

**STRATEGIC VISION TOWARD THE NEXT-GENERATION TELECOM INDUSTRY**

by

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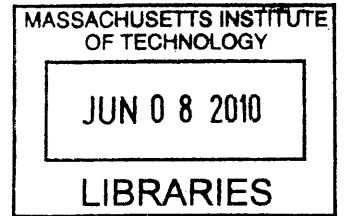
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## **ABSTRACT**

Telecommunication industry is experiencing volatile change in technology and business model. Every telecom company needs strategy that gives direction through rapidly shifting environment. NTT, Japanese telecom giant is not exception. In this thesis, Delta model is utilized to obtain strategy that leads effective management and operation of future NTT.

Another objective of this thesis is to understand the effect of different strategic bias and finding way to overcome difficulty of distinction between strategic opinions. Although Delta model is containing theoretical essence from all strategic fields, it has focus on rational planning and positioning view. This results some difficulty to apply Delta model for NTT that recently biased by emergent strategic view through experiences of continuous fight against threat from emerging new technologies and services. To fill this gap, alternative theories of Disruptive Technology, Invisible Asset, Overextension, and Organizational Knowledge Creation are applied in combination with Delta model and examined.

Through experimental mixture of Delta model and alternative theories, I obtained NTT's strategic perspective and recommendations for technology development, business globalization, and preparation against future threat.

Thesis Advisor:       Arnoldo Hax  
Title:                 Alfred P. Sloan Professor of Management Emeritus



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## CHAPTER 1 INTRODUCTION

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Recently, the telecommunications industry has become one of the most volatile industries in the world. In addition to traditional telephones, in use since the early 20th century, two new waves of technology have brought complete change to the industry: the Internet and mobile phones (also called cellphones). With the likelihood of continuing and sometimes radical changes in technology and business models, strategies for success in this industry have become crucial.

For this thesis, I conducted research into designing strategy for the Japanese telecommunication industry's leading company, Nippon Telegraph and Telephone Corporation (NTT). To construct effective strategies for NTT, I examined several theories and frameworks, including the Delta model, technological strategy theories, disruptive technology, invisible assets, and organizational knowledge creation. These models and frameworks were created to enable businesses to design and execute better strategies. At the same time, however, I found it was also necessary to take a careful approach to integrating theories, as each has different attributes.

Numagami (2009) discusses integration and mapping from the perspective of organization and strategy study. A map of strategic methods can be developed by using a virtual axis of planning/top-down to emergent/bottom-up and a horizontal axis of inner-resource focus to outer environment focus. Then, on this plane, we can plot major strategic

theories such as strategic planning, emergent strategy, a positioning view, and a resource-based view, as follows:

(1) Strategic planning based on rational planning and top-down execution is located in the upper half area.

(2) Emergent strategy that focuses on opportunities found on the front line and emphasizes a bottom-up approach takes the lower half area.

(3) A positioning view based on rational thinking about the relationship between entities in the environment lies in the upper right area.

(4) A resource based view (RBV) that stresses resource accumulation through operation is located in the lower left.

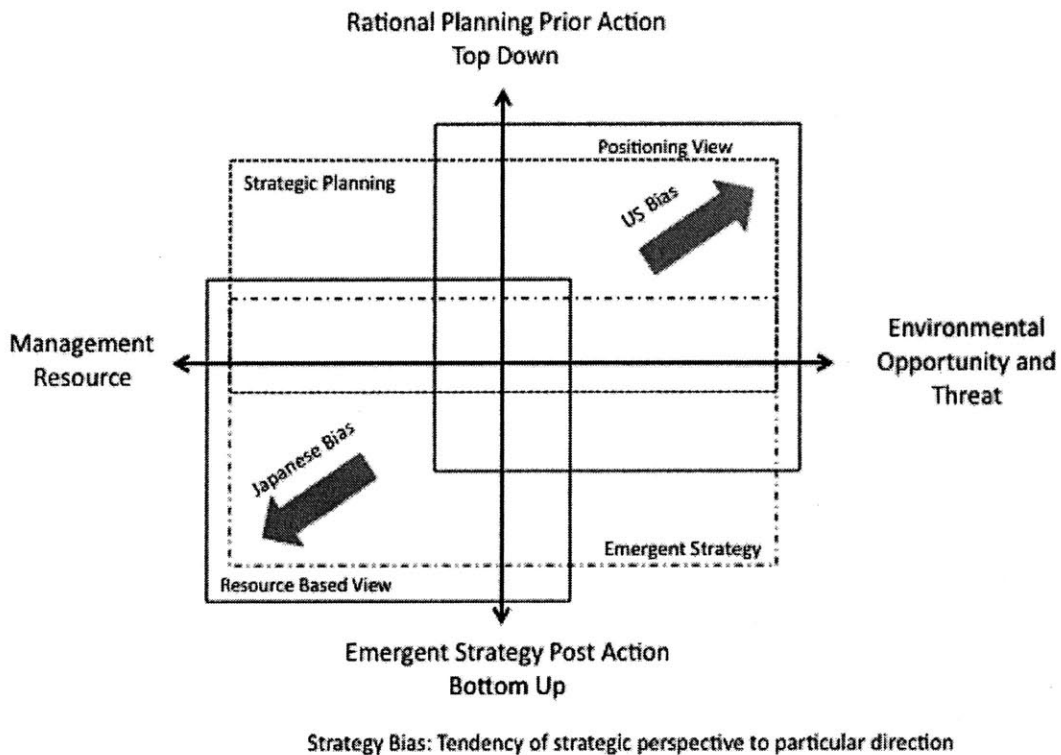
All four theories overlap in the middle area of this plane. This indicates that all of them share some knowledge and experience, which leads us to say that there is no ultimate theory for strategy.

Numagami (2009) also discusses bias in strategic thinking. Management in Japanese companies generally have adopted a mixture of RBV and Emergent Strategy as a good strategy. The reasons for this include (a) distinctive Japanese business customs such as long-term employment, (b) low liquidity in the labor market, and (c) a low rate of spin-offs. These characteristics encourage ambitious personnel who have new ideas for innovation to remain with the company. This generates a high level of potential for innovation within the organization and a bias toward strategic thinking about resources. In contrast, US companies function in a fluid labor market, and if an employee becomes discontented with

the company or has a new business idea, there is no barrier preventing him/her from exiting the organization. The result is often fewer accumulated inner resources. Thus the “strategy bias” of U.S. firms moves in the opposite direction from Japan, and can be defined as a mixture of Positioning View and Strategic Planning.

The concept of strategic bias includes a basic tendency toward strategy thinking and perception. Every strategic theory covers all the elements of planning, emergent, environment, and resources. These biases place companies in a specific quadrant in the model, and it results in a less balanced type of strategy thinking (see Figure 1-1).

**Relative position for Strategy perspective and Japanese strategy thinking bias**



Source: Numagami (2009).

**Figure 1-1. Map of strategy theories and strategy thinking bias**

Hax and Wilde (2001) and Hax (2009) integrate various strategic views into one procedure that everyone can utilize. Their Delta model coverage is broad enough to cover the entire range of strategy theory. By using the Delta model's unique strategy mapping and strategy bias concept, we can transfer their theories into pragmatic procedures. Early in the Delta model process, customer value proposition and firm competence are integrated. This pulls the balance between biases both to the right and to the left. Using the Delta model, we also can control US strategy bias toward overrun and cause.

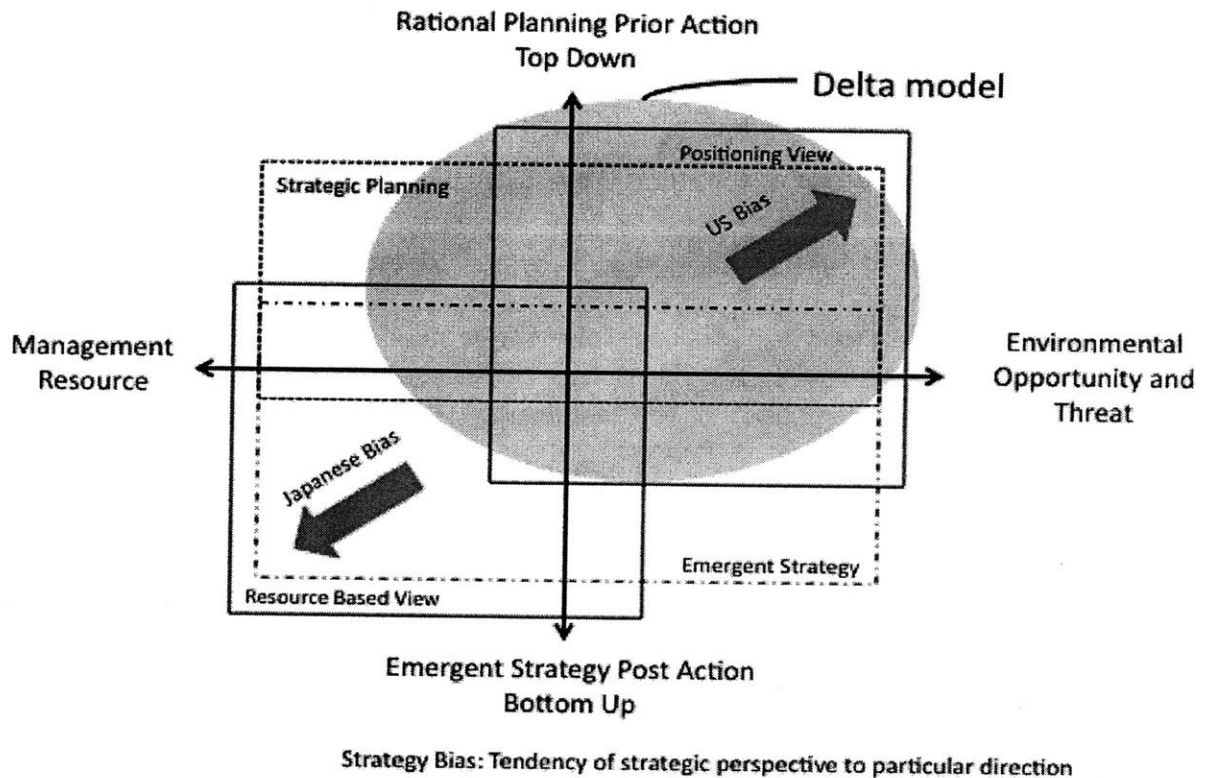
Although the Delta model covers the entire strategy spectrum, it also can focus on a particular area of the strategy map: for instance, emphasizing rational planning prior action and environmental relationships, especially alignment with customers and complementors. In the Delta model, this position is in the upper right area (see Figure 1-2). Thus the Delta model fits US firms for purpose of identifying and developing a well-balanced strategy.

For Japanese firms, however, a meticulous approach is required when utilizing the Delta model because of possible differences in strategy bias among Japanese companies (that is, the Resource-Based View and the Emergent strategy thinking bias), which are the opposite bias from US firms (that is, Plan and Environment strategy thinking bias). Numagami (2009) noted possible pitfalls with various biases and perspectives. Sometimes people perceive a different perspective as a lack of strategy. People with different opinions engage in dialogue, but they have difficulty interacting if they regard strategy differences as a lack of strategy. In such a case, it could result in contempt for each other. Care must be taken when applying the Delta model to non-US firms, including Japanese. To avoid these



potential pitfalls, my research conducted “Verification in advance” and “Reflection in action.”

### Japanese Strategy thinking bias and Delta model



Source: Numagami(2009). Adapted by author.

Figure 1-2. Position on the Delta model

In the following chapters, I present a case study of NTT as an example of a Japanese telecom firm, and I develop a strategic vision base using the Delta model, and obtain fuller knowledge about how to leverage the idea of strategic bias and to avoid pitfalls. I make two assumptions, then verify them in order to understand the current circumstances of NTT’s strategic bias.

Assumption 1: NTT operates under the effect of Japanese strategic bias (Resource Based View & Emergent strategy).

Assumption 2: The telecom industry has bias toward Emergent and resource obtaining strategy, as a result of continuous new entrants and threats such as the Internet and mobile phones.

Based on these two assumptions, I examine the effect of Japanese strategic bias on NTT in the context of the telecom industry. In reality, actions need to be taken through NTT's business operations in order to resolve the problem. However, for purposes of this thesis, I have limited my research to just the practice of strategic planning.

## CHAPTER 2 INDUSTRY PROFILE

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### 2-1. OVERVIEW

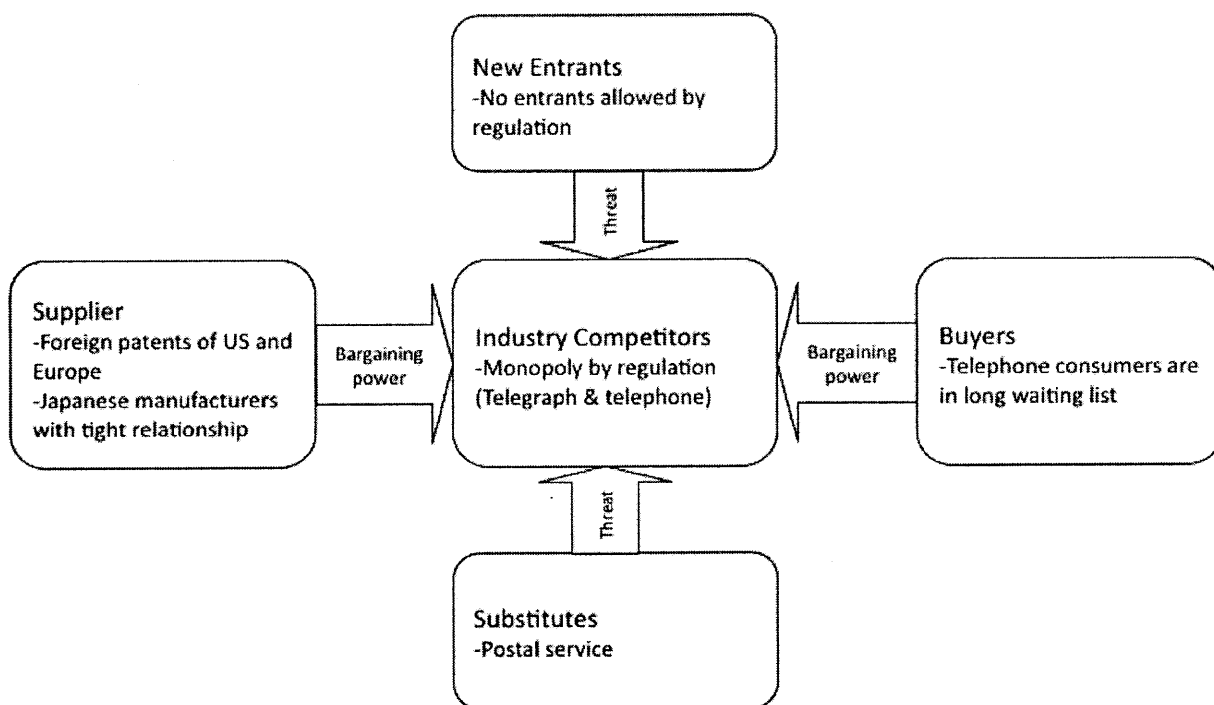
In this chapter, I present a brief history and profile of the Japanese telecommunications industry. This industry was originally guided by government policy, as the government directly owned telephone service operations. Then it became privatized and NTT was established. Today, NTT strives to enhance its competitive position. Thus the history of the industry is one of repeated introductions of liberalization policies, new entrants, and adaptive actions by NTT. Figure 2-1 gives a brief chronology of the telecom industry.

National strategy and deregulation of the telecom industry	
	Regulation/Policy/Event
1952	-Publication of "Reconstruction of Japanese Economy" -Nippon Telegraph and Telephone Public Corporation (NTTP) established
1978.3	-Wait queue for new telephone line orders eliminated
1979.3	-Auto connect phone system available throughout Japan
1984.12	-Legislation for telecom reform: "NTTP Privatization", and "Telecom market liberalization"
1985	-NTT Law becomes effective -Nippon Telegraph and Telephone (NTT ) is established
1986	-New entrant in long distance communication
1996.12	-Guidelines established for basic interconnection rules
1997	-Revisions to Telecommunications Business Law and NTT Law
1999.7	-NTT reorganized into group companies: holdings, local, international, mobile, data
2000.9	-Government declares "e-Japan Strategy"

Figure 2-1. Historical overview of the Japanese telecom industry

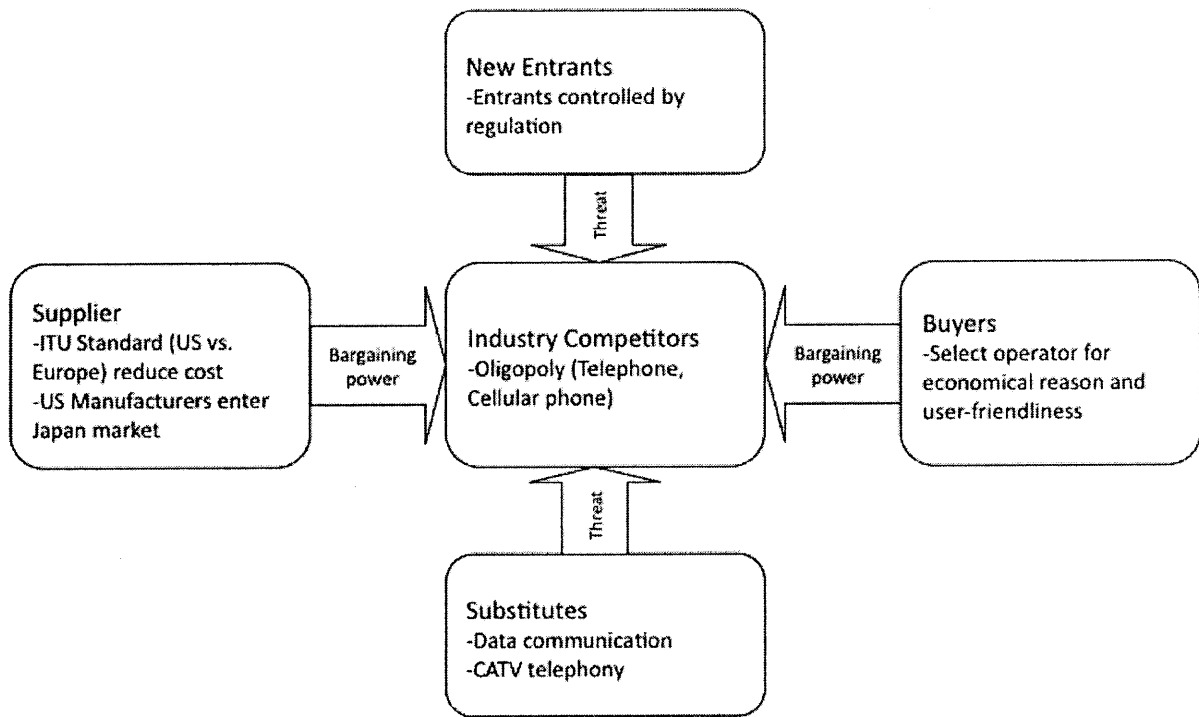
In order to clearly analyze the structure of the Japanese telecom industry, I used the Five Forces framework to depict the three historical periods (see Figures 2-2, 2-3, and 2-4). The changes that have occurred over time can be seen by comparing the three figures.

The first period (Figure 2-2) represents the industry before NTT was established. Nippon Telegraph and Telephone Public Corporation (NTTP) had a monopoly, the period was characterized by a diffusion of telephone networks. The entire Japanese society was in recovering from the damages sustained as a result of World War II, and NTTP aimed to bolster national industrial development by constructing a national telephone infrastructure. This objective included original R&D activity to escape the control of foreign patent laws.



**Figure 2-2. Five Forces in the first period (1950s to 1980s)**

The second period (Figure 2-3) features privatization of NTT, the establishment of NTT, and liberalization of the highly competitive telecom market. During the first period, Japan's domestic industry developed world-class proprietary technology, and its market and information processing technologies acquired greater freedom. In second period, telephone business became highly profitable based on this technological foundation. New services also emerged, and the Internet and cellular phones began to diffuse widely.



**Figure 2-3. Five forces in the middle stage (1990s)**

The third and most recent period is characterized by service competition (Figure 2-4). Telecom and CATV now compete with each other across business boundaries. Competition includes not only telephone services but also Internet access, multi-channel

television, and video on demand. Mobile communication has now penetrated into territory formerly owned by fixed-line services. These kinds of multi-services are bundled into packages that are both economical and convenient, such as Triple/Quadruple play.<sup>1</sup> Along with service changes, Internet-based technologies such as IP-packet control, Ethernet link and router network operation eliminate old telephone technologies. IEEE standards and module structure allow high-cost performance equipment by utilizing R&D in developed countries while manufacturing in low production cost countries. Liberalization of the industry and promotion of competition has resulted in a domestic focus on fostering industry from hardware to software, service, and web.

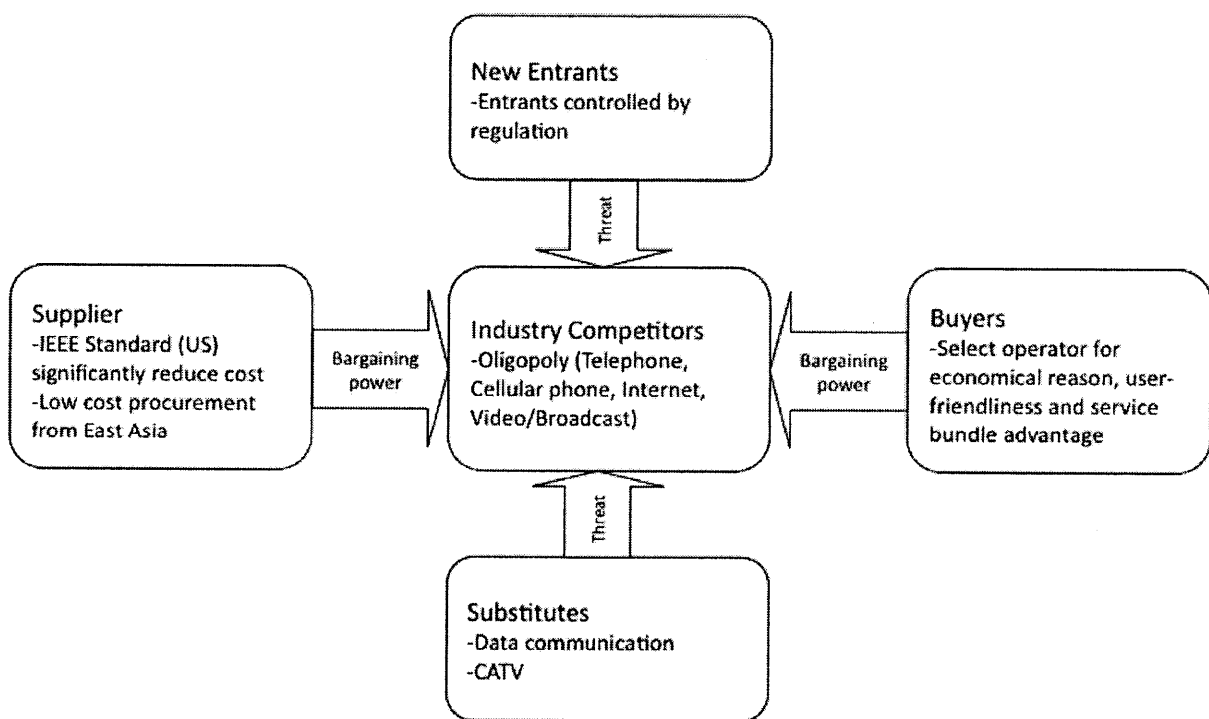
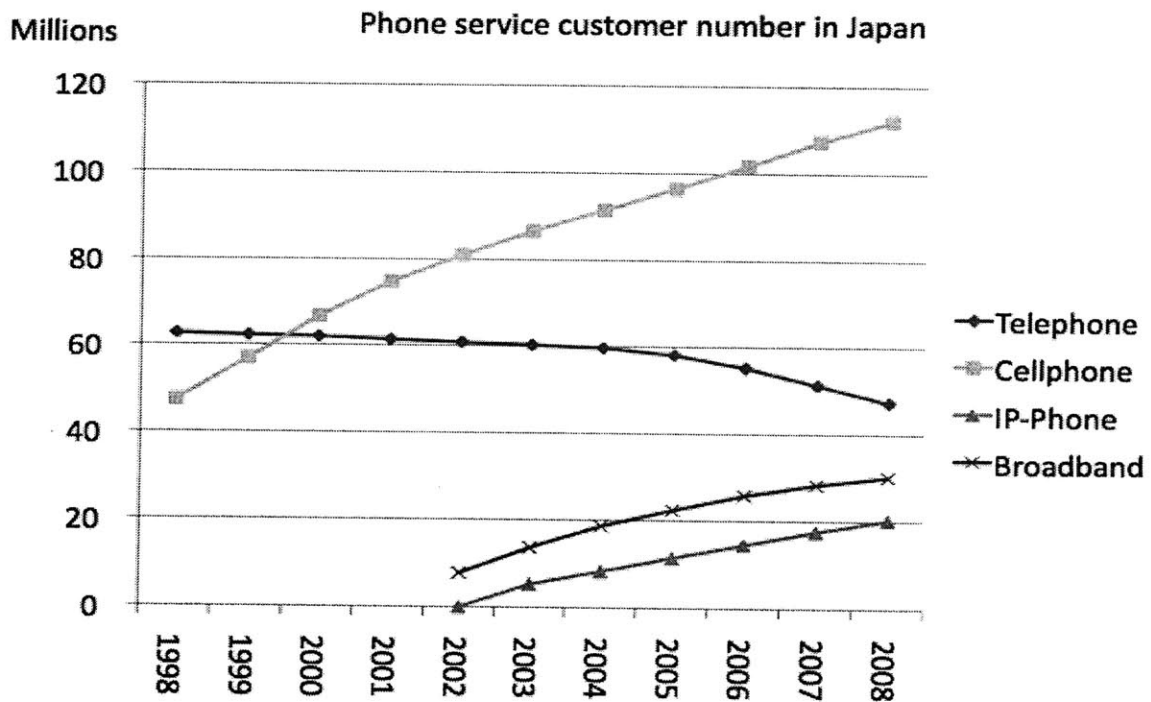


Figure 2-4. Five forces at present

<sup>1</sup> Triple play means service binding of telephone, Internet, and television. Quadruple play is adding mobile phone service to triple play service.

## 2-2. MACRO TRENDS

The Japanese telecom industry is generally regarded as an advanced market with cutting-edge technology and service. Thus, the numbers in Figure 2-5 indicate that ordinary, analogue telephone service is declining. On the other hand, cellular phones and IP phones that use a broadband connection are increasing in numbers as an alternative to traditional telephone services.



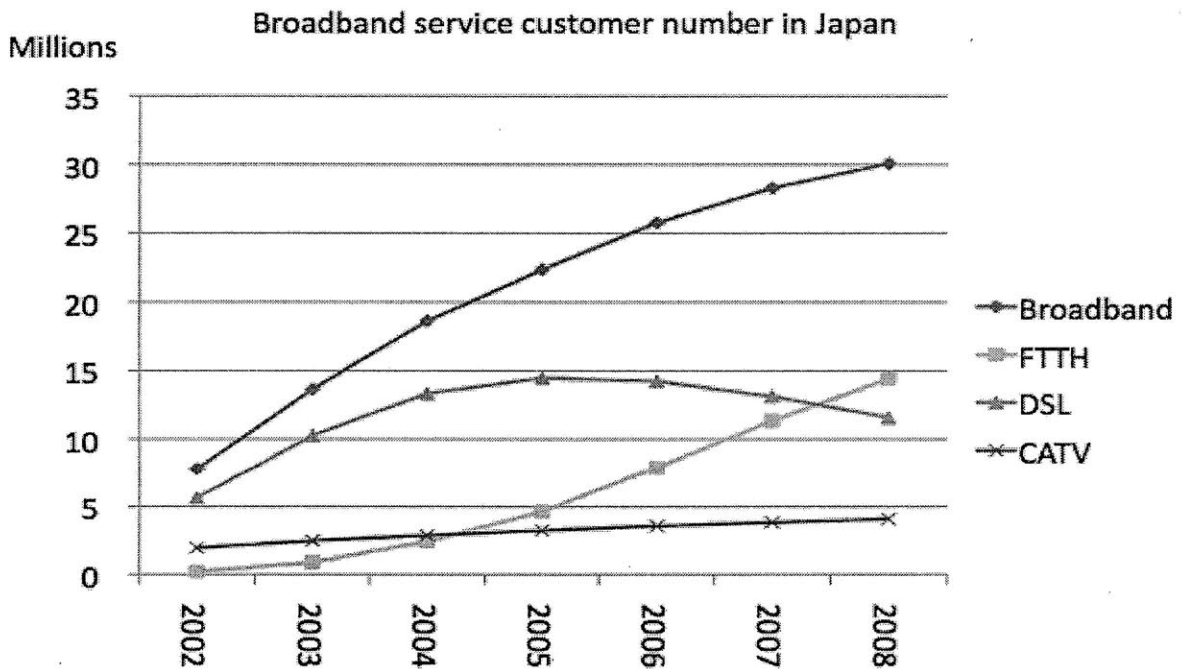
Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-5. Trends in telephone services

Furthermore, strong competition is apparent in this new service market. Digital Subscriber Line (DSL) and CATV were major players during the early stages of diffusion. In particular, DSL was the biggest driving force during severe sales competition among the

oligopoly firms. However DSL began shrinking because FTTH (Fiber To The Home) began to expand its services until FTTH finally overtook DSL in 2008.

Overall, CATV companies are not as popular. There are many regional operators with local stakeholders, and Multiple Services Operators (MSOs) were not active until recently because of regulations and business customs. The government encouraged CATV to bolster its media diversity into local areas, but CATV was unable to build a strong equity base, so it has always lagged behind its competitors in the Japanese broadband market (see Figure 2-6).

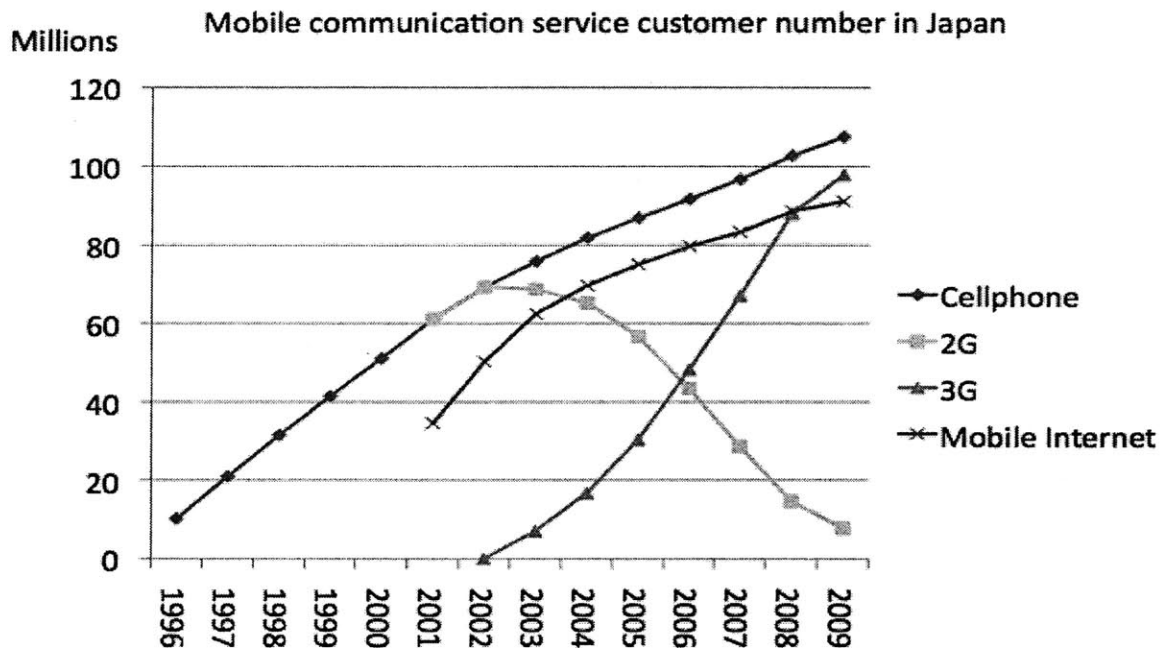


Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-6. Broadband service trends



The mobile communication market in Japan is unique compared to other countries. The total number of customers is almost equal to the total population of 127.77million<sup>2</sup>—a very high penetration in a market. Concurrently with the diffusion of cellular phones, the evolution and migration from 2G to 3G is about finished, and 2G has virtually disappeared from the Japanese market. Today approximately 90 million people use 3G mobile Internet services (see Figure 2-7).

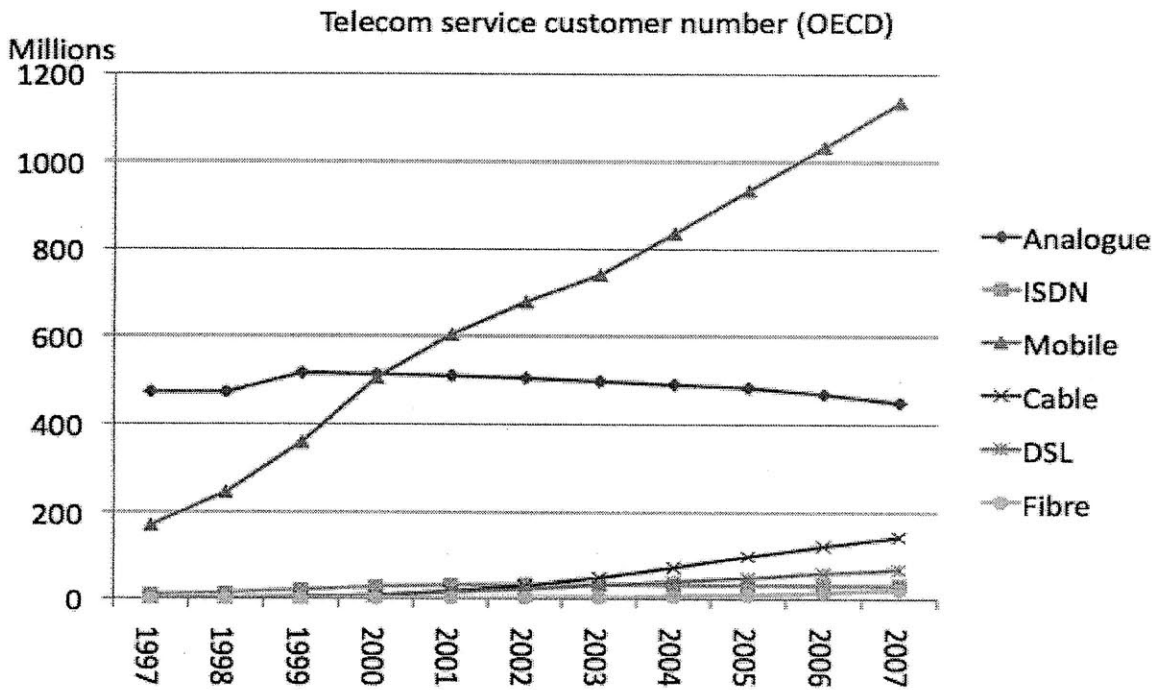


Source: Telecommunications Carrier Association (Japan). Adapted by author.

Figure 2-7. Mobile service trends in Japan

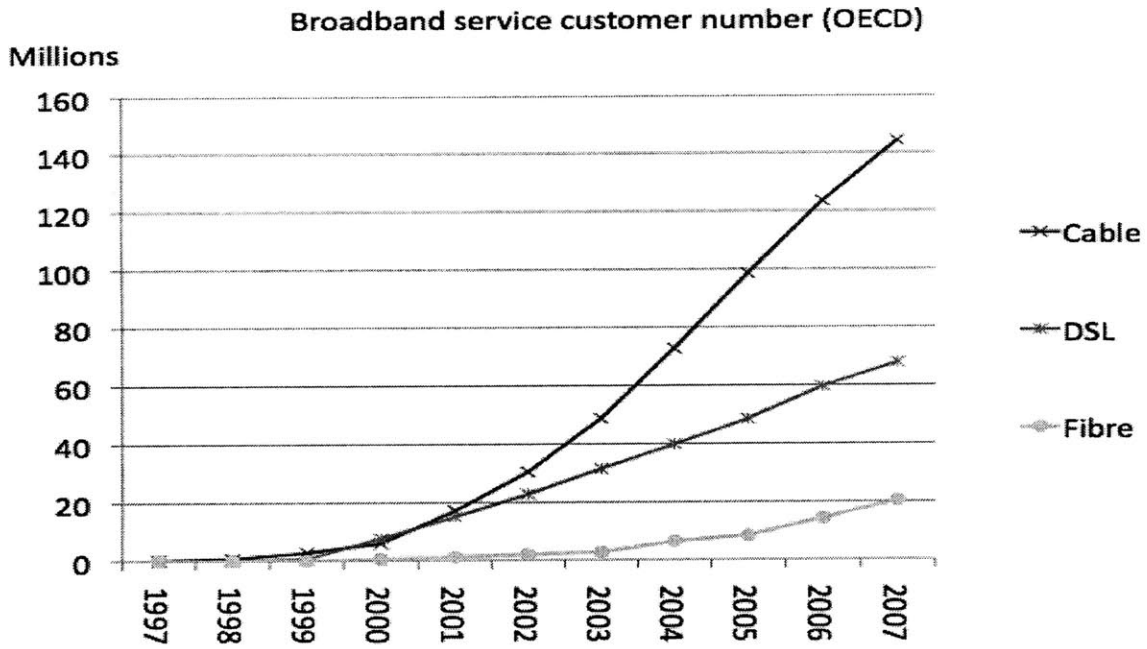
<sup>2</sup> Data of Statistics Bureau of Japan <<http://www.stat.go.jp/english/data/index.htm>>

The unique characteristics of the Japanese market are clear when compared to OECD market data. The general move from analog telephones to mobile and broadband is common in OECD countries (see Figures 2-8 and 2-9). However, broadband mainly refers to cable and DSL, with FTTH just beginning to appear. The OECD mobile market also has a large pre-pay mobile phone segment. The diffusion rate of 3G cellphones is growing but it is still a small portion of the total market (see Figure 2-10).



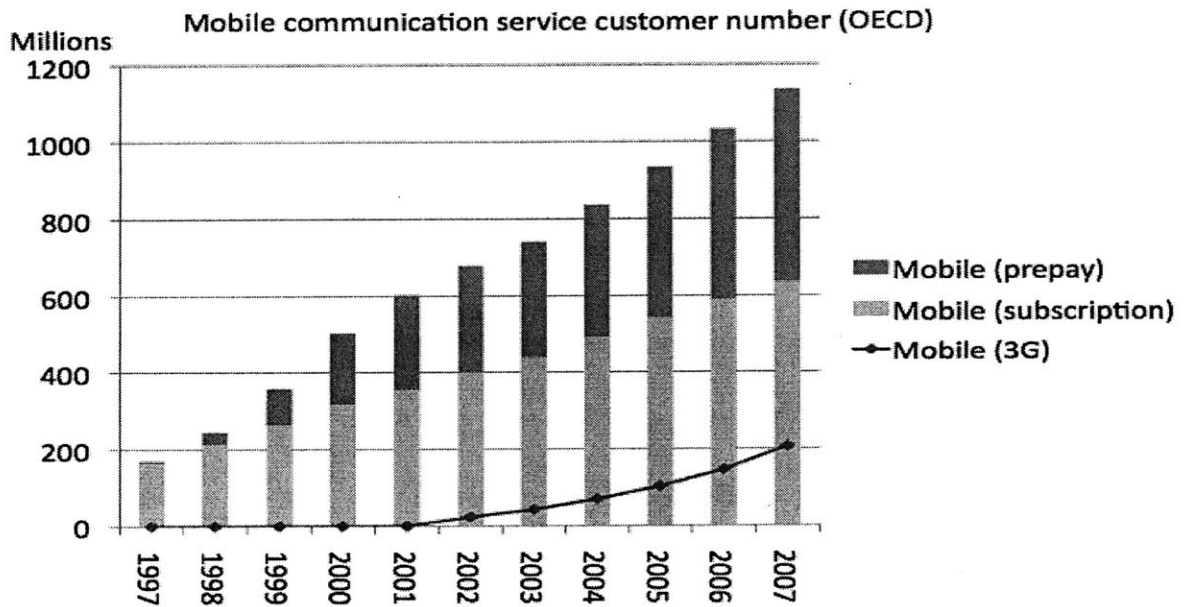
Source: OECD Communications Outlook 2009. Adapted by author.

Figure 2-8. Telecom service trends in OECD markets



Source: OECD Communications Outlook 2009. Adapted by author.

Figure 2-9. Broadband service trends in OECD markets



Source: OECD Communications Outlook 2009. Adapted by author.

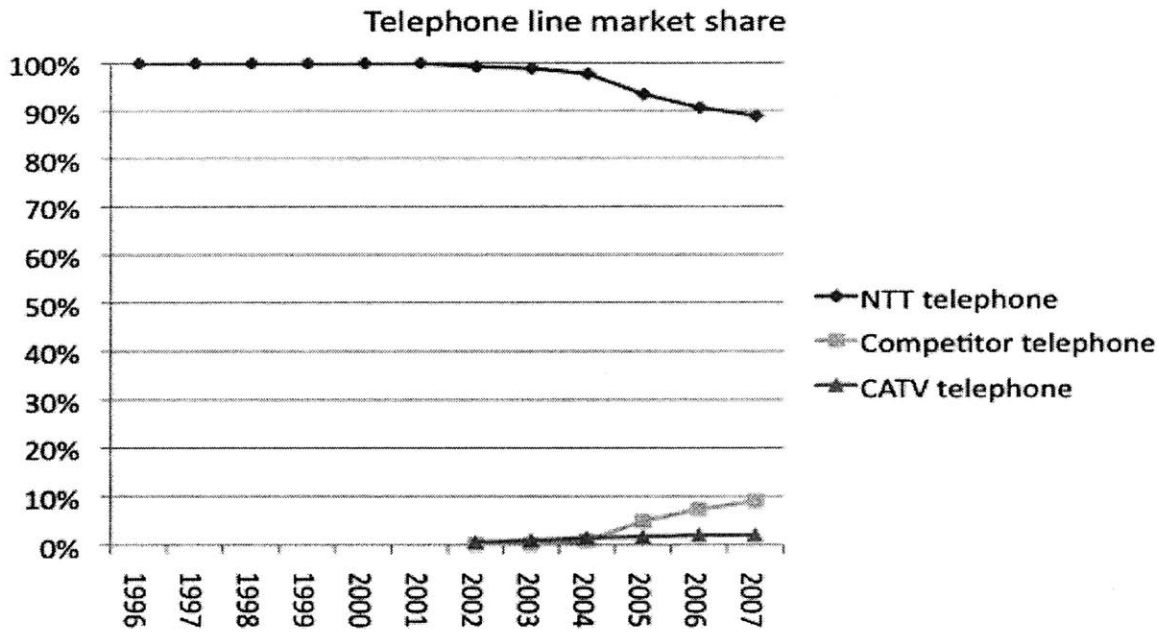
Figure 2-10. Mobile service trends in OECD markets

## **2-3. MARKET SHARE**

Data about market share offers further information about the Japanese telecom industry and the position of NTT Group within the market. NTT was established as an offshoot of NTT, and is a monopoly protected by government regulation. It was launched under privileged circumstances, and it has enjoyed this advantage since its creation in 1985. However, NTT faces severe competition today, especially in new service segments.

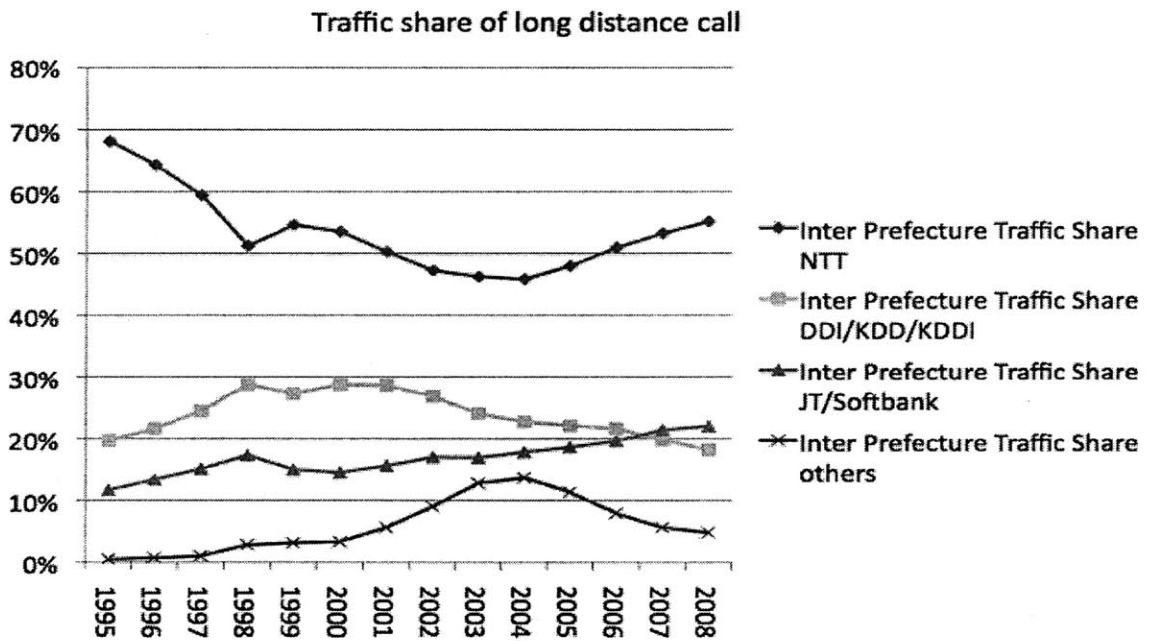
### **2-3-1. Telephone Market**

NTT has always enjoyed a monopoly in the fixed-line telephone market, and even today holds a high share of that market, largely because there are very few firms that own access facilities in the market. Instead, some competitors rent NTT's access lines. CATV telephony is also a very small amount. Recently, NTT began to focus on IP-phone over FTTH, and it is encouraging ordinary telephone users to migrate; as a result NTT's share of the fixed-line market has declined somewhat (see Figure 2-11). Traffic for long distance calling has become more competitive since the mid-1980s telecom market liberalization. NTT share fell to less than 50%, but has rebounded in the last five years (see Figure 2-12). Liquidation of local traffic began in 2000 because of liberalization of the access network including line sharing, dry copper, and dark fiber. NTT's share showed a steep decline early in the period, but it too shows signs of increasing (see Figure 2-13).



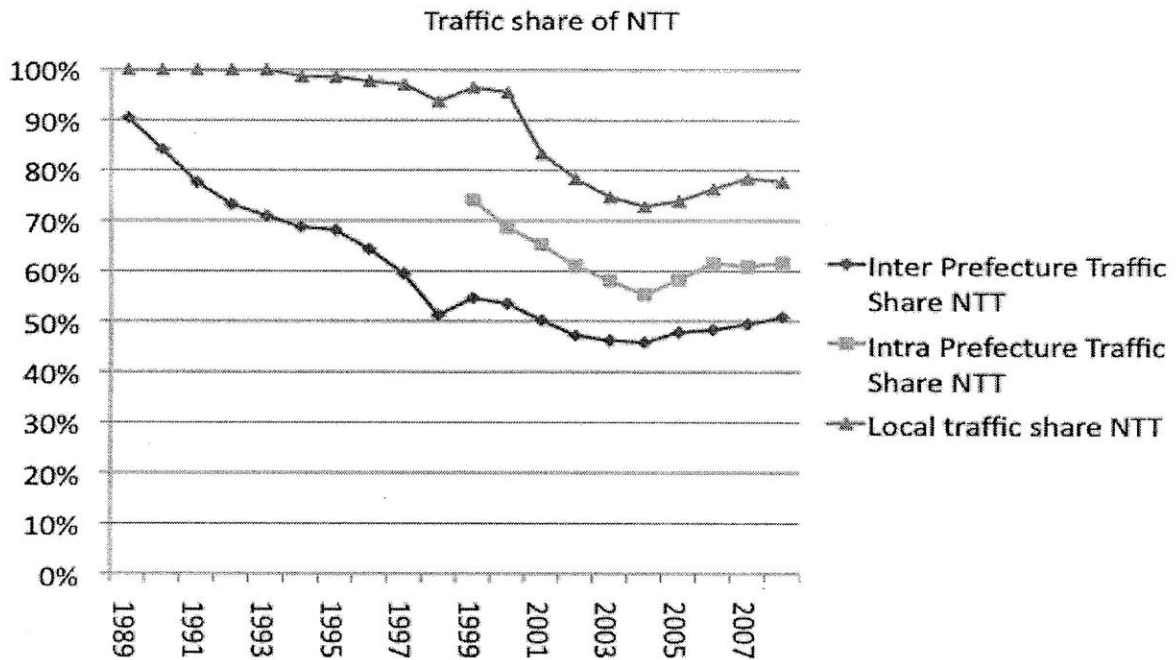
Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-11. Telephone line shares



Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-12. Long distance call shares

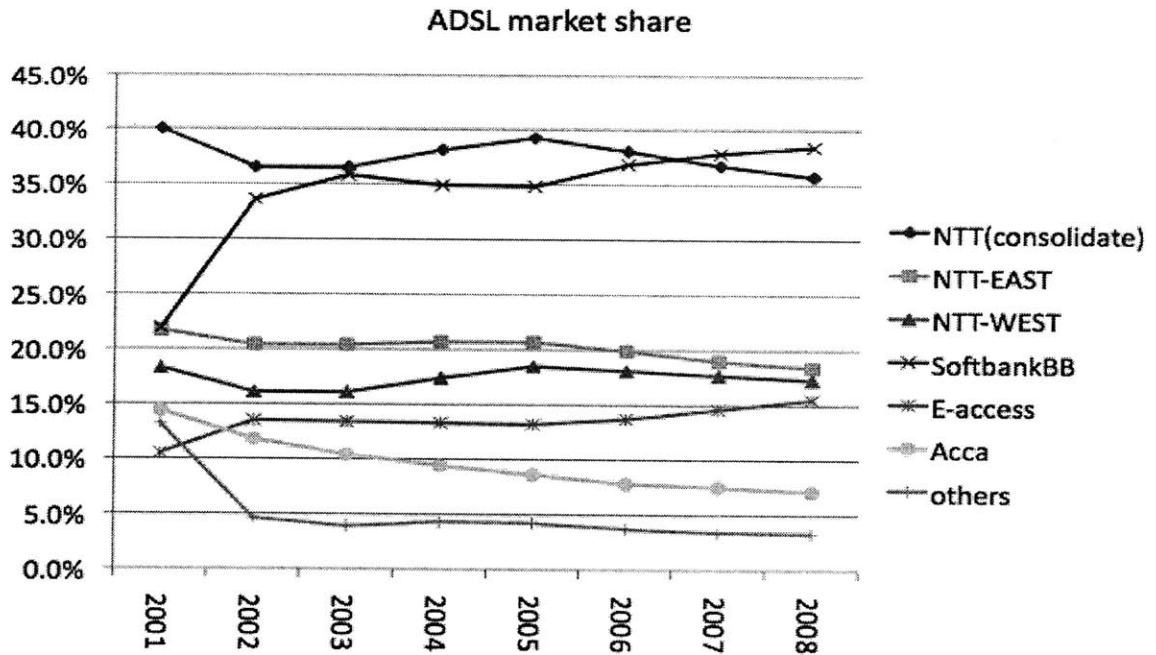


Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-13. NTT share of each call segment

### 2-3-2. Broadband Access Market

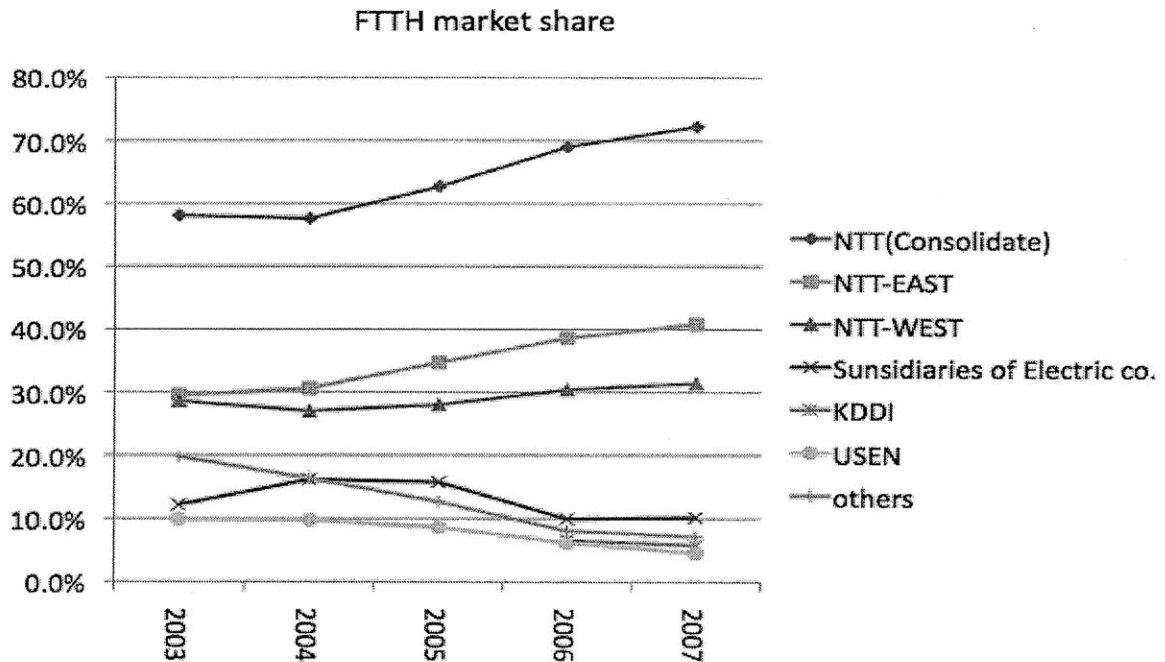
The dry copper and line-sharing system, which started in 2000, resulted not only in liquidating the telephone market but encouraging the emergence of ADSL. There were many new entrants in the early stage, but within a short time the market turned into an oligopoly. Softbank became a dominant player by acquiring other ADSL companies, and then pursued a marketing strategy based on devastating low prices. Intense competition between Softbank and NTT spurred the growth of the ADSL market. However, as FTTH service became fully diffused, ADSL began to decline after 2005. The recent loss of market shared suffered by NTT is the direct result of customer migration from ADSL to FTTH (see Figure 2-14).



Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-14. ADSL shares

In contrast to the ADSL market, NTT is the only winner in the growing FTTH market. There have been many new entrants, but their market share slumped after 2004, while NTT's market share increased. NTT is now driving the growing in the FTTH market (see Figure 2-15).



Source: Ministry of Internal Affairs and Communications (Japan). Adapted by author.

Figure 2-15. Fiber To The Home shares

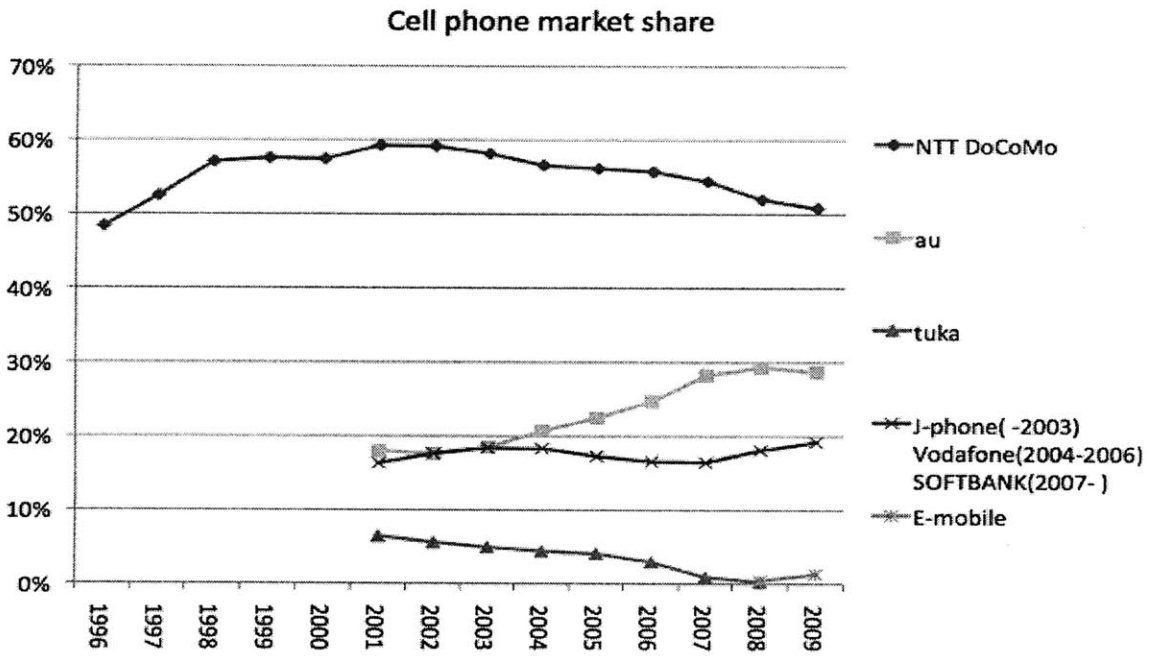
### 2-3-3. Mobile Communication Market

Like other countries, the Japanese mobile communication market is an oligopoly because of frequency resources are limited and licensing is controlled by government regulation. Major players in this segment are NTT Docomo, KDDI (including brands au and tuka), and Softbank.

Japan's mobile communication is well known because of its wide range of Internet access services provided by NTT Docomo's i-mode: data communication, and value-added services such as high-resolution digital cameras, music ringtones, decoration e-mail, digital TV broadcasting, and cashless payment.



Firms in this market operate in the world's most highly competitive market. In 2006, Softbank purchased the Vodafone business in Japan, and thereafter gained added market share with its low-price strategy, which they used successfully in the ADSL market. Today Softbank is making aggressive new efforts in collaboration with Yahoo! Japan and Apple. Facing with Softbank's momentum, bolstered by the younger generation, NTT Docomo and KDDI are gradually losing share (see Figure 2-16).



Source: Telecommunications Carrier Association (Japan). Adapted by author.

Figure 2-16. Mobile communication market share

## 2-4. SUMMARY

The Japanese telecom industry can be summarized as follows:

- Japanese telecom is a mature market.
- Historically, the industry shifted from monopoly to oligopoly, with greater market liberalization.
- Japanese telecom users readily migrate to newer technologies and services.
- NTT has spearheaded rapid service and technology changes, such as FTTH and 3G mobile.
- NTT has maintained a good track record over several decades but it is gradually losing market share in some segment, including telephone, mobile phone, and ADSL.
- New entrants, such as Softbank and KDDI, are gaining market share.

## CHAPTER 3 NTT CORPORATE PROFILE

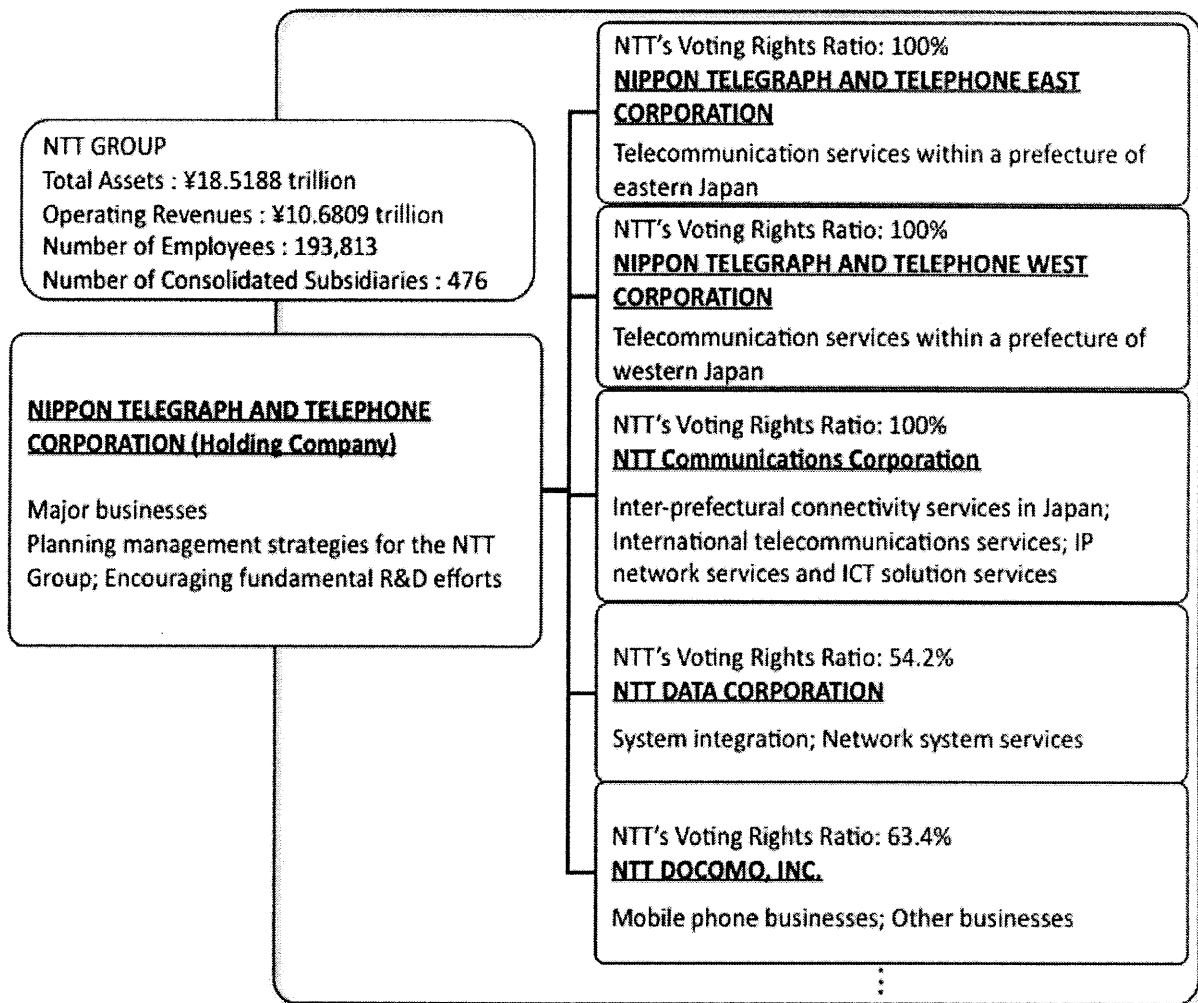
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### 3-1. ORGANIZATIONAL OVERVIEW

Launched as a 100% government-owned, single telephone company in 1985, NTT has grown to 476 group companies. NTT Holding Company owns the subsidiaries, and is responsible for group-level management and basic research and development. There are five major operating companies within NTT Group (see Figure 3-1):

1. NTT East (regional communication in the eastern part of Japan)
2. NTT West (regional communication in the western part of Japan)
3. NTT Communications (long distance, International, and Internet communications)
4. NTT DATA (system integration)
5. NTT Docomo (mobile communications).

The government strictly regulates NTT Holding, NTT East, and NTT West, with the 1985 NTT Law specifying the basic objectives and business scope of these companies. NTT stock began trading publicly in 1987. At present, government ownership has been reduced to 33.71% as of September 2009 (NTT website).



Source: NTT website. Adapted by author.

Figure 3-1. NTT Group organizational structure (March 2008)

### 3-2. HISTORY

An summary of NTT's corporate history is presented in Figure 3-2. NTT started out originally from NTP. We can see the process whereby NTT added to its ordinary telephone service by capturing new market opportunities such as software system development and mobile communication through its spin-offs, NTT DATA and NTT Docomo. There were

Corporate History

- 1952 Nippon Telegraph and Telephone Public Corporation established
- 1979 **INS Concept announced**
- 1985 Nippon Telegraph and Telephone Corporation (NTT) incorporated as a private company
- 1987 NTT listed on First Section of the Tokyo Stock Exchange
- 1988 NTT DATA CORPORATION started operations
- 1990 **VI&P Concept announced**
- 1992 NTT Mobile Communications Network, Inc. (presently NTT DOCOMO) started operations
- 1994 **Basic Concept for the Coming Multimedia Age announced**
- 1995 NTT DATA listed on Second Section of the Tokyo Stock Exchange
- 1996 **21st Century R&D Vision announced**
- 1996 NTT DATA listed on First Section of the Tokyo Stock Exchange
- 1997 Digitization of communications network in Japan completed
- 1998 **Global Information Sharing Concept announced**
- 1998 NTT DOCOMO listed on First Section of the Tokyo Stock Exchange
- 1999 NTT's operations were reorganized into a holding company structure, and it transferred its businesses to three new wholly owned subsidiaries, NTT East, NTT West, and NTT Communications
- 2002 Prefecture-based subsidiaries of NTT East and NTT West started operations
- 2002 **"Vision for a New Optical Generation" announced**
- 2004 NTT URBAN DEVELOPMENT CORPORATION listed on First Section of the Tokyo Stock Exchange
- 2004 **"NTT Group's Medium-Term Management Strategy" announced**
- 2008 **Announced a new Medium-Term Management Strategy. "Road to Service Creation Business Group"**

**New concepts and visions / Management Strategy**

Source: NTT website

Figure 3-2. Major events in NTT history

repeated patterns where NTT created new concepts and visions to lead the company and the entire industry. For example, the Integrated Network Service (INS) concept is predicted for the forthcoming digital network and various services that digital technology can serve; the Visual, Intelligent, and Personal (VI&P) concept, which will incorporate visual communication and an intelligent network that enables personal life assistance. These visions were created within the technology at that time, and thus were based on digital

telephone technology (ISDN: Integrated services digital network). However, when such concepts finally become reality, there may be different technologies and standards in place (e.g., instead of telephones, now the 3G digital mobile network and Internet; instead of centralized mainframe, now client-server computing). Spin-off companies are the outcomes of these strategic practices, but technological adaptation leads them to places they could never have predicted.

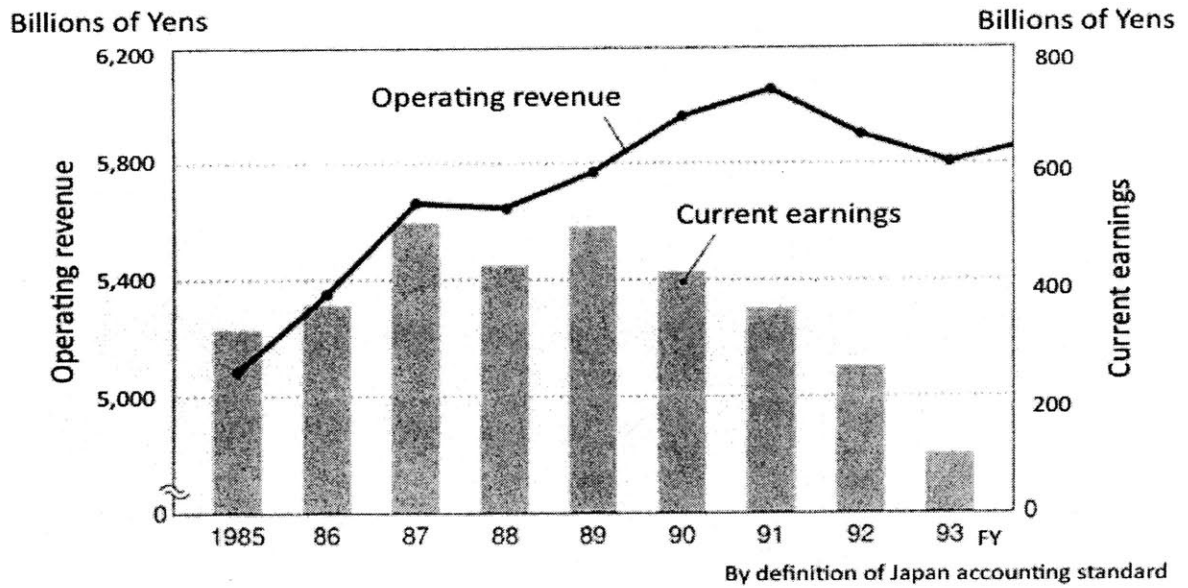
Although the government is the major stakeholder in NTT, it is also NTT's regulating authority. The Ministry of Internal Affairs and Communications (MIC) controls NTT based on government laws and regulations. MIC is concerned with social needs and objectives such as protection for customers, enhancing market competition, and encouraging national infrastructure evolution. As a result of the NTT Law enacted in 1985, the fundamental concepts of group strategy, such as group structure, functional design, and specialization of subsidiaries, are not fully under the control of NTT itself, only the broader concepts of national economy and welfare.

### **3-3. PERFORMANCE**

My data collection aimed to depict changes from the time of privatization to present. Some old data were calculated based on a different accounting standard in use at that time. Therefore while it is difficult to derive exact numbers, we can see macro trends throughout NTT's history.

From 1985 when NTT was established, to around 2000, consolidated revenue has continued an upward growth trend, showing strong growth on two separate occasions through this period. During the early stage, rapid growth was driven by telephone service. But harsh competition and share lost to long distance traffic resulted in an earnings downturn in the 1990s. Also expenditures for network digitalization were heavy at this period. However, success with mobile communication brought an unexpected increase in the volume of revenue to NTT Group, and it continued to grow steadily through the remainder of the 1990s. Revenue exceeded ¥10 trillion by 2000, but then revenue growth hit a plateau because the cellular phone business became mature and competition was severe. In 2002, extraordinary losses due to restructuring and group reorganization resulted in negative net income. Now emerging broadband services, such as ADSL and FTTH, are expected to be a core growth engine after mobile services mature, but to date they do not have enough power. Figures 3-3, 3-4, and 3-5 show revenue and income trends over the time period 1985-2009.

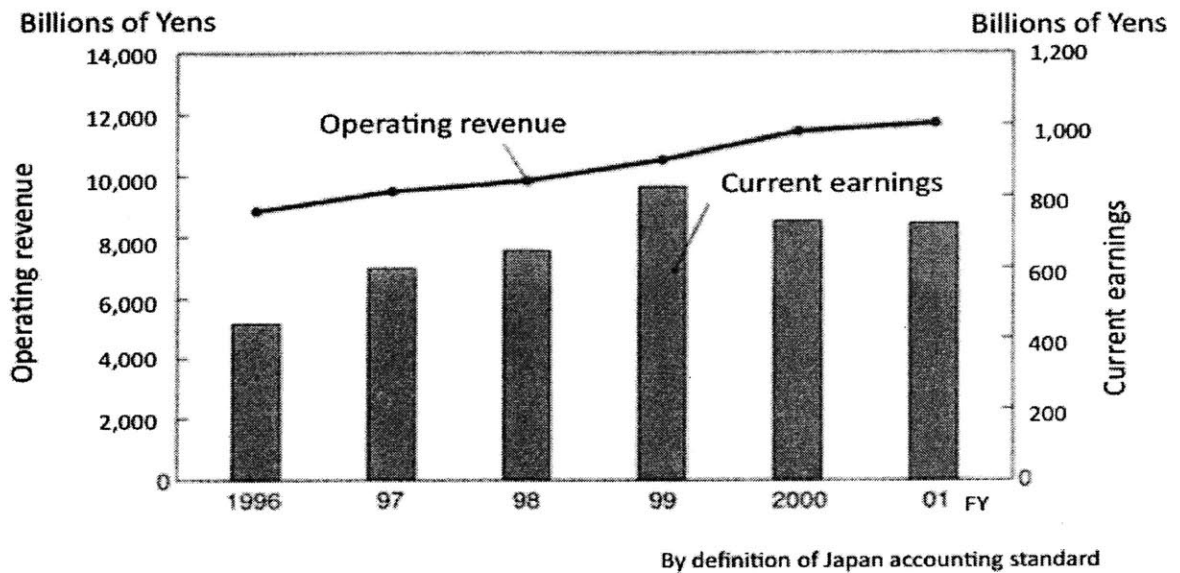
Group consolidated revenue and income trend (1985-1993)



Source: Miyazu (2003). Adapted by author.

Figure 3-3. Revenue and income trend (1985-1993)

Group consolidated revenue and income trend (1996-2001)

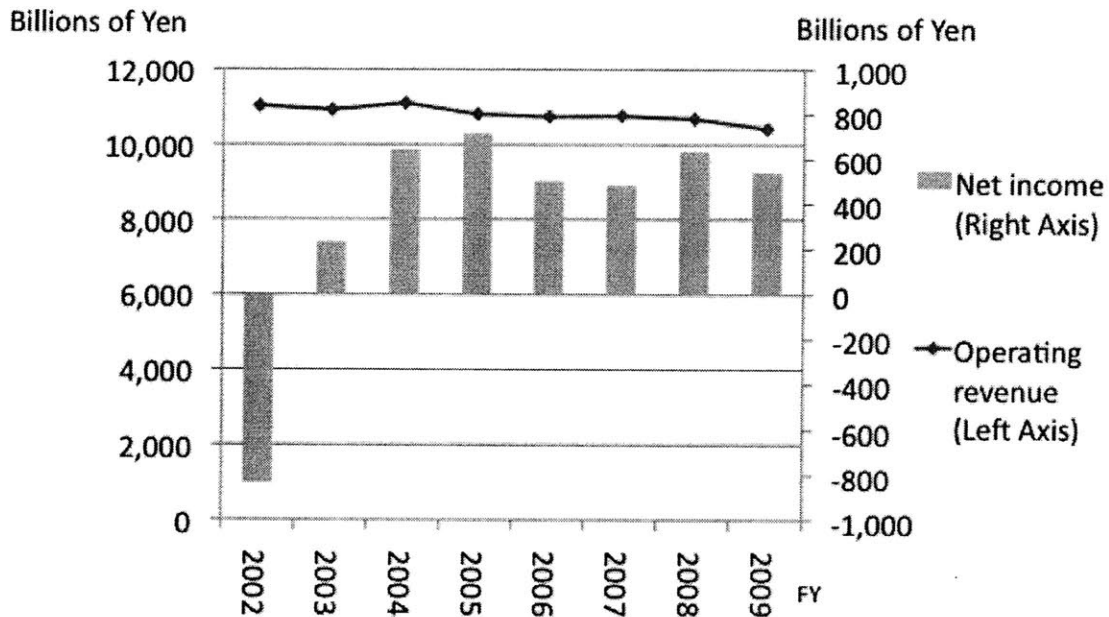


Source: Miyazu (2003). Adapted by author.

Figure 3-4. Revenue and income trend (1996-2001)



Group consolidated revenue and income trend (2002-2009)

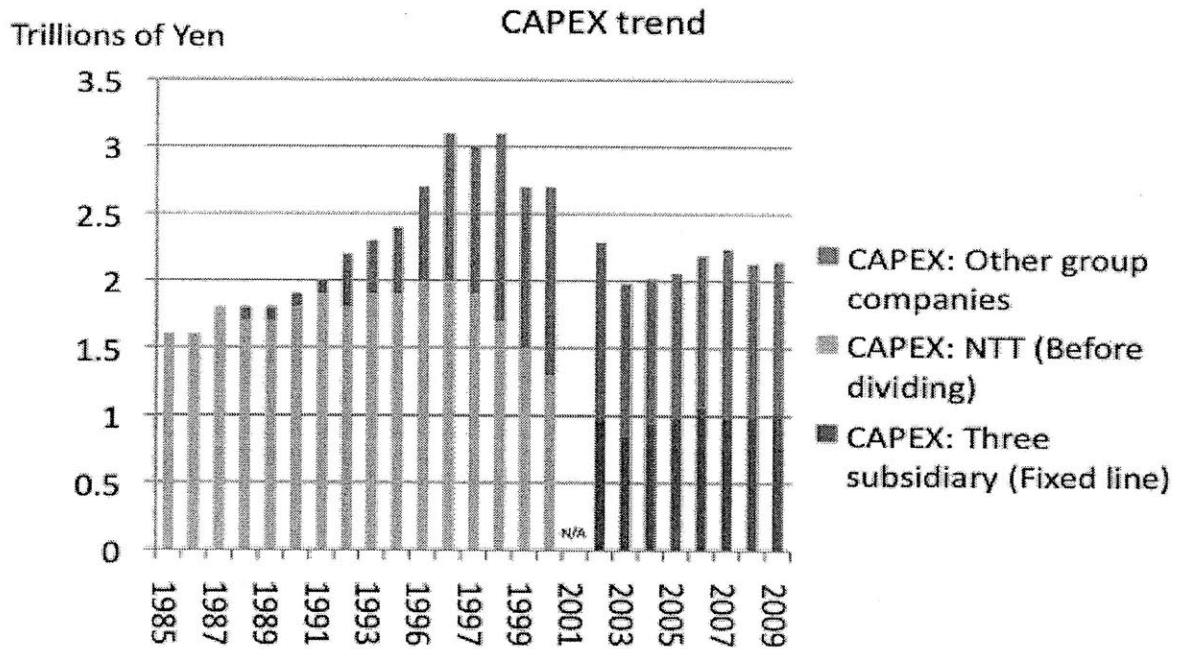


By definition of US accounting standard

Source: NTT annual report (2004) and NTT annual report (2009). Adapted by author.

Figure 3-5. Revenue and income trend (2002-2009)

The business model for the telecom industry requires huge capital investment for network equipments; thus, NTT's CAPEX trend provides another side of the company's history (see Figure 3-6). CAPEX peaked in the late 1990s, the result of two big network reinventions. The first was the completion of telephone network digitization; second was the construction of the mobile network that will accommodate rapid growth demand. Fixed line CAPEX (NTT CAPEX 1985-2000 and Major 3 subsidiaries of NTT East, West and Communications after 2001) became half of peak value.



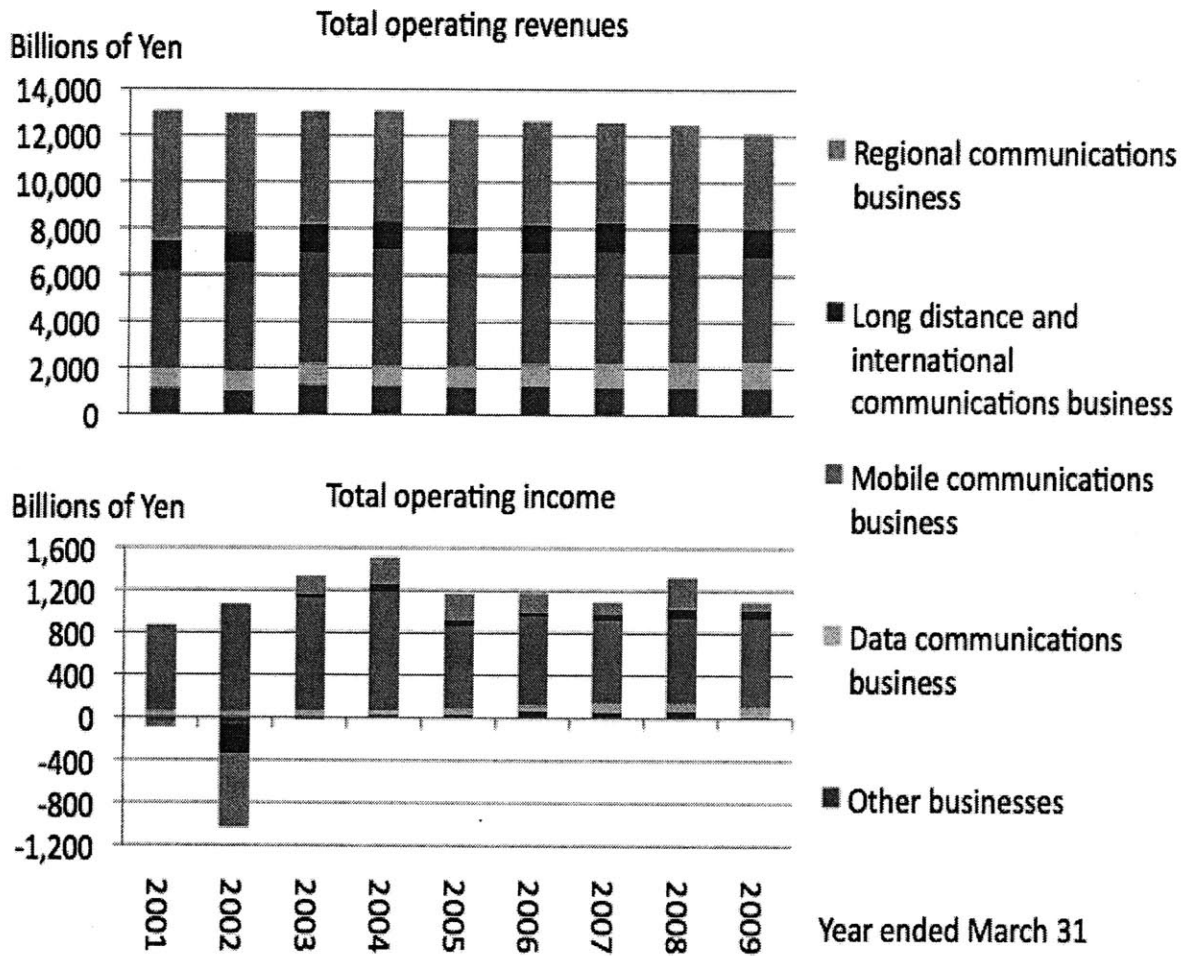
Source: Miyazu (2003), NTT annual report (2004), NTT annual report (2009). Adapted by author.

Figure 3-6. NTT Group consolidated CAPEX

This macro trend contained two changes; first, the digital telephone network entered the maintenance phase from the construction period; second, IP technology brought tremendous cost reduction to fixed-line facilities. On the other hand, CAPEX for other businesses like mobile network facilities became half of consolidated CAPEX through the late 1990s. Because of continual technology changes in the mobile segment from first generation (analog), to second generation (PDC digital), to third generation (W-CDMA), CAPEX maintained its high number within NTT Group. More details about each revenue source for NTT Group can be seen in Figure 3-7.

Mobile communications and regional communications are two major contributors to revenue, and they directly reflect market share. However, the regional communications

business is not as profitable compared to other segments. This is caused by unproductive legacies from the public service era (e.g., a price system based on public welfare logic) and old telephone technologies.



Source: NTT annual report (2009). Adapted by author.

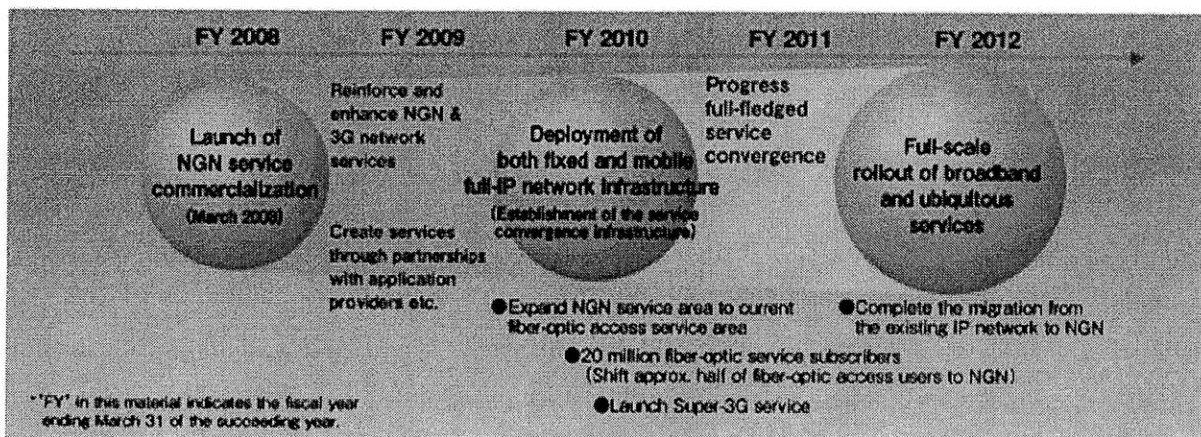
Figure 3-7. Revenue and income trends by business segments

### 3-4. OBJECTIVE AND STRATEGY

As shown in the previous section, NTT's revenue has been at a plateau or in slight decline since 2000, so the company's core objective is to create another driver that will bring additional growth opportunities to the Group. To achieve this objective, the concept of *next generation network* (NGN) is introduced. NGN include IP version 6 technology-based networks that serve a more reliable and flexible Internet; mobile communication using 3.9G technology; and IP telephony with the same quality, reliability, and fulfillment of current telephone regulations. Two major expectations are associated with this NGN concept, cost reduction and capturing new business opportunity. By using new technology, there is high possibility to synergetic use of network facility among telecom services including fixed and mobile communications. Figure 3-8 shows the evolution of NGN technology.

#### Broadband and ubiquitous services rollout strategy

- Creating and rolling out broadband and ubiquitous services in accordance with customer needs, leveraging full-IP network infrastructure
- Driving the transformation of business portfolio centering on IP and solution businesses
- Promoting reforms to the business operations of group companies in conjunction with the transformation of business portfolio



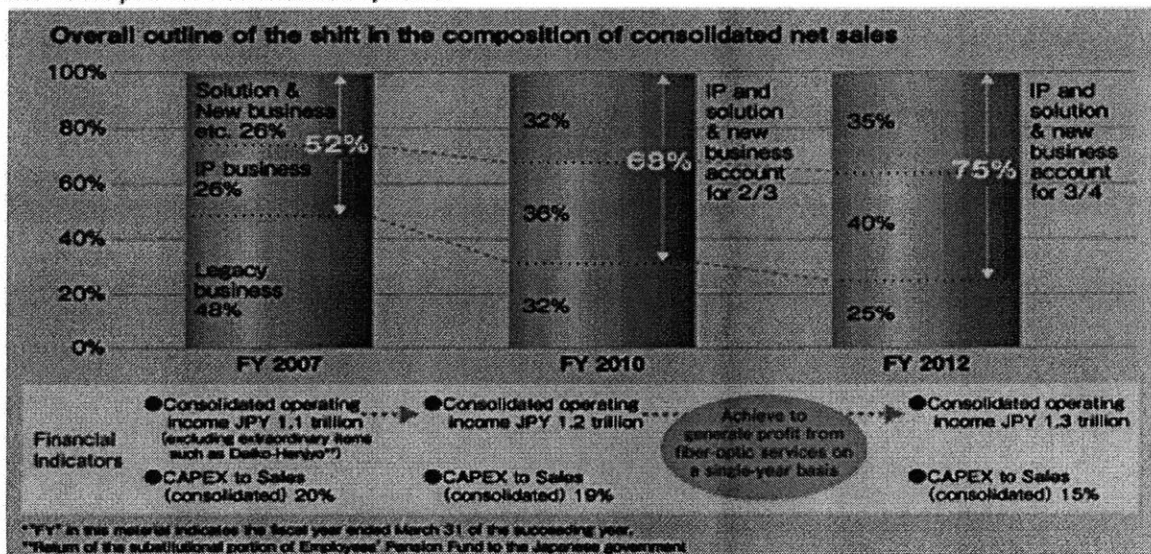
Source: NTT website.

Figure 3-8. Evolution of NGN services strategy

The ultimate use of this technology would be to utilize one network and several access technologies (i.e., fiber optics, 3.9G mobile, Wi-Fi, etc.) to bring various services to customers. As a new business, NGN capability far exceeds current Internet capabilities and would bring new opportunities to NTT, such as super low-cost telephone service, additional videoconference capability to telephone service, broadband Internet and digital HDTV broadcasting. The NGN concept is not only about individual new services, but also network convergence that brings further service bundling and convergence opportunities. NTT Group has a strategic plan for enhancing IP, a solution and new business for adding a major new part to its revenue stream (75% in 2012), while concurrently reducing the CAPEX to sales (15% in 2012) (see Figures 3-9 and 3-10).

#### Innovation of the Business Structure

We will shift the business structure from that in the fiscal year ended March 31, 2008, during which sales in the Legacy business accounted for half of consolidated net sales, to that in which IP business and Solution & New business account for three-fourths of consolidated net sales in the fiscal year ended March 31, 2013.

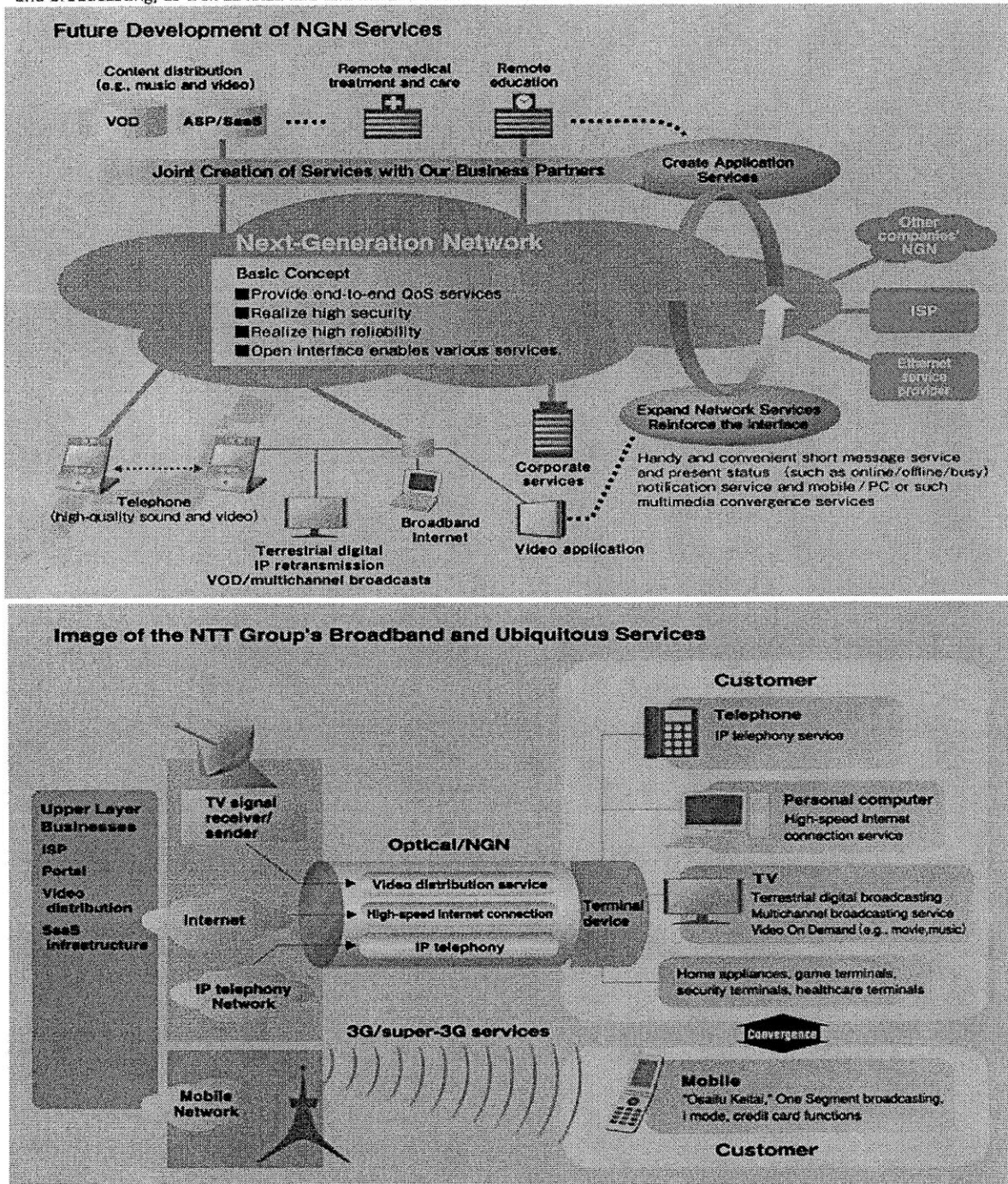


Source: NTT website.

Figure 3-9. Future Business Structure

### Development of Broadband Ubiquitous Services

Toward the full-scale development of broadband and ubiquitous services in 2012, we will expand network services such as optical/NGN and 3G/super-3G, which will lead to the convergence of services in various fields such as telecommunications and broadcasting, as well as fixed line and mobile communications.



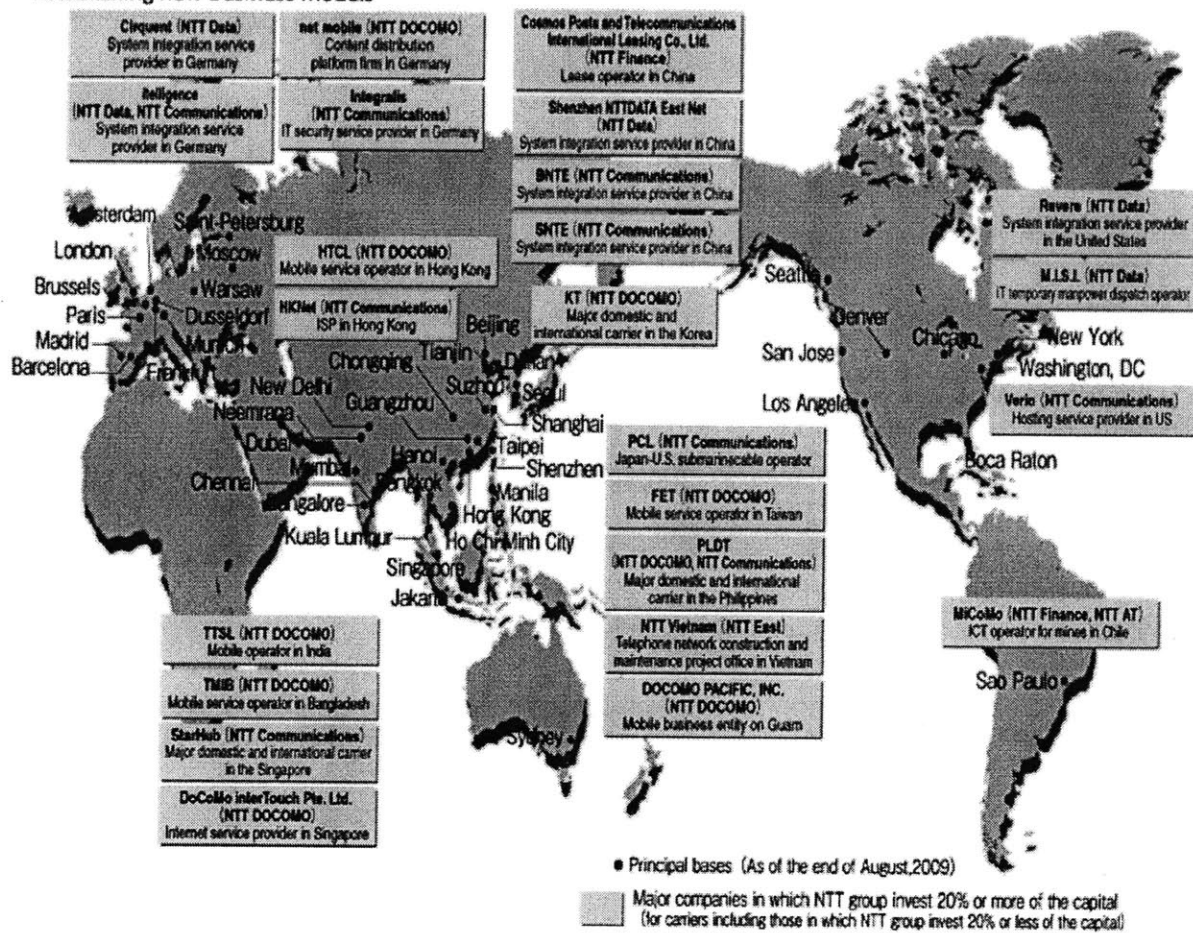
Source: NTT website.

Figure 3-10. Broadband Ubiquitous Services

Since the Japanese telecom market became mature, global expansion is another vital driving force for future growth. NTT had been closely regulated within the domestic market, but in 1999 reformation enabled the company to expand. Today NTT Communications provides the primary part of global communication service. Adding to this, NTT Docomo and NTT Data have made investments in foreign partners (see Figure 3-11).

**Development of Future Global Businesses**

- Further reinforcement of customer foundations and service-provision capability overseas
- Business development based on advanced R&D
- Establishing new business models



Source: NTT website.

Figure 3-11. Development of Future Global Business

### 3-5. RESEARCH AND DEVELOPMENT

The NTT Law stipulated specific roles for NTT R&D: it develops technologies to support the welfare of Japanese society by creating innovations through (1) research on fundamental and elemental technologies, and (2) the development and diffusion of applied technologies. Within the Group structure, NTT R&D is divided in two parts: centralized Basic R&D under the control of a holding company, and Applied R&D under the control of each operating subsidiary. Basic R&D is responsible for conducting long-term activities, and providing its achievements to various applied research applications. Applied R&D is responsible for creating new business, and for feeding back requests and needs to Basic R&D. For both parts, dedication to practical uses is the basic philosophy (see Figure 3-12).

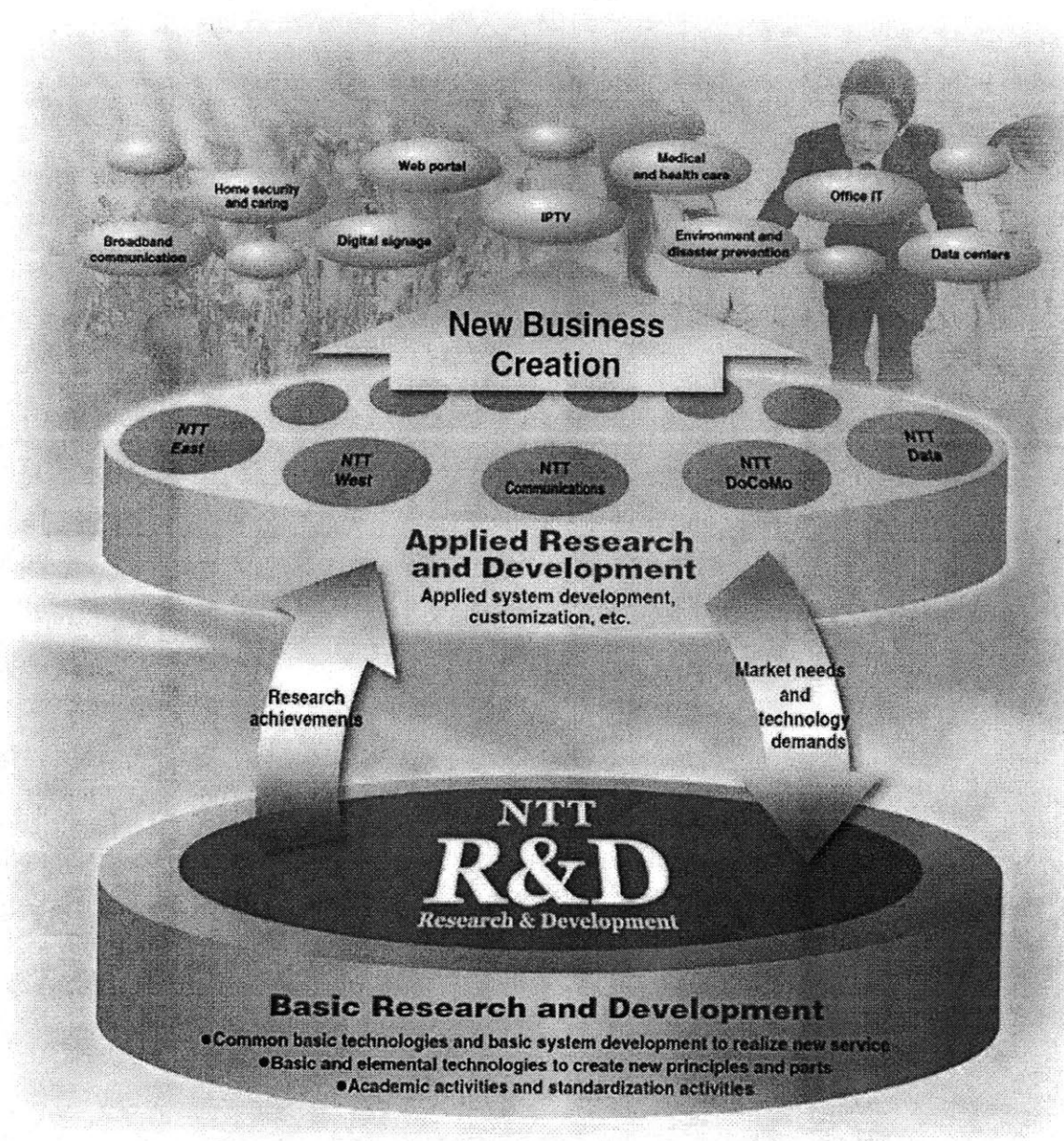
Basic R&D creates innovations that enable future objectives of the company. It consists of three laboratory groups that have additional laboratories under them (see Figure 3-13). They are designed to collaborate with each other to create productive outcomes that will maintain NTT Group as a leader in the telecom industry. The following explanation about the laboratory groups are from the NTT R&D web page:

The Cyber Communications Laboratory Group engages in research and development of technologies and products to create new ubiquitous broadband services.

The Information Sharing Laboratory Group engages in research and development of technologies and products as the bedrock for the Next-Generation Network infrastructure.

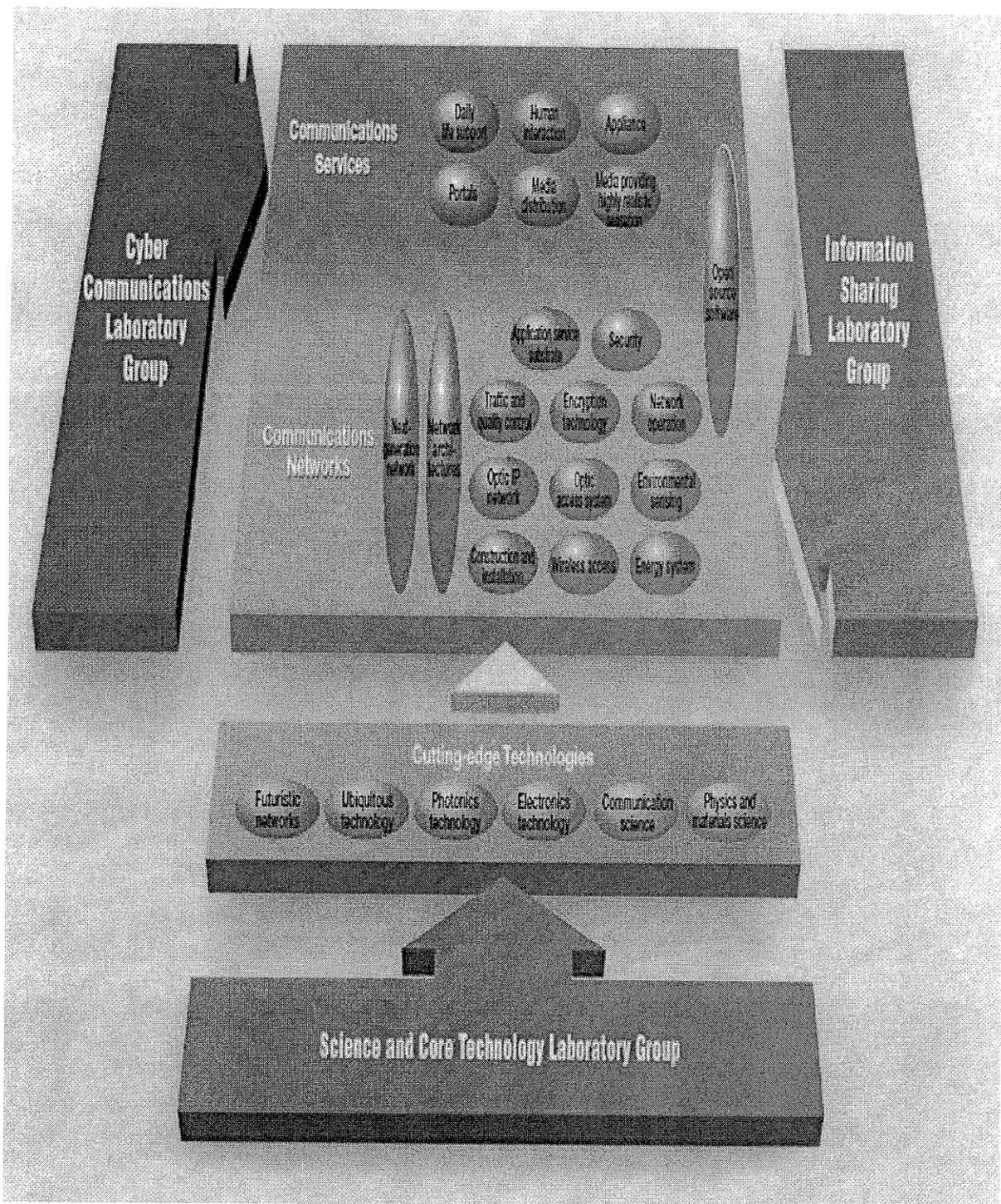
The Science and Core Technology Laboratory Group creates new principles and concepts, and engages in research and development of leading-edge technologies, which will lead to social reforms in the future.





Source: NTT website.

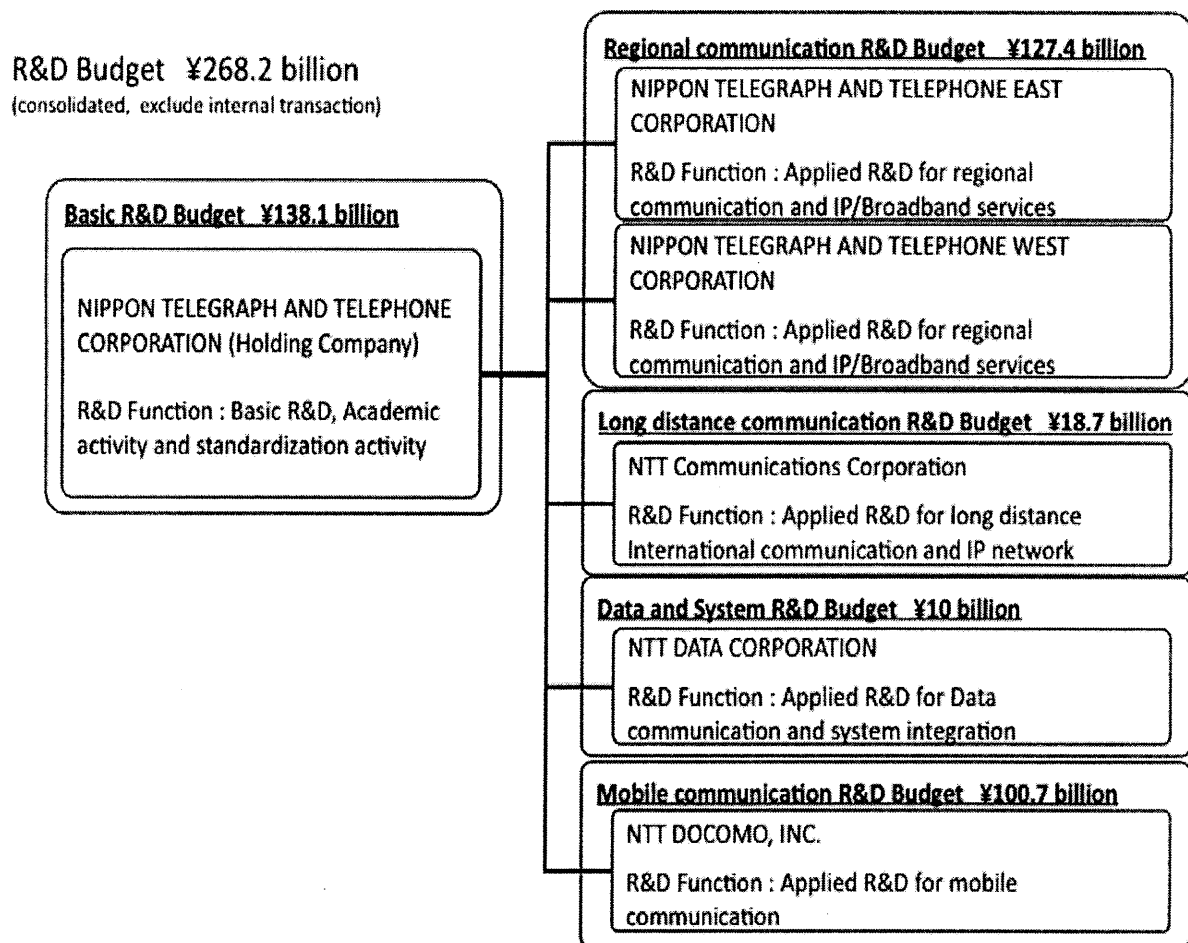
Figure 3-12. Two-tiered structure of NTT R&D



Source: NTT website.

Figure 3-13. Organizational structure of Basic R&D

The R&D budget for the entire group is supported by each operating company. The R&D expense of each company is associated with its revenue, so regional communications and mobile communications have large budgets. Operating subsidiaries allocate these resources to the Basic R&D budget as a trade-off for research achievements that they receive from Basic R&D of the holding company. The Basic R&D budget represents about half of the total Group R&D budget, and it bolsters the centralized R&D structure across the group companies (see Figure 3-14).



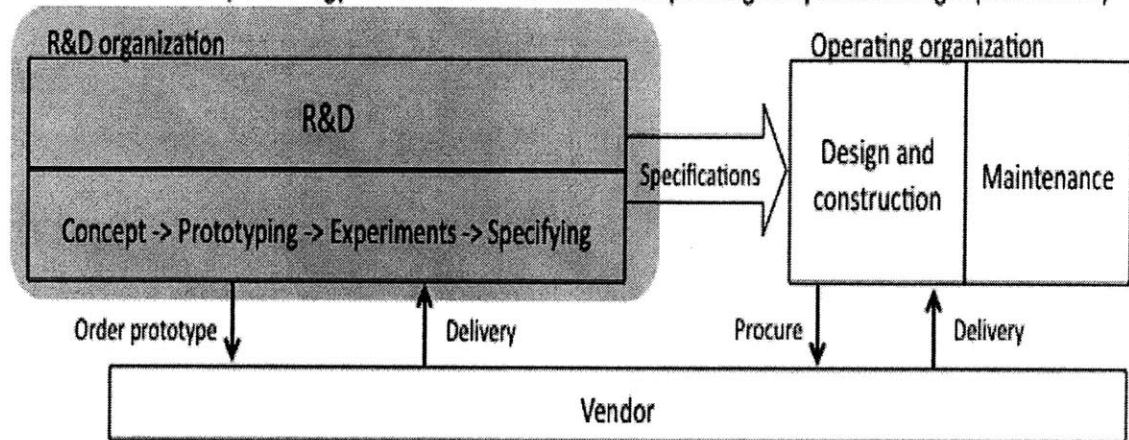
Source: NTT website and NTT annual report 2009. Adapted by author.

Figure 3-14. R&D Budget of NTT (Fiscal year 2008)

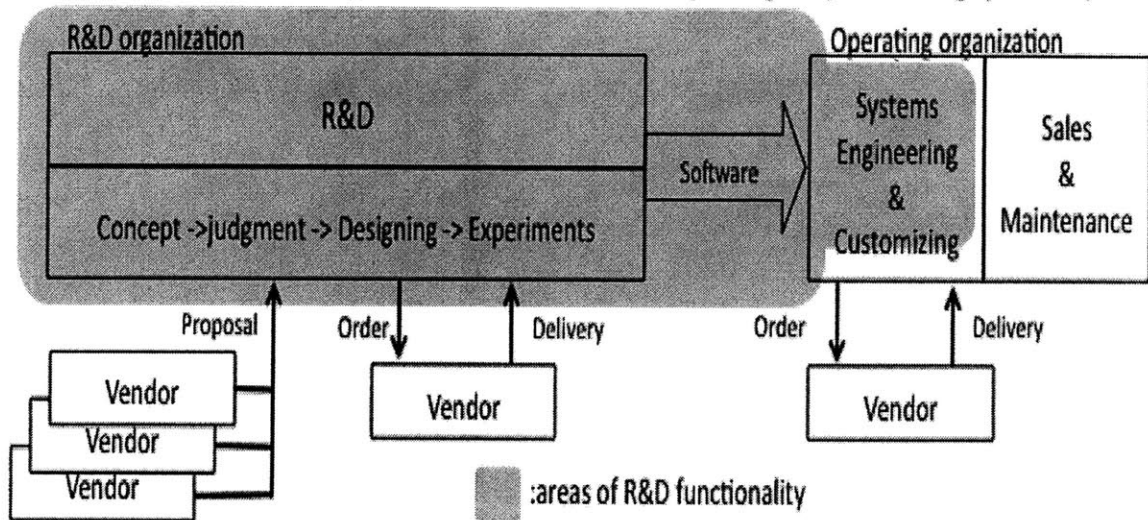
These internal transaction mechanisms have marketplace functionality within the Group. Basic R&D makes a proposal to the operating company they are interested in, and the operating company makes suggestions about potentially profitable technology developments. The model is not simply technology-push or demand-pull, but rather creative interaction.

Another unique feature of NTT R&D is its technology and knowledge transfer procedures. NTT does not own the production units within the Group, thus the process from Basic R&D to Applied R&D in each operating company is truly based on intellectual property. For hardware, specification documents are transferred as the outcome of R&D, and each operating company procures equipment based on the specifications. During the early telephone period, telecom procurements were mostly hardware and know-how transfers, which relied primarily on thesis documentation. However, digitalization allowed software control of every piece of equipment in the network, which meant that software development became the primary process. Aligning with these phenomena, NTT's R&D process redesigned and created a flexible exchange of personnel between Basic R&D and Applied R&D (see Figure 3-15).

1. Hardware oriented R&D (Technology and know-how transferred to operating companies through specifications)



2. Software oriented R&D (Technology and know-how transferred to operating companies through personnel)

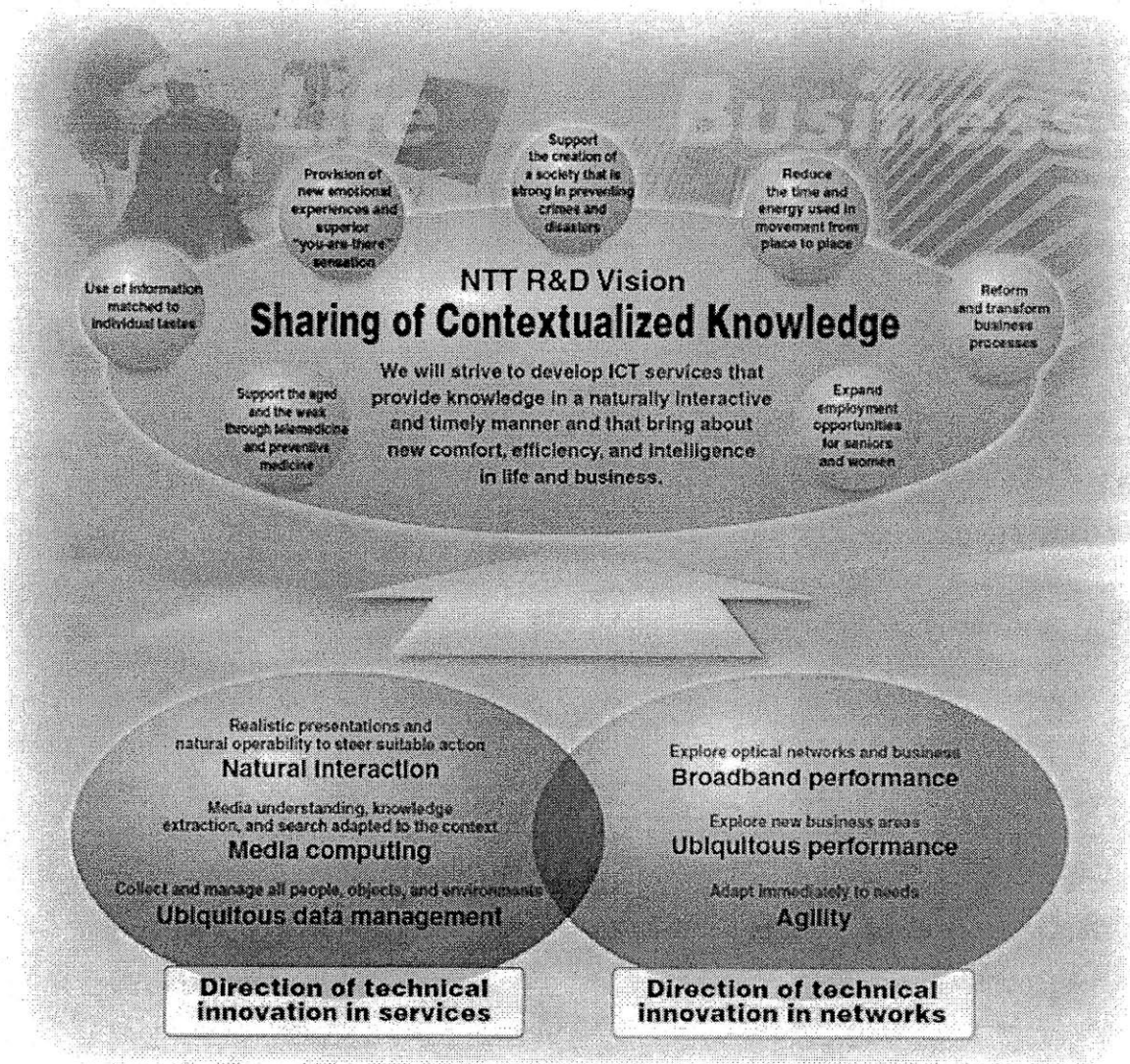


Source: Miyazu (2003). Adapted by author.

Figure 3-15. R&D Process and Technology Transfer

The current vision for NTT Basic R&D consists of three parts: technical innovation in the network, technology development for service, and long-term research regarding contextualized knowledge (see Figure 3-16). Enhancement of the network capability and creation of a variety of services will result in rich chronological data about each customer's

business interactions with NTT. Broadband network and high computing power turns this rich data into contextualized knowledge that can be linked to geographic, semantic, and personal data. The service provider can use this knowledge to support individual customer situations, preferences, and needs.

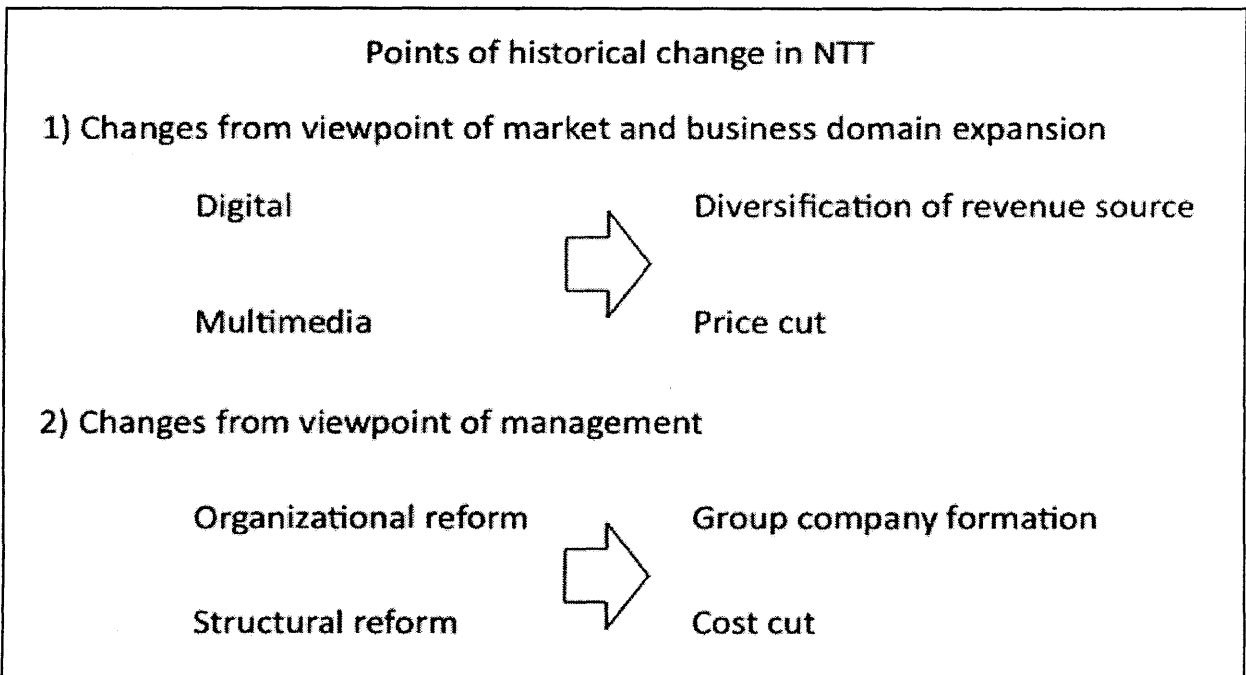


Source: NTT website.

Figure 3-16. R&D Vision

### 3-6. SUMMARY

Miyazu (2003) outlined historical changes in NTT from the perspective of the CEO who took leadership during the transition period, providing two perspectives: market and business domain expansion, and management change (see Figure 3-17). This helps us understand the strategic stance of NTT's top management. However, we need to go even further in order to learn from NTT's history.



Source: Miyazu (2003). Adapted by author.

Figure 3-17. Historical changes in NTT

Figure 3-18 indicates the objective and strategy for each period, and business outcomes. We can see more detail in NTT's strategy changes over time as it reacts to positive/negative and expected/unexpected results. Outcomes for each period more and more reflect environmental change. At first, the market situation was a strictly regulated

monopoly, making industry predictions much easier at that time than at present. Business practice outcomes corresponded to strategically planned diffusion of telephone service. However, network digitalization and regulatory changes that encouraged a more competitive market, introduced a higher degree of freedom and uncertainty to the telecom industry. Furthermore, the Internet and mobile technology now hold a major portion of the industry, and NTT has experienced great success as a result of these new opportunities. This series of incidents dramatically changed the nature of the company over time.

### Firm's objective change over time

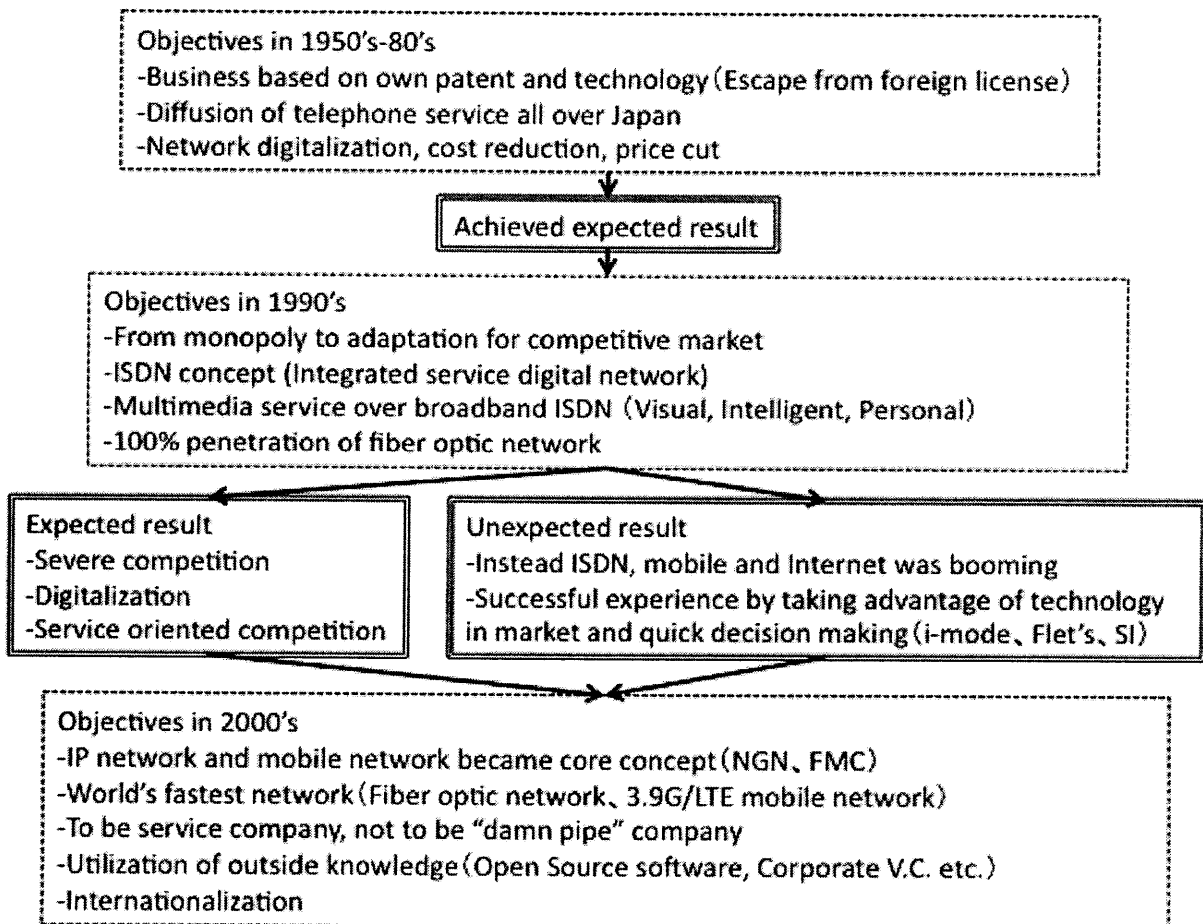
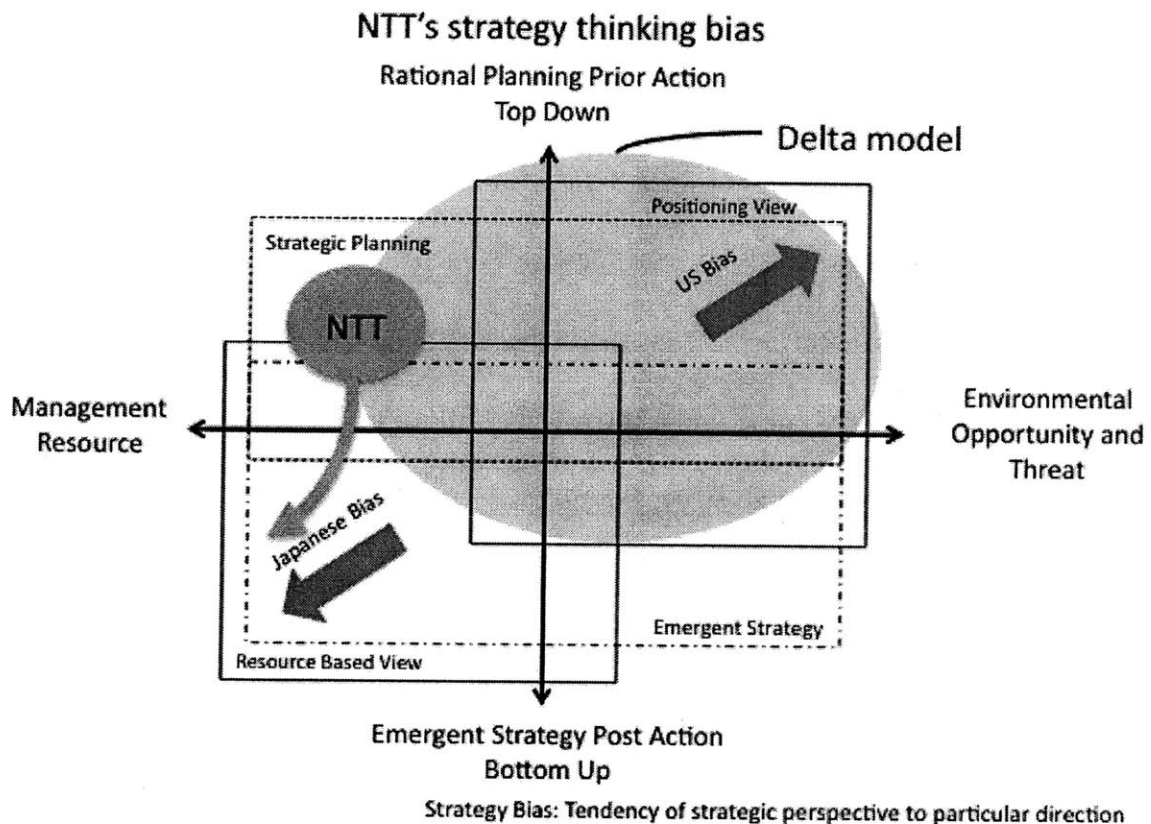


Figure 3-18. NTT changes in each period



Based on the strategy mapping presented in Chapter 1, we can see that NTT's position is changing over time. Originally NTT had a bias toward "Rational Planning Prior to Action" & "Management Resource," as we see in the 1950s to 1980s strategy and corresponding outcomes. This original position is located in the upper left quadrant in the strategy map. Changes in market, regulation, technology and success model led the firm toward "Emergent Strategy Post Action," positioned in the lower left quadrant of the map (see Figure 3-19).



Source: Numagami(2009). Adapted by author.

Figure 3-19. NTT's Strategic Thinking Bias

These moves do not mean, however, that the entire organization migrated. Part of NTT Group—for example, the Internet service provider, system solution division, and mobile carrier—were strongly affected by this new tendency, and it is common to see a wide range of strategic thinking bias with an organization. Furthermore, the general Japanese bias toward strategy may drive NTT toward even more “Emergent Strategy Post Action” & “Management Resource” in the future. This means more strategic diversity within NTT Group and more danger of misunderstanding and conflict caused by differences in strategy thinking.

To close this chapter, I will verify the two assumptions presented in the Introduction:

**Assumption1: NTT is under the effect of a general Japanese strategic bias (RBV & Emergent strategy).**

Answer to assumption 1: YES. Originally NTT held a different position, but more recently the company has come under the effect of the strategic thinking bias.

**Assumption2: The telecom industry is biased toward the emergent and resource obtaining strategy as a result of continuous new entrants and threats such as the Internet and mobile phones.**

Answer to assumption 2: YES. We can see this clearly throughout NTT’s history. When it achieved successful through unexpected results, the bias toward emergent and resource obtaining strategy was reinforced.

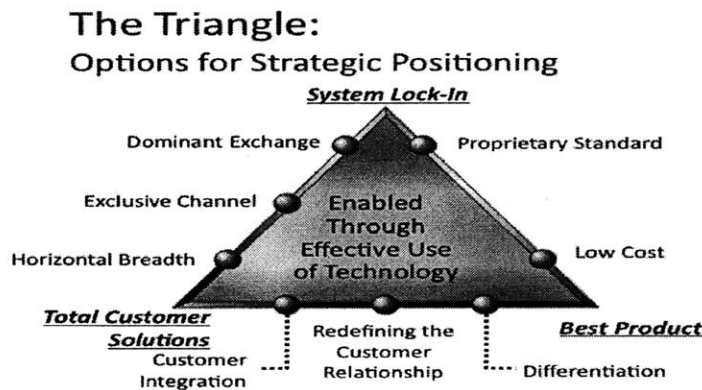
## CHAPTER 4 LITETATURE REVIEW

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Before discussing future NTT strategies, I will first review the Delta Model and several strategic theories. As shown in previous chapters, the Delta model has spread strategic thinking widely. Its core value is rational planning and relative connection with other entities in a total environment. Thus, other theories explored here were selected with the criteria that they were complementary to the Delta model in support of the objective to identify and develop NTT's future strategy in the Japanese telecom industry.

### 4-1. THE DELTA MODEL AND TECHNOLOGY STRATEGY

The Delta Model is the core component of my research. It enables the strategist to get to total customer solution from best product, and from there to opportunities to reach system lock-in.

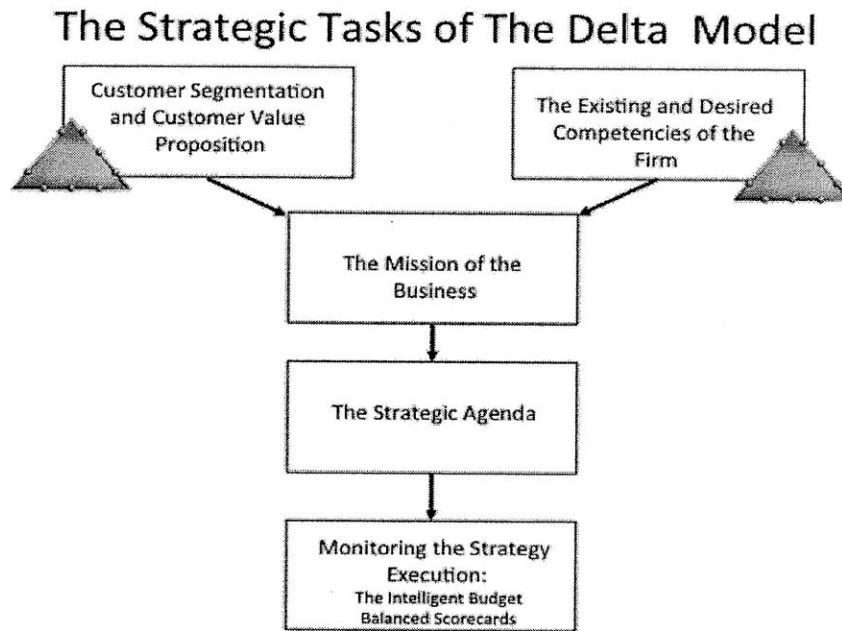


Source: Hax (2009), Hax and Wilde (2001)

Figure 4-1. Strategic positioning in the Delta Model

The Delta Model gives procedures that begin from both customer and firm competencies, which helps to balance against strategic thinking bias. Modelers develop a strategic agenda containing a cycle of plan-do-check-action and feedback from performance indicators and results of the strategy in action. Technology strategy tasks are defined as part of the core strategy process outlined by the Delta model (see Figures 4-2, 4-3, 4-4).

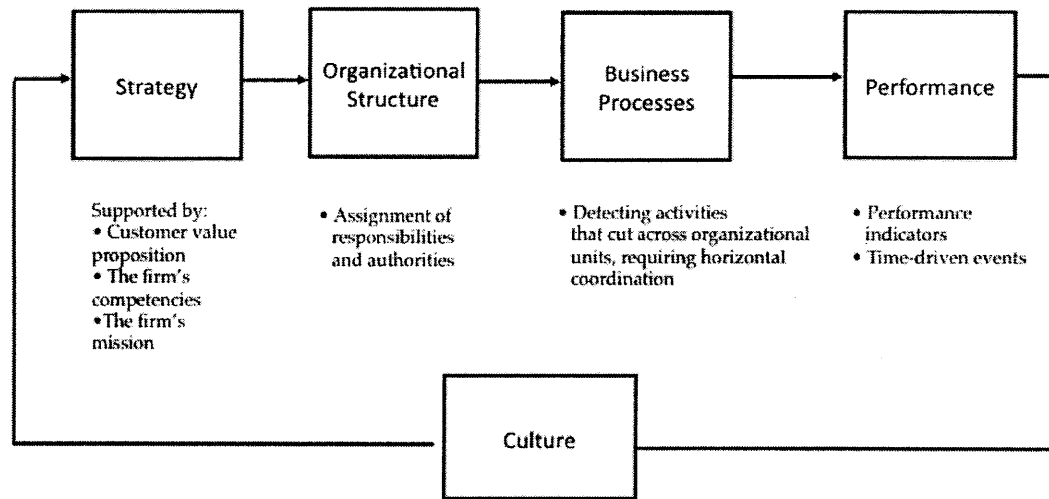
Another core concept of this process is the Strategic Technology Unit (STU). Technology strategy designs how to Identify, evaluate, obtain, and create STUs.



Source: Hax (2009), Hax and Wilde (2001)

Figure 4-2. The Process of Strategic Planning

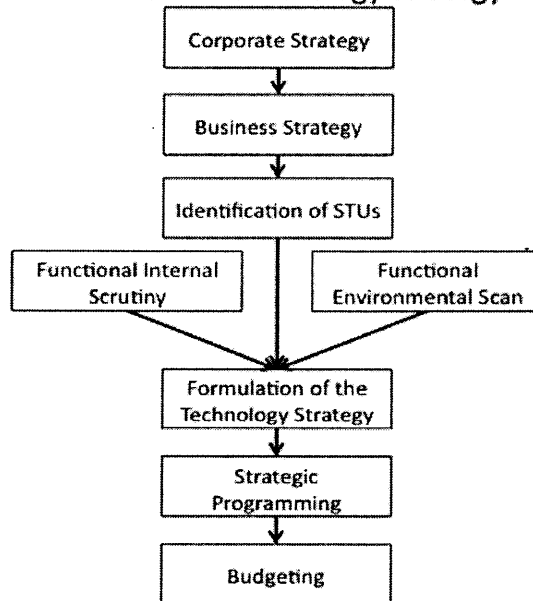
### The Components of the Strategic Agenda



Source: Hax (2009), Hax and Wilde (2001)

Figure 4-3. Components and cycle of strategy execution process

### The tasks of technology strategy



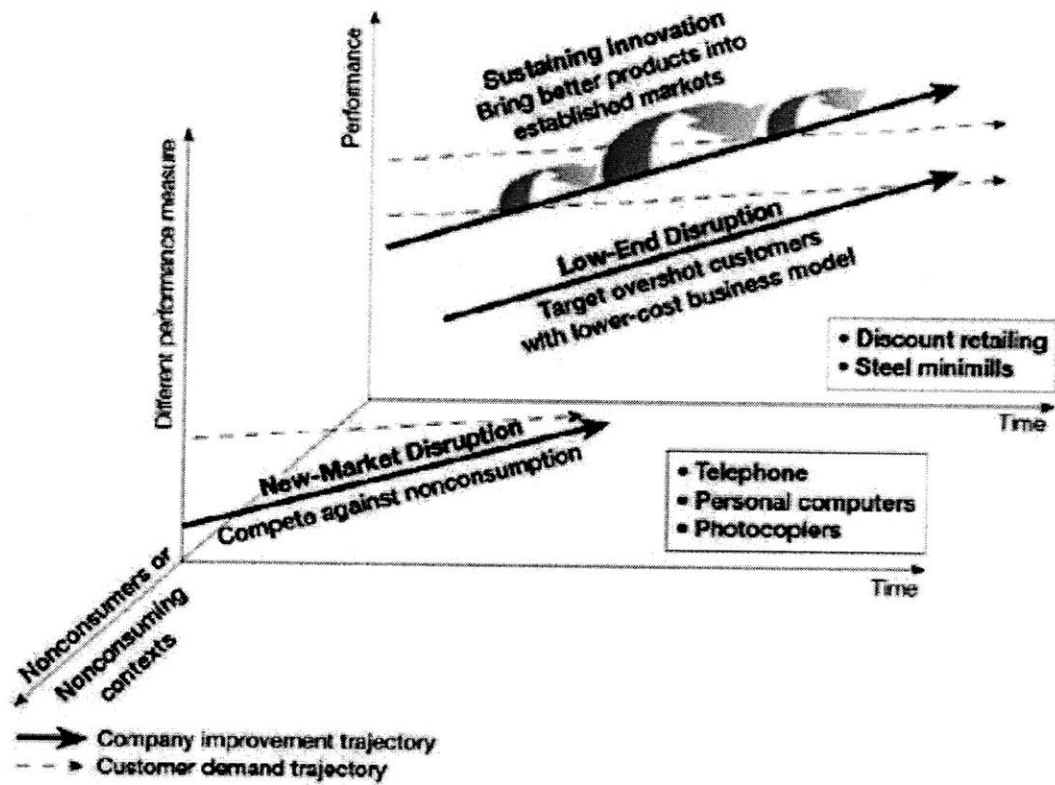
Source: Hax and Majluf (1996).

Figure 4-4. Tasks of technology strategy

#### **4-2. DISRUPTIVE TECHNOLOGY**

The telecom industry is often cited as a typical example of disruptive technological change—and the Japanese telecom market is one of the most volatile environments in the world. Thus we have to take meticulous care when using this theory as a complement to the Delta model. Christensen (2004) presents three theories regarding disruptive change. Disruptive innovation theory is the first. It begins from a low-end or new-market target and aims for overshot customers that incumbent firms serve too much functionalities or non-consuming customers that no firms reach to serve, respectively. Incumbent firms focus on their best customer and repeatedly develop incremental innovations. They create overshot customers because the effectiveness of their innovations exceeds customer needs over time. They also cannot focus on non-consuming customers because of initial small market size. Once disruptive technology comes off, incumbent firms usually cannot fight back (see Figure 4-5).

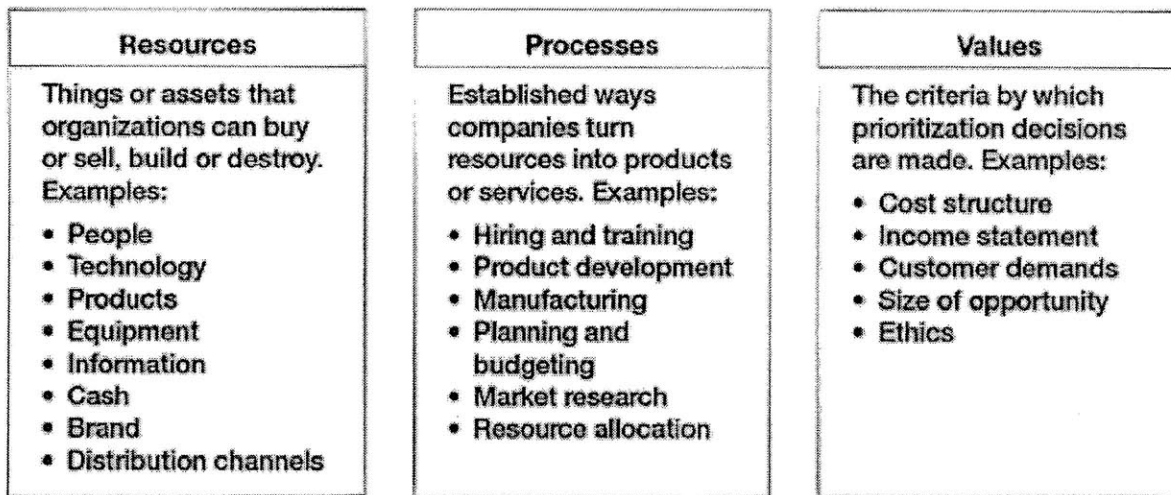
## The Disruptive Innovation Theory



Source: Christensen, Anthony, and Roth (2004).

Figure 4-5. The Disruptive innovation theory

A second theory is the Resources, Processes and Values (RPV) theory, which explains why excellent incumbent firms fail to adopt disruptive technologies. Usually incumbent firms are rich in resources, and they help create or acquire new technologies including both incremental and disruptive technologies. However, incumbent firms also have established processes and values, and these attributes prevent management from adopting disruptive technologies. The more efficient an incumbent firm is, the harder it will be to adopt disruptive technologies (see Figure 4-6).



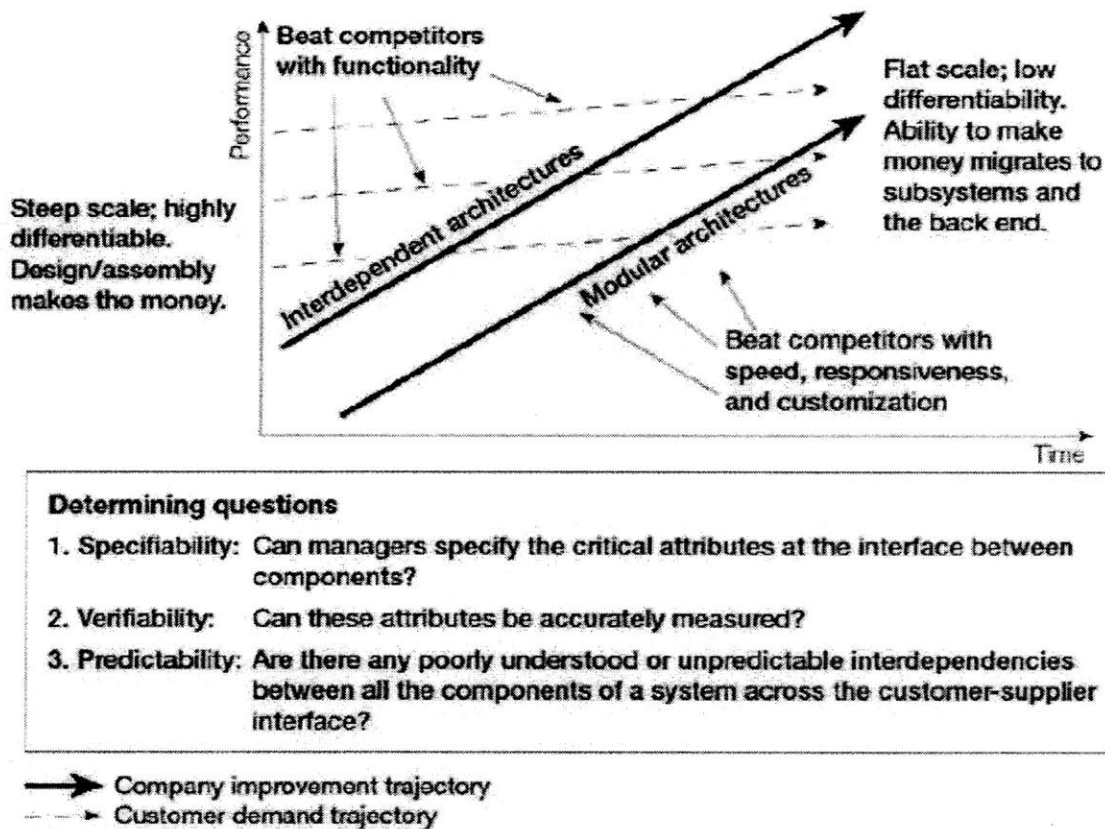
Source: Christensen, Anthony, and Roth (2004).

Figure 4-6. Resources, Processes, and Values (RSV) theory

The last theory is value chain evolution, which gives an understanding of interdependent and modular architecture. Firms can make strategic selections from two architectures, or select a competitive technology strategy from among functionality oriented and speed/response/customize oriented (see Figure 4-7).



## The Value Chain Evolution Theory



Source: Christensen, Anthony, and Roth (2004).

Figure 4-7. Value Chain Evolution (VCE) theory

### 4-3. INVISIBLE ASSETS, DYNAMIC SYNERGY, AND OVEREXTENSION

In order to discuss Japanese firms' strategies, we need to understand the logic and theory that is the basis of Japanese corporate strategy. There are many unique and original theories proposed by Japanese scholars coming from research conducted in Japanese firms.

The first theory is invisible assets, dynamic synergy, and overextension, set forth by Itami and Roehl (1987) and Itami (2003), strongly affects discipline in Japanese firms. The

concept of invisible assets adds information to corporate resources, which are typically defined as people, money, goods, and information. The uniqueness of the authors' viewpoint about information as an invisible asset is that information also includes channel capacity and internal information processing tendency. With their invisible asset theory, we can develop a similar description about the effect of an incumbent company's failure with disruptive technology, similar to Christensen's RPV theory. If an incumbent company has an information-processing tendency focused on a current business model that could prevent it from noticing a disruptive threat.

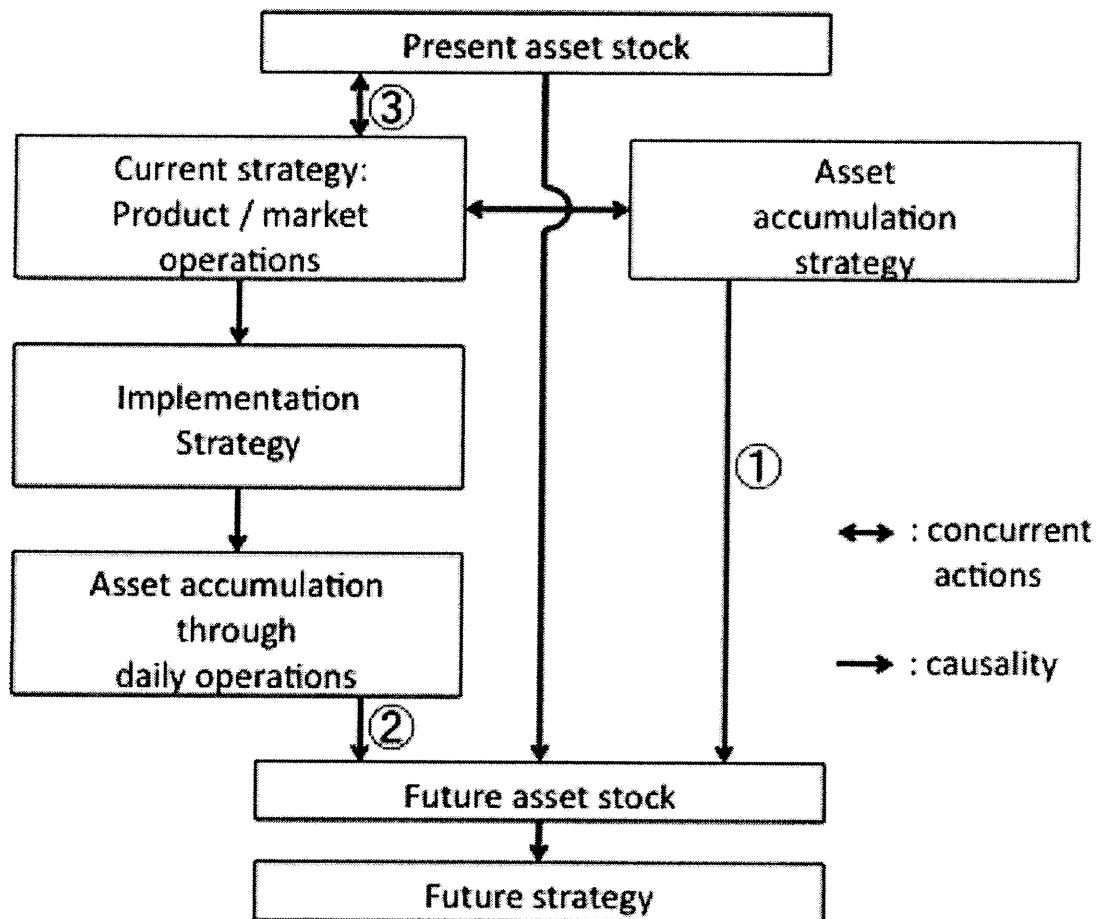
Invisible assets are further defined as follows:

- Environmental information: Stock of environmental information and capacity of intake channel (e.g., technology/production know-how, customer information database, route to acquire new technology, route to obtaining market information)
- Corporate information: Stock of corporate information and capacity of intake channel (e.g., brand, trust, image, influence on partners, advertising know-how)
- Internal information processing tendency: Pattern and uniqueness of information processing (e.g., organizational climate/culture, morale in the front line, management capability).

Based on this extended view of corporate assets, Itami discusses a corporate process, assets, and strategy. He called his framework a Dynamic Synergy model (see Figure 4-8). Like the Delta model, the Dynamic Synergy model starts from thinking about a desirable future. The current strategy is designed to reach that desirable future, but it is not

base solely on the present asset stock. The basic framework of the Dynamic Synergy model includes:

- Think future strategy and future asset stock.
- Design asset accumulation strategy and accumulation through daily operations.
- Design current strategy including consideration to present asset stock and pass to future asset stock.

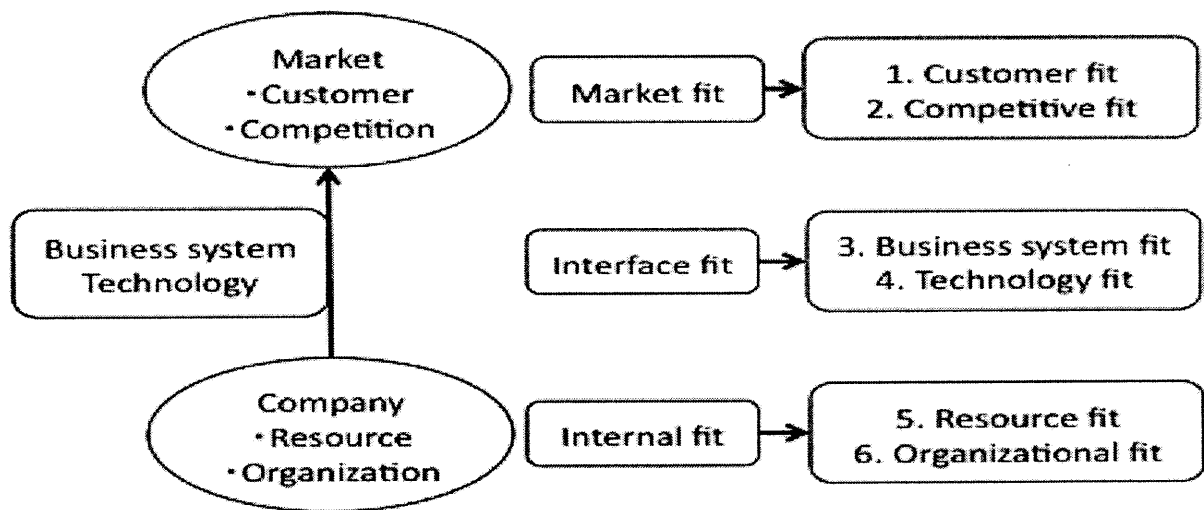


Source: Itami, Roehl (1987), Itami (2003).

Figure 4-8. The Dynamic Synergy Model

Following the discussion of dynamic synergy, Itami talks about the logic that good strategies have in common. He organized a framework of good logic that includes six types of strategic fit, and stated that a strategy will be successful when all six strategic fits are completed. The six types of strategic fits are: Customer fit, Competitive fit, Business system fit, Technology fit, Resource fit, and Organizational fit. The concept of strategic fit covers market and company, and the interface between them, which allows us to see all of the firm's activity. A good strategy should have logic that enables various aspects of organizational activity to be effective. There are three fit levels: passive, active, and leverage. Leverage fit is not a simple situation of passive or active fits; it is the key notion of designing a path to the desirable future from the current position (see Figure 4-9).

### Whole map of Strategic fit



### Three levels of fit

1<sup>st</sup>: Passive fit

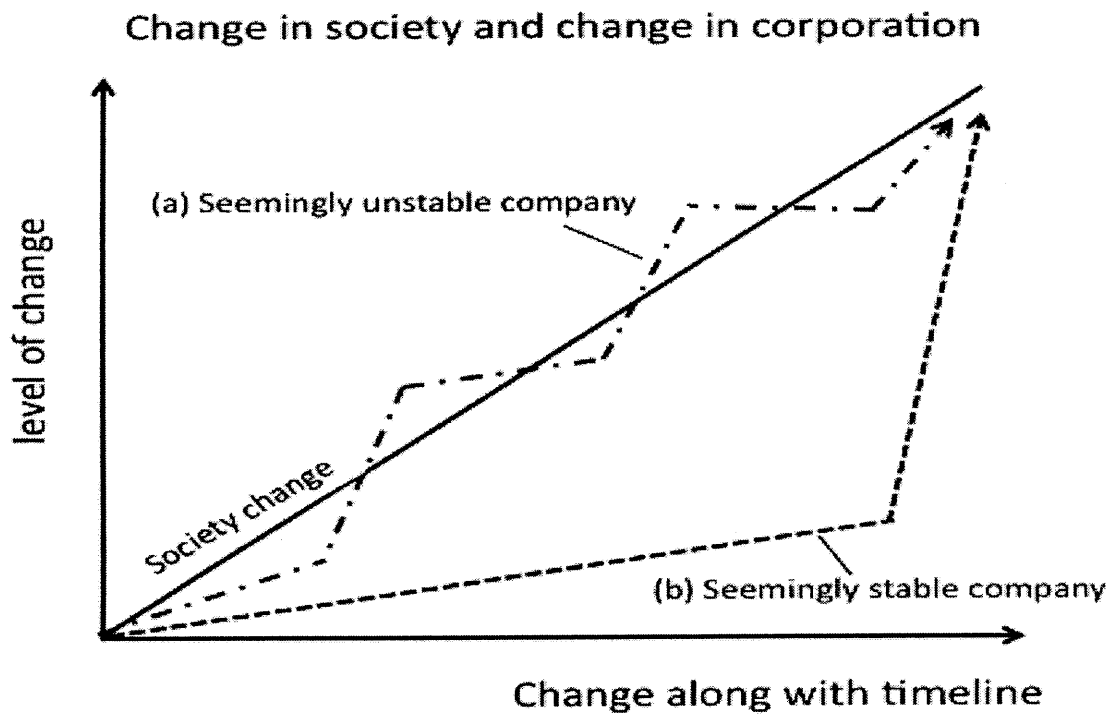
2<sup>nd</sup>: Active fit

3<sup>rd</sup>: Leverage fit

Source: Itami (2003).

Figure 4-9. Strategic fit

The Leverage level of organizational fit leads an organization into an unstable situation on purpose. This overextension or unstable strategy allows the firm to change along with societal changes. An unstable company has a greater possibility of fighting back disruptive technology because it has a higher degree of freedom and the ability to revise its process and value (see Figure 4-10).



Source: Itami (2003).

Figure 4-10. Overextension strategy

#### 4-4. ORGANIZATIONAL KNOWLEDGE CREATION

Another scholarly Japanese theory is organizational knowledge creation (Nonaka 1990; Nonaka and Takeuchi 1995). These studies are not about strategy but are based on a deep understanding of organizational behavior in Japanese firms. The uniqueness of their theory is the basic perspective of the organization as an entity that amplifies individual knowledge and creates organizational knowledge. The authors define organizational knowledge creation as a continuous process from individual to group and group to organization, and several conditions affect this process, such as autonomy, fluctuation, chaos, “BA”-setup,<sup>3</sup> redundancy, and nobleness. The following propositions, given by Nonaka, indicate the specific process.

1. The origin of organizational knowledge creation is personal knowledge creation by an individual within an organization. It is driven by his or her intention and autonomy.
2. Emergent fluctuation or chaos create the motivator for an organization member’s fundamental learning and the possibility of information/knowledge creation.
3. Setup of “BA” as a group drives tacit knowledge sharing through creative dialogue. “BA” offers opportunities to create a group-level concept.
4. As a result of the group-level concept-making process, individual knowledge is amplified toward organizational knowledge creation.
5. Attributes of organizational knowledge creation, such as irreversibility, activation, trust of organization and self-control, are dependent on redundancy of information.

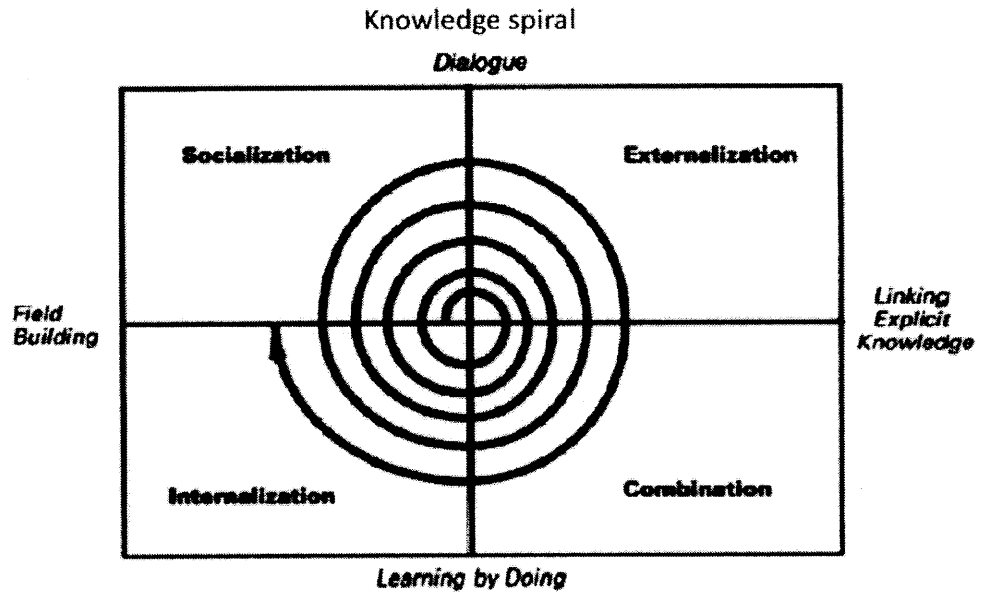
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<sup>3</sup> BA means place, or field in physically and psychologically.

6. Efficiency of organizational knowledge creation is dependent on minimum effective diversity.
7. Organizational knowledge is justified by prior shared values within the organization.
8. Organizations schematize individual knowledge into organizational knowledge by creating a loose semantic network. A strategic issue is to define how this process and this semantic web will become the bases for resource allocation.
9. Organizational knowledge is not a one-shot product; it will be the origin of future organizational knowledge creation. Thus, explicit knowledge and tacit knowledge have an upward relationship of circulation and complementarity.
10. Verticality of organizational knowledge is dependent on the spirit of nobleness between the leader(s) and members in the organization.

Organizational knowledge creation is defined as a continuous process of four modes: Socialization, Externalization, Combination, and Internalization. The continuous process is depicted as a spiral trajectory, which indicates semantic network growth from individual to group, group to organization, and organization to inter-organization (see Figure 4-11).

The four modes of knowledge creation are defined as interaction and transformation of tacit knowledge and explicit knowledge, which continuously spreads to the organization (see Figures 4-12, 4-13).



Source: Nonaka and Takeuchi (1995).

Figure 4-11. Spiral of organizational knowledge creation

Contents of knowledge created by four mode

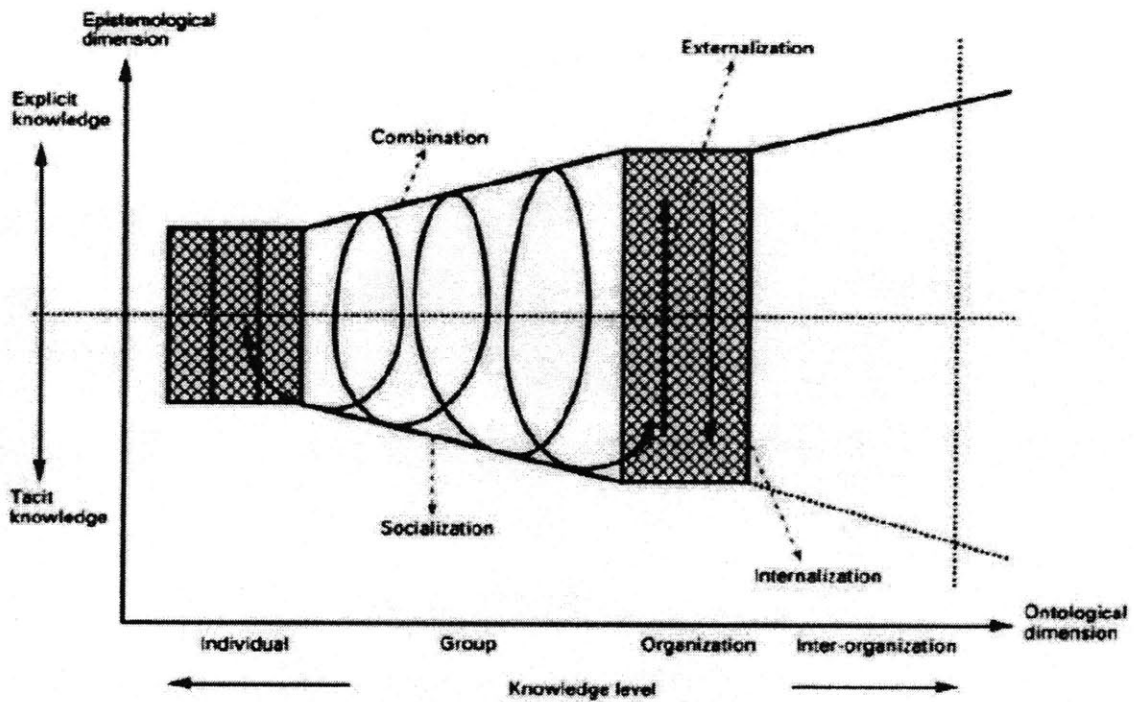
		Tacit knowledge	To	Explicit knowledge
Tacit knowledge		(Socialization) Sympathized Knowledge		(Externalization) Conceptual Knowledge
From				
Explicit knowledge		(Internalization) Operational Knowledge		(Combination) Systematic Knowledge

Source: Nonaka and Takeuchi (1995).

Figure 4-12. Four modes of knowledge creation



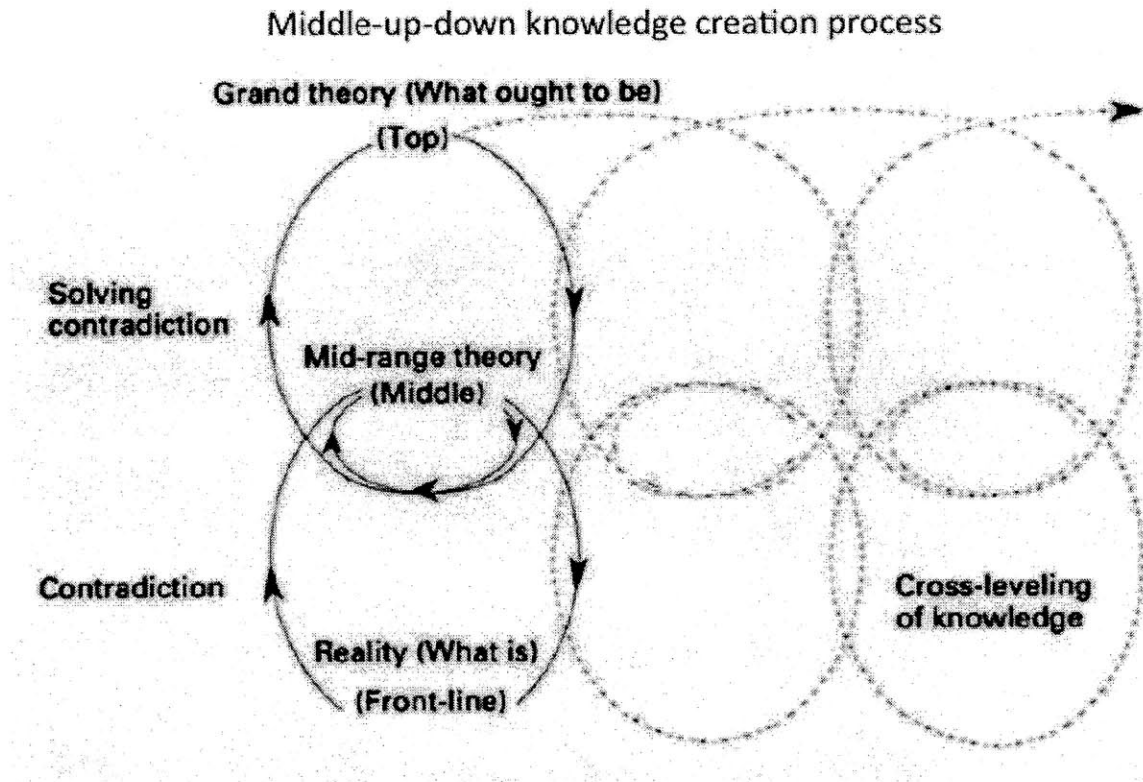
## Spiral of organizational knowledge creation



Source: Nonaka and Takeuchi (1995).

Figure 4-13. Continuous spread of knowledge creation

Top, middle, and lower-level personnel have different tasks in the organizational knowledge creation process. Top management is the semantic catalyst for organizational knowledge creation; middle management is the knowledge engineer that understands top management's concept, and encourages the lower level's expert knowledge and enables knowledge creation; the lower level is an expert that reacts to the catalyst's appeal, deals with reality and makes concept come to life. The knowledge creation process is not simply top down or bottom up, but interaction within organization linked by the middle layer. This concept most nearly depicts the Japanese intuitive perception about organizational process (see Figure 4-14).



Source: Nonaka and Takeuchi (1995).

Figure 4-14. The middle-up-down process

#### **4-5. SUMMARY**

I have overviewed several models and theories for designing strategy: the Delta model, and other theories that help in the formulation of effective strategy for Japanese telecom firms. The Delta model provides a concrete procedure for creating a well-balanced strategy. Theories about strategy offer the logic that good strategy should have, but they do not suggest pragmatic processes or procedures that guide in real practice. There could be complementary relationships between the Delta model and these theories.

For the Japanese telecom industry, which has high risk of disruptive change because of its mature and cutting-edge technology market, it would be a useful experiment to combine the Delta model, disruptive theories, invisible asset and organizational knowledge creation.

## CHAPTER 5 METHODOLOGY

### 5-1. COMPLEMENTARY MODEL FOR IN-DEPTH ANALYSIS

In order to create complementary relationships between the Delta model and the strategic theories of disruptive technology; RPV; value chain evolution; and invisible asset, overextension, and organizational knowledge creation, I conducted attempted to design a strategy for NTT Group by adding knowledge from four theories to the Delta model process (see Figure 5-1).

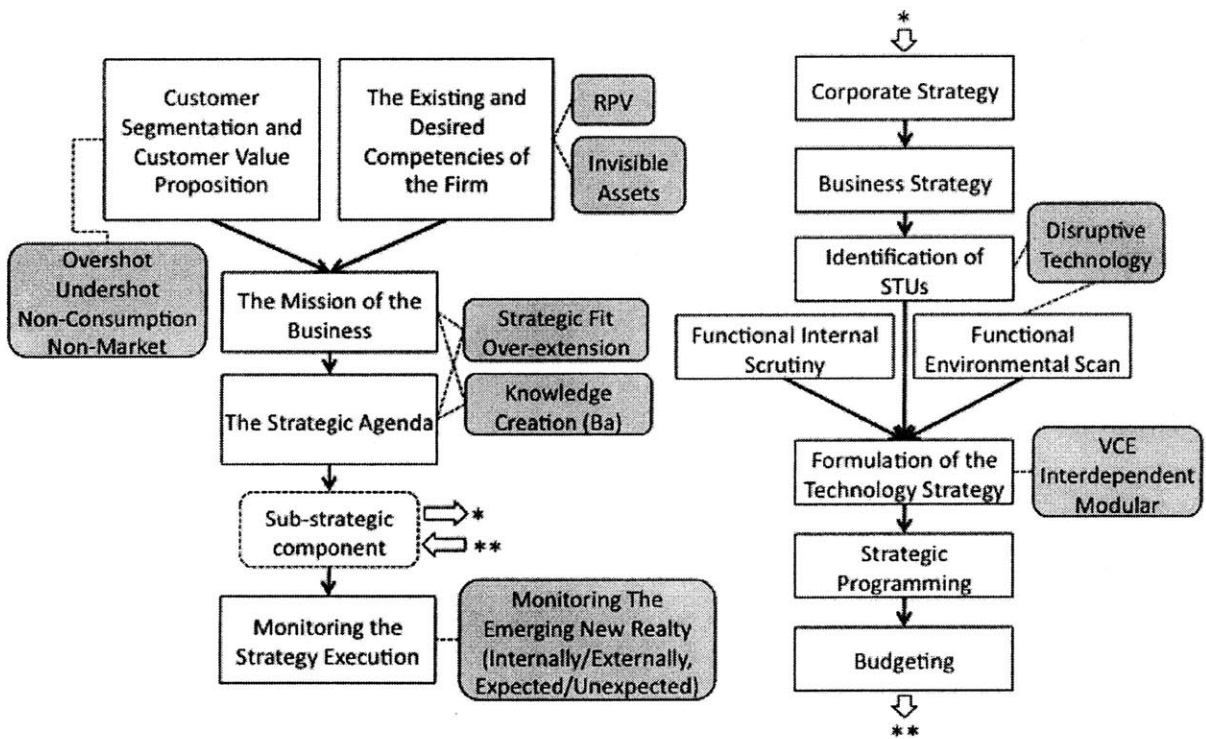


Figure 5-1. Process of the experimental procedure

The gray squares indicate elements from theories, and they are connected to a corresponding component of the Delta model. I expected that this experiment would form better strategy and acquire new knowledge that would reinforce the Delta model. However, the effectiveness of this modified procedure could be limited only to Japanese firms or the telecom industry.

Chapter 6 provides a practical use of this methodology as applied to NTT Group.

## CHAPTER 6 DATA AND ANALYSIS

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### 6-1. CUSTOMER SEGMENTATION AND CUSTOMER VALUE PROPOSITION

For the first step of this experiment, we examine the customer segmentation of the telecom industry. Adding to the ordinary Delta model are three questions regarding disruptive technology, which contains overshooting, undershooting, and non-consumption.

There are five customer segmentation tiers:

Tier 5: Price and Quality seeker

Tier 4: Bundle seeker

Tier 3: Business Connection

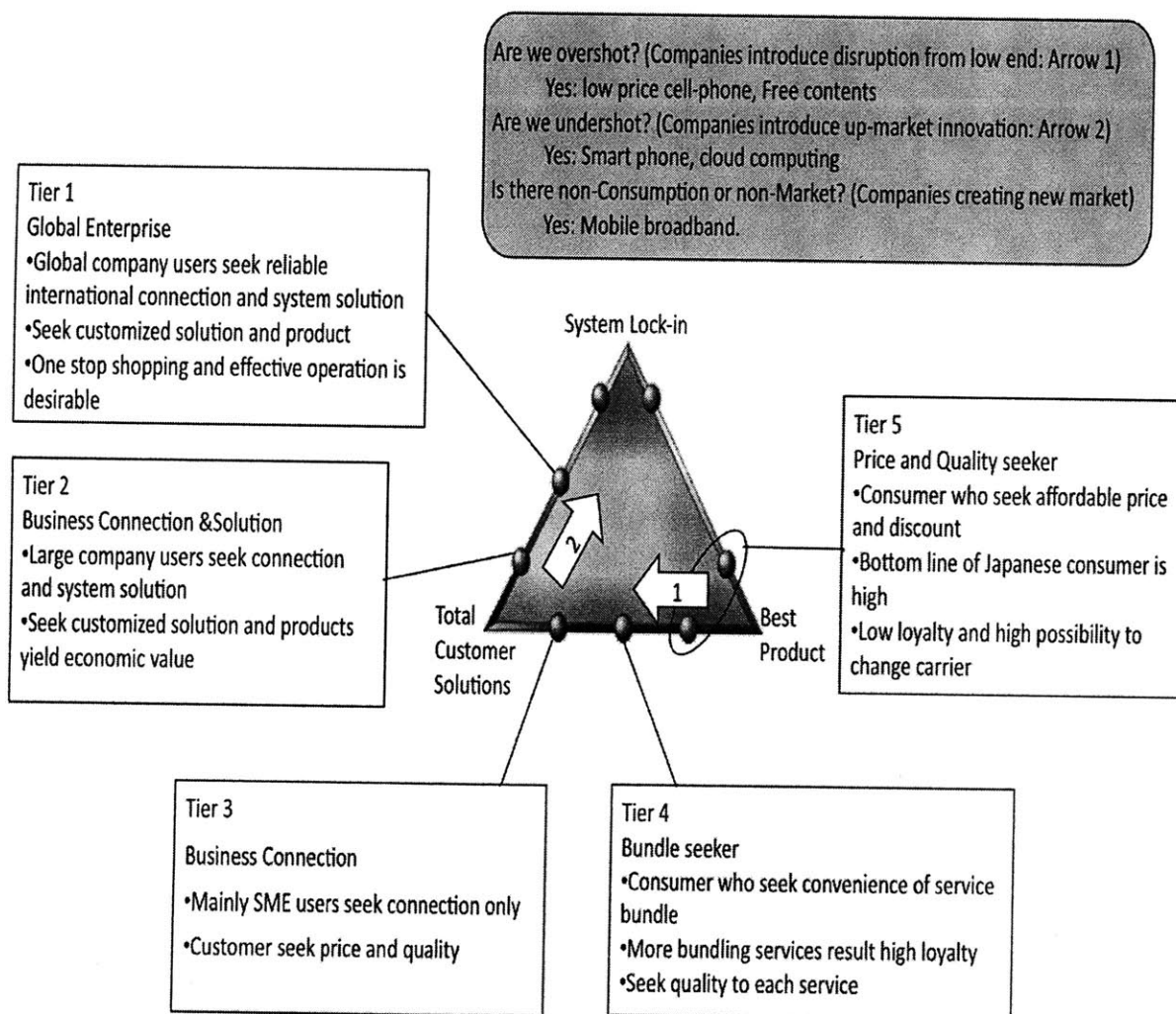
Tier 2: Business Connection and Solution

Tier 1: Global Enterprise

For consumers, the telecom business is changing from a uniform, low-price business to one that is customized and offers value-added services. The left side of the Delta model is occupied by business users that always need solutions for their business needs. Business customers who need system and software solutions and global operations are in a higher tier.

Three questions from disruptive theory bring focus to threats from mobile communications. Regarding the question of overshoot customers, NTT focuses on value-added and fair price, but a threat could come from low price cellphones and the free content business. For questions about undershot customers, NTT used to take advantage of

its i-mode Internet connection service, but the threat comes from the smart phone business and cloud computing, where U.S. firms lead that business. For non-consumption customers, mobile broadband that takes the place of fixed line or Wi-Fi has strict limitations on place. Using these disruptive questions, we can view the Delta model differently and add a possible disruptive scenario (Figure 6-1).



**Figure 6-1. Customer segmentation of telecom industry**

The Delta model provides a framework within which to analyze various business dimensions and value propositions in each tier. Using these elements, a practitioner can understand customers and the bottom line that a firm should reach in its business operations. For the Japanese telecom industry, more value and function will guide customers toward upper tiers. For business, a global system is a common requirement from Japanese firms, including small and mid-size enterprises that seek opportunities in emerging foreign markets, offshore production, etc.

By adding a “Signs of Disruptive Threat” row to these tables, a strategist can avoid the pitfall of tautology and self-complacency. Instead we have to think like the customer. But Japanese firms, under the strong effect of the overextension perspective, tend to think about “what we have” and “what we can acquire through operations” and make the story fit their current and future competencies. Speculation involving disruptive threat guides us to “what we don’t do” and “what a competitor would do.” Thus it is helpful to get close to the real customer situation in markets (see Figures 6-2, 6-3).



<b>Customer Dimension</b>	Tier 1 "Global Enterprise"	Tier 2 "Business Connection & Solution"	Tier 3 "Business Connection"	Tier 4 "Bundle seeker"	Tier 5 "Price and Quality seeker"
<b>Product Scope</b>	-Reliable and customizable international and multi-domestic network solution	-Reliable and customizable network solution in Japan	-Cost effective telecom connection for firms	-Cost effective house/apartments service	-Price and quality
<b>Services Scope</b>	-Best Service Level Agreement based quality	-Best Service Level Agreement based quality	-Affordable quality	-Whole coverage of house services	-Average quality
<b>Customer Scope</b>	-Global firms with foreign branch network -Offshore manufacturer	-Domestic firms with branch/factory network	-Domestic firms with few branches and factories	-House owner -Real-estate developer, Agent	-Individual -Small group (Family, Friends etc.)
<b>End-User Scope</b>	-N/A	-N/A	-N/A	-Rents, Households	-N/A
<b>Channel Scope</b>	-Direct -Solution partner	-Direct -Solution partner	-Direct -Sales agent	-Direct -Sales agent	-Direct -Sales agent
<b>Complementor Scope</b>	-Solution firms with global scale	-Solution partner firms with domestic focus	-Developer /agent of office renovation	-ISP -Pay TV channel	-Electronics retailer -Chain store
<b>Unique Competencies</b>	-International IP connection -Foreign carriers partnership -Support maintenance	-Next generation IPv6 network -Quality, Support, Brand	-Next generation IPv6 network -Quality, Support, Brand	-Brand in Japan market -Services bundle over IP network	-Brand in Japan market -Trust from Japanese market
<b>Signs of Disruptive Threat</b>	-Smart phone and business applications via mobile Internet -Free/low price application/Solution such as Skype, google apps and salesforce.com	-Smart phone and business applications via mobile Internet -Free/low price application/Solution such as Skype, google apps and salesforce.com	-Smart phone and business applications via mobile Internet	-Free home entertainment from internet over the head of carrier network -Home control focus on energy saving and CO2 reduction	-Low price or prepay mobile connection business from developing countries.

**Figure 6-2. Business dimensions of the telecom industry**

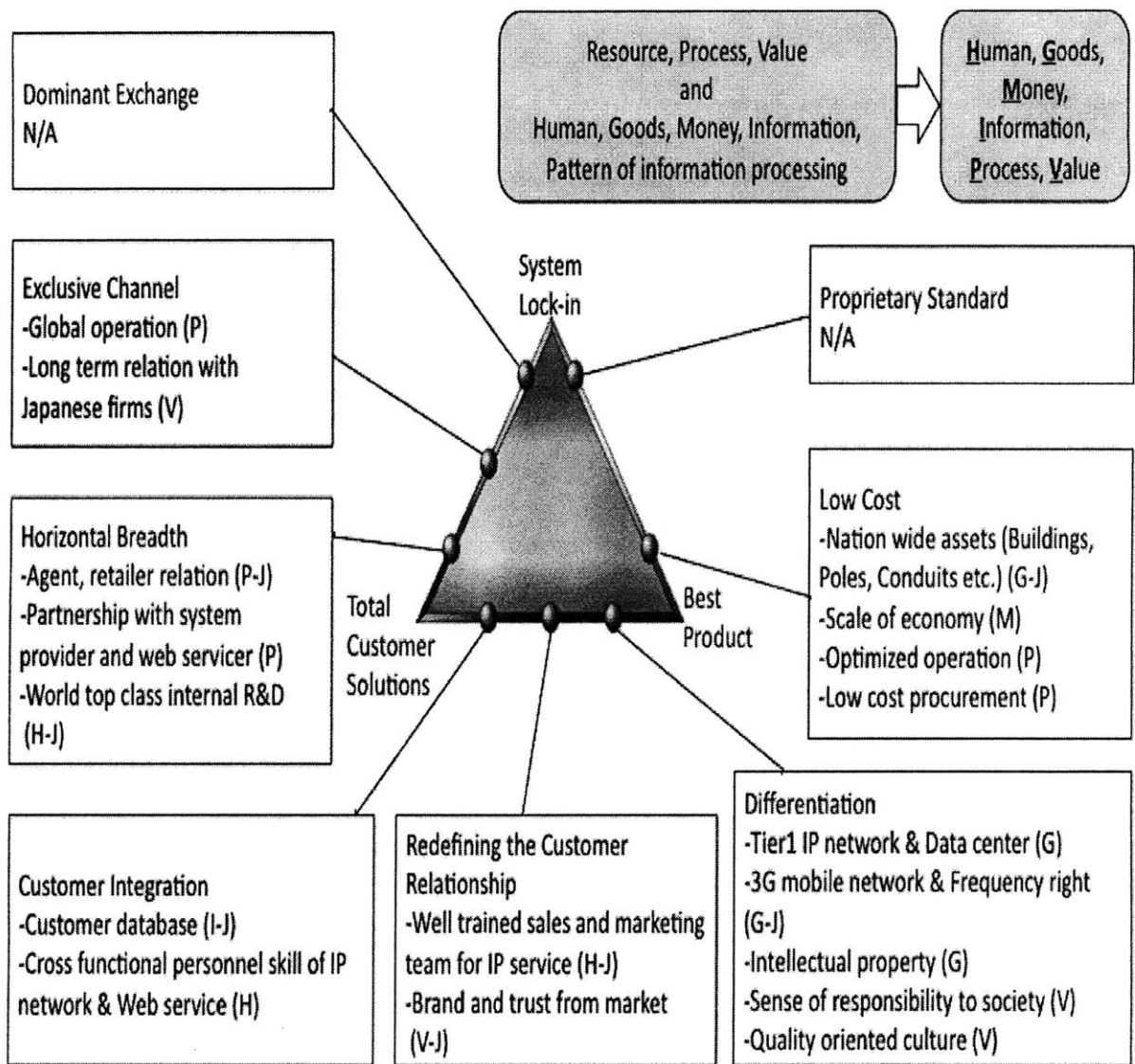
Value Proposition Element	Tier 1 “Global Enterprise”	Tier 2 “Business Connection & Solution”	Tier 3 “Business Connection”	Tier 4 “Bundle seeker”	Tier 5 “Price and Quality seeker”
Experiences	Experience of international network/system construction	Experience of network and system confusion/customization	Experience of business network customization	Experience of various service creation and marketing in Japan	Experience of effective marketing in Japan
Value Delivery Systems	<ul style="list-style-type: none"> <li>•Exclusive contact</li> <li>•Network professional in each country and global network operation</li> <li>•Japanese IPv6 Network &amp; 3G Mobile network</li> <li>•Foreign network ownership, virtual network Operator contract, Interconnection</li> <li>•Global IP network</li> </ul>	<ul style="list-style-type: none"> <li>•Exclusive contact</li> <li>•Network professional in each country</li> <li>•Japanese IPv6 Network &amp; 3G Mobile network</li> <li>•Foreign network ownership or virtual network operator contract</li> </ul>	<ul style="list-style-type: none"> <li>•marketing and sales</li> <li>•Network professional in each country</li> <li>•Japanese IPv6 Network &amp; 3G Mobile network</li> <li>•Foreign network ownership or virtual network operator contract</li> </ul>	<ul style="list-style-type: none"> <li>•Mass marketing and sales</li> <li>•Network operation</li> <li>•Japanese IPv6 Network &amp; 3G Mobile network</li> <li>•Foreign network ownership or virtual network operator contract</li> <li>•IP service function enables home entertainment etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Mass marketing and sales</li> <li>•Network operation</li> <li>•Japanese IPv6 Network &amp; 3G Mobile network</li> <li>•Foreign network ownership or virtual network operator contract</li> </ul>
Value Appropriation	<p><u>Value gained by customer</u></p> <ul style="list-style-type: none"> <li>•Superior business efficiency</li> </ul> <p><u>Value gained by NTT</u></p> <ul style="list-style-type: none"> <li>•Exclusive relationship, higher margins, predictable revenues</li> </ul> <p><u>Value gained by both</u></p> <ul style="list-style-type: none"> <li>•Shared learning in global operation</li> </ul>	<p><u>Value gained by customer</u></p> <ul style="list-style-type: none"> <li>•Superior business efficiency</li> </ul> <p><u>Value gained by NTT</u></p> <ul style="list-style-type: none"> <li>•Exclusive relationship, higher margins, predictable revenues</li> </ul> <p><u>Value gained by both</u></p> <ul style="list-style-type: none"> <li>•Shared learning in service customization</li> </ul>	<p><u>Value gained by customer</u></p> <ul style="list-style-type: none"> <li>•Superior business efficiency</li> </ul> <p><u>Value gained by NTT</u></p> <ul style="list-style-type: none"> <li>•Access through sales channel, solution firms</li> </ul> <p><u>Value gained by both</u></p> <ul style="list-style-type: none"> <li>•Learning in standard process, function and technology</li> </ul>	<p><u>Value gained by customer</u></p> <ul style="list-style-type: none"> <li>•Security, convenience, entertainment etc.</li> </ul> <p><u>Value gained by NTT</u></p> <ul style="list-style-type: none"> <li>•Exclusive relationship, higher margins, predictable revenues</li> </ul> <p><u>Value gained by both</u></p> <ul style="list-style-type: none"> <li>•Learning in connected home solution</li> </ul>	<p><u>Value gained by customer</u></p> <ul style="list-style-type: none"> <li>•convenience, entertainment etc.</li> </ul> <p><u>Value gained by NTT</u></p> <ul style="list-style-type: none"> <li>•Access through sales channel, marketing</li> </ul> <p><u>Value gained by both</u></p> <ul style="list-style-type: none"> <li>•Learning in mass market requirement</li> </ul>
Signs of Disruptive Threat	<ul style="list-style-type: none"> <li>•Interest to cloud computing based customization &amp; global operation</li> </ul>	<ul style="list-style-type: none"> <li>•Interest to cloud computing based customization</li> </ul>	<ul style="list-style-type: none"> <li>•High evaluation to cloud computing apps</li> </ul>	<ul style="list-style-type: none"> <li>•Addiction to free service and entertainment</li> <li>•Ads base business model</li> </ul>	<ul style="list-style-type: none"> <li>•Business model of extreme low price mobile communication</li> <li>•Ads base business model</li> </ul>

Figure 6-3. Value proposition of for the telecom industry

## **6-2. EXISTING AND DESIRED COMPETENCIES OF THE FIRM**

The next step in the Delta model process is checking the existing and desired competencies of the firm. These two analyses give information for further steps to be taken. The objective is design a bridge from present asset stock to future asset stock. By adding to the ordinary concept of assets/resources (i.e., people, goods, and money) the broader concept of the invisible asset (information), then process and value are introduced as attributes of the firm's competencies. An analysis of NTT's competencies shows abundant assets in Japan and a strong telecom network in its current position. However, there is a scarcity of non-Japanese network assets/resources, information, processes, and value that could be applied to global business solutions. A combination of the Delta model and these assets will provide better opportunities to conduct precise analyses. Figures 6-4 and 6-5 show NTT's existing and desired competencies, respectively.

### The Existing Competencies of the Firm



-J: Competency only in Japan

Figure 6-4. Existing competencies of NTT

### The Desired Competencies of the Firm

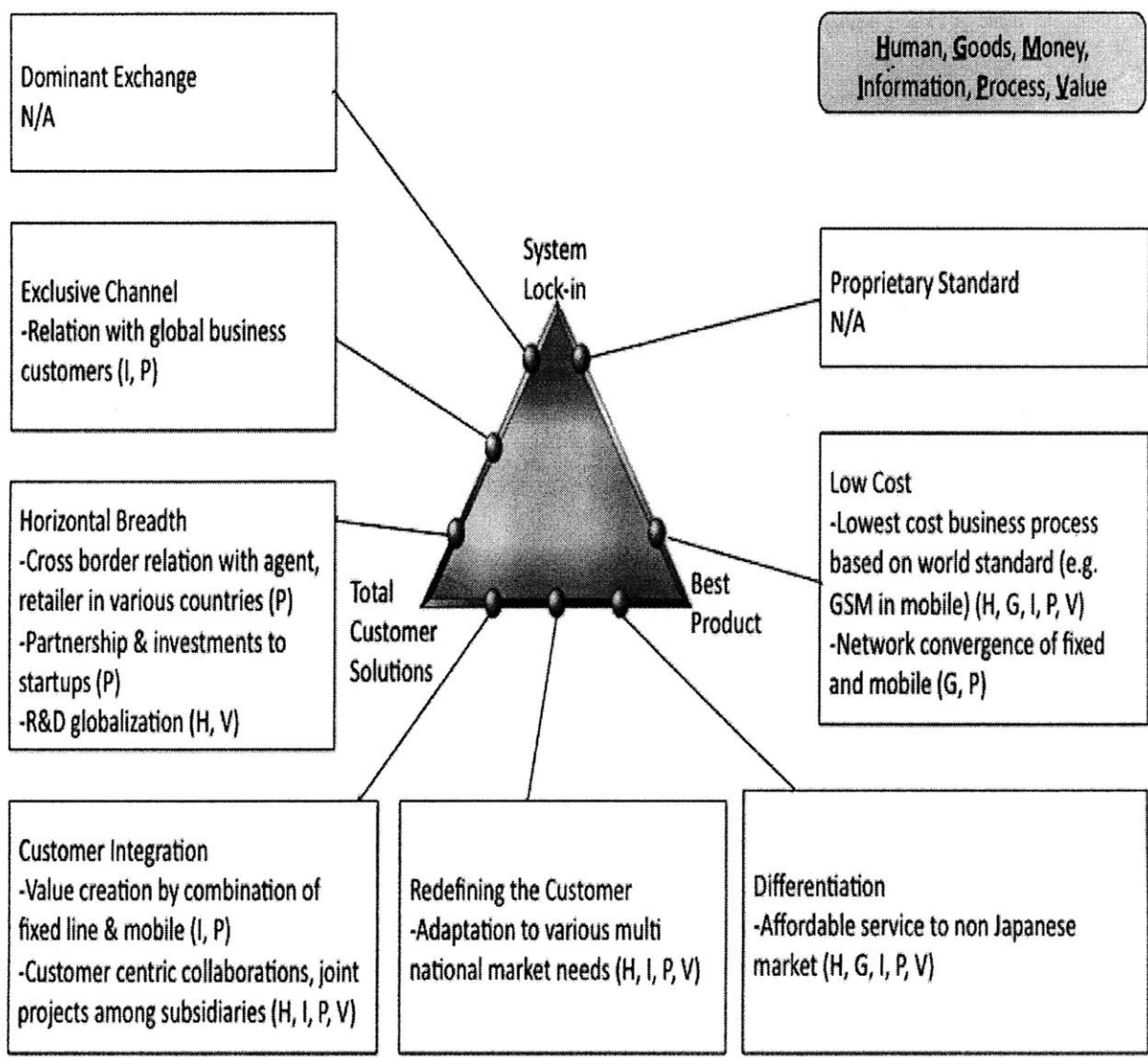


Figure 6-5. Desired competencies of NTT

### **6-3. THE MISSION OF THE BUSINESS**

In the mission of the business, both the external and internal aspects, obtained as a result of previous processes, are integrated together. Various scopes are examined and developed into current and future missions. In order to introduce the perspectives of overextension, organizational knowledge creation, and disruptive technology, the three are appended to the table as added scopes. NTT's current mission focuses on cutting-edge technology for Japanese society, but its future mission should extend outward to the global market, along with low price business, and effective mobile use. Adding the three scopes complements the original Delta model table and brings a clear focus to the future mission of the business (see Figure 6-6).

	Now	Future
<b>Product Scope</b>	<ul style="list-style-type: none"> <li>•Regional communication</li> <li>•International communication</li> <li>•Mobile communication</li> <li>•System solution</li> </ul>	<ul style="list-style-type: none"> <li>•Regional communication</li> <li>•International communication</li> <li>•Mobile communication</li> <li>•System solution</li> </ul>
<b>Services Scope</b>	<ul style="list-style-type: none"> <li>•High quality IP/Mobile network</li> <li>•Various network/web service for consumer</li> <li>•Total support from business consulting to system building</li> </ul>	<ul style="list-style-type: none"> <li>•Serve advantage of fixed mobile convergence</li> <li>•Various network/web service for consumer</li> <li>•Total support from business consulting to system building</li> </ul>
<b>Customer Scope</b>	<ul style="list-style-type: none"> <li>•ICT (Information Communication Technology) Solution Partner</li> <li>•Creative E- Life for everyone</li> </ul>	<ul style="list-style-type: none"> <li>•ICT Solution Partner</li> <li>•Creative E- Life for everyone</li> </ul>
<b>End-User Scope</b>	<ul style="list-style-type: none"> <li>•Meet to Various life style</li> <li>•One stop shopping</li> <li>•Japanese social problem solving (Digital Divide etc.)</li> </ul>	<ul style="list-style-type: none"> <li>•Personal media</li> <li>•Support for Inter-Customer Interaction</li> <li>•Ubiquitous communication</li> </ul>
<b>Channel Scope</b>	<ul style="list-style-type: none"> <li>•Domestic IP/mobile network</li> <li>•Global IP network</li> <li>•Internet</li> </ul>	<ul style="list-style-type: none"> <li>•Multi-nations and Global IP/mobile network</li> <li>•Internet</li> <li>•Future seamless/ubiquitous access</li> </ul>
<b>Complementor Scope</b>	<ul style="list-style-type: none"> <li>•Group synergy</li> <li>•Domestic agent retailer relation</li> </ul>	<ul style="list-style-type: none"> <li>•More advanced group synergy</li> <li>•External complementor in service/content/sales</li> </ul>
<b>Geographical Scope</b>	<ul style="list-style-type: none"> <li>•Global ICT Infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>•Global ubiquitous communication/solution</li> </ul>
<b>Unique Competencies</b>	<ul style="list-style-type: none"> <li>•Internal R&amp;D</li> <li>•Market experience of cutting edge technology</li> </ul>	<ul style="list-style-type: none"> <li>•Support Japanese firm globalization</li> <li>•Knowledge transfer among multi markets/countries</li> </ul>
<b>Overextension Scope (Strategy base/Operation base)</b>	<ul style="list-style-type: none"> <li>•Worlds most advanced technology development, introduction and operational knowledge learning</li> </ul>	<ul style="list-style-type: none"> <li>•Learning multi national operation and management</li> </ul>
<b>Organizational Knowledge Creation Scope</b>	<ul style="list-style-type: none"> <li>•N/A</li> </ul>	<ul style="list-style-type: none"> <li>•Based on current Japanese management, recreate new discipline that transferable multi countries</li> <li>•Experimental project for future global knowledge creation</li> </ul>
<b>Internalizing Disruption Scope</b>	<ul style="list-style-type: none"> <li>•N/A</li> </ul>	<ul style="list-style-type: none"> <li>•Free/low price business</li> <li>•Utilize potential idea from startups</li> <li>•New business model from non Japanese market (Without rich resource/assets, low ARPU, low data rate etc.)</li> </ul>

Figure 6-6. The Mission of NTT's Business

#### **6-4. THE STRATEGIC AGENDA**

Based on the mission of the business, the next step is to identify the strategic thrust and deployment to organizational units. The strategic agenda showcases the entire picture of strategy execution for the future.

Several adjustments are needed for NTT's strategic agenda. Group top management and major group companies are selected for organizational units, and "Internalize disruptive change" is introduced to strategic thrust to make an alternative focus that incumbent firm practitioners cannot reach. Because of NTT's own rich resources, its strategic thrusts tend to leverage its current advantages. However, the disruptive technology theory suggests that change will emerge from lower-level technology fields and non-consumption where NTT's current assets are not effective. Thus, action in areas such as new business incubation and corporate venture capital will be necessary for detecting, learning, and internalizing disruptive threats (see Figure 6-7).



Strategic Thrusts	Group Organizational Units						Business Processes	Performance Measurements
	CEO/Group Management	NTT Holdings	NTT East/West	NTT communications	NTT DATA	NTT Docomo		
<b>Build Internal competencies</b>								
Next generation network and related business development	2	2	1	1	1	1	OE	ROI, ROA
Fixed mobile convergence and related business development	1	1	1	1	2	1	I	Project ROI, Patent, Standard
New service concept finding such as cloud computing, contextualized knowledge sharing	1	1	2	2	2	2	B	Stock price
<b>Build global relationship, capability</b>								
Construct global IP network & business	2	2		1	1	1	B	ROI, ROA
New group synergy/joint project outside Japan				1	1	1	B	Project ROI performance measurement for organizational learning
<b>Expand foreign markets</b>								
Enhance profitability of US market	1	1		1	2	2	OE	Project ROI
Build business in emerging market (China, India, Vietnam etc.)	1	1		1	1	1	CT	Project ROI performance measurement for organizational learning
<b>Internalize disruptive change</b>								
Collaboration with startups by Corporate VC, offering network/data-center discount/free use	2	2		1	1	1	I	# of projects, Project ROI
Business incubation in emerging market	2	2		1	1	1	I	# of projects, Project ROI

1 – Key role in formulation and implementation

2 – Important role of support and concurrence

**1** – Identifies the “Champion”, who takes leadership for the strategic thrust execution

B – Business Model

OE – Operational Effectiveness

CT – Customer Targeting

I - Innovation

Figure 6-7. NTT's Strategic Agenda

## 6-5. MONITORING THE STRATEGY EXECUTION

Strategy execution should be monitored through the results of daily business operations. The Delta model presents a balanced scorecard consisting of stockholders, operational processes, organizational learning, and customers. This framework is helpful to summarize and check corporate activity, and the careful practitioner can avoid the pitfall of self-sufficient logic. For NTT and the telecom industry, adding “Searching unexpected results” to the balanced scorecard will keep the focus on internal and external disruptive threats (see Figure 6-8.)

Balanced Scorecard

Balanced Scorecard Framework	Financial Perspective (Shareholder Look)	Business Process (Operational Effectiveness)	Organizational Learning (Technology)	Customer Perspective (Customer Targeting)	Searching unexpected results (Disruptive threat)
Company	<ul style="list-style-type: none"> <li>•Volume</li> <li>•Revenue</li> <li>•Earnings</li> <li>•Margin</li> <li>•ROI</li> </ul>	<ul style="list-style-type: none"> <li>•Budget vs. operation result</li> <li>•Cost saving</li> </ul>	<ul style="list-style-type: none"> <li>•% of new technology based revenue/ earnings</li> <li>•R&amp;D expense</li> <li>•# of New business model and project ROI</li> </ul>	<ul style="list-style-type: none"> <li>•Customer satisfaction</li> <li>•Customer ROI</li> </ul>	<ul style="list-style-type: none"> <li>•New entrant to low end market</li> <li>•New business model for non-consumption</li> <li>•Possible disruptive scenario and counterplot evaluation</li> </ul>
Tier 1					
Tier 2					
Tier 3					
Tier 4					
Tier 5					

Figure 6-8. NTT's Balanced Scorecard

## 6-6. IDENTIFICATION OF STUs FROM THE CORPORATE/BUSINESS STRATEGY

In this section, we enter into a technology strategy that is part of whole strategy construction process. A discussion of technology strategy starts with the identification of innovation requirements that can be deduced from the strategic thrust of the entire company. For NTT and the telecom industry, where this research is exploratory, innovation and technology elements are quite rigid. The technology field is classified into network architecture (NA), node element development (NE), transmission element development (TE), operation system development (OS), maintenance technologies (MA), application platform development (AP), application service development (AS), and user appliance development (UA). There is a small number of companies that expand into the broad range of technology; NTT Group contains all of them (Figure 6-9).

**Innovation (Technology) Requirements from the Business Strategic Thrusts**

Strategic Thrust	Innovation (Technology) Requirements
<p><b><u>Build internal competencies</u></b>            •Next generation network and related business development            •Fixed mobile convergence and related business development            •New service concept finding such as cloud computing, contextualized knowledge sharing</p> <p><b><u>Build global relationship, capability</u></b>            •Construct global IP network &amp; business            •New group synergy/joint project outside Japan</p> <p><b><u>Expand foreign markets</u></b>            •Enhance profitability of US market            •Build business in emerging market (China, India, Vietnam etc.)</p> <p><b><u>Internalize disruptive change</u></b>            •Collaboration with startups by Corporate VC, offering network/data-center discount/free use            •Business incubation in emerging market</p>	<p><b><u>Network architecture</u></b></p> <p><b><u>Node element development</u></b></p> <p><b><u>Transmission element development</u></b></p> <p><b><u>Operation system development</u></b></p> <p><b><u>Maintenance technologies</u></b></p> <p><b><u>Application platform development</u></b></p> <p><b><u>Application service development</u></b></p> <p><b><u>User Appliance development</u></b></p>

**Figure 6-9. Innovation requirements for NTT**

## **6-7. INTERNAL SCRUTINY**

In this step, an internal scrutiny of the company is conducted based on the STUs. Because it is a widespread technology area, the scrutiny is unable to create microscopic STUs for NTT Group. Therefore, each innovation requirement that was developed in the previous chapter is regarded as an STU. Technology attractiveness and the firm's strength in each STU is examined and plotted on a technology portfolio matrix (see Figures 6-10, 6-11, and 6-12). Like the strategy for the entire company, the technology strategy indicates the firm's direction from present to future.

## Technology Attractiveness

Factors contributing to Technology Attractiveness	Very Weak	Weak	Even	Strong	Very Strong
Potential for enhancing competitive advantage in: •Product application •Process application			MT	NA, NE, TE, OS, AS	AP, UA
Impact on value-added chain •Cost •Performance •Quality •Differentiation			AS	NE, TE, OS, MT	NA, AP, UA
Proprietary positions available	AS		NE, ET, OS, MT	NA	AP, UA
Rate of technological change		MT		NA, NE, TE, OS	AP, AS, UA
Impact on entry barriers	AS, UA		MT		NA, NE, TE, OS, AP
Impact of alternative technologies •Maturity and volatility •Complexity	AS	AP, UA	NA, NE, TE, OS, MT		

Network architecture (NA)	Maintenance technologies (MT)
Node element development (NE)	Application platform development (AP)
Transmission element development (TE)	Application service development (AS)
Operation system development (OS)	User Appliance development (UA)

**Figure 6-10. Technology attractiveness for NTT**

## Technology Strength

Factors contributing to Technology Strength	Very Weak	Weak	Even	Strong	Very Strong
Rate of technological innovation		AS, UA	OS, MT, AP	NE	NA, TE
Technology productivity		NE, TE, OS, MT, AS, UA	AP	NA	
Rate of return in technology investment		AS, UA	NE, TE, MT		NA, OS, AP
Resources allocated to technology		AS, UA	OS, MT, AP	NA, NE, TE	
Impact on rate of new product introduction			NE, TE, OS, MT, AS, UA	NA	AP
Impact on process capabilities		AS, UA	MT	NE, TE	NA, OS, AP
Impact on technology-based diversification *Royalties or sales of technology *Training time of people on new technology		AS, UA	NE, TE, MT, AP	NA, OS	
Level of technological competence		AS, UA	NE, OS, MT, AP	TE	NA
Human resources	AS, UA	AP	NE, MT	NA, TE, OS	
Patent positioning	AS, UA		OS, MT, AP		NA, NE, TE

Network architecture (NA)	Maintenance technologies (MT)
Node element development (NE)	Application platform development (AP)
Transmission element development (TE)	Application service development (AS)
Operation system development (OS)	User Appliance development (UA)

**Figure 6-11. Technology strength of NTT**

## Technology Portfolio Matrix

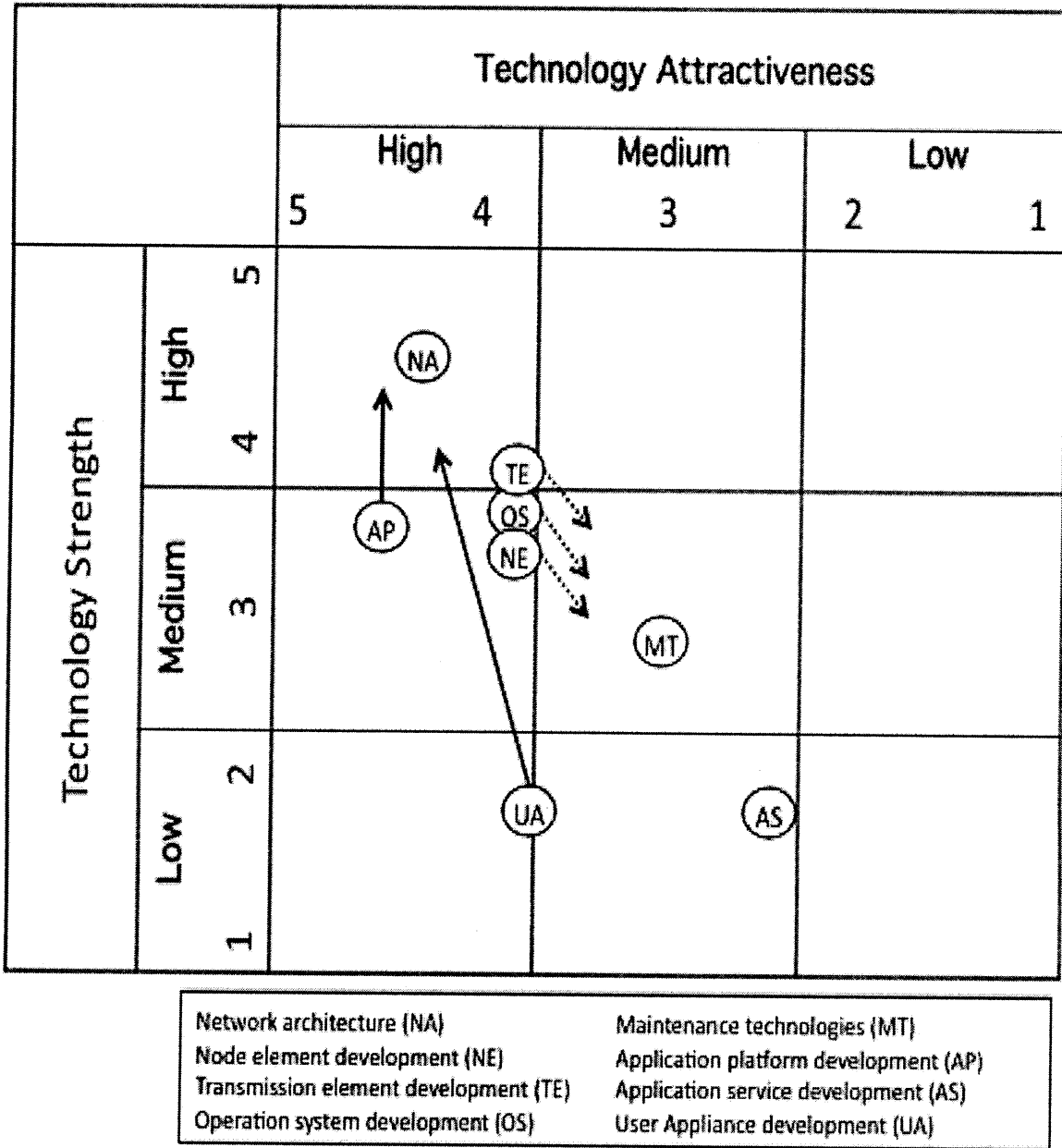


Figure 6-12. Technology portfolio matrix of NTT

The arrows of the changing STU position in the matrix indicate core concepts of technology strategy. For NTT Group, network architecture (NA) is in high attractiveness and high strength areas and those positions will not change, which shows that NTT should maintain its advantages of network designing and operation in this STU.

The two STUs located in high attractiveness but medium and low strength are most important points of the technology strategy. The Application Platform (AP) located in medium strength has always been a major NTT objective, but only really successful example is i-mode (mobile service application platform). User appliance (UA), which is positioned in low strength, is another big technology issue. During the fixed-line telephone service era, NTT controlled all telephone terminals connected to its proprietary network. However, as NTT evolved its network-capable services, it lost control to user equipment such as fax, personal computer, PDA, eBook, and Smartphone.

In contrast with these service and customer STUs, some equipment-based STUs are losing their value to the company. NTT has a long tradition of conducting basic and applied R&D for transmission element (TE), node element (NE), and operating system (OS). Technology changes from standard telephone protocols (No.7 switching, STM, ATM etc.) to the Internet protocol has resulted in a relative decline in NTT's power as the incumbent telecom company. New entrants, such as Cisco and Juniper, have increased their presence in the market, and telecom carriers have become simple purchasers of their technology. NTT's basic R&D still maintain its strong capability, and its current objective is the fusion of the advantages of traditional telecom technology (reliability, security, and operability) with



the new Internet technology (low cost, flexibility, and simplicity). At present, however, they are still in a critical situation for the long term (refer back to Figure 6-12).

The STU option table (see Figure 6-13) indicates strategic actions that can be taken based on internal technological competences as analyzed in the portfolio matrix. For each STU, there are several alternative options, and the full table gives an overview of options mapping. For this analysis, a “disruptive threat” column is added, which helps to examine possible dangers in each STU.

## STU Options

STU	Lead	Compete	Sustain	Harvest	Purchase	Abandon	Search Disruptive threat
Network architecture (NA)	*Advantage by massive installation of IPv6 & 3.9G in Japan			*Revenue from current network (telephone, IPv4, 3G)	*Foreign domestic network *International connection	*Amortized low user number service (ISDN, 2G)	*Incremental innovation in current technology
Node element development (NE)			*Basic R&D *Vendor control		*Low cost procurement	*Check R&D efficiency	*Check new entrant
Transmission element development (TE)			*Basic R&D *Vendor control		*Low cost procurement	*Check R&D efficiency	*Check new entrant
Operation system development (OS)			*Customization *Vendor control		*Low cost procurement	*Check necessity of customization	*Check new entrant
Maintenance technologies (MT)			*Basic R&D *Vendor control		*Low cost procurement	*Check R&D efficiency	*Check new entrant
Application platform development (AP)	*FMC based platform, cloud computing	*Platform services from Internet (Google, iTunes, Amazon etc.)	*Applied R&D *Service vendor relation	*i-mode platform	*Potential new entrant		*Mobile platform entrant from emerging market
Application service development (AS)			*Keep sustainable services		*User core value service	*Abandon unprofitable services	*Check new entrant
User Appliance development (UA)	*Mobile handset design		*Vendor control		*Potential new entrant/idea		*New entrant from emerging market

Figure 6-13. STU options for NTT

For NTT, the options for the three strategically important STUs—NA, AP, and UA—are the most vital part of the technology strategy. In order to maintain its leading position in the telecom industry, there is no discussion of massive installations of cutting-edge technologies, such as IPv6, 3.9G mobile, and FMC (fixed mobile convergence). However, thinking about disruptive threats brought the idea of low-cost mobile technology from emerging markets like China and India. Once technology from these markets is diffused, there would be no effective way for NTT to fight back.

## **6-8. ENVIRONMENTAL SCAN**

For the environmental analysis, the technology strategy procedure is to choose a competitor and examine its performance. The strategy designer at NTT, or for the overall Japanese telecom industry, would choose a current competitor within the Japanese market, in this case Softbank or KDDI. However, from the perspective of disruptive theory, we have to focus on future threats from telecom firms in emerging markets outside of Japan. The Japanese telecom market has already been opened to foreign investment. In the near future, NTT's real threat will come from China, which is the geographically closest emerging market.

A strategic performance analysis for Softbank and the Chinese Mobile shows clear difference between the two. Softbank's strategy is to be a technology follower. It follows the standard technology and focuses on features such as handset design, low price, marketing, and its sales force (see Figure 6-14).

Competitive Standing. Strategic Performance Measurement of Innovation (Technology)

Relevant Competitor Softbank

Indicators	Very Weak	Weak	Even	Strong	Very Strong
Rate of technological innovation		✓			
Technology productivity		✓			
Rate of return in technology investment				✓	
Resources allocated				✓	
Impact of rate of new product introduction					✓
Impact on process capabilities		✓			
Impact on technology-based diversification		✓			
Royalties or sales of technology		✓			
Training time of people on new technology			✓		
Level of technological competence			✓		
Human resources			✓		
Patent positioning	✓				

Figure 6-14. Performance measurement of Softbank

The China Mobile has a technology strategy closer to NTT. Although the current technology level and Intellectual property are not strong, it continues to evolve rapidly, and the growing Chinese mobile market will bolster its strategy execution (see Figure 6-15).

Currently, Softbank is a serious threat in the Japanese telecom market, but China Mobile has the potential to be disruptive in the long term.

Competitive Standing. Strategic Performance Measurement of Innovation (Technology)

**Potential Disruptive Competitor China Mobile**

Indicators	Very Weak	Weak	Even	Strong	Very Strong
Rate of technological innovation				✓	
Technology productivity			✓ →	✓	
Rate of return in technology investment		✓ →	✓		
Resources allocated				✓	
Impact of rate of new product introduction					✓
Impact on process capabilities					✓
Impact on technology-based diversification					✓
Royalties or sales of technology		✓ →	✓		
Training time of people on new technology			✓		
Level of technological competence			✓		
Human resources			✓		
Patent positioning		✓ →	✓		

Figure 6-15. Performance measurement of China Mobile

An innovation (technology) environmental scan gives the practitioner a broader view of the firm's daily activities for the next new innovation. This framework already includes negative impacts from threats, so there is no need for experimental additions or modifications. The Japanese market has the positive advantage of cutting-edge technology and liberalized regulations, which has resulted in an active market with attributes of FDI, strong competition, and oligopoly. We can say this is a good condition for a company like NTT which aims to be in the top tier of technological innovation.

However, competition is changing in the global picture, and being first in technology evolution is not the most profitable strategy any more. This discontinuous market characteristic is the largest risk facing the Japanese telecom industry, including NTT (Figure 6-16).

To summarize this section, we can say that the disruptive threat from emerging markets will be a serious concern in the future for the Japanese telecom market, and there are some early signs that this phenomenon can already be observed both inside and outside of NTT.

## Innovation (Technology) Environmental Scan – Identification of Opportunities and Threats

Critical External Factors	Impact	
	Positive (Opportunities)	Negative (Threats)
Market Factors	<ul style="list-style-type: none"> <li>•Emerging mobile market</li> <li>•Globalization of Japanese firms</li> </ul>	<ul style="list-style-type: none"> <li>•Big opportunity to potential disruptive competitors in emerging economy</li> </ul>
Competitive Factors	<ul style="list-style-type: none"> <li>•3.9G mobile technology achieved standard position</li> </ul>	<ul style="list-style-type: none"> <li>•Fight back from other technology (Wimax etc.)</li> </ul>
Economic Factors	<ul style="list-style-type: none"> <li>•World economy is recovering</li> </ul>	<ul style="list-style-type: none"> <li>•Some countries take ahead and Japan is behind</li> </ul>
Government & Political Factors	<ul style="list-style-type: none"> <li>•Market liberalization in many countries</li> </ul>	<ul style="list-style-type: none"> <li>•Active FDI from developed countries</li> </ul>
Regulatory Factors	<ul style="list-style-type: none"> <li>•3G frequency opening in many countries</li> </ul>	<ul style="list-style-type: none"> <li>•Incremental innovation opportunity to 3G mobile technology</li> </ul>
Technological Factors	<ul style="list-style-type: none"> <li>•Leading companies like NTT focus on new technologies such as IPv6, 3.9G</li> </ul>	<ul style="list-style-type: none"> <li>•Other firms are waiting and following</li> </ul>
Human Resources & Labor Factors	<ul style="list-style-type: none"> <li>•Low cost high skill labor in emerging market</li> </ul>	<ul style="list-style-type: none"> <li>•Linguistic disadvantage of Japanese</li> </ul>
Environmental Factors	<ul style="list-style-type: none"> <li>•New opportunity of smart grid and energy saving control using telecom network</li> </ul>	<ul style="list-style-type: none"> <li>•Harsh competition and high risk R&amp;D</li> <li>•Standard will take all</li> </ul>

Figure 6-16. Innovation Environmental Scan for NTT

### 6-9. FORMULATION OF A TECHNOLOGY STRATEGY

For the final process of forming a technology strategy, the STUs and internal and external scans unite into an agenda for strategic technology. Before finalizing, it is helpful for the strategy designer to examine the organization's decision-making characteristics. VCE

theory requires choosing between independent/modular or interdependent/integrated technology structure, and it was already included in the original Delta model framework. But bringing the explicit focus into the table helps the practitioner in a Japanese firm that already believes in the strength of an interdependent/integrated structure (Figure 6-17).

With regard to NTT, which has centralized R&D and a centralized policy-making system, it has the advantage of a powerful structure that conducts a series of network reforms toward cutting-edge technology, and the disadvantages of a likely costly process and culture.

The characteristics of the Japanese market and government policy lead NTT to continue its strategy in the domestic market. However, that strategy would not be as effective in more price-sensitive and less technology-sensitive foreign markets like China and India.

NTT's strategic agenda for technology consists of three parts: (1) recreate the national R&D infrastructure into one that is more effective; (2) create small and disruptive organizations within NTT Group; (3) design a learning process that is capable of taking in external knowledge (see Figure 6-18). In order to retain its contingent ability to make future technology changes, NTT Group's top management should incubate decentralized and autonomous small units internally and maintain an intake system for external knowledge absorption.



**Characterize Your Present Innovation (Technology) Policies Regarding The Major Decision Making Categories**

<b>Decision Category</b>	<b>Description of Policy</b>	<b>Strengths</b>	<b>Weaknesses</b>
Technology Intelligence	Centralized R&D	Fit huge size project execution such as telecom network	Not fit small & diversified independent projects
Technology Selection	Network technology oriented	Create and lead main stream of industry	Eliminate unique projects
Timing of New Technology Introduction	First Tier in the world	Focus on innovative work	Internal innovation become part of product. Most parts are invented by vendors
Modes of Technology Acquisition	Invented internally or purchase customized products from vender	Performance and quality	Relatively high cost
Horizontal Strategy of Technology	Japanese vender relation	Long-term relation and strong bind	Relation with foreign vender
Project Selection, Evaluation, Resource Allocation, & Control	Consensual decision making among holdings company and 5 major subsidiaries	Well balanced control	Less focus on newly emerging field
Technology Organizational & Managerial Infrastructure	Initiative and basic R&D of holding company and independent management of 5 major subsidiaries	Balance of concentration and decentralization	Risk of conflict or easy compromise
Value chain evolution, choice of Interdependent or Modular	Technology 1 <sup>st</sup> Tier results tendency to select Interdependent structure	Create cutting edge, Best performance product	Original interface/ specification result low interoperability with low price equipments in market

**Figure 6-17. Characteristics of NTT's innovation policy**

## The Strategic Agenda (Technology)

Strategic Thrusts	Group Organizational Units							Business Processes	Performance Measurements
	Group CIO	Basic R&D	Applied R&D	NTT East/West	NTT communi cations	NTT DATA	NTT Dozomo		
<b>R&amp;D of national infrastructure</b>									
NGN incremental kaizen process	2	2	1	1	1			OE	ROI, Capex reduction
3.9G development and construction	1	1	1				1	I	ROI
<b>Create diversified service development organization</b>									
Application platform & User appliance	2	2	2	1	1	1	1	CT	Project ROI
Variety of application service	2		2		1		1	CT	Project ROI # of service record black
<b>Create organizational learning process to introduce external knowledge</b>									
Cross-border R&D organization (Developed market focus/Emerging market focus)	1	1		2	2	2	2	B	*# of non local personnel *# of IP/Papers by local unit *# of Japanese manager with cross cultural experience
Alliance with carriers/universities	1	1		2	2	2	2	B	Project ROI
Pilot projects in future disruptive technology field	1	1		2	2	2	2	B	Project ROI # of project record black

1 = Key role in formulation and implementation

2 = Important role of support and concurrence

**1** Identifies the "Champion", who takes leadership for the strategic thrust execution

B = Business Model

OE = Operational Effectiveness

CT = Customer Targeting

I = Innovation

**Figure 6-18. Strategic technology agenda for NTT**

## CHAPTER 7 IMPLICATIONS AND RECOMMENDATIONS

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For this strategy construction process, the Delta model was utilized as the backbone, and other theories regarding strategy and technology, such as Disruptive Technology, Invisible Assets, Overextension, and Organizational Knowledge Creation were also used.

As a result of this research project, several implications were identified, as stated below.

- The theories of Disruption, Invisible assets and Organizational Knowledge Creation guide the strategy designer to effectively use the data, and to avoid self-righteousness caused by insufficient understanding and lack of proficiency with the Delta model.
- For NTT, despite the high risk of disruptive technology and a business model showing low-end or non-consuming customers, it tends to choose a more high-technology focus, having once failed with its project to transplant i-mode to Hong Kong, the United States, and other markets.
- Using the concept of Invisible assets and Overextension, the strategic importance of knowledge about multinational operations is clear.
- Also organizational knowledge creation that involves non-Japanese personnel is vital for achieving continuing power for successful growth in multinational markets.

I will also make recommendations about the future for NTT management.

1. First, essential conditions for organizational evolution, such as instability and chaos, are vital for NTT, and top management should make specific use of them. During NTT's history, instability brought about the government policy of liberalization and the introduction of competition in the Japanese telecom industry. Coincidentally, the evolution of the current business model and technology came during the same period as the policy changes. This phenomenon was supported by the anticipation of new technologies and a business model, and that brought the policy change.

Although NTT had a very hierarchical and rigid corporate culture, structure, and process, it could act effectively because instability was created environmentally and politically. Fortunately, this instability was not NTT's choice, so NTT could return to a stable organization based on recent successes in the broadband business.

However, in order to evolve itself toward the next stage of global business, NTT will have to make strategic attempts toward self-created, chaos-based innovation. In this sense, two objectives—change into a service company, and Internationalization—will be good methods for introducing instability to NTT Group, because both are unknown to the company and will bring an unstable situation.

We have seen that top management has already indicated ground theory and strategy toward the next desirable form for NTT. Based on organizational knowledge creation theory, the next step is involvement of entire organization including lower and middle level to deal with reality. It shows clearly the gap between the ideal and the reality at NTT. Knowledge creation through this chaotic situation will create desirable

future invisible assets. If NTT tries to solve the contradictions with a rigid organizational base, it will be unable to adapt and disruptive technology will take off.

2. Second, NTT must make more effort to capture the future value of Fixed Mobile Convergence (FMC). FMC is the next big challenge for telecom carriers, which means network convergence and service convergence. Network convergence will bring opportunities for drastic cost cuts; service convergence will bring new revenue sources. However, NTT has fixed line and mobile subsidiaries, both of which hold a major portion of their markets, and are under dominant firm control. This is a serious obstruction to future FMC for NTT Group because of possible regulation of independents among subsidiaries, such as resources and process.

One possible direction is another foreign country that allows subsidiaries that offer FMC services in their market. This could be a strategic experiment for NTT Group in the future.

## CHAPTER 8 CONCLUSION

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In this research, the Delta model was applied to the Japanese telecom industry and to NTT, its leading company. Using the concept of strategic thinking bias, we identified possible gaps that Japanese strategy designers may encounter when they use the Delta model to solve their practical business needs.

To fill these gaps, I combined the Delta model with some alternative theories that are important in the Japanese telecom industry. This attempt brought the Delta model and the theories of Disruptive Technology, Invisible Asset, Overextension, and Organizational Knowledge Creation together to create a well-balanced strategy construction method that can be useful for NTT Group.

For future NTT Group business, the tendency to focus on high-tech expansion contains serious vulnerability to disruptive threats from emerging markets. The Delta model shows this threat clearly, and the other theories assessed in this research bolster my conclusion and help strategy designers to gain a deeper understanding of strategy design.

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