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Adaptation to Environment by the Nippon Telegraph
and Telephone Public Corporation(NTT)

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I. Introduction

The Japanese telecommunications business was started in 1868 and managed by the government until 1952. At that time, the Nippon Telegraph and Telephone Public Corporation(NTT) was founded to replace the old system. NTT reconstructed Japanese telecommunications systems which had been completely destroyed during World War II, and accomplished two big management goals by 1978: "Instant Telephone Installation" and "Direct Distance Dialing." In 1984, the Telecommunications Act was amended, and NTT's monopoly over telecommunications was abolished. Resultingly, NTT was changed to a private company (The Nippon Telegraph and Telephone Co., Ltd., the new NTT) in 1985, and other private companies have subsequently joined in the telecommunications business. Thus, the new NTT is faced with a competitive market environment, which it has never before experienced. It is now indispensable for the new NTT to adapt effectively to a competitive market which is becoming rapidly information-oriented and internationalized.

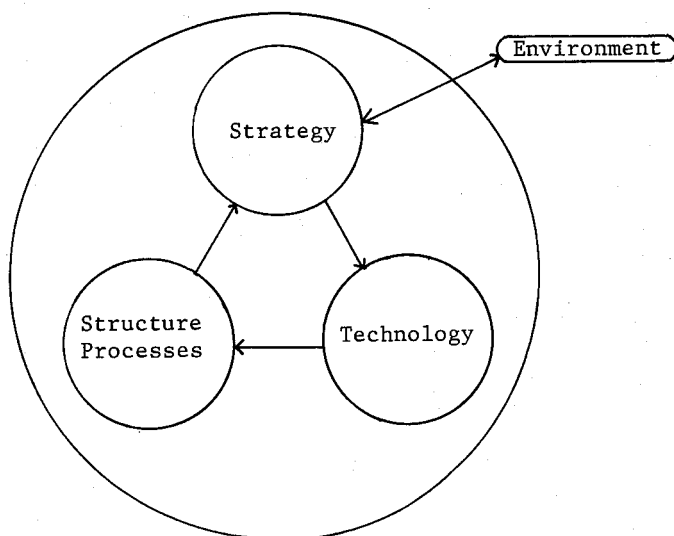
This paper deals with that NTT's adaptation to environment. First, I will analyze the past management of NTT, using the analysis model developed by Miles & Snow (1978) on organization theory¹. Next, I will discuss the adaptation of the new NTT with reference to results of the above analysis.

II. NTT's Adaptation to Environment after 1965

The adaptation to environment by NTT after 1965 when it initiated services other than telephone service was analyzed in terms of environment, strategy, technology, and structure-processes.

According to organization theory, strategy is a policy as to what domain (product-market environment) the organization should operate in and what technology of production and distribution it should adopt, and strategy is implemented through the organizational structure and processes. That is, organization aligns itself with a particular portion of overall environment by defining the domain and manages the internal interdependencies created by this form of alignment. This adjustment process produces a particular configuration of strategy, technology and structure-processes (Figure 1). Thus, organization theory considers the organizational adaptation to environment as a dynamic process of the domain definition and management of internal interdependencies. It should be noted, however, that "adaptive decisions made today tend to harden and become aspects of tomorrow's structure?" Therefore, it is

Figure 1. The Research Model

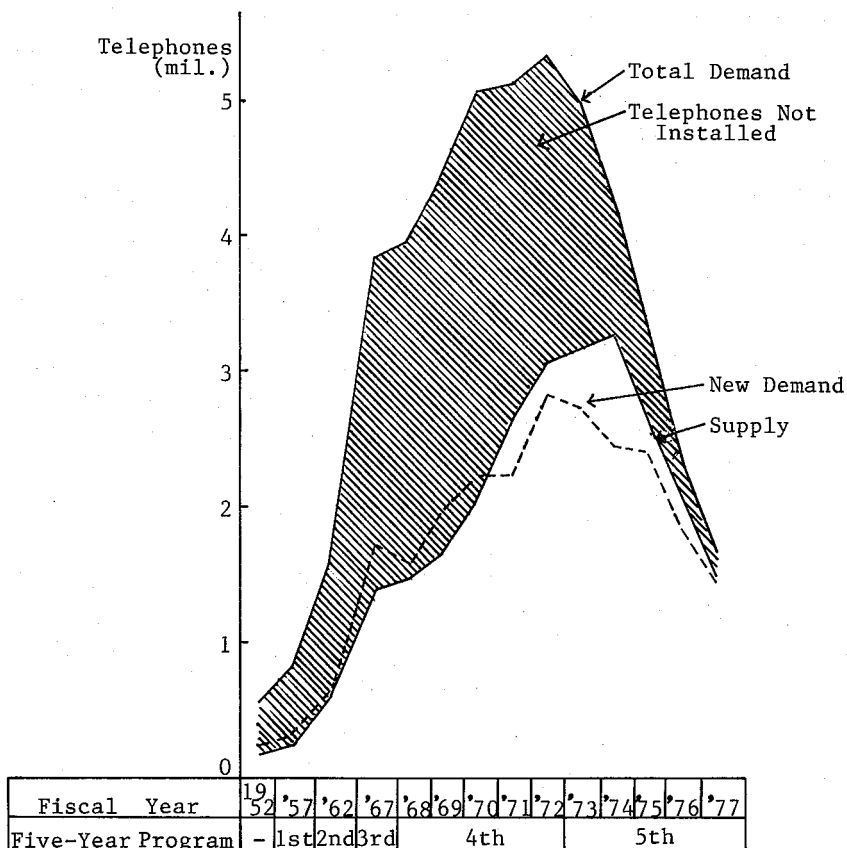


very likely that the new NTT still maintains a large portion of configuration of strategy, technology, and structure-processes of the old NTT. This is one reason why I have analyzed NTT's past adaptation in the first part of this paper.

1. Environment

NTT as a public corporation was regulated in many aspects, although a self-supporting accounting system was imposed upon it. It was expected that NTT activities should always agree with the public interest. Even the essential factors of management such as telephone rates, wages, budgets and appointments of executive personnel had

Figure 2. The Supply-Demand Relation of Telephones



Source: The Japanese Ministry of Posts and Telecommunications (1984), p.42.

to be either decided by the Japanese Diet or approved by the Minister of Posts and Telecommunications.

Nevertheless, the institutional environment of NTT was much better than that of the Japan National Railways (JNR) which has been also managed as a public corporation. This difference must be due to a difference in technology between two corporations. NTT dealt with invisible services, while JNR dealt with visible services. The former carried information, while the latter carried passengers and goods³. Moreover, it was fortunate for NTT that telephone charges were not so high as railway fares. Such conditions made most citizens indifferent to NTT, and it could enjoy more freedom of management than JNR.

The market environment of NTT was most stable during this period. As a reflection of the high growth rate of the Japanese economy, demand for installation of telephones always exceeded the supply until 1979 (Figure 2).

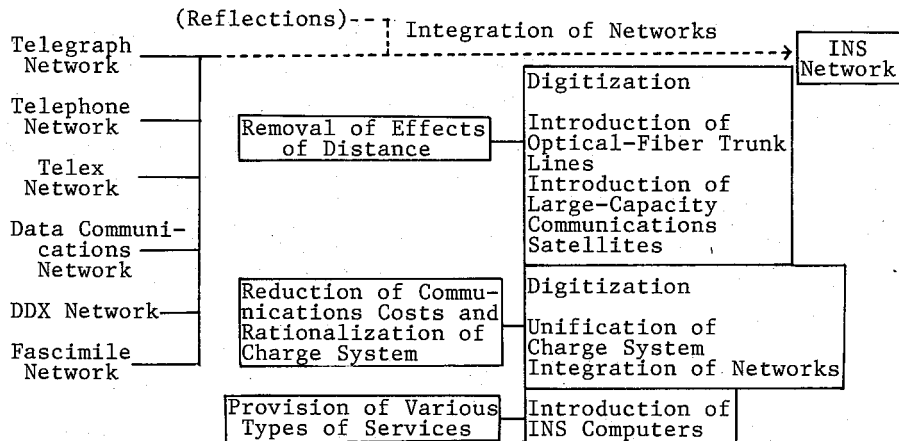
2. Strategy

(1) Domain Definition

The first president of NTT, T. Kajii, defined two management goals in 1957: "Instant Telephone Installation" and "Direct Distance Dialing". Although the objectives seemed to be only dreams at that time, such clear goals served to raise the morale of all NTT employees⁴. NTT began to expand its domain from 1965, starting its super-highway communications service and its data communications service. This expansion of domain was based on the doctrine that NTT should not rent only lines for communication but should provide also various kinds of communications services. The above two management goals were attained by 1979. Recently, NTT advanced another new ambitious project, the Information Network System (INS). The INS is a system for integrating communications services, which are presently divided into digital and analog systems, into a single, digital network. This will enhance the accessibility, variety, economy, and convenience of communications ser-

vices in Japan (Figure 3).

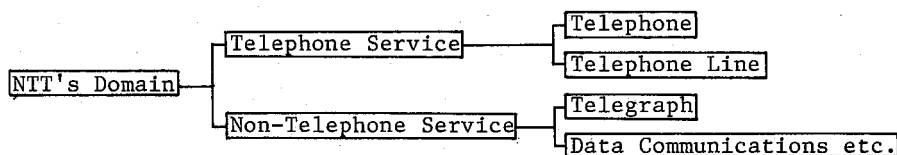
Figure 3. A Course to INS



Source: The Nippon Telegraph and Telephone Co. Ltd.(1986), p.186.

Thus, NTT modified flexibly its management goals and considerably expanded its domain, an exceptional case among public organizations. This must have been possible because of the depth of technology in telecommunications. However, it should be emphasized that telephone service has been a central domain of NTT since its establishment and has supported financially the exploration of promising new domains (Figure 4).

Figure 4. NTT's Domain



(2) Growth

Until the 1970's, NTT was just a follower of American and European telecommunications corporations in the field of new services. Therefore, it was able to develop this

new field in Japan with low investment in research and development and with minimal risk. However, this was not the main cause of its efficient and rapid growth. Much of NTT's growth was caused by incremental market penetration of telephone services. The total number of telephones in Japan increased fourfold during 1968 and 1981 (40 million in 1981). Sales of telephone services accounted for 90% of total sales and increased more than 10% every year during the above period.⁵ However, the growth rate of telephone services has already declined and new services other than telephone services are being explored for future growth of the new NTT.

3. Technology

Production activities of NTT could be divided into two main components in terms of technology: the telephone service component and the non-telephone service component. Different technology was applied to each component.

Telephone service was provided by making networks of telephone lines and building up telephone offices and transmitting stations. Thus, the technological component of telephone service was functionally organized, exhibiting high levels of routinization, formalization, and mechanization in an attempt to approach cost efficiency.

On the other hand, the technological component of non-telephone service was flexible. For example, data communications service was provided through the following steps: (1) client consultation, (2) operations investigation, (3) order reception, (4) system design, (5) bargaining, (6) equipment construction, (7) personnel training (8) initiation of services, and (9) maintenance. Thus, the technological system of non-telephone service required flexibility and was difficult to standardize.

Technology concerned with telecommunications has improved rapidly. NTT actively introduced these improvements to make high quality and economical service possible.⁶ As a result, NTT was faced with a personnel reshuffle prob-

lem. Telephone operators became unnecessary when direct dialing was introduced. It is said that NTT's history is a history of personnel reshuffle⁷. By the end of 1983, more than 140,000 employees were reshuffled. Such a huge personnel reshuffle was facilitated by cooperative union-management relations and intensive personnel training. Cooperative relations between union and management were arrived at by the following agreement: "Conflicts between union and management should be resolved in collective bargaining and the agreement obtained in collective bargaining should be fulfilled by both union and management." Personnel training was carried out in three forms: (1) on-the-job training, (2) off-the-job training, and (3) school training. In 1983, 76% of the total employees were trained in new technology⁸.

4. Structure and Processes

As mentioned above, strategy and technology of the NTT were differentiated to accommodate stable telephone service and dynamic non-telephone service. This duality was also reflected in organizational structure and processes⁹.

(1) Planning

Since the telephone service market was a "sellers' market", its planning tended to be oriented toward problem solving rather than problem finding. The planning sequence involved the following steps: (1) setting of output and cost objectives, (2) translation of output and cost objectives into specific operating goals and budgets, (3) comparison of actual results to projected figures, and (4) any necessary adjustments.

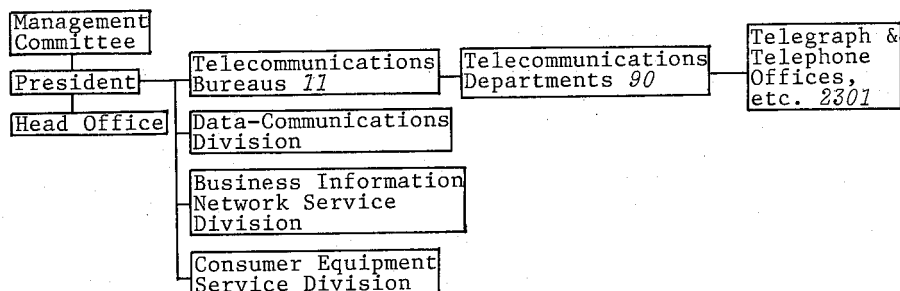
On the other hand, planning for development of new non-telephone service was carried out in a different way. This planning occurred through close interaction between the Engineering Department and the Marketing Department in the Head Office. The initial step in planning was to evaluate new services currently being investigated by AT &

T, the British Post Office, and the like. Then, the Electrical Communications Laboratory of NTT did research for introducing new services and reported its findings to the Engineering Department. When NTT decided to introduce a new service based on these results, system design, equipment construction, and marketing campaigns were readied. Thus, the planning for new non-telephone service tended to be oriented toward problem finding rather than problem solving.

(2) Organizational Structure

Organizational structure consisted of a major functional organization and three service divisions (Figure 5).

Figure 5. Organization Chart of NTT, 1985



(Note) Figures in italics indicate the number of independent facilities.
Source: The Nippon Telegraph and Telephone Co., Ltd. (1986), p.10.

The functional organization concerned with telephone service had four levels in its hierarchy. In addition, NTT had 11 Telecommunication Bureaus which were responsible to the president. Within each Telecommunications Bureau there were several Telecommunications Departments, and within each Telecommunications Department there were a number of Telegraph and Telephone Offices. Each organization subunit contained an extensive division of labor and was highly formalized.¹⁰ Such functional organization was well suited to the centralized management of telephone service.

For non-telephone services which were introduced since 1965, new independent divisions were established sep-

arately from the preexisting functional organization for telephone service. Each division was a self-contained organization subunit with a service responsibility comprising several sections.¹¹ For example, the Data-Communications Division included five Data Sections, the General Affairs Section, and the Marketing Section. Because of the complexity of technology involved, those divisions operated with a minimum of standard procedures, and employed many project teams.

(3) Coordination and Control

NTT used two different forms of coordination and control for telephone and non-telephone service subunits. In stable telephone service subunits, coordination and control were achieved by use of standardization and planning. When exceptional problems occurred, they were solved by the Head Office's Departments concerned.

Conversely, since many non-telephone service operations were closely interrelated, simple coordination and control mechanisms such as standardization and planning did not suffice. Therefore, project teams were organized to compensate for the above mechanisms. Within these project teams, operations were coordinated and controlled through meetings of members intimately familiar with the nature of the project.

(4) Performance Appraisal

Again, a different definition and appraisal of organizational performance was applied to two subunits in NTT. In the telephone service subunits, performance was defined in term of efficiency. NTT prepared its profit objective and service betterment goals to every Telecommunications Bureau every year since 1963. The actual results were compared to projected figures and necessary adjustments were made.

In the non-telephone service subunits, performance was defined mainly in terms of effectiveness. For example,

in the Data-Communications Division, performance was appraised against projections of sales in facility service.

(5) Interdepartmental Power Relationships

Personnel, Maintenance, Plant Engineering, and the Accounting and Finance Departments wielded considerable power in the Head Office. The Personnel Department was especially strong because of its contribution to the stabilization of union-management relations that were the most uncertain factors. Because Maintenance, Plant Engineering, and the Accounting and Finance Departments held management resources and produced most NTT earnings, they ranked high. The Engineering Department followed the above departments. A possible reason for rather large power wielded by the Engineering Department was that it was engaged in moving new services into standardized production. It is conceivable that the Marketing Department charged with selling in the monopolistic market wielded less power. Non-telephone service divisions wielded still less power because their sales were marginal.

(6) Organizational Culture

An organizational culture is defined as a system of values which organization members implicitly hold in common. To be specific, it is the members' mode of thinking and behavior that is essential to the organization's success.

NTT inherited values such as "telephone operator's spirit" and "engineering worker's spirit", which originated with employees of the Ministry of Communications during the Meiji era. Members who embodied these values were respected as heroes or heroines. NTT had many popular myths which resulted from these values. Among them, "More than twenty operators died with receivers on their ears in the air raid on Tokyo" and "Engineering workers walked for 8 km carrying cables on their backs at midnight in the Izu-kanogawa Typhoon." Such organizational culture was created among the personnel who were engaged in telephone service

and contributed greatly to the certain supply of telephone service!²

On the other hand, a new user-oriented culture is growing among personnel who are charged with non-telephone service. Possible causes of this phenomenon may be: (1) that personnel in this service area have exposed themselves to competitive markets, and (2) that their task is to develop a service system which meets the needs of its clients.

5. General Evaluation of the NTT Structure and Processes After 1965

The structure and processes of NTT after 1965 had characteristics which were demonstrated in the preceeding sections. These characteristics combined to reduce uncertainty within the organization and provided top management with ability to control operations of various subunits closely!³

However, the fact cannot be overlooked that NTT possessed some bureaucratic dysfunctions like those in other public organizations. In its structure and processes, NTT's specialized subunits were too heavily emphasized and the decision-making system was too centralized. Therefore, the following dysfunctions were brought about in NTT, especially in telephone service areas: (1) lack of adjustment in directives or instructions among functional areas, and (2) inhibition of ingenuity in lower subunits by the Head Office!⁴

III Tasks of the New NTT for Environmental Adaptation

In this paper, I have analyzed environment, strategy, technology, and structure-processes of the NTT after 1965, and the results have demonstrated that these qualities were linked together to form a consistent pattern.

The choice of which domain or which segment of a particular domain an organization will operate in is most important for its environmental adaptation. Fortunately, the

new NTT has great leverage in defining its domain because of the depth both in technology and in the market for telecommunications. The new NTT should define its future domains for obtaining synergistic effects in cooperation with other private corporations. It will also be necessary to develop new management resources which facilitate new projects, and to discard the bureaucratic dysfunctions mentioned above. However, the new NTT should take care not to impair management resources accumulated during the period when NTT was a public corporation.

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Notes

- 1 See Miles & Snow (1978), pp.13-30, pp.249-263.
- 2 Quoted in Miles & Snow (1978), p.28.
- 3 See Hiramatsu (1980), p.5.
- 4 In 1953, a fund-raising system of issuing debentures to telephone subscribers was founded. This system was unique in the world and contributed greatly to the attainment of two big management goals.
See Ikeda (1980), p.192, Hiramatsu (1980), p.4, and Hirota(1981), p.162.
- 5 See Hiramatsu (1980), p.5.
- 6 See Hirota (1980), pp.161-167.
- 7 See Ikeda (1980), p.180.
- 8 A quick change for NTT in the technology of telecommunications might affect easy acceptance of new technology by employees and good union-management relations.
See the Nippon Telegraph and Telephone Public Corporation (1984), p.97.
- 9 See Miles & Snow (1978), pp.42-77.
- 10 See Hiramatsu (1980), p.171.
- 11 The Business Information Network Service Division and the consumer Equipment Service Division were not completely self-contained organization subunits.
- 12 See Ikeda (1980), pp.95-109.
- 13 See Miles & Snow (1978), p.46.
- 14 See NTT's internal materials.

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