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The Postwar Telecommunications, Computer, and Software Industries

Charles Weathers

NTT and industrial policy

The Ministry of Telecommunications was established in 1949. The Ministry oversaw telephone and telegraph services. In 1952, just after the Occupation ended, the government turned the Ministry of Telecommunications into the Nippon Telegraph and Telephone Company (NTT). It was modeled on the United States' Tennessee Valley Authority, because government leaders wanted it to be a public firm with the flexibility and initiative of a private firm.

Officially, the Ministry of Posts and Telecommunications (MPT) regulated NTT. In reality, MPT had little control over the company. In addition, the Diet had to approve NTT's budgets and price changes. However, NTT kept Liberal Democratic Party politicians happy by providing them with lots of money. In short, NTT was fairly independent from its establishment until it was restructured and partially privatized in 1985.

NTT played an important role in Japan's industrial policy. Its main purpose was to help raise the country's technology level and support the development of strategic industries. In particular, it was supposed to nurture and support the development of technologically advanced electronics firms. Since the telecommunications sector was protected from foreign competition, national leaders did not think about making NTT internationally competitive.

NTT had to import most of its technology until the mid-1970s. Most technology imports were from the United States' AT&T and Germany's Siemens. For many years, NTT's laboratory, like most Japanese laboratories, focused on copying American technology.

NTT also helped to stimulate economic growth. It did this in part by providing telecommunications services for business and consumers. By the late 1970s, direct-dial phones were available to everyone. In addition, NTT's huge investment budget helped to stimulate the economy during economic slumps.

NTT had a large budget because it forced consumers to buy bonds in order to own phones. The bonds were expensive. They cost 100,000 yen. Phone users also had to pay an installation fee and to pay very high charges for phone services. In addition, the government subsidized NTT, mainly through the Fiscal Investment and Loan Program (FILP). NTT could not make large profits since it was a public company, and its profits were regulated. Instead, it spent lots of

money on investment.

The government has relied on private firms to make communications equipment. Both before and after the war, the "big four" suppliers were NEC, Fujitsu, Hitachi, and Oki. During the 1950s, NTT accounted for over half of those companies' sales. There were also around two hundred other suppliers.

NTT's orders helped the big four firms to develop quickly. The orders provided stable demand that helped the firms to maintain investment. Since there were only four major suppliers, and NTT had plenty of money, the orders were large. This helped the firms to gain economies of scale and make large profits. These profits often subsidized other businesses. For example, the profits on NTT orders helped Fujitsu to remain in the cutthroat computer mainframe business. (Mainframes are the large computers that were produced from the 1950s to the 1970s. IBM introduced the personal computer (PC) in 1981.) Since NTT's orders were stable, large, and highly profitable, the suppliers called the company a "dollar box" (*doru bako*).

The suppliers and NTT shared valuable information, and most products were developed jointly. There was little price competition, but NTT expected the suppliers to steadily improve performance by reducing costs and raising quality. Reliability, not cost, was emphasized. If a supplier had problems, former NTT officials often "descended from heaven" (*amakudari*) to become the firm's chairman and president. Many weak suppliers, especially Oki, may have been protected because they provided jobs for retired NTT officials. Thus, amakudari caused inefficiency and corruption in the telecommunications industry.

Until the late 1970s, there was a strong consensus that NTT should play an important role in industrial policy, and NTT was effective in assisting the development of high-tech industries. Then conditions began to change. Technological innovation became more complex. The US began to pressure Japan to open its telecommunications market and purchase products from foreign suppliers. In addition, companies began to complain about the low quality and high cost of telecommunications services. It was no longer clear what role NTT should play.

MPT, the Ministry of International Trade and Industry (MITI), and other government actors began to argue about how to restructure NTT and the telecommunications industry. In 1985, NTT was partially privatized. Then, in 1996, it was broken up into three firms. At first, this restructuring increased competition only a little because the three firms were placed under an umbrella holding company. Nevertheless, competitive pressures have steadily increased and prices have fallen. In 1985, NTT charged 400 yen for a 3-minute phone call between Tokyo and Osaka. In 1993, the price was reduced to 180 yen, and in 1998, it was reduced to 90 yen. In addition, the introduction of new products, especially mobile phones, and the appearance of new firms like Fusion and Yahoo has greatly increased competitive pressure.

Computers and Software

Japan's industrial policy for computers was successful in hardware (at least until the late 1970s) because it helped firms gain comparative advantage by using economies of scale and steadily im-

proving manufacturing techniques. However, industrial policy was much less successful in promoting the computer software industry, because technological change is more rapid. Innovation and creativity are more important than mass production. In addition, it became more difficult to copy foreign technology by the 1980s.

The government tried to use the same industrial policy for software as it did for steel, autos, and computer hardware. MITI and other government agencies preferred to support large companies. However, they provided less money. In turn, the companies tended to use the same approach in software as in hardware. They copied IBM's strategy of creating closed standards (so that their products were not compatible with other companies' products) and bundling hardware and software (i.e., sold them together). Thus, they "locked in" users — customers had to buy both hardware and software from the same company. The computer companies also created software factories to create economies of scale in producing software and to improve efficiency. (These factories were not supported by government industrial policy.) The software factories were effective in producing software for factories, robots, and other manufacturing applications. They were not very good, however, at creating software for operating systems (OS) and applications.

MITI established the Super High-Performance Computer Project in 1966. It operated for five years. As part of the project, MITI helped create Japan Software, a joint venture that included the Industrial Bank of Japan (IBJ) and the three main computer makers, NEC, Fujitsu, and Hitachi. MITI wanted the three firms to create a common operating system. However, the three firms preferred to develop closed standards so that they could bundle hardware and software. As a result, Japan Software failed. It went bankrupt in 1972.

The closed standards strategy worked for several years. This was partly because IBM was forced by the US government to unbundle its hardware and software in 1969. IBM also had to publish much of its technical information. Japanese companies could then copy and modify IBM software. Copying was not really legal but it was cheap. Therefore, MITI and the computer companies could focus investment on hardware, semiconductors, and telecommunications equipment.

The *keiretsu* (business groups) and industrial policy supported the computer firms, and supported the strategy of using closed standards. MITI preferred to support companies that were large, especially if they were keiretsu members. The six main computer firms were Fujitsu, Hitachi, NEC, Mitsubishi, Toshiba, and Oki. All but Oki were large firms. Mitsubishi and NEC belonged to large keiretsu, the Mitsubishi and Sumitomo groups, respectively. Mitsubishi Bank and Sumitomo Bank provided large loans to Mitsubishi and NEC. In addition, the Mitsubishi and Sumitomo companies usually bought computers from Mitsubishi and NEC. Fujitsu and Hitachi did not have strong keiretsu ties, but the Industrial Bank of Japan bought shares in the firms and provided a lot of loans to them. The IBJ and the Long-Term Credit Bank of Japan provided a lot of capital to the computer industry.

The government protected the computer companies from foreign competition and helped create demand. MITI made it difficult to buy foreign computers. It established a 25 percent tariff on computers in the 1960s. In addition, companies had to apply to MITI for import licenses to buy

foreign computers until 1972. MITI often refused, and put pressure on companies to buy domestic computers instead. Moreover, it usually took three years to get a foreign computer. The companies often complained in the 1960s because the quality was much lower than for IBM machines. Government agencies usually bought Japanese computers. They accounted for about 25 percent of domestic demand from the 1960s to the 1980s. Like private companies, they sometimes complained, so MITI often compromised and let government agencies import at least one foreign machine, especially if it would greatly improve efficiency. However, NTT bought most of its computers from foreign companies until the early 1970s.

Industrial policy did not work as well for software as for hardware. Most of Japan's software was produced by large firms, but they were not very innovative. It was very hard to establish small software firms that might have produced more original and innovative products. In contrast to Silicon Valley, it was hard for start-ups to get bank loans. Banks wanted land as collateral, and Japan did not have a venture capital market. Protection for intellectual property was weak. That made it easier for large firms to copy foreign technology, but it discouraged entrepreneurs from starting small software firms. An exception was game-software, where start-up costs were low, and firms like Sega and Nintendo became very successful.

Japanese firms were internationally competitive in hardware by the late 1970s, but the performance of software was not good. MITI tried to encourage unbundling, but had no success because the economy began to grow, and because companies did not want to pay the high costs of using new IT equipment. However, the situation was changed by the "IBM industrial spy incident" in 1982. Hitachi and Matsushita were caught trying to copy IBM technology, and were forced to begin paying licensing fees. Japanese companies were no longer able to copy IBM software free of charge. They realized that they would have to develop their own to remain profitable.

By the 1990s, MITI had changed strategy. It began to use market forces to promote development of a stronger software industry. As in telecommunications, new products and foreign companies played an important role in increasing competition. IBM introduced DOS/V in 1992. DOS/V made it possible to use Japanese on IBM computers. Later that year, Compaq began to sell DOS/V machines in Japan for less than half the price of Japanese machines. Japanese companies then began to reduce prices as well. Although they changed the market in Japan, IBM, Compaq, and other foreign computer (hardware) makers made only modest profits there. The big winner was Microsoft, whose software still dominates the market in Japan, as elsewhere.

Study and Discussion Questions

1. Why was NTT independent even though it was a regulated public company ?
2. What role did NTT play in industrial policy ?
3. What relationship did NTT have with the "big four" suppliers ?
4. What were the strengths and weaknesses of industrial policy in the telecommunications industry ?
5. How did the government support the computer industry ?
6. Why did computer makers prefer to use closed standards ? What was the weakness of the strategy ?
7. Why was industrial policy less successful for software than hardware ?

8. Why did Japanese computer makers finally stop using closed standards?

Sources (The main sources for the lecture are the three works below by Marie Anchordoguy).

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