-sales support is available nearby, particularly with new products.

7) Product Development

NTT reorganized its R&D efforts in order to get more "market pull" into the product development effort. NTT wants its developers working directly with customers.

Market input and feedback are crucial in the early stages of the product development cycle. The R&D/customer interface is vital in the market in which a firm introduces a new product. If an American firm always introduces its new products in the United States, and later expands its marketing efforts to include Japan, a Japanese R&D presence may be of limited value. Likewise, a firm competing only in NTT's Track I and Track II environments might be successful without Japanese R&D.

The Track III process on the other hand, by definition, implies product introduction in Japan. Geographic proximity to NTT researchers should aid communication, particularly in the early stages of the product development process, which can help a vendor influence the specifications of the design toward his products or capabilities. Anyone with experience in industrial marketing knows how important it is to influence specifications in the RFP (Request for Proposal) process, which the Track III process resembles. A vendor's laboratory personnel, in essence, become the firm's account executives in this environment.

Firms serious about participating in Track III procurement, or those who wish to develop or introduce new products via Japan's market leaders and early adopters, should comprehensively evaluate the costs, the benefits and the functional and organizational placement options of a Japanese investment in applied research capability.

Market expectations

Previous chapters described some of the expectations of the Japanese business customer. Many expect to see a significant financial and time investment (i.e., Northern Telecom) before a relationship is considered "satisfactory." Market entry is risky. A substantial investment does not guarantee success.

Adaptive development is expensive, but the foreign firm that is not willing to fully "Japanize" a product will not

succeed. An executive of a Japanese telecommunications equipment manufacturer described to me a PBX that an American firm had "adapted" to the Japanese market. The American firm did not consider it necessary to change the "ringing tone" capabilities of the PBX. As the executive described it, in Japan, the paging tone traditionally has a "ping-pong" sound. Many tone options were provided with the American PBX, but none were capable of the "ping-pong" sound. The U.S. firm had been told to make this feature change, but had opted not to because of the expense. The American PBX had superior product technology, but because it lacked this "small" feature, the product was a failure in Japan.

This problem is reminiscent of the problems NTT was having with Northern Telecom in the early stages of their relationship. NT was repeatedly asking "why?" when NTT requested a new feature or a change. That mindset, the unwillingness of some Americans to freely accept the differences of the Japanese customer, is puzzling and irritating to the Japanese.

On another cultural note, an NTT executive expressed extreme annoyance at having to speak English to do business with Americans in Japan. He expects to speak English while in the United States, but he feels that any supplier wishing to do business in his country should speak the language. He expressed his disappointment with Americans in terms of the lack of respect given. Speaking the other's language is a

form of respect, and he believes Japan has now earned the respect of the world.

The Japanese still tolerate a great deal of English being spoken in their country. In fact, in order to open up procurement to more foreign companies, NTT now allows proposals to be submitted in English. Even so, any U.S. firm wishing to create the impression of seriousness, commitment and adaptability would submit all proposals in Japanese.

U.S. sales force involvement

Just as sales to Japanese companies operating in the U.S. can be made in Tokyo, sales to U.S. multinationals operating in Japan can be made, or at least influenced, from the U.S.. When a new product is introduced, lead customers are particularly difficult to secure, so an American firm operating in Japan can help its cause by utilizing and leveraging U.S. customer relationships to "prime the pump" in Japan. It appeared to me, during my visit to Japan, that the domestic sales arms of some American companies are not closely involved in, or even aware of, international sales opportunities.

Japanese firms with strong downstream capabilities, such as NTT, may prefer to distribute products in Japan for an American partner that has the ability, and has demonstrated the willingness, to exercise this leverage. With the disappearing demarcation between domestic and international

customer telecommunications networks, the opportunity for extra-national selling appears to be substantial.

Levers with NTT

NTT will not select foreign products purely on price/performance characteristics. NTT will chose partners that will help it achieve its international and domestic technology, marketing and political goals. Firms that have strengths that complement NTT's weaknesses will be in the best position to penetrate the NTT market.

NTT's ideal partner would be one that provides international network services, has an established non-Japanese customer base, provides technological and human resource capabilities in areas where NTT needs support (i.e., software, marketing), and possesses the marketplace, technical and political clout to help NTT establish international standards that are compatible with NTT's existing and planned network offerings.

NTT will use procurement, its monopsony buying power in the Japanese market, to access technology. NTT will look for alliances that provide it with access to software development capabilities and techniques, particularly those relating to applications software (for customer-specific or network management applications). Because it wishes to enter the international market, NTT will want to acquire the technologies required to operate in this environment (for example, international message handling and undersea cable

technologies). In addition, NTT may seek semiconductor manufacturers who can compete with NEC and Hitachi on price and quality, but who are less threatening to NTT in the domestic market.

NTT will be looking for partners it can feel comfortable enough with to organize the joint product development efforts along the more efficient parallel-development path. NTT will seek assistance in marketing, especially with methods to improve business/consumer transaction stimulation activities. NTT is vitally interested in securing information on successful sales and service organization design, staffing strategy, and incentive plans that will help it build a successful national and international large account management team.

For political reasons, I suspect that NTT will lean toward purchasing from firms with high public visibility and U.S. political clout, while at the same time making selective Track I and Track II purchases from small American firms so as to not appear biased against small firms. Because of heavy domestic pressure on NTT to upgrade the nation's long distance network, NTT would benefit enormously from a partnership with a firm with experience in "digitizing" a large national network. For these reasons, AT&T might be NTT's "right choice" for a partner.

The NTT alliance

The optimal legal form that a U.S. firm should seek for an NTT partnership has only been alluded to and not discussed. The NTT alliance can take a variety of forms, from a joint venture to a simple technology agreement covering the joint development process. The alliance can take different forms depending on what elements of the "value chain" are entailed. Joint ventures tend to be costly, unstable and short-lived, but the successful joint venture can provide the participants with the benefits of scale economies, reduced risk, market power, and access to new markets and know-how.[35] In addition to securing products with price/performance characteristics that will provide it with competitive advantage in the marketplace, NTT is vitally interested in the last benefits listed--access to technical and marketing know-how, and access to world markets.

NTT can provide the foreign entrant with immediate economies of scale and scope in Japan. But, market access will not come cheaply. NTT will be intent on gaining more than it gives up, to use its purchasing power to buy knowledge, so any firm entering into a relationship with NTT should know, at the outset, what it expects to gain and what it is willing to give up to meet these objectives. The firm should take technology acquisition initiatives and protection

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35Porter, M., and Fuller, M., "Coalitions and Global Strategy," Competition in Global Industries, ed. M. Porter, (Cambridge, Mass.: Harvard Business School Press, 1986, 322-5.

safeguards, both of which include the use of Japanese researchers and engineers, seriously.

Until American firms develop stronger learning capabilities, they should be wary of technology-driven joint ventures. "The challenge for Western companies is not to write tighter legal agreements but to become better learners."[36] Because of the manufacturers' high reverse-engineering skills, NTT may be a less risky partner in this regard than its competitors. The Track III process encourages a technology coalition without the need for a new legal entity, so I prefer the technology agreement over the technology-based joint venture.

A marketing-based joint venture, on the other hand, warrants strong consideration. NTT currently has several marketing subsidiaries, many of them joint ventures, in fields such as telemarketing (Appendix 4-4). It cannot be assumed that the Japanese gain more from marketing collaborations than Americans do. On the contrary, logic may lead one to surmise that, given the subtleties and intricacies of the Japanese market, U.S. firms may benefit more from such collaborations. The American managers who work in the joint venture company, after the venture is dissolved, can then return to the host company and provide it with the knowledge and experience

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36Hamel, G., Doz, Y., and Prahalad, C., "Collaborate with Your Competitors-and Win," Harvard Business Review, January-February 1989, 139.

gained. The U.S. firm should be able to leverage a marketing relationship with NTT to position itself for favorable consideration on technology/product projects.

Other costs

A close relationship with NTT could damage other important relationships in Japan. KDD, for example, views NTT as a threat and may be concerned about doing business with firms too close to NTT. KDD is currently selecting additional bedfellows, and I, personally, believe they will continue to do so without regard to the partner's other relationships. In fact, a strong relationship with NTT and a powerful presence in both Japan and the United States would give an American firm more, not less, bargaining power with KDD.

NTT is a potential international competitor, so providing it with help in establishing international marketing and operating capabilities, and in particular, giving NTT access to a U.S. customer base, is risky. NTT may be competing with American companies in the United States and around the world within a decade.

CONCLUSIONS

American firms possess every incentive to consider aggressive, immediate entry into the Japanese telecommunications market. The benefits afforded by Japan's strong economy, labor force, technology capabilities and stable political environment (which is experiencing a minor

"bump" with the Recruit scandal), make it a very attractive site for long-term investment. In the new globally-competitive environment, participation in Japan is essential. The opportunity window is currently wide-open because of the strong yen, rising trade pressure from the United States, and because, for political and competitive reasons, NTT is searching for new partners.

In the field of telecommunications, American technology is equal to or superior to Japanese technology. But, advanced products alone do not guarantee success in this market. The successful firm will need a political strategy, for both Japan and the United States, and will need to build a company that can do business the "Japanese way." This Japanese company must have the flexibility to produce products for the unique tastes of the Japanese market and to operate on a Japan-based profitability schedule. A Japanese laboratory is worthy of serious consideration. The Japanese subsidiary should be organizationally structured and positioned so that it has the autonomy to operate effectively in Japan, while at the same time operating as an integrated piece of a globally-integrated corporate whole.

Previous chapters in this thesis provide the reader with an assessment of the capabilities of and the relationships between the major "players" in the Japanese telecommunications market. But, clearly, more detailed analysis than this is required for any firm considering entry into this market.

In my opinion, NTT's market position, combined with the complexities inherent in the competitive dilemmas and opportunities it faces, make it an attractive and receptive partner for any American firm willing to make the necessary commitment to NTT and Japan. A partnership with NTT provides any American telecommunications firm, particularly one that can benefit from the economies of scope that the NTT channel can provide, with an excellent entry opportunity in Japan. A firm that possesses capabilities NTT wishes to acquire occupies the healthiest competitive position. But, NTT is a potential international competitor, so any relationship with this company should be approached with resolve and caution.

I believe that the current industry structure is optimal for Japan and for new foreign entrants. A single, national monopoly is in the best financial and operating position to manage the development to the nation's long distance network, a critical element to improving the nation's comparative advantage (infrastructure) and meeting national social goals (regional development). NTT's new technology strategy provides for the dissemination of technology, particularly basic technologies, to those firms that can most benefit from it. Through its supplier management and procurement practices, NTT encourages competition and innovation while maintaining market stability. By providing a market for foreign telecommunications products, NTT may help a number of Japanese industries stave off the increasing threat of world protectionism.

APPENDICES

Appendix 2-1

New Type I Carriers

(As of December 15, 1988)

Company	Type of Service	Service Area	Start of Service	
Long-Distance Carriers				
o Daini Denden Inc	Telephone Leased Circuit	Tokyo, Aichi, Osaka, Hiroshima, Fukuoka, Miyagi and their neighboring prefectures	Leased Circuit Telephone	10/24/1986 9/4/1987
o Japan Telecom Co	Telephone Leased Circuit	Right of way along the Tokaido, Sanyo, Tohoku and Jyoetsu Bullet Train routes, and areas along those routes	Leased Circuit Telephone	8/1/1986 9/4/1987
o Teleway Japan Corp	Telephone, Leased Circuit	Along the Tomei and Meishin Highways, and areas along those routes	Leased Circuit Telephone	11/11/1986 9/4/1987
Satellite Carriers				
o Japan Communications Satellite Co	Leased Circuit	Nationwide		1989
o Space Communications Corp	Leased Circuit	Nationwide		1989
Regional Carriers				
o Tokyo Telecommunications Network Co., Inc	Telephone Leased Circuit	All prefectures in the Kanto region	Leased Circuit Telephone	11/1/1986 5/1/1988
o Chubu Telecommunications Co	Leased Circuit	Aichi, Gifu, Mie, Shizuoka		6/1/1988
o Osaka Media Port Corp	Leased Circuit	Osaka, Kyoto, Hyogo, Shiga, Nara, Wakayama		3/1/1987
Lake City Cablevision Co	Leased Circuit	7 cities and towns including Suwa City, Okaya City		10/1/1987
International Telecom Carriers				
o International Telecom Japan, Inc	Telephone Leased Circuit	Nationwide	Leased Circuit Telephone	4/1/1989 2/1/1990
o International Digital Communications Inc	Telephone Leased Circuit	Nationwide	Leased Circuit Telephone	5/1/1989 10/1/1989
Car Telephone, etc				
o Nippon Idou Tsushin Corp	Telephone (Car, Portable)	Tokyo, Kanagawa, Saitama, Chiba, Ibaraki, Aichi, Mie, Gifu		12/15/1988
o Kansai Cellular Telephone Co	Telephone (Car, Portable)	Osaka, Kyoto, Hyogo, Shiga, Nara, Wakayama		4/1/1989
o Tokyo Bay Marinet Telecommunications Co	Telephone (Ship, Portable)	Tokyo Bay and the surrounding coast		9/1/1988
Other				
o Railway Communications Co	Telephone Leased Circuit	44 cities and districts excluding Nara, Saga and Okinawa		4/1/1987
Radio Paging	24 companies including Tokyo Telemessage Inc. (23 of which have already started operation)			

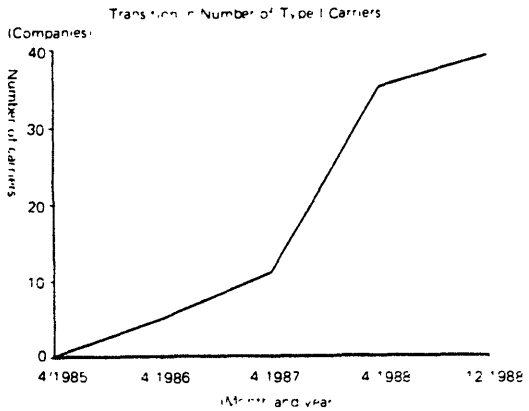
Source: *New Era*, 1 January 1989

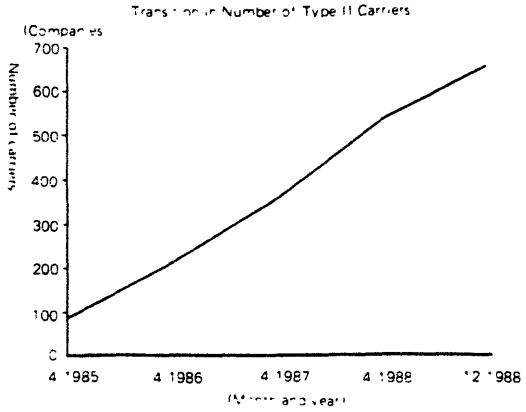
Appendix 2-2

Growth in New Carriers

Unit: Companies

	4/1 '1985	4 1 '1986	4 1 '1987	4 1 '1988	12 ' 1988
New Type I Carriers	0	5	11	35	39
General Type II Carriers	85	200	346	512	622
Special Type II Carriers	0	9	10	18	23
Total Number of Type II Carriers	85	209	356	530	645
Total	85	214	367	565	684





Source: *New Era*, 1 January 1989

Appendix 2-3

Type I Carriers in Operation

As of September 1, 1988

Classifications	No. of companies	Already in operation
Special company	2	2
Long distance services	3	3
Satellite services	2	0
Local services	4	4
International services	2	0
Cellular phones	3	1
Wireless paging	24	19
Others	1	1

Source: NTT

Appendix 2-4

Management Situation of Three NCCs Offering Long-Distance Services

(Unit: billion yen)

Name	Daini Denden	Nippon Telecom	Nippon Kousoku Tsushin
Capital	8 billion yen	9 billion yen	12.45 billion yen
Services offered	Tel./private lines	Tel./private lines	Tel./private lines
Settlement FY 1987			
Revenue	7.3	7.2	3.9
Expenditure	13.9	12.2	10.7
Profit/Loss	–6.6	–4.9	–68
Start-up			
Private lines	Oct. 24, 1986	Aug. 1, 1986	Dec. 11, 1986
Telephone	Sep. 4, 1987	Sep. 4, 1987	May 1, 1988
Main facilities	Micro-wave radios	Optical fiber cables	Obtical fiber cables

Source: NTT

Appendix 2-5

REVENUE STATUS OF NEW COMMON CARRIERS

Revenues ※Million Yen

Items / NCCs	As of March 31, 1988		As of March 31, 1989 (Planned)	
	Revenues	Net-Profit	Revenues	Net-Profit
DDI	8,838 -Leased Circuit 1,300 -Telephone Services 5,900	▲6,439	30,000 -Leased Circuit 2,000 -Telephone Services 28,000	2,000
JT	7,152 -Leased Circuit 2,000 -Telephone Services 5,100	▲4,897	26,500 -Leased Circuit 3,500 -Telephone Services 23,000	0
TWJ	3,865 -Leased Circuit 1,600 -Telephone Services 2,300	▲6,748	16,000 -Leased Circuit 2,500 -Telephone Services 13,500	▲2,000 3,000
T TNet	1,723 -Leased Circuit 1,700	▲5,242	5,000 -Leased Circuit } Not Announced -Telephone Services }	Not Announced
Total	21,578 -Leased Circuit 6,600 (2.2%) -Telephone Services 13,300 (0.4%)	▲23,326	77,500	—

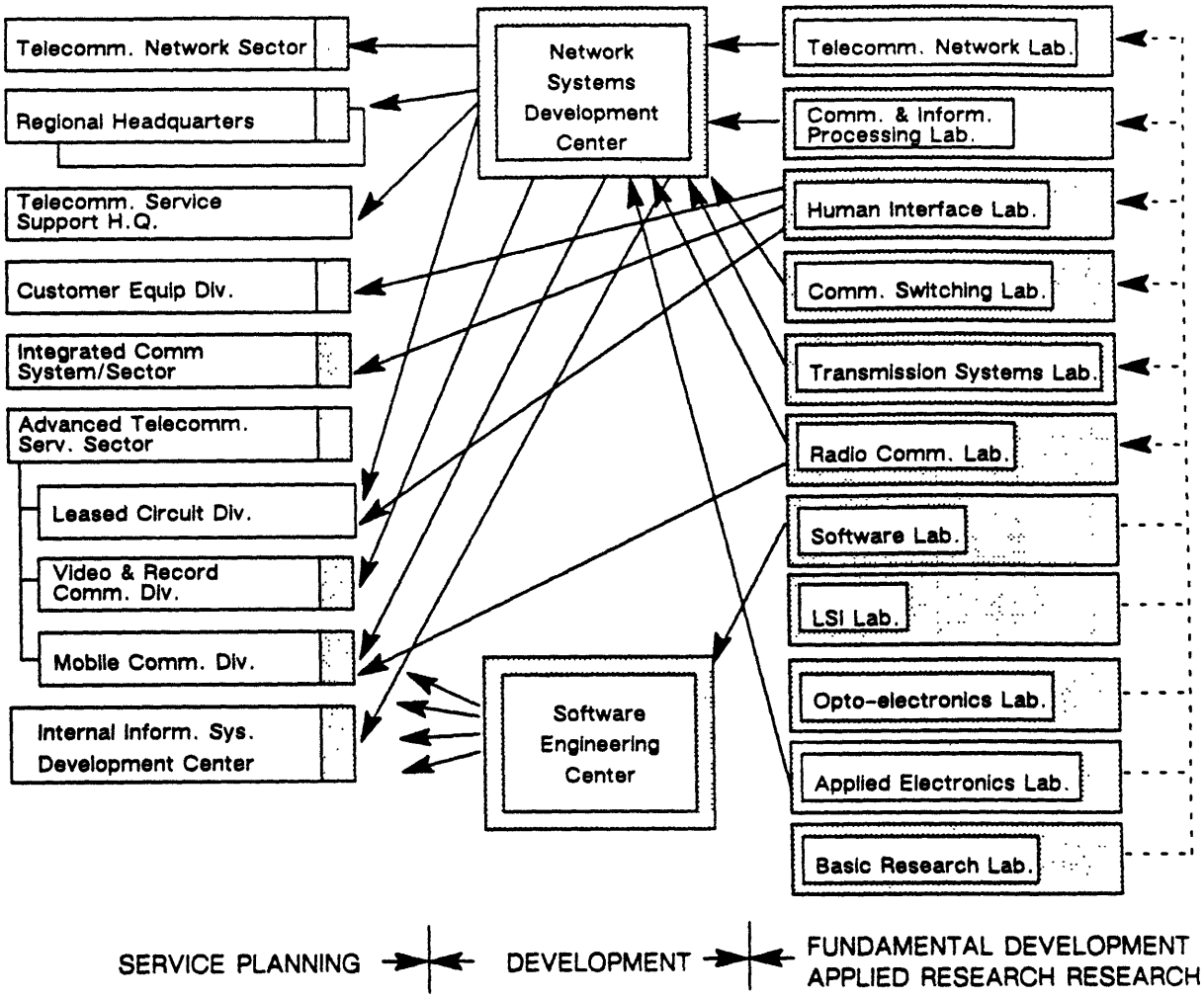
( ) Estimated Share

Source: NTT

K4687gdm/ltd

Appendix 3-1

NTT R&D ORGANIZATION



Source: NTT

K4687Agdm/ltd

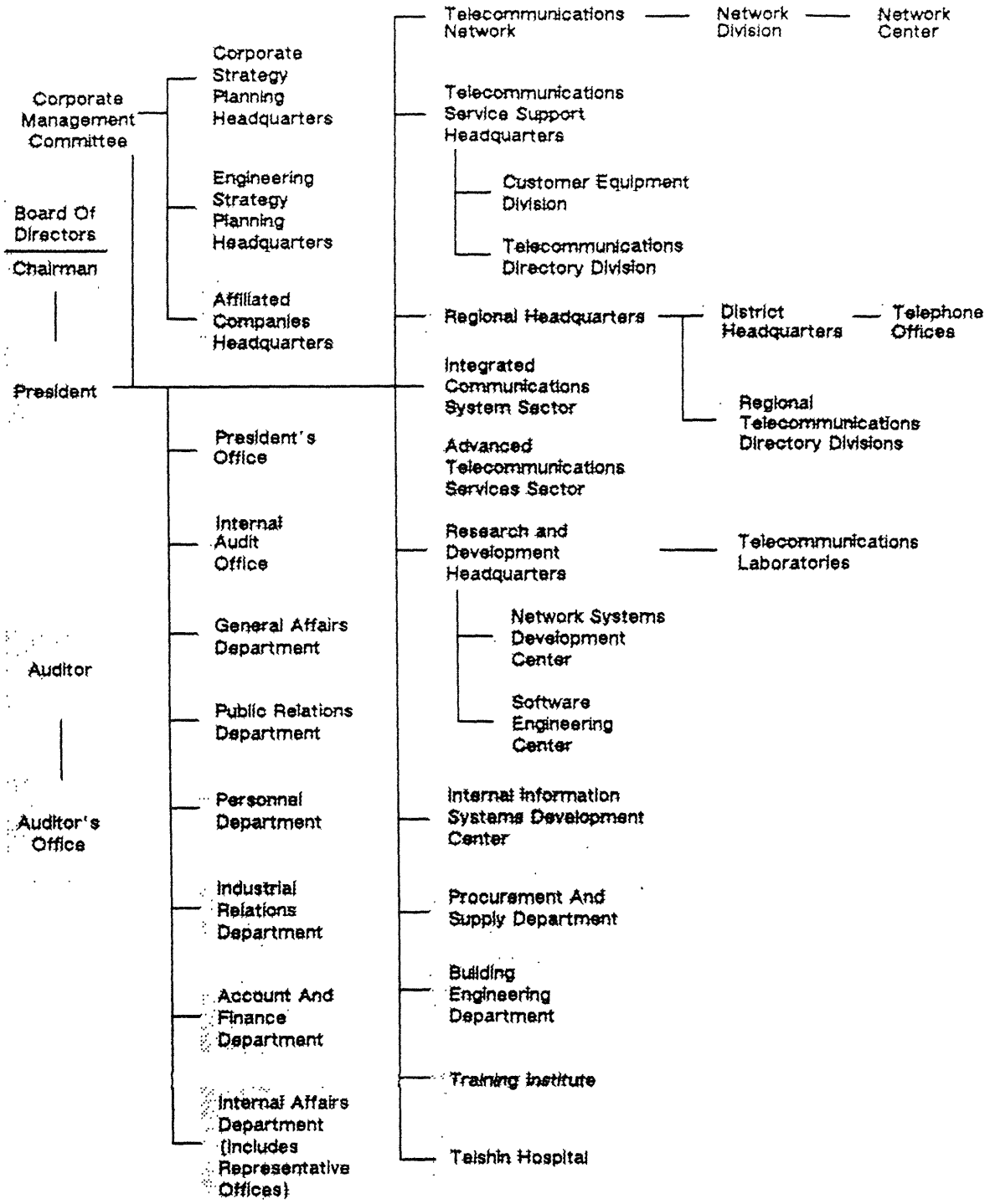
Appendix 3-2

MAJOR PRODUCTS PURCHASED FROM FOREIGN FIRMS

Products	Companies
Digital Switching System (DMS-10)	Northern Telecom, Inc. (U.S.A.)
Supercomputer	Cray Research (U.S.A.)
Computer	IBM, DEC (U.S.A.)
Ada Compiler	STA (Sweden)
Intelligent Multiplexer	Infotron (U.S.A.)
Optical Fiber Cable	Siecor (U.S.A.)
Cable Transfer Splicing System	3M (U.S.A.)
Plasma Deposition System	Electrotech (U.K.)
Digital Multiplexing Equipment	AT&T (U.S.A.)
Emergency Subscriber Loop Carrier Equipment	AT&T (U.S.A.)
Echo Canceller	AT&T (U.S.A.)
DDX Packet Sequence Display and Testing Equipment	Siemens (F.R. Germany)
Pocket-bell Pager	Motorola (U.S.A.)
Mobile Telephone Equipment	Motorola (U.S.A.)
Modem	Telindus (Belgium) Racal Milgo (U.S.A.)
Tracer-2 Telephone Set	Crest (U.S.A.)
Two-Axis Earth Sensor	Officine Galileo - (Italy)
R&D Equipment	Hewlett Packard, Convex (U.S.A.), Cameca, ISARIBER (France)
Telephone Directory Paper	Ahlstron (Finland) Crown-Zellerback (U.S.A.), Follum-Fabrikker (Norway), MacMillan-Bloedel (Canada)

Appendix 3-3

NTT ORGANIZATION



(As of July 1, 1989)

Source: NTT

K4687Bgdm/ltd

APPENDIX 4-1

Central Office Switching Systems

TYPE	COMPANY	MARKET POSITION	MARKET SHARE
Digital Central Office Switching Equipment (1987)	Fujitsu	1	42%
	NEC	2	23%
	Oki	3	19%
	Hitachi	4	16%
Analog Central Office Switching Equipment (1987)	Oki	1	59%
	Fujitsu	2	18%
	NEC	3	14%
	Hitachi	4	9%

Source: Northern Business Information

APPENDIX 4-2

Transmission Systems

TYPE	COMPANY	MARKET POSITION	MARKET SHARE
Fiber Optic Systems (1986) (1)	NEC	2	20%
	Fujitsu	3	18%
	Hitachi	6	4%
"Copper Cable" Transmission Systems (1986) (1)	NEC	1	24%
	Fujitsu	2	19%
	Hitachi	3	10%
	Oki	4	7%
Earth Stations (1986) (1)	NEC	1	49%
Microwave Systems (1988) (2)	NEC	1	60%
	Fujitsu	2	20%

(1) Source: Frost and Sullivan
(2) Source: NTT Manager Estimate

APPENDIX 4-3

Customer Premises Equipment

TYPE	COMPANY	MARKET POSITION	MARKET SHARE
PBX (1986)	NEC	1	40%
	Fujitsu	2	37%
	Oki	3	13%
	Hitachi	4	8%
Key Systems (1986)	NEC	2	22%
	Hitachi	3	13%
	Fujitsu	4	9%
	Oki	4	9%
Facsimile (1986)	NEC	4	9%
	Hitachi	5	8%
Data Communications Equipment (1986)	Fujitsu	1	Unknown
	NEC	2	Unknown
	Oki	3	Unknown
Mobile, Cellular & Paging Equipment (1986)	NEC	1	19%
	Fujitsu	2	11%

Source: Frost and Sullivan

Appendix 4-4

List of NTT's New Affiliated Companies

(As of June 30 1988)

Company	Date of Establishment	Capitalization (million ¥)	NTT s Share (%)	Operations
NTT Leasing Co	Apr 11, 1985	250	40 4	Leasing of terminal equipment
Sogo Tsushin Engineering Co	Apr 26, 1985	20	50	Consulting on telecommunications
NTT System Technologies Co	May 16, 1985	100	100	Designing data communications systems
INS Engineering Corp	May 30, 1985	499	33 5	Design and sales of DIPS systems
InfoCom Research, Inc	June 18, 1985	160	50 9	Research, analysis and survey of telecommunications
NTT Software Corp.	July 2, 1985	200	97 5	Basic software development
Nippon Telematique, Inc.	Aug 20, 1985	300	50	Sales of local CAPTAIN systems
NTT PC Communications Inc	Sept 4, 1985	1,400	90	Developing communications networks for personal computers
NTT Chugoku Media Supply Co	Oct 11, 1985	150	44 1	Provision of information for CAPTAIN
NTT Syscom Corp.	Oct 16, 1985	70	64 6	Sales of PC application systems
Kansai Teleca Co	Oct. 16, 1985	30	50	Coding and advertizing telephone cards

(Continued on next page)

Source: *New Era*, 15 July 1988

NTT's Activities

Company	Date of Establishment	Capitalization (million ¥)	NTT's Share (%)	Operations
PHOTONIC INTEGRATION RESEARCH INC	July 24, 1987	U.S.$4.2 million	49	Development and sales of optical waveguide products
NTT Media Scope Co	Aug. 6, 1987	100	36	Publishing telephone directories
NTT Kansai Telecon Co	Aug. 12, 1987	200	50.5	Telecontrol
Japan Satellite Video Planning Inc	Aug. 18, 1987	150	25	Satellite communications
NTT Building Co	Aug. 28, 1987	3,669	100	Real estate
NTT Material Distribution Service Ltd	Aug. 28, 1987	120	75	Material distribution
NTT Hokkaido Espas Co	Aug. 31, 1987	50	100	Operation of parking lots, etc.
NTT Publisher Co	Sept. 4, 1987	20	51	Publishing
NTT Learning Systems Co	Sept. 21, 1987	200	37	Design and sales of CAL systems
Electro Ad Co	Oct. 2, 1987	50	55	Advertizing
NTT Telecall Shinshu Co	Oct. 2, 1987	30	55	Telemarketing
NTT America, Inc.	Nov. 2, 1987	U.S.$2 million	100	Facilitating NTT's procurement activities in North America
NTT Shikoku Telecon Service Co	Nov. 12, 1987	150	55	Telecontrol
INFAS & NTT NETWORK Co., Ltd.	Nov. 14, 1987	150	35	Promotion of fashion information
NTT Tohoku Telecontrol Co	Nov. 18, 1987	100	54	Telecontrol
NTT do Brasil-Comercio e Representações Ltda	Nov. 25, 1987	currency of Brazil equivalent to 36 million yen	100	Facilitating NTT's technology transfer and research activities in Middle and South America
NTT Gunma Business Support Co	Dec. 7, 1987	30	40	Telemarketing
NTT Telemart Yamanashi Co	Dec. 7, 1987	20	40	Telemarketing
NTT Kyushu Echos Co	Dec. 21, 1987	98	100	Operation of parking lots, etc.
NTT Repro Co	Dec. 23, 1987	97	100	Real estate
NTT Telecom Engineering Tokyo Co	Feb. 8, 1988	80	90	Maintenance of telephone pole lots
NTT Asset Planning Co	Feb. 8, 1988	50	100	Operation of OA schools, etc.
Hello Sports Plaza Kyushu Co	Feb. 23, 1988	95	55	Promotion of fitness activities
NTT Chuou Telecon Net Co.	Feb. 25, 1988	300	52	Telecontrol
NTT Security Management Center Co	Feb. 29, 1988	90	45	Storage of magnetic tapes
NTT Telecom Engineering Kansai Co	Mar. 11, 1988	80	74	Maintenance of telephone pole lots
NTT Telecom Engineering Kanto Co	Mar. 14, 1988	100	90	Maintenance of telephone pole lots
NTT Telecom Engineering Tokai Co	Apr. 4, 1988	100	85	Maintenance of telephone pole lots
Business Communication System Engineering Co., Ltd.	Apr. 26, 1988	200	40	Development of software for PBX use

(Continued on next page)

NTT's Activities

Company	Date of Establishment	Capitalization (million ¥)	NTT's Share (%)	Operations
NTT International Corp	Oct 17, 1985	3,000	52 7	Overseas engineering sales, installation, operations, and consultation on telecommunications
NTT Legato Co	Oct 18, 1985	50	100	Telemarketing
Nippon Computer Security Corp	Oct 23, 1985	495	45	Computer security
NTT Travel Service Co	Nov 20, 1985	40	25	Tourist services
Hokuriku CAPTAIN Service Co	Dec 13, 1985	30	33 3	Provision of information for CAPTAIN
Nippon Information and Communication Corp	Dec 18, 1985	6,000	50	Designing and operating VAN systems
NTT Ad Co	Dec 18, 1985	50	75	Advertizing and publishing
NTT Tokyo Soft Supply Co	Dec 19 1985	50	100	Sales of PC application systems
Le Parc Co	Dec 19, 1985	20	90	Parking
NTT Rental Engineering Co	Dec 24, 1985	380	48	Construction equipment rental
Japan Utility Subway Co	Jan 18, 1986	1,200	39.4	Supervising common-use tunnels
NTT Telemarketing Co	Jan 20, 1986	450	45	Telemarketing
NTT Urban Development Co	Jan 21, 1986	3,043	100	Real estate
Dynamic Admedia	Feb 10, 1986	20	85	Advertizing
NTT System Service	Mar 13, 1986	70	90	System planning and maintenance
Advanced Telecommunications Research Institute International	Mar 22, 1986	10,953 5	57 5	Basic research and development of telecommunications technology
NTT Town Net Service Co	Apr 1, 1986	30	100	Telemarketing
NTT Chugoku Telecom Service Co	Apr 1, 1986	30	66 7	Telemarketing
Nippon Directory Development Co	Apr 26, 1986	300	50	Consultation concerning telephone of directories
Internetwork Inc *1	May 12, 1986	4,000	25	VAN services
NTT Card System Co.	May 22, 1986	100	45	Credit card services
NTT Information Development	May 24, 1986	480	52	Providing business information
NTT Telesupport Co	May 26, 1986	50	51	Telemarketing
Japan Intelligent Building Systems	May 30, 1986	150	20	Planning, consultation and maintenance of intelligent buildings
NTT Finance (U K.) Limited	June 10, 1986	U S.$10 million	100	Overseas financing
NTT R Co.	June 19, 1986	60	35	Development and sales of automatic meter readers and alarm systems for LP gas
NTT Finance (Holland) B.V.	July 7 1986	P.G.L. 0.3 million	100	Overseas financing
NTT Pastel Co	July 24, 1986	20	100	Telemarketing

(*1) June 18, 1985 Planning company established

(Continued on next page)

NTT's Activities

Company	Date of Establishment	Capitalization (million ¥)	NTT's Share (%)	Operations
NTT Telephone Assist Co	Aug 11 1986	30	75	Telemarketing
Nippon Card Engineering Co	Aug 28 1986	800	20	Prepaid card business
NTT Intelligent Building Service Co	Sept 3, 1986	30	52	Maintenance of intelligent buildings and telecommunications facilities
Information Space Service Co	Oct 2, 1986	50	45	Storage of magnetic records
NTT Green Media Co	Oct 31 1986	50	56	Sales of communications and information systems
NTT Tour Media Co	Nov 4 1986	430	20 9	Provision of travel information shared by travel agents
NTT Hokuriku Telmac Co	Nov 17, 1986	30	76 7	Telemarketing
NTT Hokkaido Telemart Co	Nov 18 1986	30	70	Telemarketing
NTT Estate Co	Dec 8, 1986	2,137	100	Real estate business
Nagoya Information Center Co	Dec 16 1986	200	20	Operation of local CAPTAIN center
Healthynet Hiroshima Co	Dec 23, 1986	90	100	Sports club
NTT Telemate Co	Jan 17, 1987	52 5	71 4	Telemarketing
NTT Kyushu Tracom Co	Feb 6, 1987	30	55	Telemarketing
NTT Kyushu Telecontrol Co *2	Feb 12, 1987	400	34	Telecontrol
NTT Emission	Feb 16, 1987	30	65	Provision of information services
NTT Auto Leasing Co	Feb 20, 1987	300	46 5	Leasing of cars and trucks
Nippon Facility Service Co	Feb 26, 1987	100	35	Maintenance of intelligent buildings and telecommunications facilities
Data Security Service Co	Mar 10, 1987	70	42	Storage of magnetic tapes
NTT Building Technology Institute	Apr 1, 1987	50	52	Consultating and transfer of construction technologies
Nippon Ticket VAN Service Co	Apr 1, 1987	100	20	Operations of ticket VAN services
NTT FA-Net Systems Corp	Apr 1, 1987	100	40	Factory automation engineering
Hello Sports Plaza (Kansai)	Apr 3, 1987	95	46	Promotion of fitness activities
Hello Sports Plaza (Tokyo)	Apr 6, 1987	70	41	Promotion of fitness activities
NTT Niigata Communication Co	Apr 24, 1987	30	53 3	Telemarketing
NTT Tohoku Telema Co.	May 1, 1987	50	64	Telemarketing
International Integrated Data Base Corp.	May 14, 1987	200	26	Provision of international database services
NTT Intelligent Technology Co.	June 3, 1987	300	53	Design and sales of AI workstations
AI-REC Co	June 23, 1987	80	51	Ace Mole rental and sales
NTT Estex Co.	July 1, 1987	95	100	Operation of parking lots and driving ranges

(*2) Feb. 20, 1986 Planning company established

(Continued on next page)

NTT's Activities

Company	Date of Establishment	Capitalization (million ¥)	NTT's Share (%)	Operations
INTACT Co., Ltd	May 18, 1988	90	45	Management and operation of real estate
NTT Super Sports Club Corp	June 1, 1988	150	50	Promotion of fitness activities
NTT Telecom Engineering Shikoku Co	June 7, 1988	50	95	Maintenance of telephone pole lots
NTT Telecom Engineering Kyushu Co	June 29, 1988	80	85	Maintenance of telephone pole lots

Appendix 4-5

Computer Market Share Comparison in Japan

Units: Million Yen, Number of Machines

Maker	Placement Value	%	Units	%
Fujitsu	53,8172	32.7	2,348	36.0
Japan IBM	341,148	20.7	676	10.4
Hitachi	302,084	18.4	894	13.7
NEC	254,367	15.5	1,694	26.0
Japan Unisys	160,267	9.7	500	7.7
(Univac/Sperry)	(117,011)	(7.1)	(209)	(3.2)
(Burroughs)	(43,256)	(2.6)	(291)	(4.5)
Japan NCR	32,328	2.0	291	4.5
Mitsubishi	16,881	1.0	110	1.7
Subtotals:				
Japanese		67.6		77.4
U.S.		32.4		22.6
Total	1,645,247	100.0	6,513	100.0

Source: *Nikkei Computer*, 26 September 1988, p. 77

APPENDIX 6-1

ANNOUNCED GLOBALIZATION PLANS OF JAPANESE TELECOMMUNICATIONS EQUIPMENT VENDORS

COMPANY	PLAN HIGHLIGHTS
NEC CORP.	. Has adopted a company theme of globalization. . Intends to increase its overseas production ratio from 30% in 1987 to 50% within four or five years. . Will reinforce its software staff in the United States. . Intends to establish a new company to manufacture electronic exchanges in Thailand. . Plans to produce mobile telephones and facsimile machines in the United Kingdom. . Will produce PBXs in New Zealand for the Canadian market.
FUJITSU, LTD.	. Cites production in the United States as the core of its globalization program. . Plans assembly of central office switches in Singapore.
HITACHI, LTD.	. Intends to increase overseas manufacturing to 30% of total production. . Is restructuring European subsidiaries.
MITSUBISHI CORP.	. Intends to establish an international financial network among Japan, Europe, the United States, and Southeast Asia to procure parts most cost-effectively. . Will manufacture facsimiles and portable mobile telephones in the United States.
OKI ELECTRIC INDUSTRY CO., LTD.	. Plans no specific telecommunications products but will reinforce information equipment manufacturing in Europe, the United States, and Asia.
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.	. Will increase its production of facsimile equipment. Intends to establish an R&D section in Singapore.
MATSUSHITA COMMUNICATION INDUSTRIAL CO., INC.	. Plans to produce mobile telephones in the United Kingdom.

Source: SRI International

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