

**The Re-Positioning and New Brand Creation of
Telecommunications Companies in an IT Society**

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Submitted to the Alfred P. Sloan School of Management
in Partial Fulfillment of the Requirements for the Degree of

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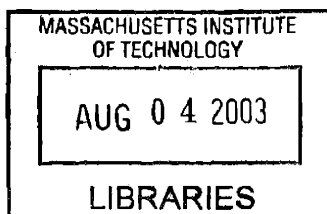
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ABSTRACT

The telecommunications industry has developed differently, in each nation, depending on the political, economic, and cultural environment within each country. Only the technology has achieved some standardization in order to facilitate smooth connections between nations, with the assistance and coordination of the United Nations International Telecommunication Union (ITU).

For the past twenty years, the telecommunications industry had faced multiple challenges, including privatization, deregulation, fierce competition, dramatic technological change, and a variety of market changes. Today, telecommunications companies need to quickly reposition themselves in order to survive.

In Part One, we identify and discuss various long-term assumptions of customer needs. In Part Two, we construct scenarios relevant to the telecommunications industry, based on Fahey and Randall's competitive foresight scenarios methodology. Then we analyze strategies for NTT Group which we believe could revitalize the Japanese economy which has already endured ten years of stagnation, followed by suggestions for the world economy.

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This thesis is dedicated to all the people of NTT Group.

Part One

Learning from Customers

CHAPTER 1

Introduction

The telecommunications industry has developed under a variety of national flags as a national unit within the political, economic, and cultural context of each country. However, the technology has been standardized to enable smooth connections between nations, under the overall coordination of the United Nations' International Telecommunication Union (ITU).

For the past twenty years, privatization of enterprises and competition has produced changes in the market and in technologies (e.g., from analog to digital). During that time, most telecommunications companies operate under some form of government regulation (i.e., approval for market entry and exit of services, setting rates, and provision of services) because government was responsible for providing public utility services such as telephones. During this time, however, the telecommunications industry encountered some market failures and a tendency to become monopolistic. But government also began to fail in its responsibilities, eventually resulting in some kind of utilities deregulation in most nations. The policies instituted in each nation, therefore, were established to seek a middle road between the market failures and government failures.

In the past ten years, the market has changed dramatically with the emergence of the Internet and mobile telecommunications. Globalization of the world's economies and advancing IT has accelerated this trend. As a result, in February 1998, the WTO Agreement shifted deregulation from one based on the nation as the relevant unit, to one based on the international. This does not mean that any nation loses control of its telecommunications.

Indeed, telecommunications have much to do with national security, and each nation's major telecommunications companies must restructure themselves to compete with a global company in its home base.

For the past three years, telecommunications companies have faced critical situations such as excessive competition brought about by corporate mergers and acquisitions that cross national boundaries, or because of investment in optical fibers in the backbone network, and the feverish auction of third-generation IT.

In Part One of this thesis, we identify and discuss assumptions regarding the long-term future based on customer needs. This discussion includes several issues:

1. The key technologies of broadband services such as DSL, FTTH in the fixed line, and 3G, 4G, and wireless LAN in wireless line, which will be established and developed into integrated networks, including an IP-based network.
2. A dedicated telephone network cannot exist alone. A telecommunications company cannot survive only by providing telephone services.
3. In the near future, both network and platform will be shared through a horizontal and vertical global alliance of IT companies that include telecommunications companies.
4. In the transition, the transformation will occur first in mobile telecommunications, and later in the fixed lines, because fixed lines provide the universal service required to secure daily living and national security.
5. But globalization does not mean that services should be uniform, and standardization of technology is not the only issue. Services are unique in each country and vary within each segment. Services do not change at the same pace as technology development. Introducing new services and applications must be done at the right

time to meet customers' needs. Also, customers tend to accept products and services that incorporate medium to high technology, not the most highly developed.

6. The markets and IT technology both accelerate changes in the way marketing is done by IT companies, ranging from mass marketing to one-to-one marketing.
7. Telecommunications companies must think globally and act locally using IT technology.

Today, telecommunications companies are facing the requirement to reposition themselves immediately if they wish to survive.

In Part Two of this thesis, we focus specifically on NTT Group and its long-term future.

We begin by identifying and developing four scenarios:

- domestic fixed-line service,
- domestic wireless service,
- international fixed-line service, and
- international wireless service.

We test the validity of these scenarios as they impact NTT in both its domestic and global markets. We conclude with suggestions for the transformation of NTT Group.

For the convenience of the reader, there is a brief Glossary in the Appendix with definitions of the numerous acronyms that appear throughout the thesis.

CHAPTER 2

Identifying Customer Telecommunications Needs

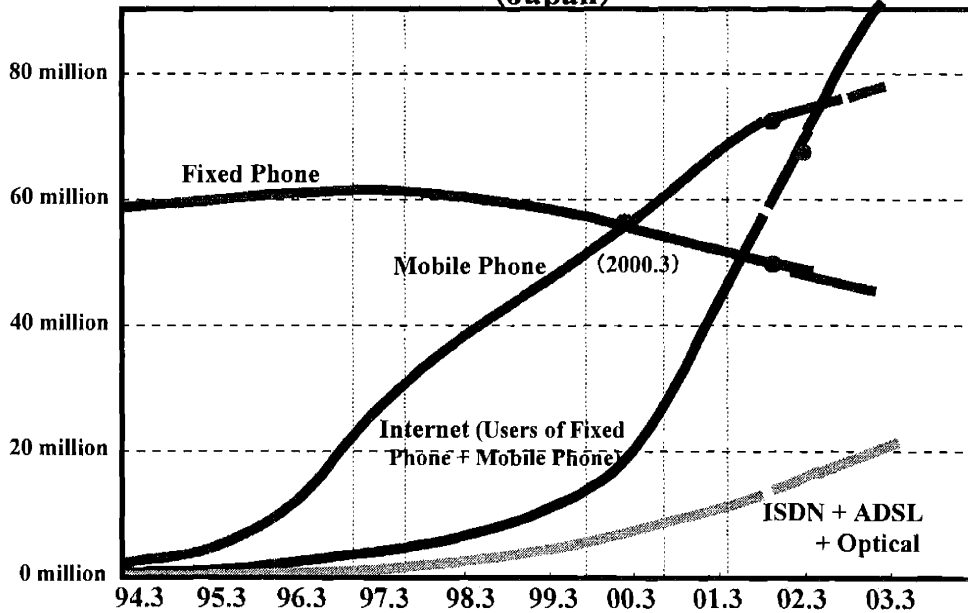
2.1 OVERVIEW

As a result of ongoing developments in service and technology, customers are continually changing their communication styles and methods based on their individual needs. In general, however, overall trends have evolved from fixed-line to wireless, from telephone (voice) to Internet (data), and from narrow-band to broadband. Business customers have shifted from fixed-line, to wireless, to fixed-email; private customers have shifted from fixed-line, to wireless, to fixed-email, and now to wireless e-mail. We review each of these segments in greater detail below.

2.1.1 Fixed-line Service

As the demand for voice service through fixed lines continues to decline rapidly in developed countries, the number of fixed-line subscribers and customers is also dropping, and is fewer than the numbers of wireless customers. The first-mover of this trend was Finland, where wireless subscribers exceeded fixed by 1998. Sweden, Norway, Denmark, and most of Western Europe, as well as Asia, Hong Kong, Korea, and Japan have also seen the same trend. (see Figure 2-1).

**Figure 2-1 Changes in the Numbers of Service Subscribers and Users
(Japan)**

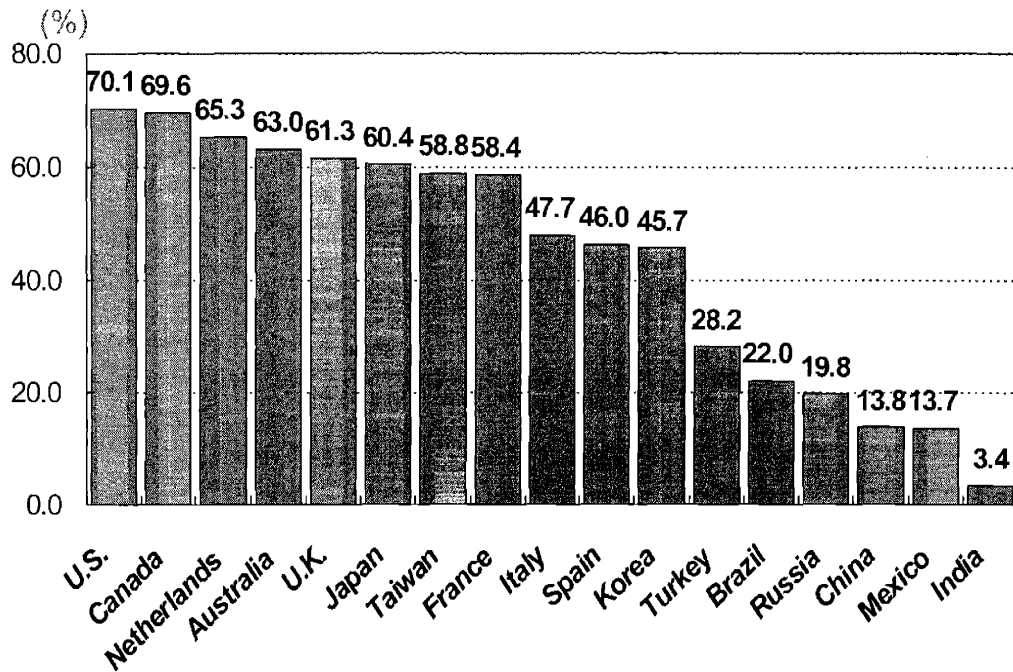


Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

The penetration of fixed-line service differs from country to country. Among developed countries, penetration has matured and become saturated at about 60-70%, while gradually transforming to broadband (DSL) service. On the other hand, in developing countries, penetration remains at less than 10% and is shifting from fixed-line to wireless.

Consequently, wireless (mobile) can be positioned as the main player, and fixed line as a subplayer in narrow band service, and fixed line is the main player and wireless (mobile) the subplayer in broadband service.

Figure 2-2 Penetration Rate of Fixed-line Service by Country (as of December, 2001)



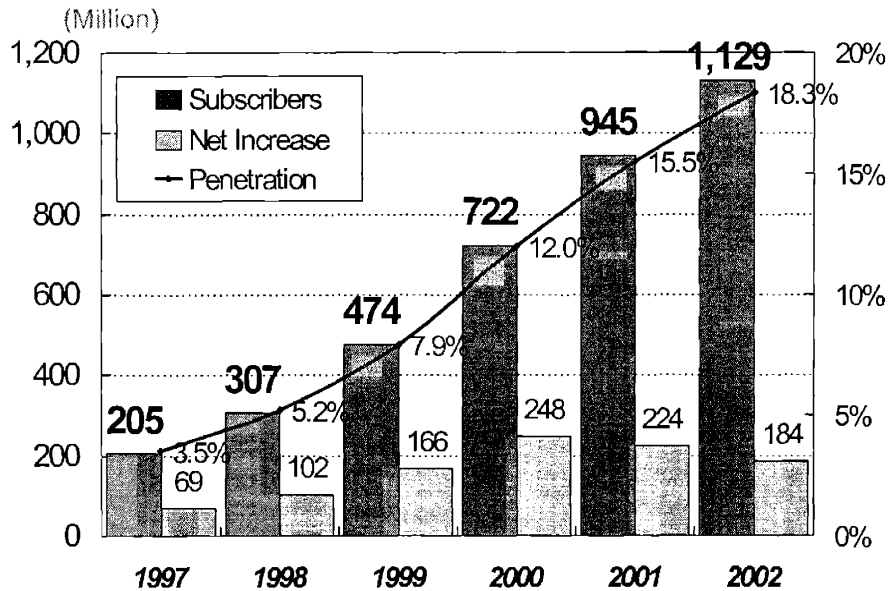
Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

2.1.2 Wireless

(a) Existing Service

Over the past few years, wireless telecommunications have developed dramatically. Figure 2-3 shows the global growth of wireless telecommunications, with more than one billion people today using wireless service and penetration at about 20% in 2002.

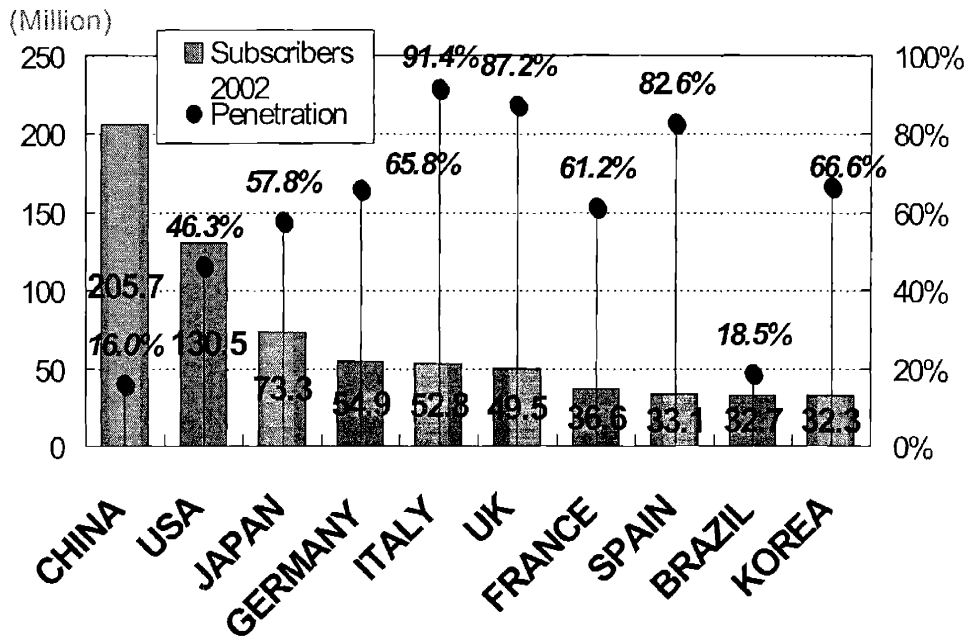
Figure 2-3 Wireless Service Subscribers (Worldwide)



Source : "World Cellular Information"

Figure 2-4 shows the top ten countries in the world in terms of number of subscribers, and Table 2-1 shows the regional base number of subscribers and penetration. Based on this information, we conclude that the number of wireless subscribers in Asia (except Korea and Japan), South America, Eastern Europe, and Africa will continue to increase, while the numbers in North America, Western Europe, Korea, and Japan will become mature and eventually saturated. For example, the penetration rates in Korea, the U.S., and Japan are 67%, 46% and 58%, respectively, which means there is little room to expand voice wireless subscribers. On the other hand, penetration rates in China and Brazil are 16% and 19%, respectively, and we believe there is great customer demand for voice wireless communications in these countries.

Figure 2-4 Wireless Service Subscribers (by Country)



Source : "World Cellular Information"

Table 2-1 Numbers of Wireless Service Subscribers (Regional)

Region	Subscribers (million)	Penetration (%)
Western Europe	300	76.3
North America	142	45.3
Eastern Europe	72	21.1
Middle East	49	20.9
South America	100	18.5
Asia—Oceania	430	12.1
Africa	36	4.3

Source: World Cellular Information

(b) New Service

Based on the amount of saturation in existing wireless voice service, especially in North America, Western Europe, Korea, and Japan, we believe new services will be required to meet or create the customer demand. Those services are 3G wireless service and wireless LAN service. It is expected that both services will be capable of transmitting and delivering video and music using their high-speed transmitting capability, and that customers will enjoy a wide range of content and services. The strengths and weaknesses of 3G and wireless LAN are shown in Table 2-2.

Table 2-2 The Strengths and Weaknesses of 3G and Wireless LAN

	3G	Wireless LAN
Technology	W-CDMA (UMTS) CDMA-2000 etc	IEEE802.11b IEEE802.11a IEEE802.11g Bluetooth1.2
Speed	384kbit/s-2M/bit/s	11Mbit/s
Coverage	Wide	Limited
Mobility	High	Low
Concept	Replace existing service	Complement 2G and 3G service
Strengths	Wide coverage High mobility	High speed
Weaknesses	High speed (But slower than Wireless LAN)	Limited coverage Low mobility (Depend on hot spots)

Source: Authors, 2003

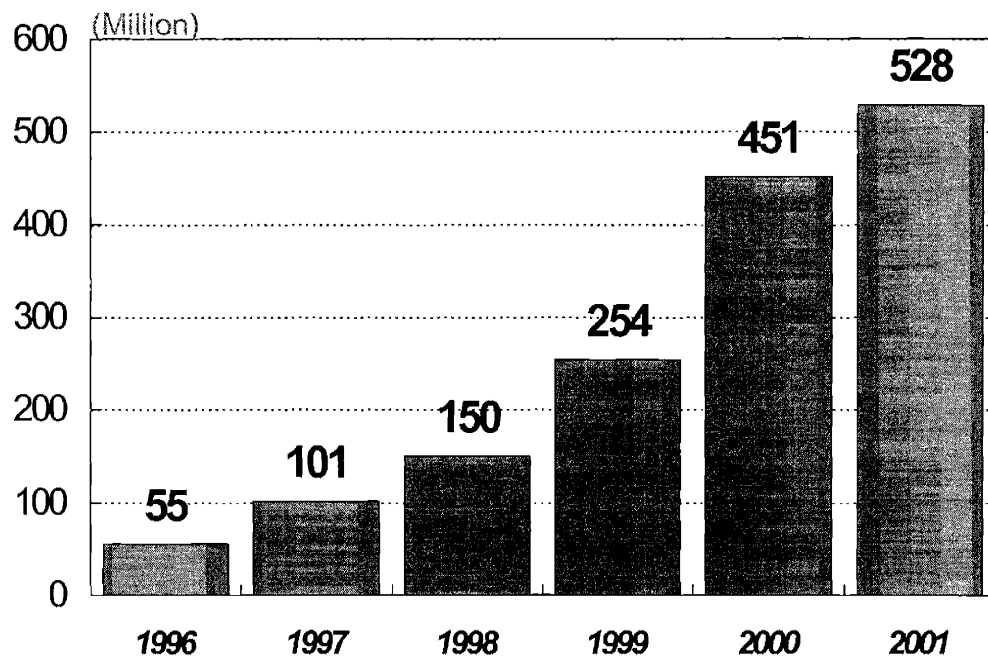
Nevertheless it is a fact that the auction of 3G services deteriorated the financial condition of many EU operators, to the point that some are having difficulty launching 3G services. The critical issues are the feasibility of investment in 3G and how to roll out 3G service.

2.1.3 Internet

In the past few years, the Internet has developed tremendously. Figure 2-5 shows the growth of Internet penetration worldwide. Today, more than 500 million people around the world use the Internet, and its penetration is more than 50% in the top ten countries (see Table 2-3).

However as irony would have it, the more Internet penetrated, the more Customers recognize it as commodity. Accordingly in the light of marketing, companies related to Internet should add value to their Internet services for example rich contents, customized contents, electric commerce, application service, e-learning, e-government, supply chain management, certification and so on.

Figure 2-5 Numbers of Internet Users (World)



Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

Table 2-3 Top Ten Countries with Highest Internet Penetration

Countries	Internet penetration (%)
Sweden	64.7 (2002)
Iceland	60.8 (2000)
Denmark	60.4 (2002)
U.S.	59.8 (2001)
Hong-Kong	59.0 (2002)
Holland	58.1 (2002)
U.K.	55.3 (2001)
Norway	54.4 (2001)
Australia	54.4 (2001)
Canada	53.3 (2002)

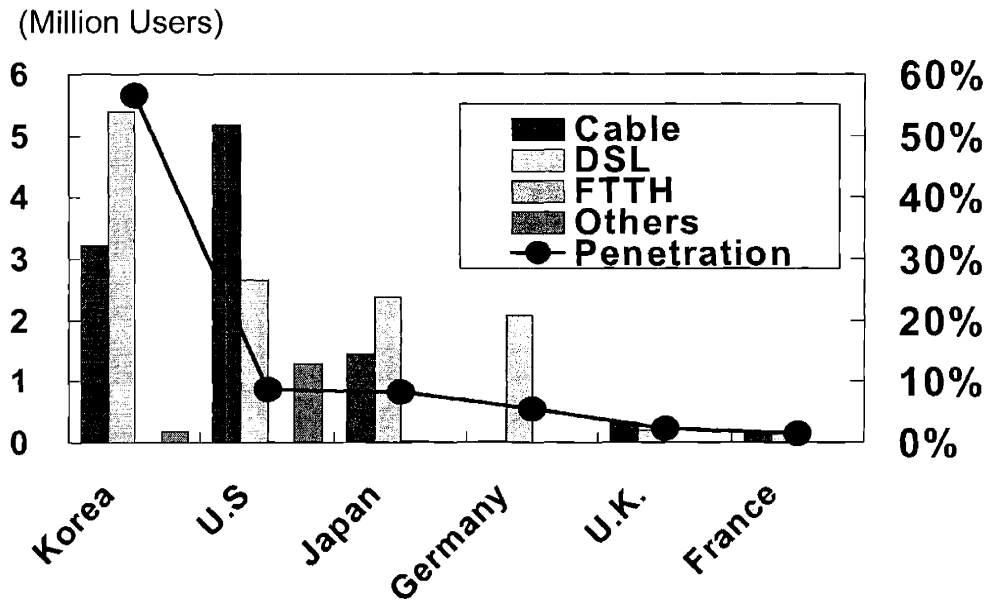
Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

2.1.4 Broadband (DSL, CATV, FTTH)

Broadband service is rapidly increasing, especially with the addition of video. However, the physical means of delivery vary from service to service, between DSL, CATV, FTTH, FWA, and Satellite (discussed further in section 3.1.2). In the end, however, customers basically need the service and are not especially concerned about the means. What means are used depends on the historical development of the physical network in each country.

The move toward widespread use of broadband is in full swing in a number of countries (see Figure 2-6). In an advanced Internet country like the U.S., the number of broadband contracts exceeds 9 million, with cable Internet making key developments in broadband. In Asia, especially in Korea, the development of broadband has been remarkable, with 8.8 million broadband contracts, a number that is rapidly closing in on the number of users in the U.S.

Figure 2-6 Broadband Access Penetration in Various Countries

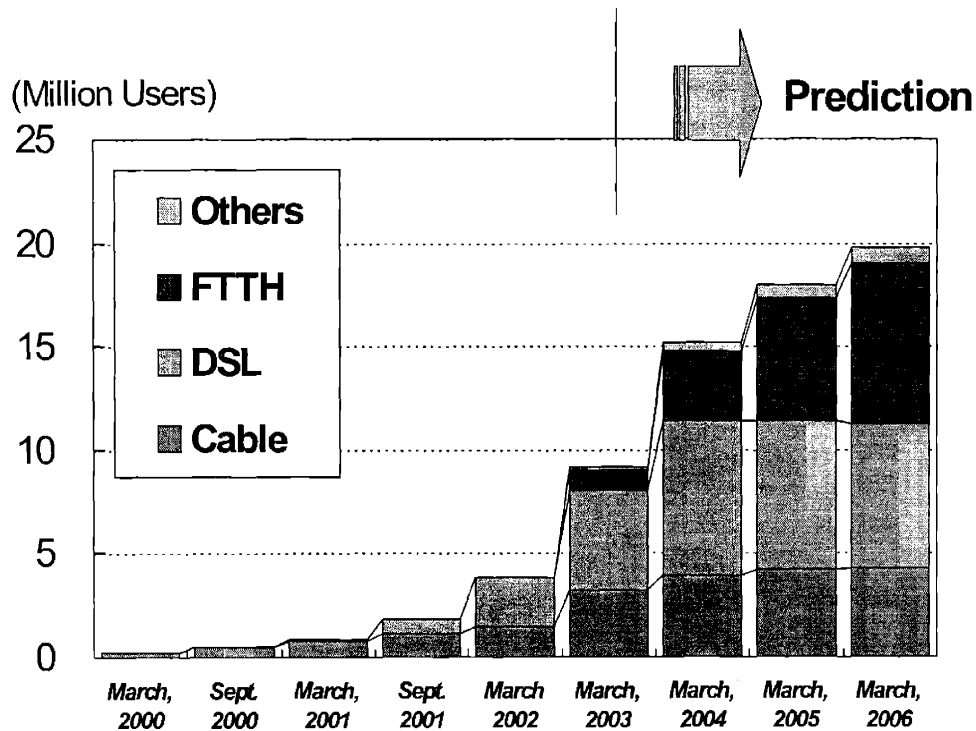


Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

By comparison, the number of DSL contracts is just over 2 million in Germany, and Europe as a whole has seen a relatively slow growth in the number of broadband contracts with, for example, 539,000 in U.K. and 351,000 in France. At present, the number of DSL contracts in Japan, where dramatic growth has been observed, ranks third behind the U.S. and Korea (see Figure 2-7).

We consider there is some opportunity of penetrating into European market.

Figure 2-7 Changes in Numbers of Broadband Subscribers in Japan



Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

2.2 KEY PLAYERS AND MARKET PERCEPTIONS

Within fixed-line market, the U.S. had always led, with Japan following. For wireless service, Northern Europe has led the market and Japan followed. Today Asian companies lead in mobile Internet and broadband, but China is expanding rapidly into these markets. IT companies that are strong in applications and content, such as Microsoft and Sony, are trying to enter the telecommunications market through the use of bundling techniques.

2.2.1 United States

Long distance telecommunications company has suffered the two-edged sword of enormous debt and plummeting stock prices. Declining prices came about slowly as a result of the Telecommunications Act of 1996, then became worse because of excess network capacity built during the dot.com bubble, all combining to slow the U.S. economy. Indeed, the public image of telecommunications companies took a major blow with the bankruptcy of WorldCom and the ensuing scandal regarding manipulated accounting. This meant that telecommunications company could not control terminal manufacturers, switching machine makers, router makers, and software houses, and none has the power to pull the back up. In addition, following the Telecommunication Act of 1996 several DSL operators such as Covat and Northpoint went bankrupt, which raised the price of DSL service provided by the various regional Bell companies.

(a) Fixed-line

Cable TV holds a 58% share of broadband use. While CATV operators are eagerly working to bundle digital TV, high-speed Internet connections, and cable telephone, the regional Baby Bells have each responded in their own strategic way. Verizon in the Northeast is hoping to replace twisted pair cable with optical fiber if it is shown to be feasible. BellSouth is proceeding with DSL using twisted pair cable for the last mile, and SBC is looking into the use of satellites.

In the area of Internet service, AOL holds the largest share of this market with 20% of all customers, following by MSN at 6%. The long distance companies that also provide Internet connections are responding in different ways. AT&T provides direct connections

through its AT&T Broadband (1%) and AT&T Worldnet (1%). WorldCom (MCI) provides wholesale networking. Sprint indirectly provides connections via Earthlink in which Sprint holds a 26.7% investment.

Perception: In the U.S., telecommunications customers are more sensitive about price. As regional Bell companies penetrate the long distance market, they are encountering severe competition. In contrast, the access line market is more stable.

VoIP has yet to become a significant player in the mass market. Part of the reason for this is that competition among traditional telephone service providers is so intense in the U.S. that prices for long distance calling have become relatively inexpensive, and consequently customers have less economic incentive to switch. As a result, there has been less push by VoIP providers to encourage a switch.

(b) Wireless

Perception. In the U.S., wireless customers are more sensitive about price with fewer demands for mobile. The growth of wireless is flat, even while other developed companies are experiencing steeper growth. Changes in this scenario will depend on the American lifestyle with its large houses and moving about by automobile, both of which should not bring about steady growth in wireless use.

But declining prices and the growing appeal of terminals and contents will push demand upward. We believe there is some possibility that the growth of the wireless will be steeper in U.S. as it has been in other developed countries.

Figure 2-8 shows the various U.S. players.

Figure 2-8 U.S. Players

	Local	Long Distance	Mobile	ISP
Verizon	Verizon		Verizon Wireless	Verizon Online
SBC	SBC		Cingular	SBC Internet
BellSouth	BellSouth			Bell South
Sprint	Sprint		PCS Sprint	Earth Link
AT&T	Comcast	AT&T	AT&T Wireless	AT&T

Source: Authors, 2003

2.2.2 European Union

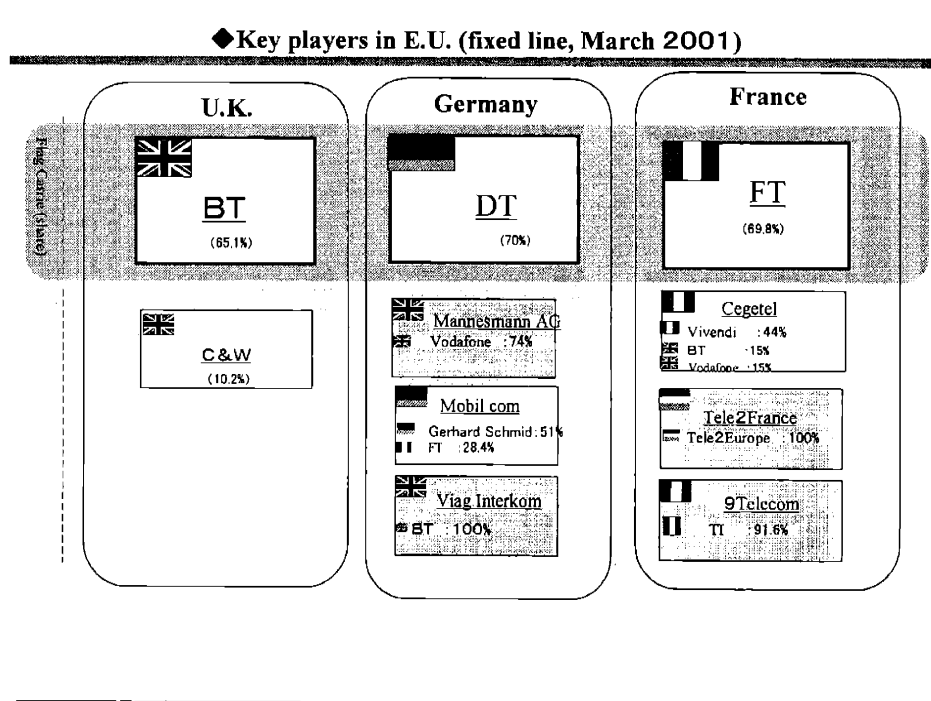
In the U.K., which has adopted policies similar to U.S.-style competition, British Telecom has been broken up into smaller entities. On the other hand, Germany and France adopted a policy of gradually introduced competition, and in those countries national carriers have remained powerful. In general, it has been difficult for foreign operators to compete successfully in most European companies (see Figure 2-9, 2-10).

(a) Fixed-line

Within broadband, most operators in Germany promote DSL; French operators promote FTTH; and cable TV is dominant in Belgium and the Netherlands

Perception. Customer needs for broadband are not especially high. Regarding both Internet and mobile, Northern Europe has a higher penetration. Customers in Northern Europe are also more information sensitive.

Figure 2-9 EU Players (Fixed line)



Source: Authors, 2003

(b) Wireless

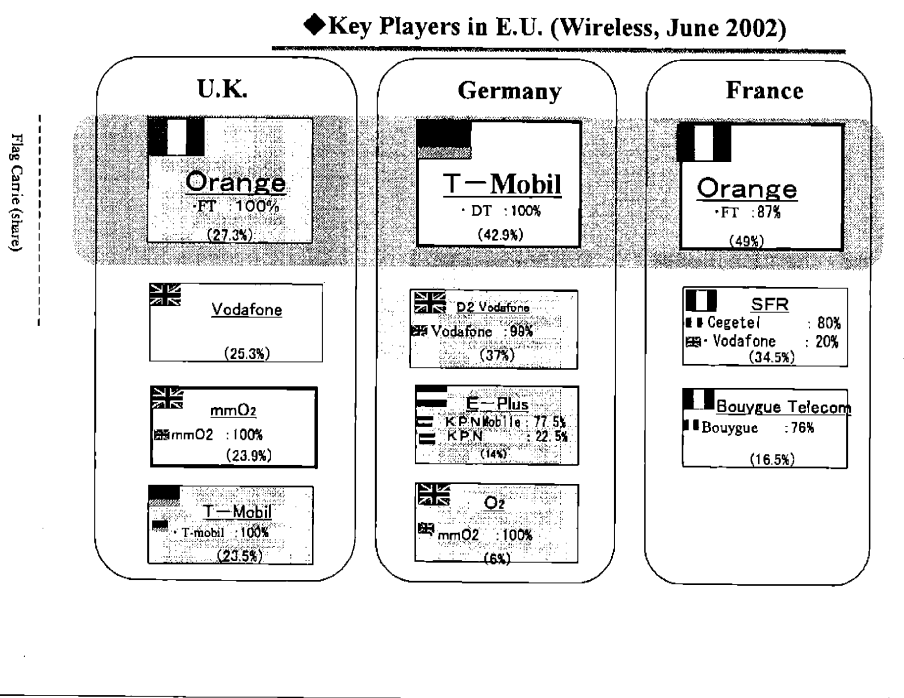
Perception. Germany has low ARPU because they do not enjoy much in the way of wireless communication service, but those who do use it as tool. On the other hand, French and Italian customers enjoy good communication via wireless service.

Many French customers have put mobile phones on their office desks to show that they are fashionable. On the other hand, British and German customers tend to keep them in their pockets.

Regarding wireless Internet use, French customers tend to accept it most and enjoy using it. On the other hand, Germans treat it as a technology rather than a service.

There is some gap in perception among the European countries. Generally speaking, the more fashion-oriented countries easily accept broadband.

Figure 2-10 EU Players (Wireless)



2.2.3 ASIA

In countries where fixed-line service is already mature and saturated, such as Japan, Singapore, Hong Kong, and Korea, wireless service is increasing dramatically, coming close to or over the numbers of fixed-line customers. In contrast, among countries with low penetration of fixed lines, such as the Philippines, Thailand, Indonesia, and China, both fixed and wireless are increasing. Fixed lines are still growing an average of 10% annually, which

is less than of wireless (discussed further in section 7.3.2). The players in Korea and China are as Figure 2-11, 2-12.

(a) Fixed-line

Perception. Overall, Asian countries like Taiwan and Singapore are more sensitive to the potential increased use of broadband, and India and China are emerging strongly into the Internet market.

(b) Wireless

Perception. At this time, mobile Internet service is not as popular in Asia, which has an average 14% penetration, except in Japan where there is 50% penetration. However, customers demand is high and growing. There is excellent potential for penetrating this market.



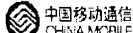



Figure 2-11 Korea Players

	SK Group	KT Group	LG Group
Mobile	SK Telecom	KT Freetel	LG Telecom
Long Distance		Korea Telecom	Dacom
Local			Hanaro
ISP	Netsgo	KT Hitel	Chollian

Source: Authors, 2003.

Figure 2-12 Chinese Players

⊙:dominant ○:started △ plan (Aug.2002)

	 中国电信 CHINA TELECOM	 CNC 中国网通	 中国移动通信 CHINA MOBILE	 中国联通 CHINA UNICOM	 中国卫星 China Satellite	 中国铁路 CHINA RAILWAY
local	⊙(South)	⊙(North)	—	○	—	○
Long distance	⊙	⊙	—	○	—	○
Data transaction	⊙	⊙	—	○	○	○
International	⊙	⊙	○	○	—	—
International leased circuit	⊙	⊙	—	○	—	—
Mobile	△	△	⊙	○	—	—
Pager	—	—	—	⊙	—	○
Satellite	—	○	—	○	⊙	—
ISP	⊙	○	○	○	○	○
VoIP	⊙	○	○	○	—	○
Data center	○	○	—	○	—	—

Source: Authors, 2003

CHAPTER 3

Creating Customer Needs

3.1 PROGRESS OF THE TECHNOLOGY

In this chapter, we give an overview of new technology trends and show how standardization, integration, and opportunities for next-generation technologies will increase customer benefits.

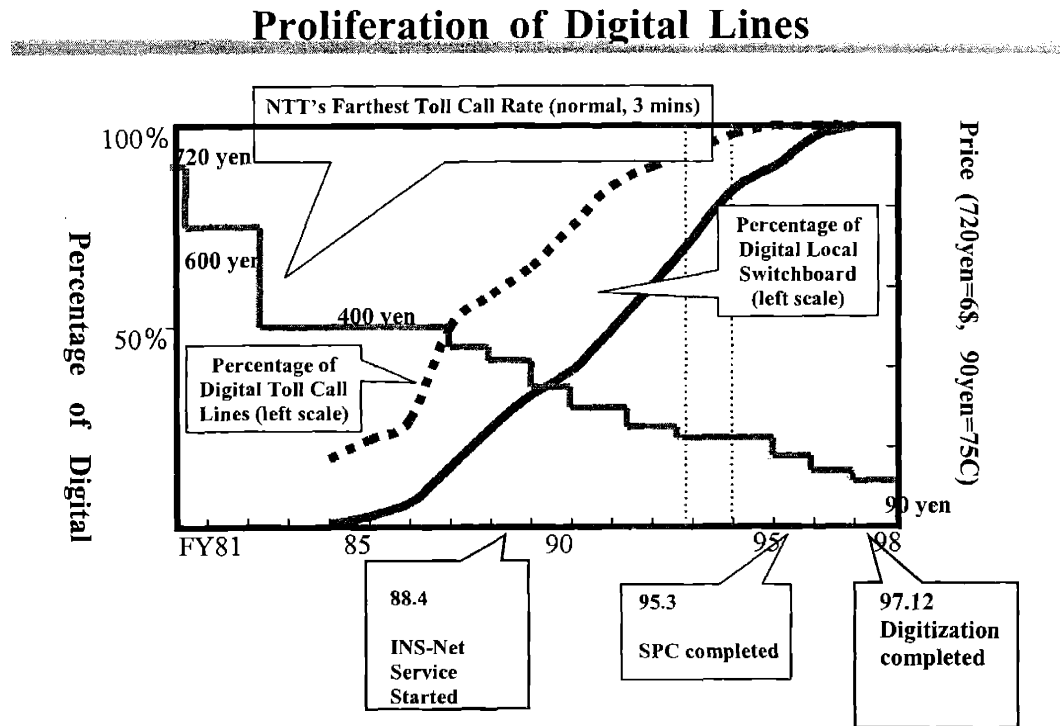
There are many kinds of new technologies coming in the near future. Which will be accepted by customers? If a new technology is not accepted, it could be disruptive. We will analyze the process of customer needs development and suggest methods for introducing new services and applications based on these new technologies.

3.1.1 Digitalization and Integration

Digitalization has brought about revolutionary change in the telecommunications industry. It has overcome distance problems by reducing amplification loss in long distance, and reduced costs by requiring fewer maintenance and monitoring staff. In short, it has brought high quality and low cost with efficient throughput (see Figure 3-1).

It has made integration easier because digital information can be processed easily. In today's Internet era, customers are migrating from dial-up connections to broadband. This high speed data network has brought low prices and new services, including the transmission of various kinds of information, including voice via TCP/IP. We will discuss this further in Section 3.1.4.

Figure 3-1 Digitalization Reduces Prices (Japan)



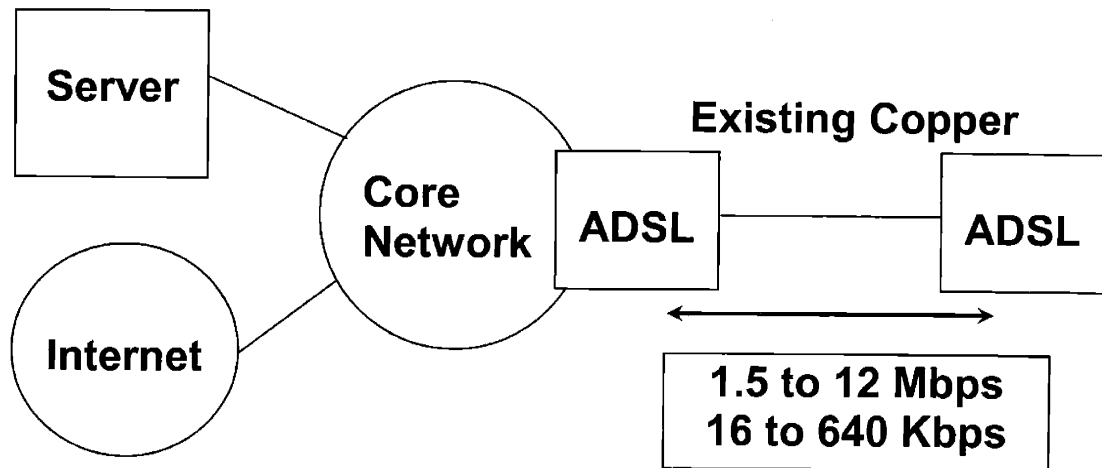
Source: NTT

3.1.2 Fixed access lines (DSL, FTTH)

Digital Subscriber Line (DSL) technology is a modem technology that uses existing twisted-pair telephone lines to transport high-bandwidth data, such as video, to service subscribers. xDSL is drawing significant attention from implementers and service providers because it promises to deliver high-bandwidth data rates to dispersed locations with relatively small changes to the existing telecommunication infrastructure. xDSL services are dedicated, point-to-point, public network access over twisted-pair copper wire on the local loop (the so-

called “last one mile”) between a network service provider central office and the customer site or on local loops created either intra-building or intra-campus.

Figure 3-2 Components of an ADSL Network



Source: Authors, 2003

FTTH (Fiber-To-The-Home) is the installation of optical fiber from a telephone switch directly into the subscriber’s home. Fiber optic cable is an alternative to coaxial cable. The speed and available contents of ADSL and FTTH are shown in Table 3-1.

Table 3-1 The Speed/ Available Contents of ADSL/FTTH

Access line		ISDN	Cable/ FWA/ ADSL			FTTH
Speed (bps)		64k	600k	1.5M	9M	100M
Smoothly available content services		e-mail, web-site	Picture	TV conference	Video	Hi-vision TV
Time for download	CD	2.5H	15min	6min	1min	6sec
	Cinema	125H	13H	5H	1H	5min

Source: Authors, 2003

FTTH is more efficient but requires the replacement of existing telecommunications infrastructure. With further technological development, the cost of optical fiber will be lowered to equality with the cost of twisted-pair telephone lines or coaxial cable. Thus, when twisted-pair face replacement during customary maintenance, the installation of optical fiber makes sense in preparation for the near future. Early replacement prior to lost of normal use is risky from the standpoint of ROI.

It is expected that FTTH will replace DSL in the future but the precise transition timeframe is difficult to forecast. At present, FT in France, Verizon in the U.S., and NTT in Japan are making strong moves into FTTH for broadband. Such replacements may be effected by the progress of potential substitutes such as broadband power lines.

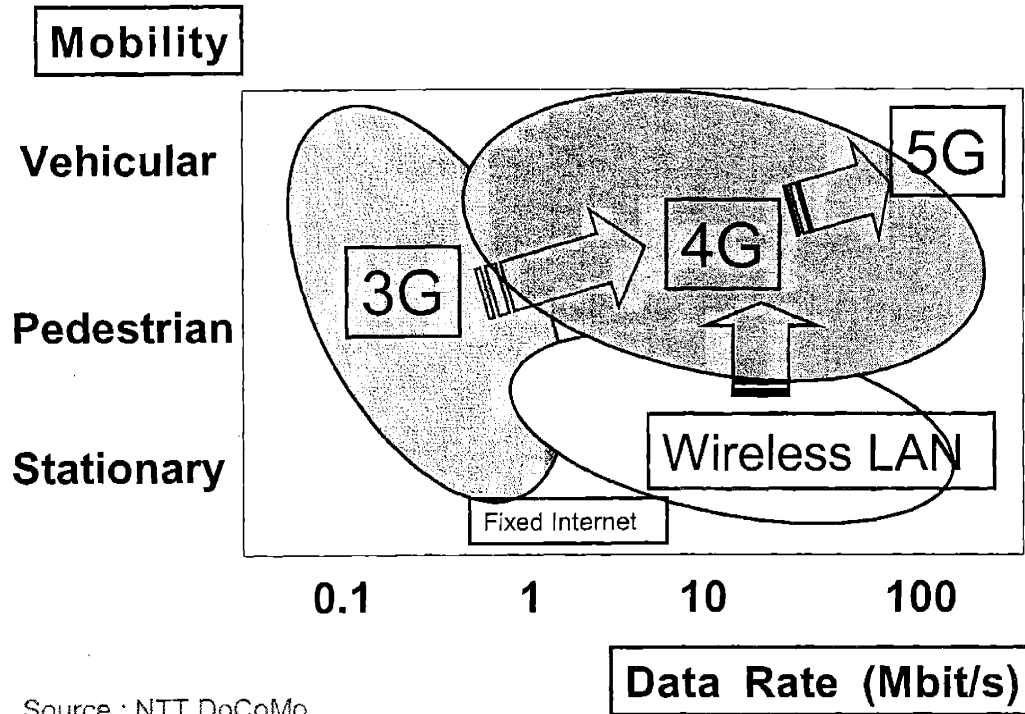
3.1.3 Wireless Access and Wireless LAN

Although mobility on 3G wireless service is very high, its transmission speed is limited (384kbps to 2Mbps). On the other hand, wireless LAN technology can easily download large files. Moreover, with fixed line service, customers are familiar with high transmission speed.

Accordingly, 3G technology should be combined with wireless LAN to become 4G which would enable customers to access rich content and to use a variety of applications with

high transmission speed and high mobility. Figure 3-3 shows a mobile system beyond 3G and wireless LAN.

Figure 3-3 Mobile System beyond 3G and Wireless LAN



Source : NTT DoCoMo

3.1.4 VoIP (Voice Over IP)

With the extraordinary growth of the Internet has come the parallel growth of the backbone around which it is based. VoIP is a technology that utilizes this growing backbone to transmit voice data in the form of discrete packets.

VoIP has some significant technological aspects that differ from existing telephone connections, such as conversations between users that no longer require a continuous

connection. This more efficient use of the network allows for both lower fixed costs and lower maintenance costs and therefore a smaller overall network. Also, since VoIP uses the same backbone as other IP applications, VoIP can easily integrate other data forms into its applications.

While the long-term advantages may be clear, there are significant hurdles that need to be cleared if VoIP is to become the dominant technology in voice communication. The most significant hurdle is poor connection quality resulting from an undedicated connection. Other issues include no emergency contact line, no number portability, and a requirement that users must be connected to the network in order to place or receive calls.

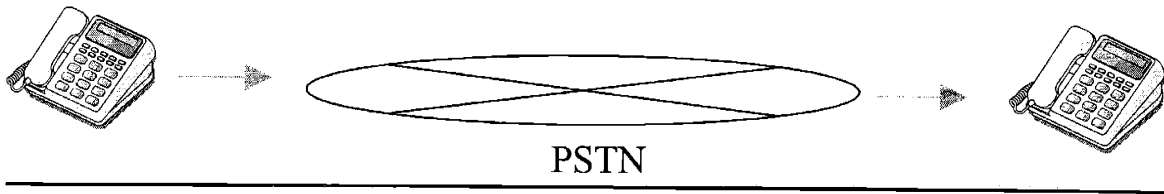
There are currently three types of VoIP, as shown in Figure 3-4. The first uses existing standard phones and interacts with a public switched telephone network (PSTN) on the terminal ends. The IP network is used between PSTN connections in order to have a more efficient connection. The second and third types connect directly to the IP network either through an IP phone or a PC. Both types can still connect to standard phones through the PSTN.

The VoIP application requires players: One is the access line providers, another is service provider, and the other is IP wholesalers. It is possible that one operator can integrate all these services in one operation.

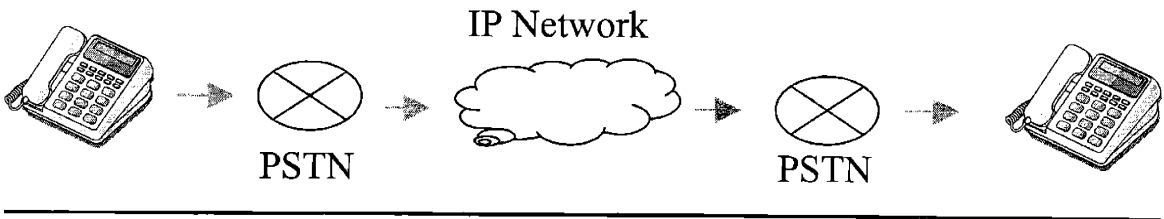
In the near future, fixed-line operators will provide VoIP as one of the broadband applications and VoIP will replace voice transmission.

Figure 3-4 Types of IP Phone Networks

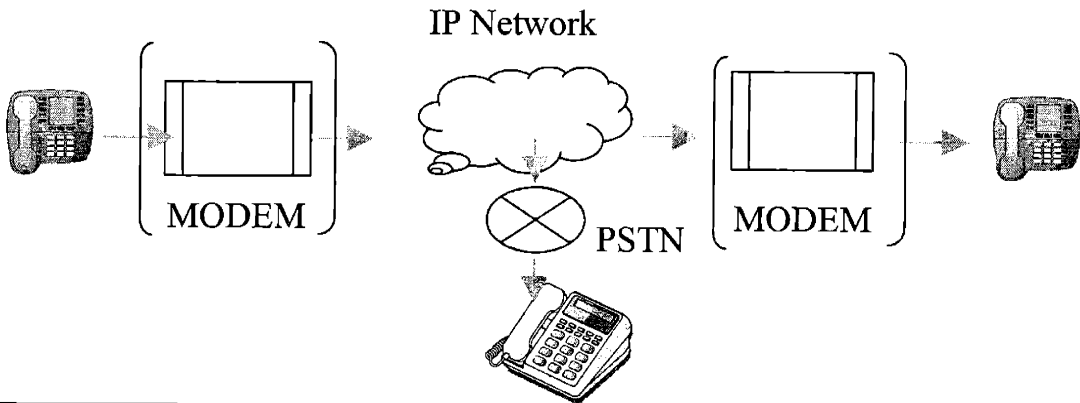
Legacy Network



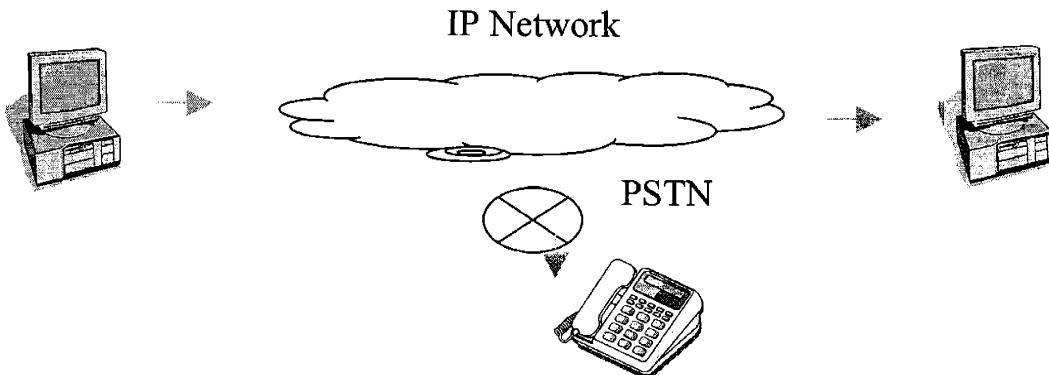
Phone to Phone Network



IP Phone to Other Network



PC to Other Network

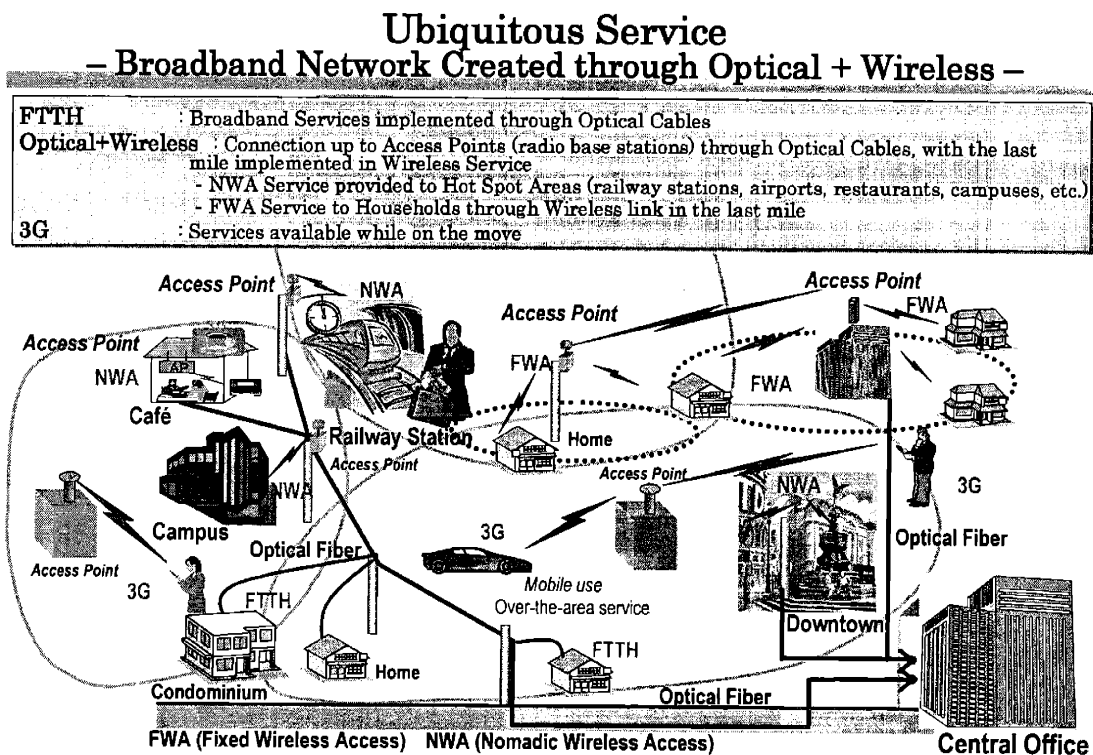


3.1.5 Ubiquitous Network

Mobile communications can provide service to almost anything that moves, including automobiles, notebook PCs, vending machines (remote control), pets, parcels, commodities in retail shops, home appliances (remote control), wallets, commuter cards, and so on. Depending on the application services such as location, stock management, cashless services, and security services are possible in an ubiquitous network.

Key technological success factors for an ubiquitous network are smaller size and reduced cost of chips. Today's technology has produced acceptable size, but in terms of cost, a one-digit cost reduction is required to make ubiquitous networks achieve penetration. At the same time, cost reductions also require mass production. Thus, like other breakthrough technologies, it faces the age-old "chicken or egg" question.

Figure 3-5 Ubiquitous Service



Source: NTT

3.1.6 Digital Broadcasting

In the broadcasting industry, digitalization is ongoing. Thus, content will be delivered through a digital network of optical fibers in the near future in parallel with digital terrestrial broadcasting. Wavelength division multiplexing (WDM) technology enables the provision of simultaneous voice, Internet, and digital broadcasting services at a speed of 100Mbps over optical fiber (FTTH). The broadcasting operator can choose the means (optical fiber or wave) based on the cost and quality.

NTT began digital broadcasting service experimentally in March 2002 in Japan. The digital terrestrial broadcasting will begin a small launch in 2003 and strive to achieve 100% by 2011. Fiber optics is considered the best option for physical delivery from an economic standpoint.

In the U.S., U.K., Sweden, Spain, and Finland, digital terrestrial broadcasting has already begun and most other developed countries will begin in 2004. However, in developing countries, digital terrestrial broadcasting will begin only experimentally and there are no plans for launching on a commercial basis (see Table 3-2). There is some possibility that broadband operators will penetrate into the digital terrestrial broadcasting market with FTTH service, but there is little time for preparation.

Table 3-2 Digital Terrestrial Broadcasting

U.S.	Started	Nov-98	Not nationwide
Canada	No plan		
(South America)			
Brazil	Started	2002	
Mexico	No plan		
(West Europe)			
Finland	Started	Aug-01	
Sweden	Started	April-99	
Germany	Started	2002	
U.K.	Started	Sep-98	
France	Will start	2003	
Italy	Will start	2003-2004	
Spain	Started	May-00	
(Asia)			
Japan	Will start	2003	Finish 2011
China	Will start experiment	2003	
Korea	Started	2001	Finish 2010
Taiwan	Started	2002	
Singapore	Started	Mar-01	
India	Started	Feb-02	
(Oceania)			
Australia	Started	Jan-01	

Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

3.1.7 IP Backbone Network (IPv6)

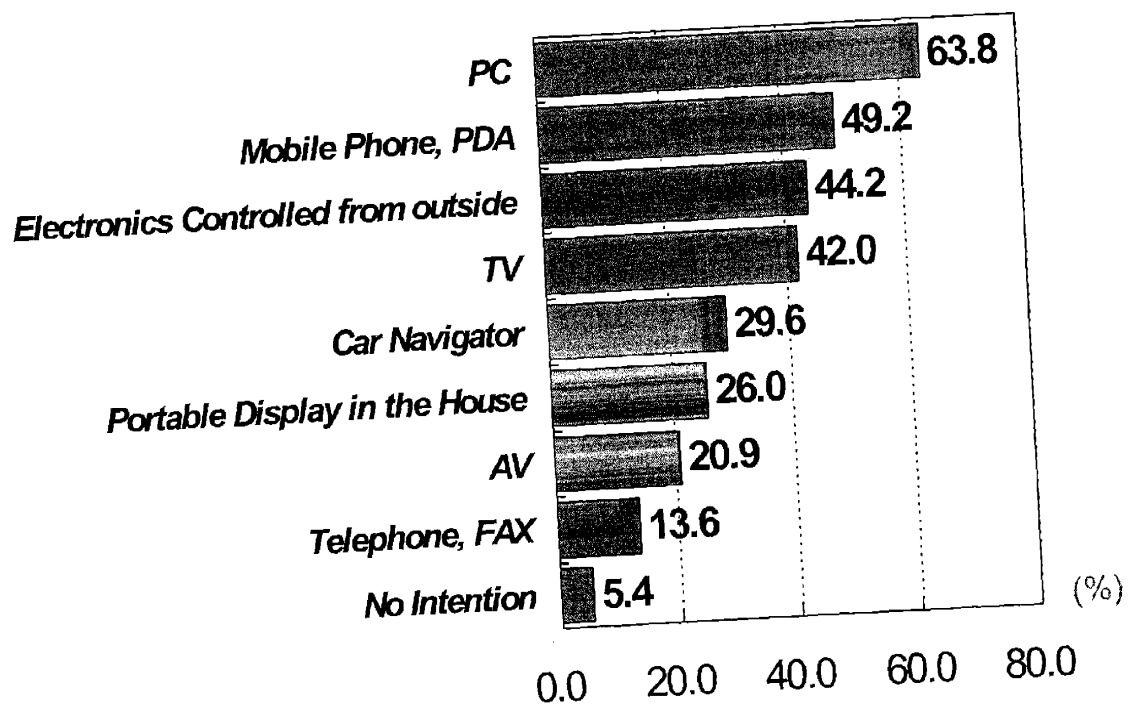
Internet Protocol Version 6 (IPv6) is the next generation protocol that will replace the current Internet Protocol—IP Version 4 (IPv4). Most of the Internet today uses IPv4, which is now nearly twenty years old. IPv4 has been remarkably resilient despite its age, but problems are beginning to appear.

The biggest problem is the growing shortage of IP addresses. Every machine that joins the Internet is required to have an IP address, and that finite number will soon be consumed. IPv6 will fix that problem. It also adds many improvements to IPv4, such as routing and network auto-configuration. IPv6 will enable “Internet homes “and the use of the Internet

for appliances such as air conditioners and microwave ovens. As Figure 3-6 shows, there appears to be sufficient demand for IPv6 in household electronics.

IPv6 is expected to gradually replace IPv4, although the two will coexist for a number of years during a transition period.

Figure 3-6 Potential Network Terminal for Internet (Japanese User)



Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

3.1.8 Standardizing the technology

Historically, the basic technology for telecommunications had been standardized by the United Nations International Telecommunication Union (ITU), with connections to each country, and its focus has been on international connectivity. For example, in the 3G standardization process, ITU adopted five standards, including W-CDMA, cdma-2000, etc.

As a result, there was no system or terminal equipment compatibility between the various systems worldwide. Table 3-3 shows the results of 3G standardization.

Table 3-3 2G Systems and 3G-Standardization Results

2G	3G
GSM	W-CDMA (Europe, Japan)
CDMA	Cdma2000 (U.S., Japan)
US-TDMA	UTRA-TDD (U.S.)
PDC	UWC-136 (U.S., Canada)
	DECT (Europe)

Source: Authors, 2003

In the future, it will be even more important to standardize basic network architectures and in order to support competition among applications. In addition, customers will be able to enjoy convenient terminal equipment compatibility and lower prices as a result of mass production possibilities.

3.2 NATIONAL TELECOMMUNICATIONS POLICIES

When considering penetration into foreign markets, there are two key questions to be considered regarding national telecommunications policies:

1. How will the government promote the domestic market?
2. Will the government protect domestic operators by restricting foreign direct investment?

There is some discussion as to which is more beneficial to customers: competition or regulation and price control, interconnection including LRIC (Long run incremental cost), universal funds, equal access, and number portability. But in the end every service provider and operator must act within national regulations.

Telecommunications have always been the underlying power of a nation's security, so most governments remain committed to improved telecommunications. This is also seen in the IT strategies currently being pursued or considered in every nation. If a government tries to strength a telecommunications company so that it can compete with another nation's company, it should not reduce that company's power and facilities. On the other hand, governments frequently intervene in national company business when domestic dominance disrupts normal competition among companies and hinders the development of domestic markets. This has occurred on more than one occasion in the U.S., UK, and Japan.

With today's telecommunications based on TCP/IP, it makes no sense to break the national telecom company into segments such as local, long-distance, international, mobile, and data transactions—at least from the standpoint of customer convenience. Nor does make sense to prohibit the integration of telecommunications with broadcasting, either by law or regulation, in order to maintain one company in a dominant position.

Originally, regulatory changes were induced by telecommunications acts, but today regulation is often produced by antitrust laws in most developed countries. In contrast, in developing countries, national regulations exist that protect rapid development although WTO regulations are making progress.

In every case, in the short-term, regulations will need to be changed to ones that promote the integration of services.

3.2.1 United States

3.2.1.1 Basic policies

The U.S. government is changing its policy, first set forth in the Telecommunications Act of 1996, which encourages an increase in the number of telecom competitors. Under the Act, wholesale pricing (LRIC) forced the Bell companies to provide network elements at prices far below their real cost. That policy hampered the development of full-scale, facilities-based competition, and the Bell companies' investment in networks for new services because rent was more economical than investment, because if the Bell companies made investments in technology, they often had the end result of subsidizing their direct competitors.

FCC Chairman Powell is a key person in this issue. The *Wall Street Journal* noted: "Mr. Powell said he thinks the FCC may have erred in the past by implicitly encouraging the formation of hundreds of Bell competitors without realizing how few of them would ultimately be able to survive."¹

The competition based on facility is significant, for the following reasons:

1. The operator based its own facility can provide the differentiation of the services and can control the cost.
2. It promotes the redundancy of the facility that helps for the emergency & disaster.
3. The maker of the facility can have the power.

Powell also said: "The policy of the U.S. produced mistakes. Lucent (formerly Bell Labs), a national jewel, is disappearing."

¹ WSJ Interactive, 2002.07.15 "FCC, faced with telecom crisis, could let a Bell buy WorldCom."

On 2/20/03, the FCC adopted the revised “unbundled network elements” (UNE) rule. It did so to enable broadband to accelerate so broadband operators will invest in broadband networks. Detailed versions of the rule will be determined in each state, however, so it is questionable just how the Bell companies will accelerate their investment. In any case, this rule should have the effect of lowering the price of broadband service and accelerating FTTH in U.S. in the long run. At the same time, it will make penetration into the U.S. broadband market by foreign operators without investment much more difficult in the future.

3.2.1.2 Restrictions on Foreign Investment

The U.S. has more strict schemes for restricting foreign investment than either the U.K. or Germany. These restrictions include:

1. Wireless operators: below 20% (indirect investment: below 25%)
2. FCC investigations from the standpoint of public interests (i.e., national security, foreign policy, and trade concerns)
3. The Exxon-Florio Amendment to the Defense Production Act of 1950.

With these restrictions, penetration into the U.S. market by foreign operations will not be easy.

3.2.2 European Union

3.2.2.1 Basic policies

There are two methods of deregulation. One method is used in the U.K., which adopted a policy similar to the U.S. to manage competition. This policy resulted in the breakup of British Telecom (BT). The other method is utilized in Germany and France, both

of which adopted a gradual introduction of competition. This policy has enabled the national telecom companies to remain powerful.

The EU has made some progress with integration regulations. If services are integrated, the object of EU regulations changes to electronic telecommunication network.

We believe the regulatory environment is reasonable in the EU.

3.2.2.2 Restricting Foreign Investment

France has stricter restrictions on foreign investment than either Germany or the UK. French law compels the government to hold all shares above 50% of France Telecom shares.

The wireless market is difficult to penetrate because there are restrictions on foreign investment allowing wireless operators to hold a maximum of 20% of the market. The key players reflect this restriction (see Chapter 2.2).

3.2.3 Asia

3.2.3.1 Basic policy

In Asia, there are many government-driven IT plans, such as “Multimedia Super Corridor (MSC)” in Malaysia and “Singapore One” in Singapore. In China, the government regulates competition because it learned from the example of other progressive countries that excessive deregulation brings excessive and duplicated investment, which leads to a deteriorating market.

China tends to adopt the policies of other countries such as the U.S., and Japan. In 2002, the Chinese government broke up China Telecom into Northern and Southern units as a way of introducing competition.

Although China to part in the WTO Conference on December 11, 2001, it still restricts foreign investment into domestic operations that seek to provide long-term service.

In the 3G arena, TD-SCDMA is the first Chinese original global standardization to be adopted by ITU.

So in general terms, the government supports development, and it strengthens domestic operators by helping them to survive in competition with foreign operators in the future.

3.2.3.2 Restricting Foreign Investment

Among developing countries, majority investment is difficult (see Table 3-4).

In China, the largest potential market in Asia, the government controls foreign investment in three categories: value-added networks, wireless and fixed, and resale. The restriction is being gradually decreased to holdings not more than 49% (50% in value-added networks) until 2008 when Beijing will host the Olympics and to the wider national area. Joint ventures with Chinese companies are a prerequisite, and the least amount of capital is determined based on the breadth of the proposed operation. Installation fees were abolished, so it is difficult for startups by foreign operators, as the length of time is too long for investment. Also, Chinese carriers are listed on the New York Stock Exchange for the purpose of raising funds, so they do not need foreign currency for investment. Given these constraints, it is difficult for foreign operators to penetrate into the Chinese market.

To date, AT&T is only player that has begun operating in China, in Shanghai. This occurred as the result of non-market negotiations between the U.S. and Chinese governments. Recently, however, Telstra (Australia), SK Telecom (Korea), and PCCW (Hong Kong) announced individual plans for penetrating the Chinese market, including value-added networks, wireless Internet access, and banking IT, respectively.

For major foreign operators, it is important to begin feasibility studies and to build some connections with the Chinese central government and other municipal governments if they hope to begin startups in the near future.

Table 3-4 Upper Limits of Foreign Investment in Asia

Korea	49% (KT: 33%)
China	49% (China Telecom : 20%)
Taiwan	60% (direct 20% + indirect 40%)
Hong Kong	None
Philippine	40%
Thailand	20%
Malaysia	61% (Telecom Malaysia : 30%)
Singapore	None
Indonesia	35%
Japan	None (NTT : 33%)

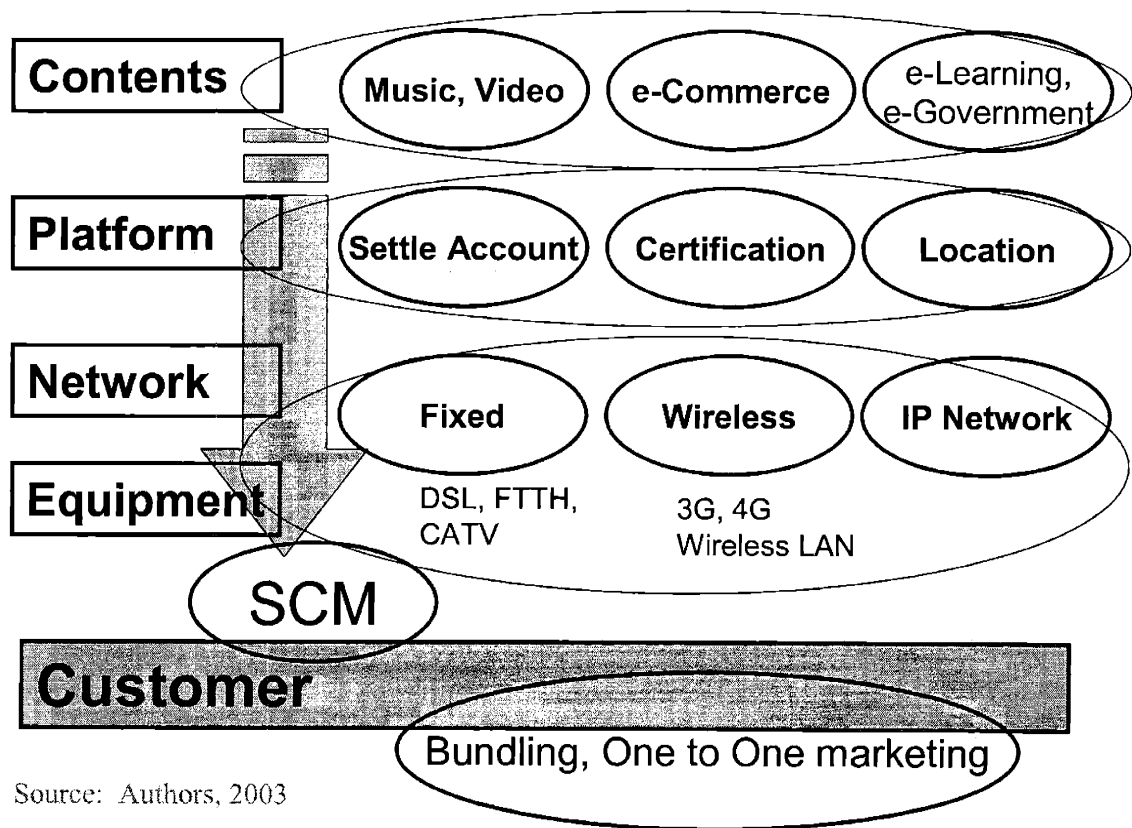
Source: Authors, 2003

3.3 SERVICES AND APPLICATIONS

In this section, we examine trends among various services and applications in order to understand why vertical integration is so important. Telecommunications companies tend to be global, integrated (by virtue of both vertical and horizontal alliances) so they can respond to customer needs and reduce operating costs per subscriber. In this era of greater integration, technology-oriented management tactics such as standardization is not the path for enabling

any telecommunications company to survive. Instead, market-oriented management stand the best chance of bringing about survival. Figure 3-7 illustrates a variety of services and applications.

Figure 3-7 Services and Applications



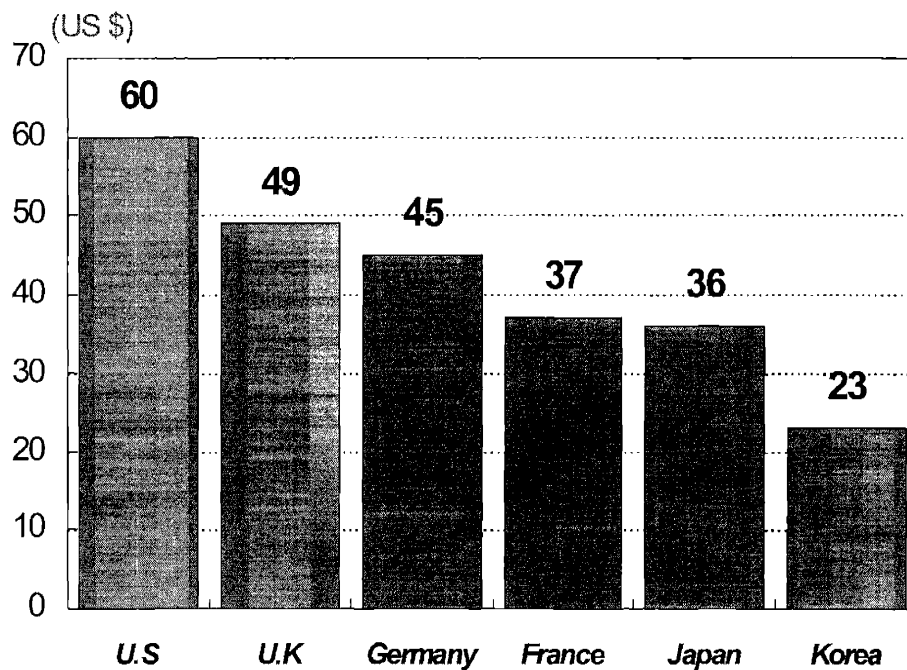
Source: Authors, 2003

3.3.1 Charges

(a) Monthly Charges

Figure 3-8 shows monthly DSL charges for several developed countries. In general, these charges have shown a recent tendency to decrease. In fact, one reason for the high penetration of broadband service in Korea is its relatively low monthly DSL charge. This is one factor that encourages customer demand.

Figure 3-8 DSL Monthly Charges (as of February, 2002)



Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

U.S.	Verizon (1.5Mbps/ 128kbps)
U.K.	BT (500kbps/ 250kbps)
Germany	DT (768kbps/ 128kbps)
France	FT (500kbps/ 128kbps)
Japan	NTT (1.5Mbps/ 512kbps)
Korea	KT (1.5Mbps/ 256kbps)

In the area of broadband service, charges vary depending on the amount of traffic, such as packets of i-mode, which will diminish due to integration and fixed monthly charges. At that point, operators must rebuild their business model to improve how they can obtain more money from their customers.

(b) Bundled Services Charge

Although bundling is a basic marketing strategy, in the telecommunications industry it is used effectively to bundle fixed service with wireless service to achieve volume discounts and aggregated billing. Not only within telecommunications but also between telecommunications and the broadcast industry, it is important to consider bundling as an effective way to decrease the cancellation rate.

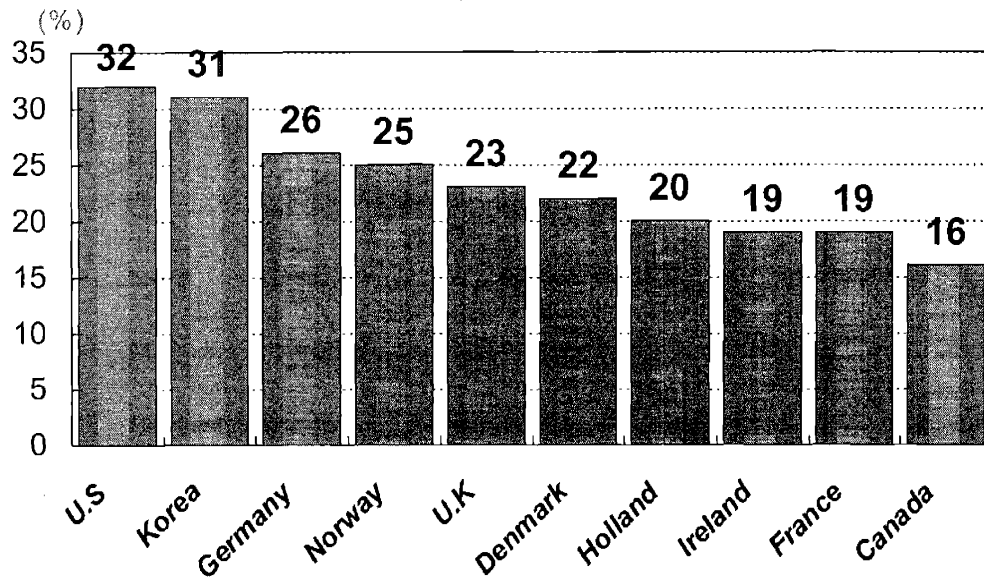
Moreover, every telecommunication company builds a customer database which includes information such as subscriber statistics (age, sex, etc.), monthly charges, and amount of traffic. However, there are few telecommunication companies that actually practice “one-to-one marketing” given the large quantity of data involved. One-to-one marketing is an effective tool for decreasing cancellations and increasing average revenue per unit (ARPU).

3.3.2 Electric commerce

(a) Fixed service

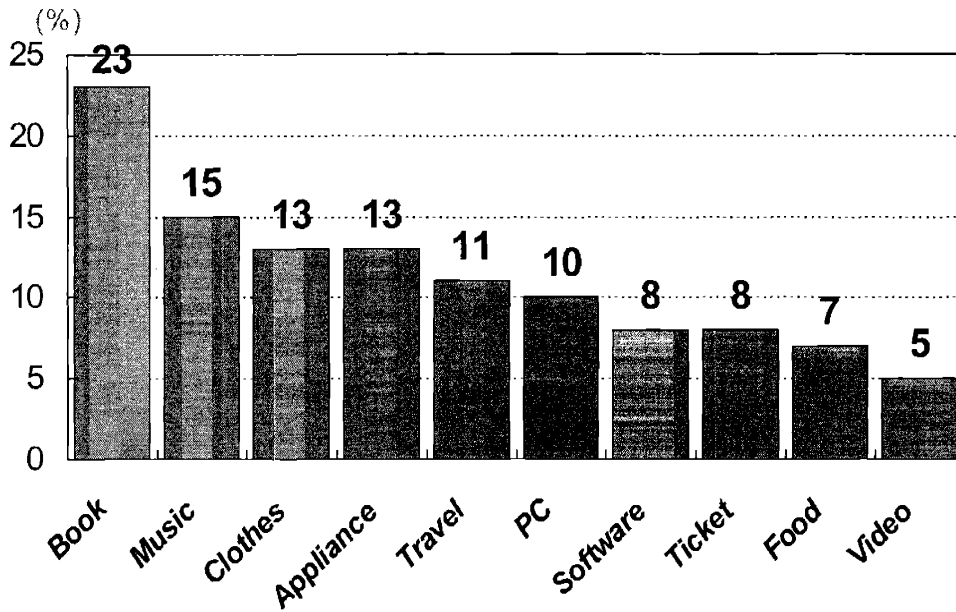
The state of electric commerce in the world today is shown in Figures 3-9 and 3-10. Electric commerce has made major progress throughout the world, with customers enjoying benefits such as low-cost search capabilities, low transaction costs, and declining marginal

Figure 3-9 Penetration of Online Shopping



Source: Global e-commerce report 2002

Figure 3-10 Commodities of Online Shopping



Source: Global e-commerce report 2002

costs. In this context, many companies have added value to their services by avoiding commoditization of their services. Not only do telecommunications companies need to prepare a suitable transmission environment (i.e., broadband, 3G, 4G) but they must also expand their business field in order to create and manufacture attractive content.

(b) Wireless service

Some examples of where wireless service can affect e-commerce are given below. They have the potential to significantly change customers' lifestyles.

(1) Public transportation

Wireless phones could be used for transportation purchases, such as commuter rail pass and airplane tickets

(2) Shopping

Wireless service could be used to load store coupons and member cards.

(3) Financial (electronic ticket)

Customers could show their wireless phone at the ticket gate at concert or sports events, using it as an electronic ticket.

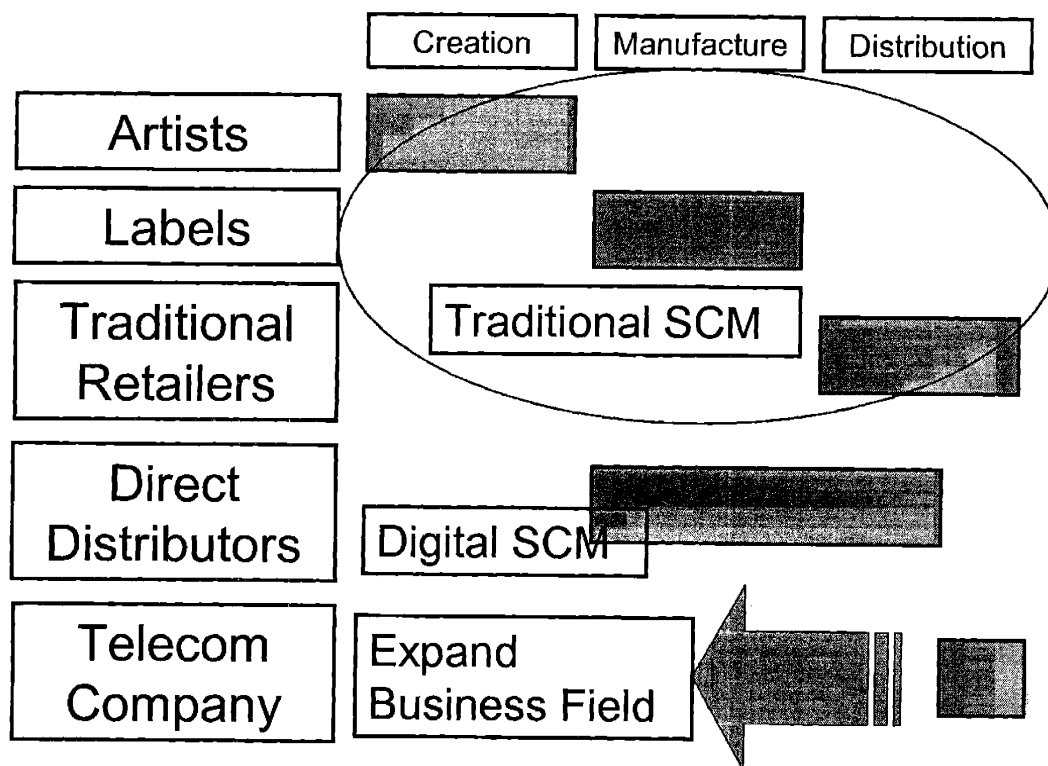
3.3.3 Music and Video

As digital business continues to develop, the traditional supply chain will have to transform itself into a digital supply chain, for the following reasons:

1. low search and transaction costs meet radical personalization
2. anything that can be digitized can be delivered at a rapidly declining marginal cost

Figure 3-11 shows the potential transformation of music and video distribution. Customers can enjoy personalized service at a low price. At the same time, telecommunications companies must not only prepare a suitable transmission environment (such as broadband, 3G, 4G) but must expand their business fields to include creating and manufacturing.

Figure 3-11 Music and Video Distribution



Source: Authors, 2003

3.3.4 Government, Education, Medical

In terms of universal government services such as education and medical, customers can be anyone. This represents a vast market for such functions as e-voting, e-

government marketplace, e-learning, and medical examinations via broadband. However, in these areas, the issue of privacy is crucial, which means that a universal, secured network is absolutely requisite. For many operators, however, these represents even more opportunities.

3.3.5 Supply Chain Management

Object-to-object communications that make use of wireless technology, such as IC tags can bring about revolutionary changes in supply chain management (SCM).

Wireless IC tags are a good example. These are small tags, also called an RFID tag. An ID is recorded in an IC chip on the tag, and can be retrieved via an electronic wave. As data on it can be read without contact, it is not affected by dirt and dust, microsizing, or being located in tiny spaces, since it operates by electronic wave exchange. It works without a power source because of non-contact power transferred from an antenna, and running expenses are low.

For example, the MIT Auto-ID Center is doing R&D to standardize future versions of the universal barcode system. The research aims to make physical distribution more efficient by rapidly reading and managing small wireless IC tags containing individual IDs attached to every product at each distribution stage. Wireless IC tags have the advantage of holding more than barcode information, including the following: (1) the ability to read data automatically by passing a certain location; (2) the ability to read quantities of data collectively; and (3) the difficulty of copying or counterfeiting.

Moreover, the Auto ID Center advocates the use of a wireless IC tag with the following features: (1) the ability to manage not only kinds of products but also individual articles, since a barcode on a wireless IC tag includes a serial number that uniquely identifies

individual items; (2) the ability to manufacture the tag at extremely low cost while also managing the information flexibly, since a barcode is recorded on the tag and product information is recorded in the network database; (3) the ability to use a wireless IC tag among many companies, due to standardizing (a) the wireless IC tag code, (b) the descriptive language for the product information database, and (c) the system that refers to product information in database with a barcode.

With these features, if the Auto-ID Center wireless IC tag can be read at every point in a physical distribution process, the flow of products can be controlled and managed at extremely low cost. As a result, it is possible to make physical distribution more efficient by optimizing stock management and minimizing lost products. The cost savings should more than cover the introductory investment in wireless IC tags.

If the IC tag has micro computing linked to a web-based network using radio frequency identification (RFID) technology, it can send information automatically through a web-linked reader of the IC tag on the product. This could dramatically change B2B and B2C.

The potential volume for communication between objects in SCM is infinite, and most operators will find some opportunity to gain profit from it. The problem will be the business model, and how the operator will charge in this field. This is a challenging issue.

The MIT Auto ID Center has encountered some problems with security, but that situation is improving. Standardization can only lead to further acceleration of object-to-object communications.

CHAPTER 4

Developing the Corporation to Respond to Customer Needs

4.1 FORECASTING CUSTOMER NEEDS

In the broadband era, one can enjoy video via terrestrial broadcasting or MPEG 2 moving content through a 6Mbps network. In the average household, four members can enjoy net service simultaneously through a network of at least 24 Mbps. If one uses high-definition video, it will require an additional 20-30 Mbps in the network. So we can assume that a maximum of 50 Mbps will meet customer needs in a typical household.

4.2 DETERMINING THE FUTURE PHYSICAL NETWORK

To respond to customer needs, what network should an operator install? It is clear that wireless cannot respond to all these needs via 4G technology. Even if it could, it would take too long. Is FTTH suitable? Certainly we should consider broadcasting as a viable substitute. If digital terrestrial broadcasting is integrated into FTTH, then FTTH would be the answer. If not, high-definition video could be transmitted through digital terrestrial broadcasting, and then a fixed network would be enough for DSL. If Microsoft provides new software that requires more than 50Mbps, FTTH will be required. When pier-to-pier service becomes more popular, FTTH will be required as the killer application of pier-to-pier service.

And if twisted-pair is replaced with optical fiber, the expected value, duration, transaction costs, and risks of FTTH will need to be calculated. As technology continues to develop, this will be more feasible, but at the present time, the ROI is very low.

4.3 GLOBALIZATION

In today's wireless environment, Vodafone (UK) is a major global player. It has been involved in a variety of mergers and acquisitions, and continues to be a strong provider of services to the EU and Japan.

In the growing field of 3G wireless service, NTT DoCoMo (Japan) is the first mover. In addition, five types have been approved including W-CDMA, cdma2000 which have been recognized as the global standard by ITU.

When the telecommunication environment is regulated, standardized types of service are *de facto* and dominant. *De facto* is usually not part of the most developed technology, but it is accepted by a large number of countries. The key is that suppliers can more readily respond to *de facto* technology. The more highly developed technologies are often the disruptive ones.

Following the WTO agreement, globalization of the telecommunications has been accelerated. But what does "globalization" of telecommunications mean? Is it the same with other products or services? In fact, the global market is a power game, dominated by the most powerful innovators, suppliers, and markets. The U.S. has dominant power and therefore takes the lead in formulating the rules mandated by the WTO. Some standards have been developed by smaller countries in the EU. In addition, the U.S. which has a vast market is more pragmatic and generally oriented to *de facto* standards.

The key factors for successfully globalizing a new technology are:

1. Proceed with the *de facto* standard
2. Penetrate countries with a large market.

After that, other factors to be considered include:

3. Globalization is significantly affected by national policies, such as IT strategies.
4. Globalization occurs when an operator has some competitive advantage.
5. A technology is ripe for globalization when it shows profitable growth through diversification and learning occurs in foreign testing grounds.
6. Globalization reduces operating costs per subscriber (R&D, switching machine, router), with greater economies of scale.
7. Penetration into foreign markets requires both a global and local approach. (“Globalization—think global, act local!”)
8. Internal decisions regarding globalization (i.e., foreign investment, joint ventures, alliances, and licensing agreements) are evaluated based on expected value, duration, transactions costs, and in-country risk.

4.4 INTEGRATION

Digitalization makes integration easier because digital information can be dramatically easily integrated than analog. A network operator has the opportunity to provide integrated services in a physical network by delivering voice and broadcasting contents via optical fiber, and by bundling services in the form of “information complements.” Thus, an operator takes the role of physical network, service platform, and network service provider. Operators sometimes enter into alliances with content holders.

The bedrock of customer relationships is billing. How the operator is perceived by customers is a critical issue for branding. In a wireless environment, the terminal is a visible piece of equipment, whereas it is not in a fixed-line environment.

4.5 VALUE SEGMENTATION

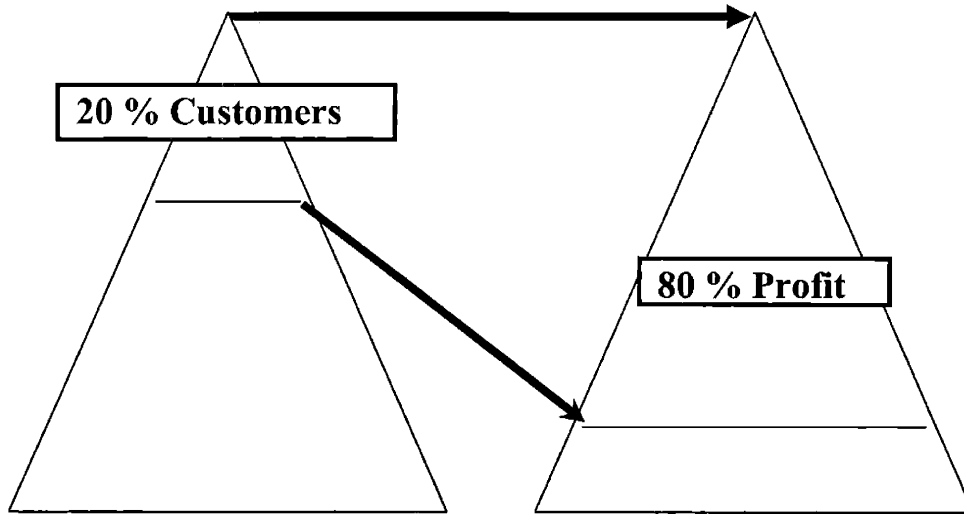
Value segmentation is completely different in the financing industry than it is in telecommunications. For telecommunications, the monthly fixed charge for the last mile is stable and is protected by government regulation as a universal service. Therefore this is the most profitable segment without severe facility based competitor in the last mile.

A variable charge that depends on traffic flow is less profitable because there is usually competition to consider. Corporate customers in particular have greater bargaining power, so service operators are reducing their charge for corporate customers to the break-even point—sometimes even below. The result is that operators depend on the mass market for a stable source of income, which means that little change for the mass market is best in the last mile. In the transformation from traditional telephone to VoIP, the trend will be strengthened because the dedicated network of traditional telephone is more profitable with more traffic in the same tariff.

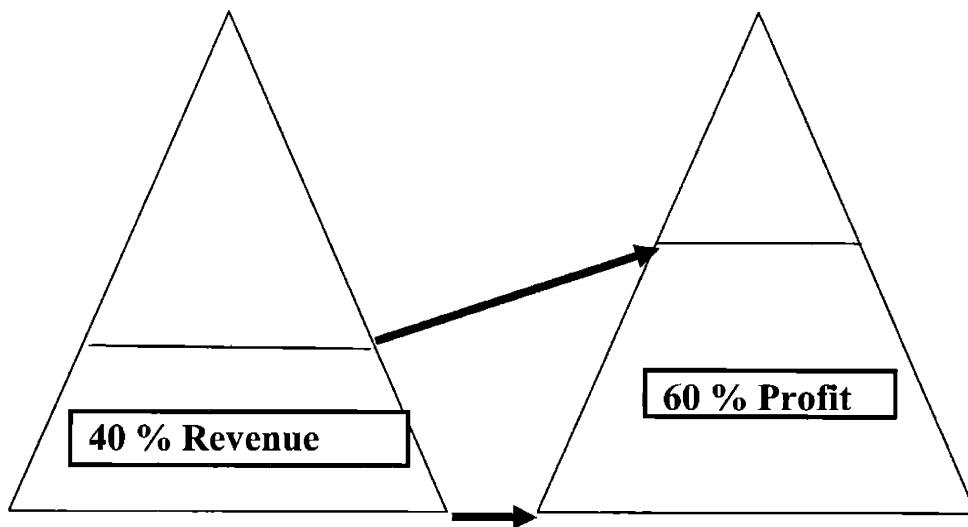
To analyze customer value in a telecommunications company, the industry cost structure must be taken into account. That factor is a fixed cost which is constant with each customer or subscriber, while variable costs, such as customer acquisition and agent subsidiaries, vary considerably with each customer. Figure 4-1 shows the Converse Delta model applied to the telecommunications industry.

Figure 4-1 The Telecommunications Industry's Converse Delta Model

Other Industries



Telecommunications Industry



Part Two

The Future of NTT Group

CHAPTER 5

Constructing Scenarios

In this chapter we construct various scenarios that are relevant to the telecommunication industry and to NTT Group, based on Fahey and Randall's (1998) competitive foresight scenarios methodology. We constructed the scenarios based on the current market framework which is comprised of four sectors: domestic fixed-line services, domestic wireless services, international fixed-line services, and international wireless services.

5.1 NTT GROUP

NTT (Nippon Telegraph and Telephone Corporation) Group is the leading telecommunication corporate group in Japan. NTT was established in 1985 as a result of the privatization of NTT public corporation. The NTT Group structure is shown in Table 5-1.

Table 5-1 The NTT Group Structure

NTT	Holding company
NTT East	Regional telecommunication
NTT West	Regional telecommunication
NTT Communications	Long distance and international service
NTT DATA	Data communication
NTT DoCoMo	Wireless communication

Source: Authors, 2003

In 1996 NTT was confronted with the vast growth of the Internet, which forced the company to transform itself from a domestic telephone-centric company to a global information-communications company, and in the process shifting from fixed line to IP. It reorganized into a holding company to respond more flexibly to market demands and to integrate the vertical market (i.e., terminal, network, platform, and content). Today, it is accelerating the introduction of FTTH and 3G service, but the process for introducing a service application is not as clear, nor is it obvious how it can change from fixed line to IP. Therefore, we have examined the situation and will propose scenarios and strategies for transformation.

5.2 DOMESTIC FIXED-LINE SERVICES SCENARIOS

5.2.1 Defining the Decision Focus

In defining the scope of this thesis, we identified three defining issues for consideration. We have to:

1. deal explicitly and effectively with the full range of uncertainty in the long-term future;
2. take into account future corporate, competitive, customer, government, and technological conditions; and
3. take into account future business models and frameworks.

With these issues in mind, we framed the decision-focus question as follows:

Which domain and which business model should NTT Group pursue most vigorously in order to survive in today's IT society?

5.2.2 Identifying Key Decision Factors

We identified six key decision factors for domestic fixed line service, as follows:

1. Customer needs for broadband services.
2. Competition with other operators, other Internet service providers, and other application service providers.
3. Alliances with other value chain players, such as content holders, and with broadcast players.
4. Relations, including regulatory, with government.
5. Development of new technologies, including fiber, DSL, etc.
6. Relations with suppliers.

5.2.3 Identifying and Assessing Key External Forces

We identified key external forces that bear on the key decision factors. Table 5-2 shows the key external forces.

Table 5-2 Key External Forces for Domestic Fixed-line Services

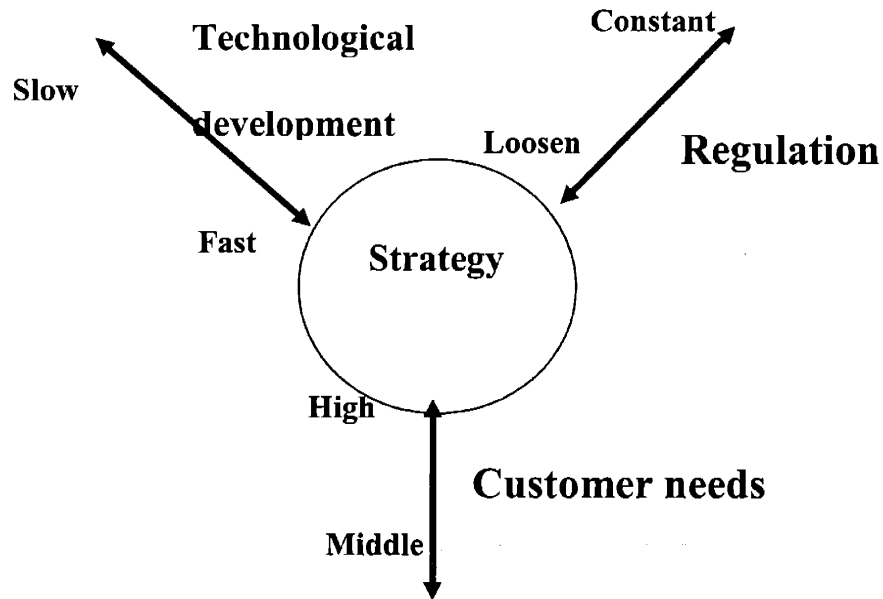
Uncertainty			
Low	←————→	High	
<ul style="list-style-type: none"> ✓ Going concerns of competitors (Yahoo-BB) ✓ Coalition of the competitors (Tepco+ IJ) 	<ul style="list-style-type: none"> ✓ Technological development (DSL, FTTH, VoIP enabling 911) ✓ Cost of installing fiber ✓ Billing platform ✓ Customer's acceptance for one-to-one marketing ✓ Customer's acceptance for one billing ✓ Customer's acceptance for bundling 	<ul style="list-style-type: none"> ✓ Customer's needs for broadband service ✓ Customers' needs for ubiquitous service ✓ New application develop (Microsoft) ✓ Digital convergence (single digital pipe to deliver all services) ✓ Digital terrestrial broadcasting 	High ↑ Impact ↓ Low
<ul style="list-style-type: none"> ✓ Supplier relationship (FTTH connector) ✓ High quality substitute (4G) 	<ul style="list-style-type: none"> ✓ Global mutual connecting scheme of VoIP 	<ul style="list-style-type: none"> ✓ Regulation (open market policy, anti-system lock-in) 	
<ul style="list-style-type: none"> ✓ Government support for IT 	<ul style="list-style-type: none"> ✓ The cost of the terminal adapter or the new VoIP telephone equipment ✓ Switching cost 	<ul style="list-style-type: none"> ✓ The revenue allocation rule among the VoIP players 	

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.2.4 Establishing Scenario Logics

We focused on key external forces in the upper right sector, and we looked for groupings, cause and effect relationships, and other linkages among these factors. Figure 5-1 illustrates the scenario structure.

Figure 5-1 Scenario Structure for Domestic Fixed-line Services



- Regulation:** Will government loosen regulations regarding open market policy, anti-system lock-in, or will government keep regulation the same?
- Customer needs:** Will customer needs for broadband services be high or middle?
- Technological Development :** Will technology regarding DSL, FTTH, and VoIP be developed quickly or slowly?

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.2.5 Selecting and Elaborating Scenarios

Table 5-3 shows the combination of driving forces.

Table 5-3 Combinations of Driving Forces for Domestic Fixed-line Services

Driving forces			Scenario/probability
Regulation	Customer need	Technology development	
Loosen	High	Fast	(Scenario A) 3
Loosen	High	Slow	7
Loosen	Middle	Fast	(Scenario B) 1
Loosen	Middle	Slow	5
Constant	High	Fast	4
Constant	High	Slow	8
Constant	Middle	Fast	2
Constant	Middle	Slow	(Scenario C) 6

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

From among eight scenarios, we selected three scenarios in the priority of high probability. The *selection criteria* are :

1. optimistic
2. middle
3. pessimistic

The *priority criteria* are:

1. Technology development will be fast,
2. Customer needs will be middle, and
3. Regulation will loosen.

(Scenario A) Optimistic

Regulations: Loosen; Customer need: High; Technology development: Fast

In this scenario, Customer need and Technology development produce a synergistic effect. Because of Regulation, there is some possibility that there will be system lock-in effect.

(Scenario B) Middle Scenario, Most probability

Regulation: Loosen; Customer need: Middle; Technology development: Fast

In this scenario, although Technology development is fast, Customer need is only middle, so there is some probability that service is over- specifications.

(Scenario C) Pessimistic Scenario

Regulation: Constant, Customer need: Middle, Technology development: Slow

In this scenario, the operator cannot provide service to meet customers' needs.

5.3 DOMESTIC WIRELESS SERVICES SCENARIOS

5.3.1 Defining the Decision Focus

We determined that there were four defining issues to consider. We had to:

1. deal explicitly and effectively with a broad range of uncertainty in the long-term future
2. take account of future corporate, competitive, and technological conditions
3. take account of future business models and frameworks
4. take account of future customers' needs.

With these issues in mind, we framed the decision-focus question as follows:

Which domain and which business model in the domestic wireless field should NTT Group pursue most vigorously in order to survive in today's IT society

5.3.2 Identifying Key Decision Factors

We identified five key decision factors for domestic wireless services, as follows:

1. Customers' needs regarding high-speed multimedia and new services after voice traffic becomes saturated.
2. Competition from other operators, other Internet service providers, and application service providers.
3. Relations with other SCM players (vertical development), and with broadcast players (horizontal development).
4. Relations with government (regulations).
5. Development of new technology including 3G, 4G, 5G, and wireless LAN.

5.3.3 Identifying and Assessing Key External Forces

We identified key external forces that bear on the decision factors identified above.

Table 5-4 shows the key external forces.

Table 5-4 Key External Forces for Domestic Wireless Services

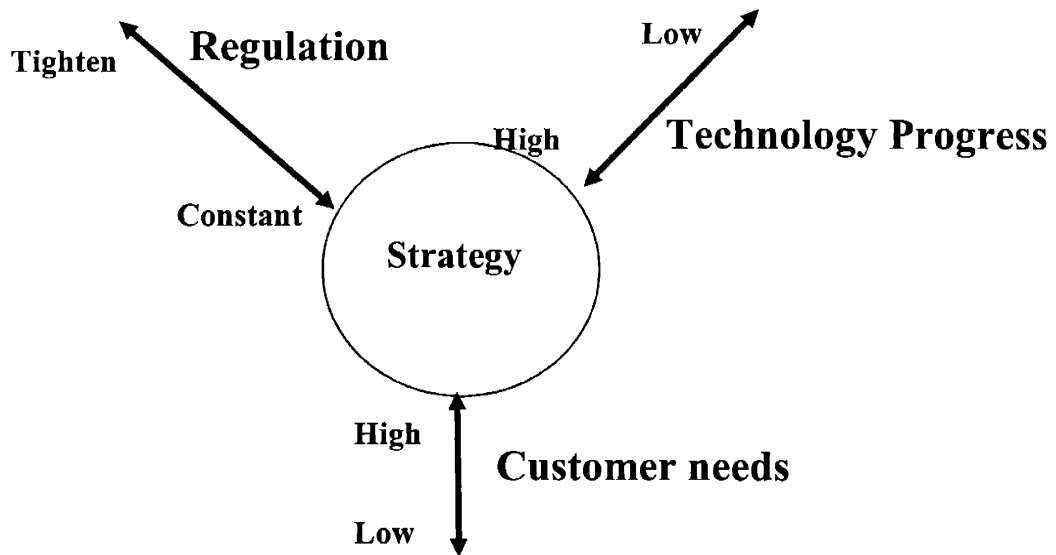
<p>Uncertainty</p> <p>Low ←————→ High</p>		
<ul style="list-style-type: none"> ✓ Fierce competition with other operators ✓ Competition with other Internet service providers ✓ Competition with other application service providers ✓ Relation with other SCM players ✓ Relation with other broadcast players ✓ High-quality substitute 	<ul style="list-style-type: none"> ✓ Customers' needs for high-speed service ✓ Customers' needs for multimedia service ✓ Customers' needs for ubiquitous service ✓ Technology progress (3G, 4G, 5G, Wireless LAN) ✓ Government regulation (open market policy, anti-system lock-in) 	<p>High</p> <p>↑ Impact ↓</p> <p>Low</p>
	<ul style="list-style-type: none"> ✓ Economic situation ✓ IT recession recovery ✓ Iraq war ✓ Political stability 	

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.3.4 Establishing Scenario Logics

We focused on key external forces in the upper-right sector, and we looked for groupings, cause and effect relationships, and other linkages among these factors. Figure 5-2 shows the scenario structure.

Figure 5-2 Scenario Structure of Domestic Wireless Services



- Regulation:** Will government strengthen regulation regarding open market policy, anti-system lock-in, or will government keep regulation constant?
- Customer needs:** Will customer needs for mobile multimedia services be high or low?
- Technology Progress:** Will progress of technology regarding 3G, 4G, 5G and Wireless LAN be high or low?

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.3.5 Selecting and Elaborating Scenarios

From among eight (2*2*2) scenarios, we selected four. Table 5-5 shows the possible combinations of driving forces.

Table 5-5 Combinations of Driving Forces for Domestic Wireless Services

Driving forces			Scenarios
Regulation	Customer need	Technology	
Constant	High	High	(Scenario A)
Constant	High	Low	(Scenario B)
Constant	Low	High	(Scenario C)
Constant	Low	Low	
Tighten	High	High	
Tighten	High	Low	
Tighten	Low	High	
Tighten	Low	Low	(Scenario D)

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

(Scenario A) Optimistic Scenario

Regulation: Constant; Customer need: High; Technology: High

In this scenario, Customer need and Technology development have a good relationship and synergistic effect. According to Regulation, a system lock-in effect will be maintained. So operators can meet customer need and enjoy business opportunities—typically a positive reinforcement scenario.

(Scenario B) Middle Scenario

Regulation: Constant; Customer need: High; Technology: Low

In this scenario, although Customer need is high, Technology development is low, so operators cannot meet Customer need and operators will have difficulty penetrating services.

(Scenario C) Middle Scenario

Regulation: Constant, Customer need: Low, Technology: High

In this scenario, although Technology development is high, Customer need is low. So operators cannot meet customer needs and operators will have difficulty penetrating services. It is a typical technology-driven scenario.

(Scenario D) Pessimistic Scenario

Regulation: Tighten; Customer need: Low; Technology: Low

In this scenario, Customer need and Technology development are also low. So operators cannot meet customer need and operators will have difficulty penetrating services. It is typically a negative reinforcement scenario.

5.4 INTERNATIONAL FIXED-LINE SERVICES SCENARIOS

5.4.1 Defining the Decision Focus

We determined that there were three defining issues to consider. We have to:

1. Deal explicitly and effectively with the full range of uncertainty in the long-term future
2. Take account of future corporate, competitive and technological condition
3. Take account of future business model and framework

With these issues in mind, we framed the decision-focus question as follows:

Which domain and which business model should NTT Group pursue most vigorously in order to survive in today's IT society?

5.4.2 Identifying Key Decision Factors

We identified eight key decision factors for international fixed-line services, as follows.

1. Customer needs for basic and broadband in each country.
2. Cultural and social aspects of each country.
3. Political stability, economic growth, and risk of each country.

4. Relations with government (regulatory or support for IT, Foreign direct investment).
5. Relations with suppliers.
6. Development of new technologies, including fiber and DSL.
7. Competition with other operators, other Internet service providers, and application service providers.
8. Alliances with other SCM players, such as content holders and/or with broadcast players.

5.4.3 Identifying and Assessing Key External Forces

We identified key external forces that bear on these key decision factors. Table 5-6 shows the key external forces.

Table 5-6 Key External Forces of International Fixed-line Services

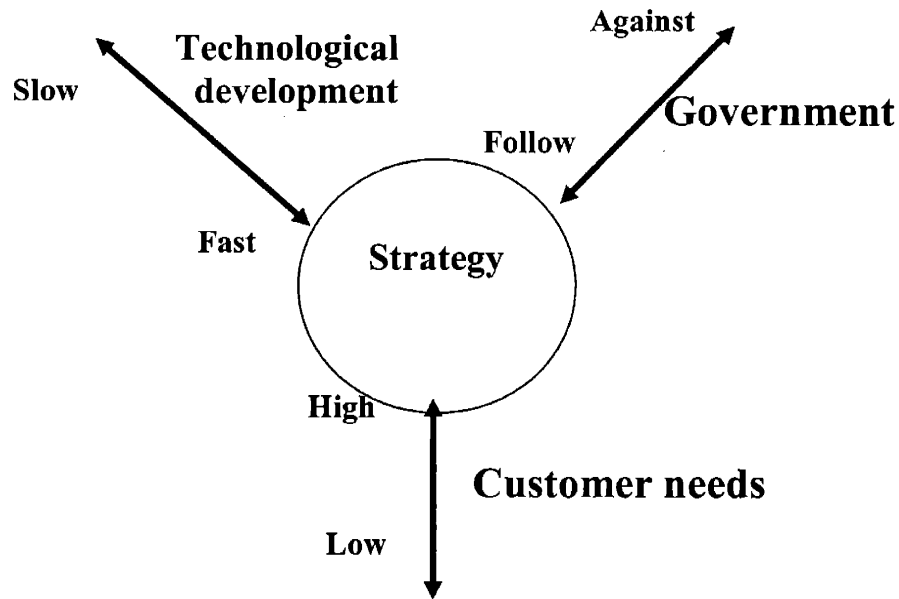
Uncertainty			
Low	←————→		High
<ul style="list-style-type: none"> ✓ Substitute technology (wireless, satellite, Cable) ✓ Competition with other operators ✓ Competition with other Internet service providers ✓ Competition with other application service providers ✓ Relation with other SCM players ✓ Relation with other broadband players 	<ul style="list-style-type: none"> ✓ The technological development (DSL, FTTH) 	<ul style="list-style-type: none"> ✓ Digital convergence including broadcasting ✓ Governmental Policy of telecom in the developing countries (Basic service is wireless or fixed? Broadband in metropolitan or speed penetration?) ✓ Governmental Policy of telecom in the developed countries (Monopoly? Facility-based competition? Unbundled?) 	High ↑ Impact ↓
	<ul style="list-style-type: none"> ✓ Restriction of the foreign investment 	<ul style="list-style-type: none"> ✓ Customer’s demand for basic service ✓ Customer’s demand for broadband service ✓ Customer’s demand for ubiquitous service ✓ Country risk ✓ Economic situation ✓ Political stability 	
	<ul style="list-style-type: none"> ✓ Terminal development 	<ul style="list-style-type: none"> ✓ Supplier relationship ✓ The relationship with application providers 	Low

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.4.4 Establishing the Scenario Logics

We focused upper-right key external forces, and we looked for groupings, cause and effect relationships and other linkages among these factors. Figure 5-3 shows scenario structure.

Figure 5-3 Scenario Structure of International Fixed-line Services



- Government:** Will government allow penetration by loosening regulations regarding open market policies, anti-system lock-in, or will government keep or tighten such regulations?
- Customer needs:** Will customer needs for narrowband or broadband services be high or low?
- Technological Development:** Will technology regarding DSL, FTTH and VoIP be developed fast or slow?

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.4.5 Selecting and Elaborating the Scenarios

Table 5-7 shows the various combinations of driving forces.

Table 5-7 Combination of Driving Forces for International Fixed-line Services

Driving forces			Scenarios	
Government	Customer needs	Technological development		
Follow	High	Fast	(Scenario A)	2
Follow	High	Slow		4
Follow	Low	Fast	(Scenario B)	1
Follow	Low	Slow	(Scenario C)	3
Against	High	Fast		6
Against	High	Slow		8
Against	Low	Fast		5
Against	Low	Slow		7

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

From among the eight scenarios in the table, we selected three scenarios in the priority of high probability. The *selection criteria* are:

- 1 optimistic
- 2 middle
- 3 pessimistic

The *priority criteria* are :

- 1 Government will follow
- 2 Technology development will be fast
- 3 Customer needs will be low (especially in the developing countries).

(Scenario A) Optimistic Scenario

Government: Follow, Customer need: High, Technology: Fast

In this scenario, Customer need and Technology development have a good relationship and synergistic effect. Government will accelerate its development.

(Scenario B) Middle Scenario, most probability

Government: Follow, Customer need: Low, Technology: Fast

In this scenario, although Technology development is fast, Customer need is low, so the service is disrupted.

(Scenario C) Pessimistic Scenario

Government: Follow, Customer need: Low, Technology: Slow

In this scenario, in spite of Government's support, customer needs are low and technology development is also slow. An operator would find it difficult to enter the country and to penetrate services.

5.5 INTERNATIONAL WIRELESS SERVICES SCENARIOS

5.5.1 Defining the Decision Focus

We determined that there were four defining issues to consider. We have to:

1. Deal explicitly and effectively with a broad range of uncertainties in the long-term future
2. Take account of future corporate, competitive, and technological conditions.
3. Take account of future business models and frameworks.
4. Take account of future customer needs.

With these issues in mind, we framed the decision-focus question as follows:

Which domain and which business model in the international wireless field should NTT Group pursue most vigorously in order to survive in today's IT society?

5.5.2 Identifying Key Decision Factors

We identified five key decision factors among international wireless services, as follows:

1. Customers' needs for voice and high-speed multimedia service in each country.
2. Cultural and social aspects of each country.
3. Political stability, economic growth, regulation, and risk of each country.
4. Competition from other operators, other Internet service providers, and application service providers.
5. Relations with other SCM players (vertical development) and with broadcast players (horizontal).

5.5.3 Identifying and Assessing Key External Forces

We identified key external forces that bear on the key decision factors. Table 5-8 shows the key external forces.

Table 5-8 Key External Forces for International Wireless Services

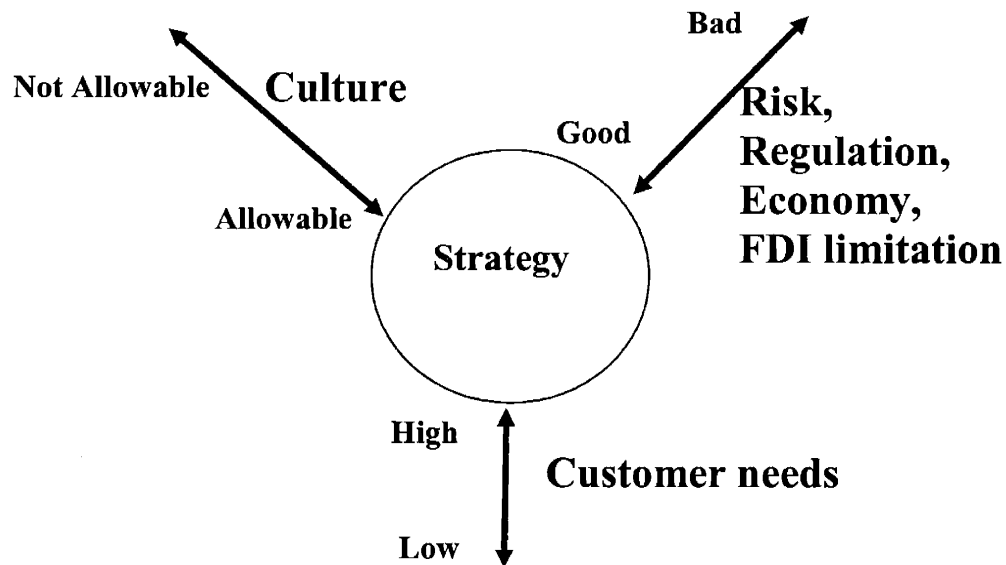
Uncertainty		
Low	High	
<ul style="list-style-type: none"> ✓ Fierce Competition with other operators ✓ Competition with other Internet service providers ✓ Competition with other application service providers ✓ Relation with other SCM players ✓ Relation with other broadcast players ✓ High quality substitute 	<ul style="list-style-type: none"> ✓ Customers' needs for voice service ✓ Customers' needs for high-speed service ✓ Customers' needs for multimedia service ✓ Customers' needs for ubiquitous service ✓ Cultural aspect ✓ Social aspect ✓ Political stability ✓ Limitation of FDI ✓ Economic growth ✓ Regulation ✓ Country risk ✓ Original SCM system 	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">High</div> <div style="margin-bottom: 10px;">↑</div> <div style="margin-bottom: 10px;">Impact</div> <div style="margin-bottom: 10px;">↓</div> <div>Low</div> </div>
	<ul style="list-style-type: none"> ✓ IT recession recovery ✓ Iraq war 	

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.5.4 Establishing Scenario Logics

We focused on key external forces in the upper-right sector, and we looked for groupings, cause and effect relationships, and other linkages among these factors. Figure 5-4 shows the scenario structure.

Figure 5-4 Scenario Structure of International Wireless Services



- Risk:** Will regulatory changes, tax changes, economic, and FDI limitations be good or bad?
- Customer needs:** Will customer needs for mobile multimedia services be high or low?
- Culture:** Will customers' cultural and social allowance for cell phones, mobile multimedia, mobile Internet, etc. be high or low?

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

5.5.5 Selecting and Elaborating Scenarios

From among eight (2*2*2) scenarios, we selected four. Figure 5-9 shows combinations of driving forces.

Table 5-9 Combination of Driving Forces for International Wireless Services

Driving forces			Scenarios
Risk	Customer need	Culture	
Good	High	Allowable	(Scenario A)
Good	High	Not Allowable	
Good	Low	Allowable	
Good	Low	Not Allowable	(Scenario B)
Bad	High	Allowable	(Scenario C)
Bad	High	Not Allowable	
Bad	Low	Allowable	
Bad	Low	Not Allowable	(Scenario D)

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

(Scenario A) Optimistic Scenario

Risk: Good; Customer need: High; Culture: Allowable

In this scenario, Customer need and Culture have a good relationship and synergistic effect. So operators can meet customer needs and enjoy good business opportunities. This is typically a positive reinforcement scenario.

(Scenario B) Middle Scenario

Risk: Good; Customer need: Low; Culture: Not Allowable

In this scenario, although Risk is not a problem, Customer need is low and the Culture aspect is not good, so operators cannot meet customer need and operators will have difficulty penetrating services.

(Scenario C) Middle Scenario

Risk: Bad; Customer need: High; Culture: Allowable

Even though Customer need is high and Culture aspect is good, risk is a problem. In this scenario, operator should be careful to enter the country and should avoid taking any risks.

(Scenario D) Pessimistic Scenario

Risk: Bad; Customer need: Low; Culture: Not Allowable

In this scenario, Customer need is low and the cultural aspect is not good. This is a typical negative reinforcement scenario and an operator would find it difficult to enter the country and to penetrate services.

CHAPTER 6

Testing Strategies in Scenarios

In this chapter, we test our strategies in various scenarios. We start to construct them based on the current market framework, that is, domestic fixed-line services, domestic wireless services, international fixed-line services, and international wireless services. We could also create a global strategy (i.e., between nations), but telecommunications between nations is more problematic at this time and not such an attractive market, so we chose not to pursue such a strategy in this thesis.

6.1 DOMESTIC FIXED LINE SERVICES STRATEGY

6.1.1 Organizing Strategic Choices

Our basic stance is as follows:

We will not change our main business domain, which is:

- sticking to Last one mile (physical network)
- providing end-to-end service directly to customers
- staying with monthly service charges that produce sustainable income
- continuing to provide telephone service.

We anticipate that ordinary telephone service will disappear in 2015 and be replaced with VoIP.

Based on these assumptions, we have three strategies. Using accepted strategic management tools for developing alternative investment and operating choices, sets of

compatible options were organized and labeled as “distinctive strategies.”

In domestic fixed-line services that are losing market, there is no possibility of a no-go strategy.

Strategy 1: Breakthrough strategy — Go to FTTH with broadcasting

- NTT Group will replace twisted pair with optical fibers that deliver digital terrestrial broadcasting. It will also convey VoIP (Horizontal development = FTTH + VoIP + digital terrestrial broadcasting).
- NTT Group will proceed with vertical development downloaded to houses and video in alliance with wireless.

Strategy 2: Incremental strategy

- NTT Group doesn't use FTTH, shift to DSL with VoIP (ISDN service would be terminated).
- NTT Group would make a new item in the domestic market such as household electronics control with IPv6.

Strategy 3: Market-oriented Strategy

- NTT Group will introduce one-to-one marketing for basic telephone, ISDN, and DSL including a gradual shift to VoIP.

6.1.2 Assessing Strategic Choices

We tested each of these strategies by considering how they would work in each of the scenarios. Table 6-1 shows the dynamic scenarios matrix.

Table 6-1 Dynamic Scenarios Matrix for Domestic Fixed-line Services

	Scenario A Optimistic scenario	Scenario B Middle scenario	Scenario C Pessimistic scenario
Strategy 1 Breakthrough strategy	Very Good	Poor ROI is very low.	Disaster ROI is minus.
Strategy 2 Incremental strategy	Good	Fair	Poor
Strategy 3 Market- oriented Strategy	Poor	Fair	Good

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

Scenario A: Optimistic Scenario

Regulation: Loosen; Customer need: High; Technology development: Fast

Scenario B: middle Scenario

Regulation: Loosen; Customer need: Middle; Technology development: Fast

Scenario C: pessimistic Scenario

Regulation: Constant; Customer need: Middle; Technology development: Slow.

We found that what should be selected depends on the scenarios. Scenario B is most probable, and Scenario A is second probable. So we should select Strategy 2 as the first priority and Strategy 1 as the second priority.

6.2 DOMESTIC WIRELESS SERVICES STRATEGIES

6.2.1 Organizing Strategic Choices

Using some of the accepted strategic management tools for developing alternative investment and operating choices, sets of compatible options were organized as distinctive strategies.

Strategy 1: No-Go strategy

- Maintain existing voice service and enter into new business with minimal investment.
- Stick to last one mile (end-to-end service directly to customers) and stick to monthly charges.

Strategy 2: Medium strategy

- Maintain existing voice service and retain existing subscribers by introducing one-to-one marketing techniques and pursuing higher-rank customers.

Strategy 3: Positive strategy

- Make new creations in the domestic markets (e.g., children, animals etc.)
- Develop horizontal integration with the broadcast industry
- Develop vertical business fields that include platforms for content delivery, e-commerce, music, video distribution
- Develop new businesses, such as IC tags.

6.2.2 Assessing Strategic Choices

We will test the each of these strategies by considering how they would work in each scenario. Table 6-2 shows the dynamic scenarios matrix.

Table 6-2 Dynamic Scenarios Matrix of Domestic Wireless Services

	Scenario A Optimistic Scenario	Scenario B Middle Scenario	Scenario C Middle Scenario	Scenario D Pessimistic Scenario
Strategy 1 NO-GO strategy (Voice + retention)	Disaster Missing the opportunity	Fair	Fair	Good
Strategy 2 Medium strategy (1-2-1 marketing)	Poor Missing the opportunity	Fair	Fair	Good
Strategy 3 Positive strategy (Multimedia + horizontal + vertical)	Good Needs and technology meet strategy	Poor Cannot achieve mission due to lack of technology	Poor Cannot achieve mission due to lack of needs	Disaster Destroy the company

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

Scenario A: Optimistic Scenario

Regulation: Constant; Customer need: High; Technology: High

Scenario B: Middle Scenario

Regulation: Constant; Customer need: High; Technology: Low

Scenario C: Middle Scenario

Regulation: Constant; Customer need: Low; Technology: High

Scenario D: Pessimistic Scenario

Regulation: Tighten; Customer need: Low; Technology: Low

6.3 INTERNATIONAL FIXED-LINE SERVICES STRATEGY

6.3.1 Organize Strategic Choices

Using some of the accepted strategic management tools for developing alternative investment and operating choices, sets of compatible options were organized and labeled as distinctive strategies. Our basic standpoints are:

- The competitive advantage is network operation and new FTTH.
- We stick to last one mile and monthly charges.
- In a foreign country, the government effects operations.
- Some developing countries may follow us, but some developed countries may not.
- If not, we must moderate our business model of sticking to last one mile and monthly charges.

Strategy 1: Solution Provider in Developed Countries

- NTT Group will provide IT solutions via vertical applications in alliance with domestic national carriers in developed countries.

Strategy 2: Minority Investment in Developed Countries' Broadband Services

- NTT Group will proceed with minority investment in overseas major broadband telecommunications operators in developed countries.

For example, metropolitan = FTTH, Other areas =DSL + VoIP. It depends on the situation of physical network of each country.

Strategy 3: Minority Investment (or JV) in High-Risk Countries

- NTT Group will proceed with minority investment in overseas telecommunications operators (or joint venture with the domestic partner) for providing basic voice and internet services in high risk countries.

Strategy 4: Majority Investment in Developing Countries' BB Services (DSL)

- NTT Group will proceed with Majority investment (to the upper limits of foreign investment) in overseas fixed-line telecommunications operators for broadband service in developing countries (DSL + VoIP)

Strategy 5: Majority Investment in Developing Countries' FTTH Services

- NTT Group will proceed with Majority investment (to the upper limits of foreign investment) in overseas fixed-line telecommunications operators for broadband service in developing countries (FTTH + VoIP).

6.3.2 Assessing Strategic Choices

We tested each of these strategies by considering how they would work in each scenario. Table 6-3 shows the dynamic scenarios matrix.

Table 6-3 Dynamic Scenarios Matrix for International Fixed-line Services

	Scenario A Optimistic Scenario	Scenario B Middle Scenario	Scenario C Bad Scenario
Strategy 1 (Solution, DC)	Poor	Poor	(Poor)
Strategy 2 (Minority, BB, DC)	Fair	Poor	(Disaster)
Strategy 3 (Minority, LDC)	Fair	Poor	Poor
Strategy 4 (Majority, DSL, LDC)	Good	Fair	Disaster
Strategy 5 (Majority, FTTH, LDC)	Very Good	Disaster	Extreme Disaster ROI is minus (too large)

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

Scenario A: Optimistic Scenario

Government: Follow; Customer need: High; Technology: Fast

Scenario B: Middle Scenario

Government: Follow; Customer need: Low; Technology: Fast

Scenario C: Bad Scenario

Government: Follow; Customer need: Low; Technology: Slow

We found that the strategy we should select depends on the scenarios. Scenario B is most probable and Scenario A is second. Therefore we should select Strategy 4 in developing countries and, when the scenario changes from B to A, then we should select Strategy 5 in developing countries.

6.4 INTERNATIONAL WIRELESS SERVICES STRATEGIES

6.4.1 Organizing Strategic Choices

Using some of the accepted strategic management tools for developing alternative investment and operating choices, sets of compatible options were organized and labeled as distinctive strategies.

Strategy 1: Conservative strategy

- Minority investment in overseas telecommunication operator
- Promote basic voice service
- Introduce mobile multimedia services at a later time.

Strategy 2: Medium strategy

- Minority investment in overseas telecommunication operator

- Promote both voice and mobile multimedia services.

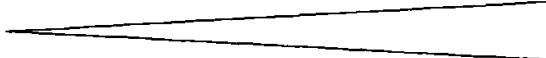
Strategy 3: Positive strategy

- Majority investment in overseas telecommunication operator
- Promote both voice and mobile multimedia services.

6.4.2 Assessing Strategic Choices

We tested each of these strategies by considering how they would work in each scenario. Table 6-4 shows the dynamic scenarios matrix.

Table 6-4 Dynamic Scenarios Matrix for International Wireless Services

	No risk				Much risk
	Scenario A No country Risk and optimistic	Scenario B No country Risk and Pessimistic	Scenario C Great country Risk and optimistic	Scenario D Great Country Risk and Pessimistic	
Strategy 1 Conservative strategy (Minority, voice only)	Poor Missing the opportunity	Fair	Poor	Poor	
Strategy 2 Medium strategy (Minority, voice + multimedia)	Good Needs and culture meet strategy	Poor	Poor	Poor	
Strategy 3 Positive strategy (Majority, voice + multimedia)	Good Needs and culture meet strategy	Disaster Destroy the company	Poor	Disaster Destroy the company	

Source: Authors, 2003, adapted from Fahey & Randall, 1998.

Scenario A: No country risk; Optimistic

Risk: Good; Customer need: High; Culture: Allowable

Scenario B: No country risk; Pessimistic

Risk: Good; Customer need: Low; Culture: Not Allowable

Scenario C: Great country risk; Optimistic

Risk: Bad; Customer need: High; Culture: Allowable

Scenario D: Great country risk; Pessimistic

Risk: Bad; Customer need: Low; Culture: Not Allowable

CHAPTER 7

Strategic Decisions for the Future

7.1 INTEGRATING FIXED-LINE AND WIRELESS SERVICES

In Chapters 5 and 6, we analyzed strategies for four dimensions: domestic fixed-line services, domestic wireless services, international fixed-line services, and international wireless services. In this chapter, we will develop two integrated strategies: a **domestic market strategy** and an **international market strategy**.

We think it is important to make use of group synergies to help NTT Group cope with fierce global competition and to make the best use of its present and emerging digital technologies. Moreover, basic telecommunications, by nature, have seamless connectivity—customers do not have to recognize either a fixed-line or wireless service; instead, they simply enjoy a richer life by making use of telecommunications in a variety of forms.

7.2 STRATEGIES FOR THE JAPANESE MARKET

7.2.1 Assessing Scenarios

Based on the conclusions determined in Chapters 5 and 6, we believed “Scenario 0” has the most probability in the Japanese market.

Scenario 0

Regulation: We assume regulations will loosen or at least remain constant

Customer needs: Customer needs for broadband services will be relatively high.

Technology Progress: Will remain steady for DSL, Fibers (FTTH), VoIP, 3G, and 4G.

The reasons are as follows:

- In Japan, demand for broadband is increasing.
- In Japan, VoIP and 3G services have already been launched. We believe these technologies are trustworthy.
- Regulatory trends are still uncertain, but it is assumed that drastic change will not occur, and we hope it will in fact loosen as one means of inducing economic recovery.

7.2.2 Domestic Market Strategy

Based on this scenario (Regulation: constant or loosen; Customer needs: relatively high, Technology progress: high), NTT Group's domestic strategy should be a combination of fixed scenario A or B and Strategy 1 or 2 combined with wireless scenario A and Strategy

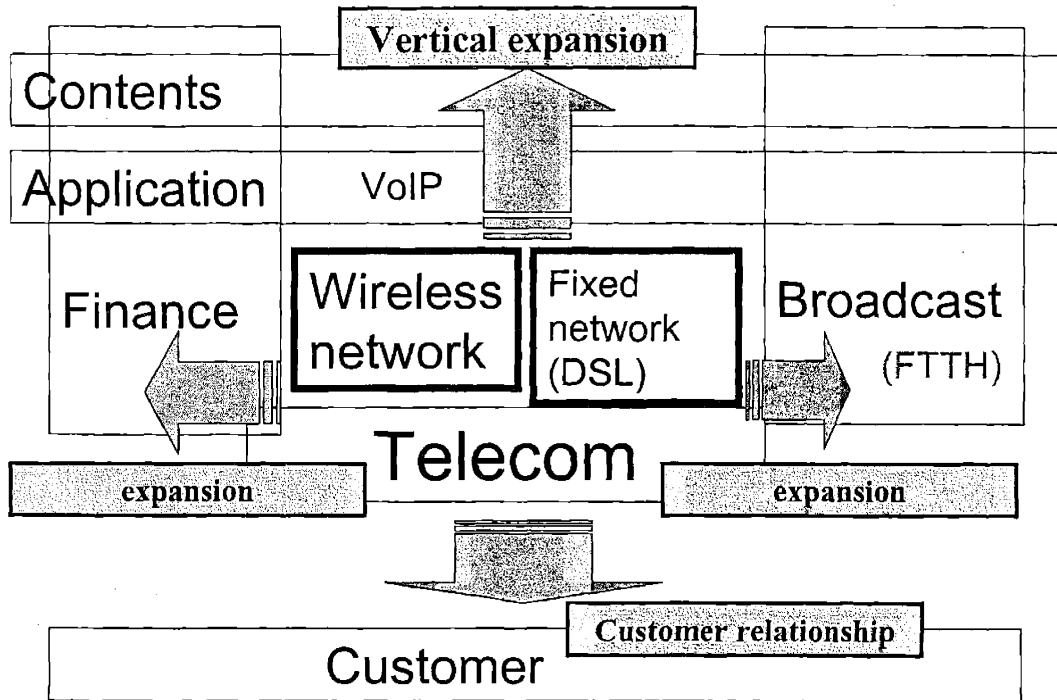
3. This would be defined as follows:

NTT group should provide integrated service (fixed-line and wireless services) to all customers (C, B, B2B, B2C, B2B2C), and aim for horizontal and vertical expansion. At the same time, NTT Group should retain its existing customers by:

- ✓ one-to-one (1-2-1) marketing, price discrimination, segmentation, turn them into supporters, compile all-in-one bill, one-stop shopping.
- ✓ system lock-in business model, win-win supply chain management, broadcast transmission via optical fiber, finance services, bill compiling, deputized bill collection, settling terminal equipment.

Integrated service, including launch fiber, DSL, and 3G, common mail address, IT consulting, e-commerce, e-government, e-learning, e-medical, ubiquitous service, e-CRM.

Figure 7-1 The Domestic Market Strategy



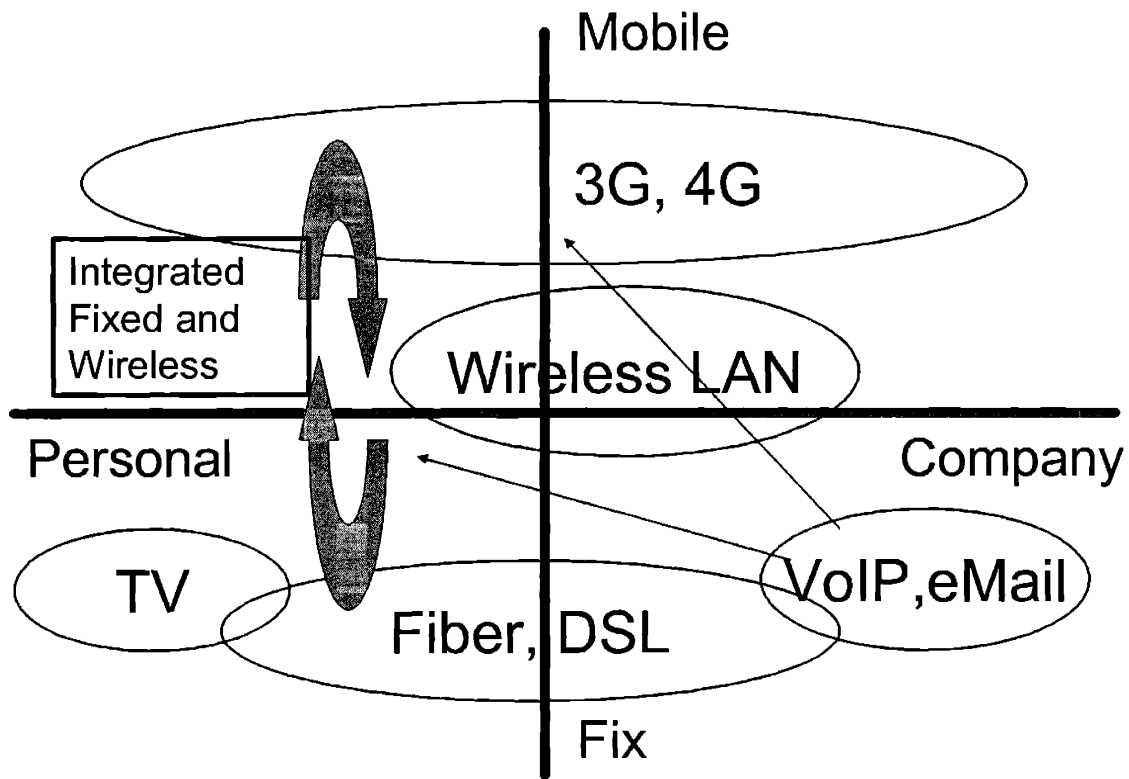
Source: Authors, 2003

7.2.3 Actualizing the Strategy

To actualize the strategy, NTT Group should first crystallize its positioning. Then it should put together a marketing mix (price, product, place, and promotion) that will enable it to penetrate current broadband services offered in the domestic Japanese market. This strategy tends to be somewhat technology-driven, so it is important to focus customers on this new service using a strategic marketing mix.

Figure 7-2 shows a positioning map of the Japanese telecommunications industry, with the X-axis representing personal or company use, the Y-axis for fixed or mobile use.

Figure 7-2 Positioning Map



Source: Authors, 2003

7.3 STRATEGIES FOR THE GLOBAL MARKET

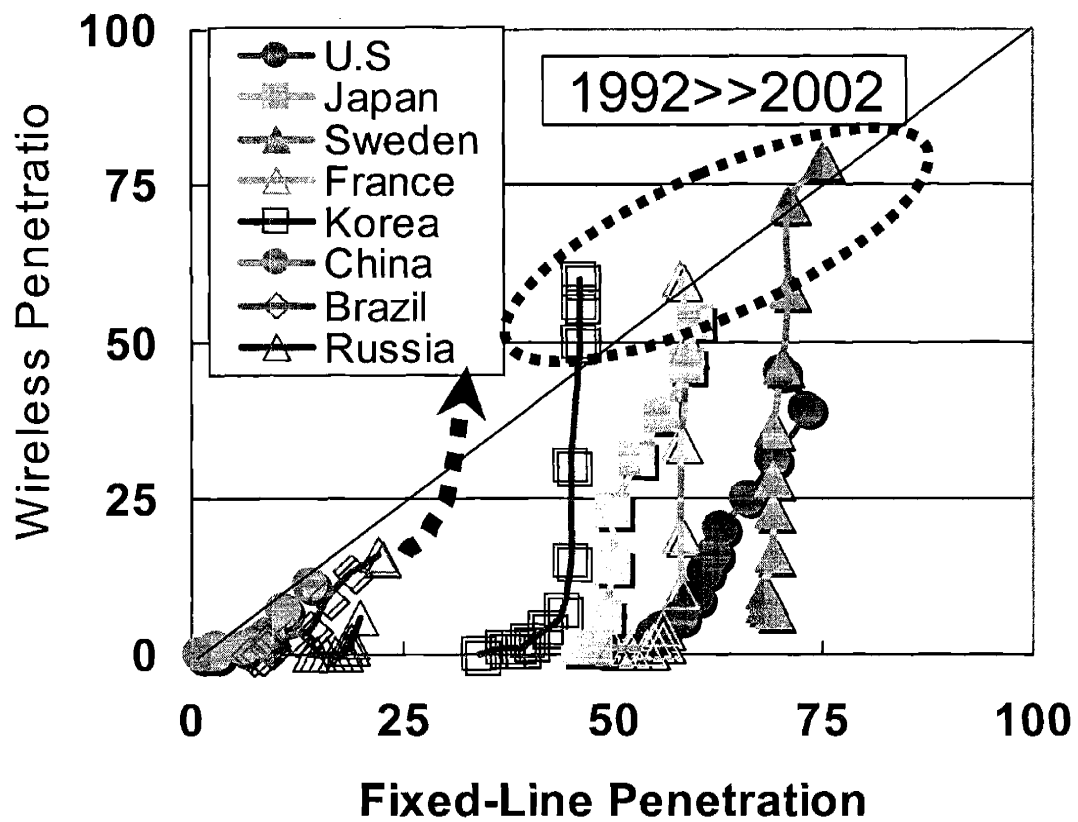
7.3.1 Scrutiny of Scenarios

Based on our findings in Chapters 5 and 6, we cannot decide which scenario has the best possibility because each scenario is affected by the specific country's policies, risk, customer needs, the situation of the physical network, etc. Therefore, we must examine risk on a country-by-country basis.

7.3.2 Global Market Trends

Figure 7-3 shows global market trends in the telecommunications industry.

Figure 7-3 Global Market Trends in the Telecommunications Industry



Source: Ministry of Public Management, Home Affairs, Post and Telecommunications (Japan)

Based on this figure and projections, we think:

- 1) In developed countries, penetration will not change significantly because the markets in these countries has already matured.
- 2) In developing or emerging markets, penetration by both fixed-line and wireless services

will change significantly over the next four or five years. Penetration of wireless service will change dramatically compared with fixed-line service because construction costs and length of time for construction of wireless service are much cheaper and shorter than those for fixed-line service. In the future, after the successful penetration of wireless, fixed-line broadband services such as DSL, FTTH will make a strong appearance. In this case, the time frame is also an important consideration.

7.3.3 Global Market Strategy

Strategies will vary according to each country's circumstances. Generally speaking, the aims of globalization, as well as the global strategy for NTT Group are the following:

- Profitable growth (beyond 0 growth)
- Marketing identification
- Geographic diversification, with risk reduction through portfolios
- Incremental dividend increases in the invested company
- Consulting fees/intellectual property rights
- Cost reductions for terminal equipment and exchange machines

We have designed a weighting for fixed and wireless services, the extent of broadband in relation to market attractiveness, the regulatory environment, country risk, and customers' needs. When designing, it is helpful to follow the weighting trends for fixed and wireless over the past ten years in Figure 7-3.

There are several important criteria when searching for wireless service partners, such as:

- number of subscribers

- high ARPU (average revenue per units)
- a wide-ranging array
- commitment to 3G
- national coverage
- corporate culture and governance

Based on these we have identified global strategies for NTT Group.

Strategy X: Investing in developing and emerging countries

NTT group should invest (either as a minority or majority investment) in the construction of 3G NW, DSL + VoIP or fiber. Investment should be based on thorough risk analysis of operating services, dependent on customers' needs, the situation of physical network and in alliance with *de facto* operators.

Strategy Y: Investing in developed and mature countries

NTT group should invest (either as a minority or majority investment) in providing 3G, 4G, and FTTH technologies, successful business models and IT solutions (vertical applications) to customers in alliance with national operators.

At the same time, acquisition of or alliance with a global router manufacturer should be given serious consideration (routers are used for VoIP routing) in the standpoint of controlling suppliers.

Table 7.1 illustrates a global market strategy.

Table 7-1 The Global Market Strategy

	(1)	(2)	(3)	(4)	(5)	Existing partners	Strategy	Go/ No Go
U.S.	M	H	L	H	L	AT&T Wireless VERIO	Y	-
Canada	L	H	L	H	NA		Y	Go
South America	H	NA	H	NA	NA	TeleSudeste (Brazil)	X	-
Western Europe	L	M	L	H	H	H3G UK (UK) E-Plus (Germany) Bouygues (France) KPN (Netherlands) BASE (Belgium)	Y	-
Eastern Europe	H	H	M	NA	NA		X	Need Further Study
(Russia)	H	H	H	NA	NA	Virgin Huge Market	X	
Africa	H	NA	H	NA	NA	Huge Uncertainty	X	
Middle East	H	NA	H	NA	NA		X	
(Iraq)	H	NA	H	NA	NA		X	
Asia	H	M- H	H	M	NA	TT&T (Thai) PLDT (Philippines) StarHub (Singapore) SriLanka Telecom (SriLanka) HKNet (Hong Kong)	X	
(China)	H	H	H	M	NA		X	
(Korea)	L	H	L	H	H		Y	Go
(Taiwan)	L	L	L	H	H	KGT	Y	-
Oceania	M	H	M	H	NA		Y	Go

Captions:

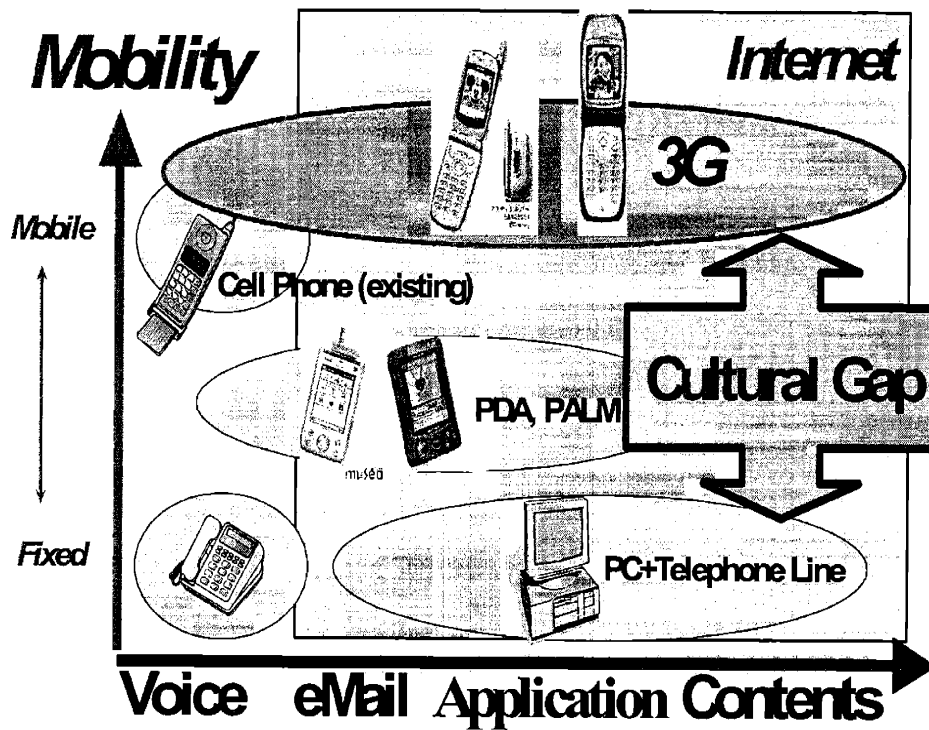
- | | |
|--|---------|
| (1) Market attractiveness (population, growth) | H, M, L |
| (2) Regulations (e.g., FDI limitations) | H, M, L |
| (3) Country risk | H, M, L |
| (4) Customer needs for broadband service | H, M, L |
| (5) Mobile culture allowance | H, M, L |

7.3.4 Actualizing the Strategies

To actualize these strategies, NTT Group should first clarify its positioning. Thereafter it should develop a marketing mix (price, product, place and promotion) that will enable it to penetrate broadband services in each market. As this technology is somewhat technology-driven, it is important to rouse customer demand and to fill the gap of cultural

and social aspects using use the appropriate marketing mix. Figure 7-4 illustrates the cultural and social gap.

Figure 7-4 Cultural and Social Gap



Source: Authors, 2003

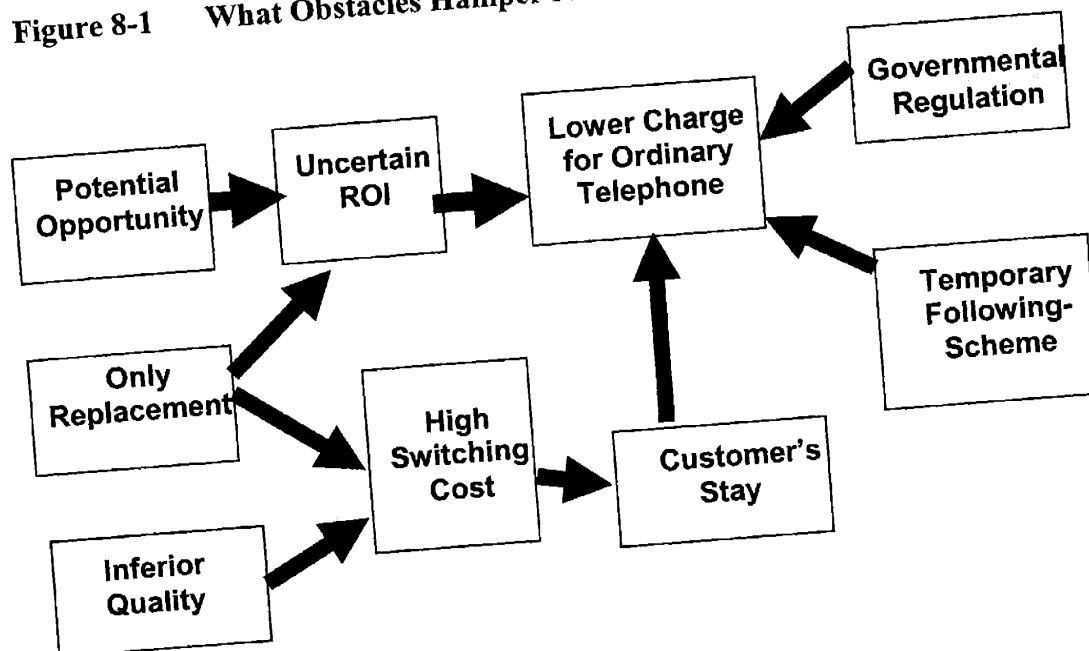
CHAPTER 8

Transformation of NTT Group

Having identified generic strategies, as well as those suitable for NTT Group, how should these strategies be realized? In this chapter, we offer a series of suggestions for actualizing the strategies within NTT Group.

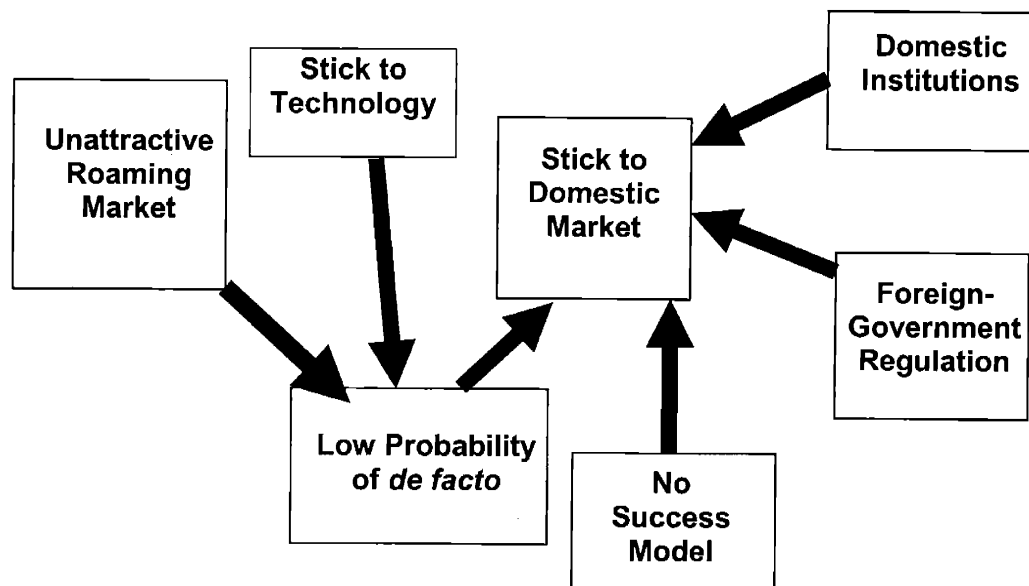
We have concluded that there is some opportunity in VoIP and globalization. Therefore we begin by first analyzing the obstacles hampering NTT Group's transition to VoIP and to greater globalization. We use the methodology in Shiba and Walden's LP model. Our concept map is shown in Figures 8-1 and 8-2.

Figure 8-1 What Obstacles Hamper NTT Group's Transition to VoIP?



Source: Authors, 2003

Figure 8-2 What are the Obstacles of NTT Group's Globalization ?



Source: Authors, 2003

Based on these figures, we concluded that NTT Group must break through from legacy telephones into broadband globally if it wishes to full participate in today's IT era. This will require NTT Group to completely change its current business standing in its basic domain. Break-through will be difficult compared to control and incremental change. So, how can NTT Group accomplish this successfully?

8.1 CEO-DRIVEN EXECUTION

We interviewed Dr. Sherwin Greenblatt, former CEO of Bose Corporation, and Alex d'Arbeloff, Chairman of MIT and former CEO of Teradyne, and then analyzed their

management styles, which we have illustrated in Figures 8-3 and 8-4. We find top management as first mover of change (CEO-driven Execution) and outsider required for change driver.

Figure 8-3 What is the Essence of Greenblatt's Management Style?

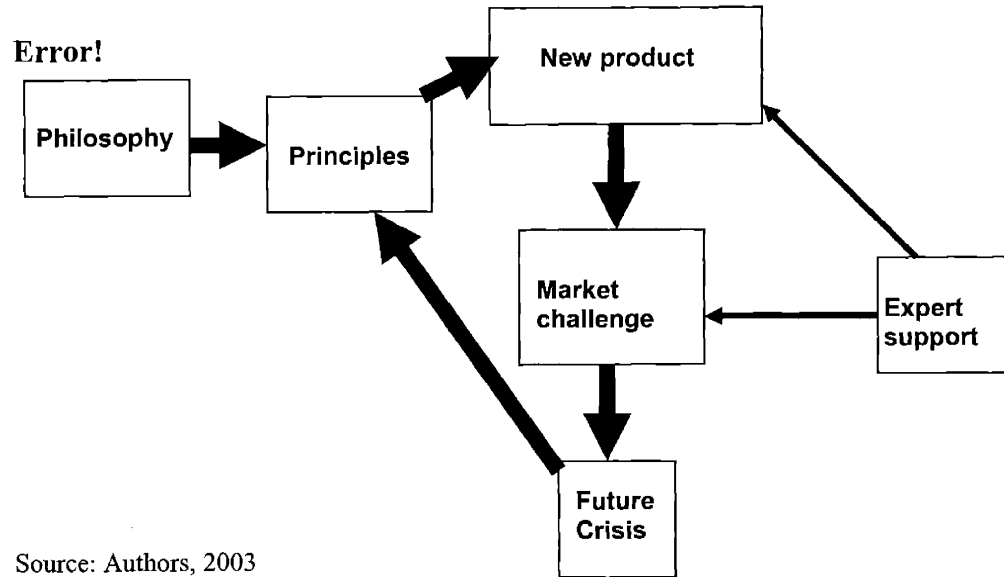
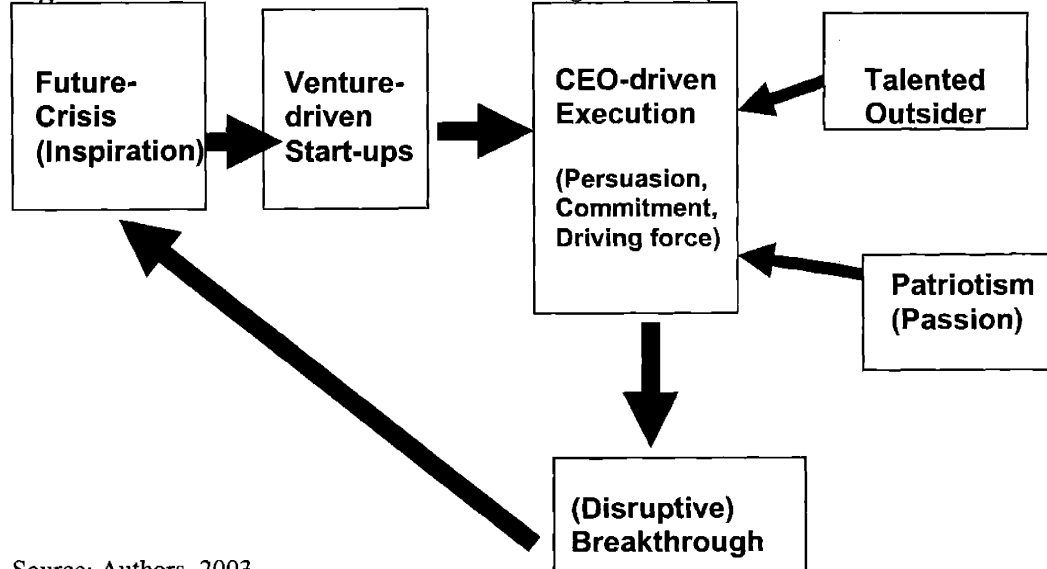


Figure 8-4 What is d'Arbeloff's Management Style?



8.2 NTT'S WEAKNESSES IN THE IT ERA

If it will seriously pursue a breakthrough strategy, what corporate elements should be changed? A summary of NTT Group's value chain is described in Figure 8-5, from which we identified the Group's strengths and weaknesses, listed below.

Strengths

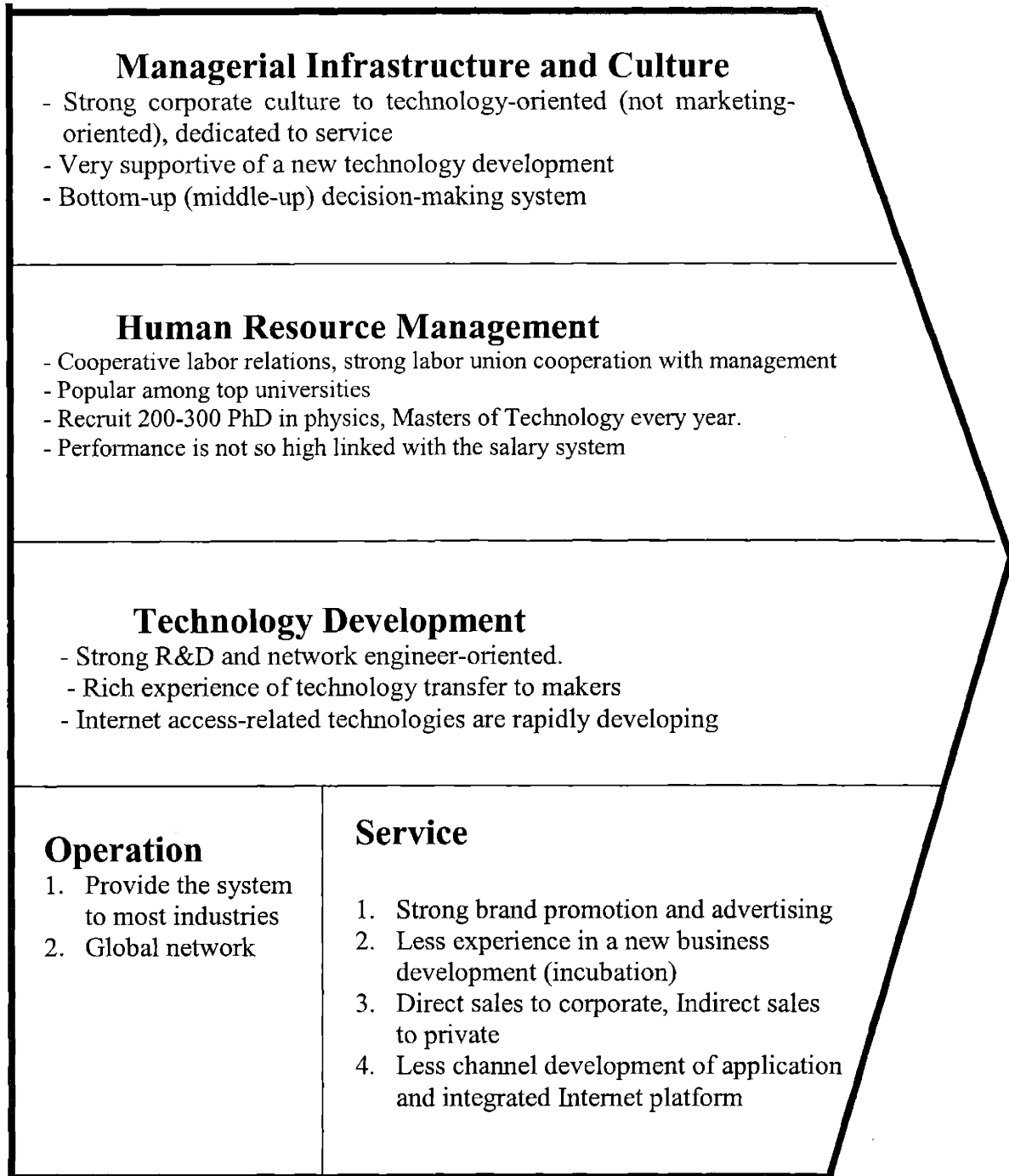
- Strong R&D skill
- Rich experience in network development
- Plenty of business experience with vendors, manufacturers, and suppliers in Japan
- Strong presence and technical advantage in the broadband access system, especially, optical technology
- Nationwide customer database
- Strong corporate brand in Japan

Weaknesses

- Vast equipment assets for an ordinary telephone network
- Lack of experienced employees to help with future expansion of new business
- Lack of e-CRM experience
- Lack of incentives for individuals who try new business development
- Lack of new business model development for platform bundle service

These weaknesses must be conquered if progress is to come in the future. We propose some remedies for conquering these weaknesses in the following sections.

Figure 8-5 NTT Group's Current Value Chain



Source: Authors, 2003

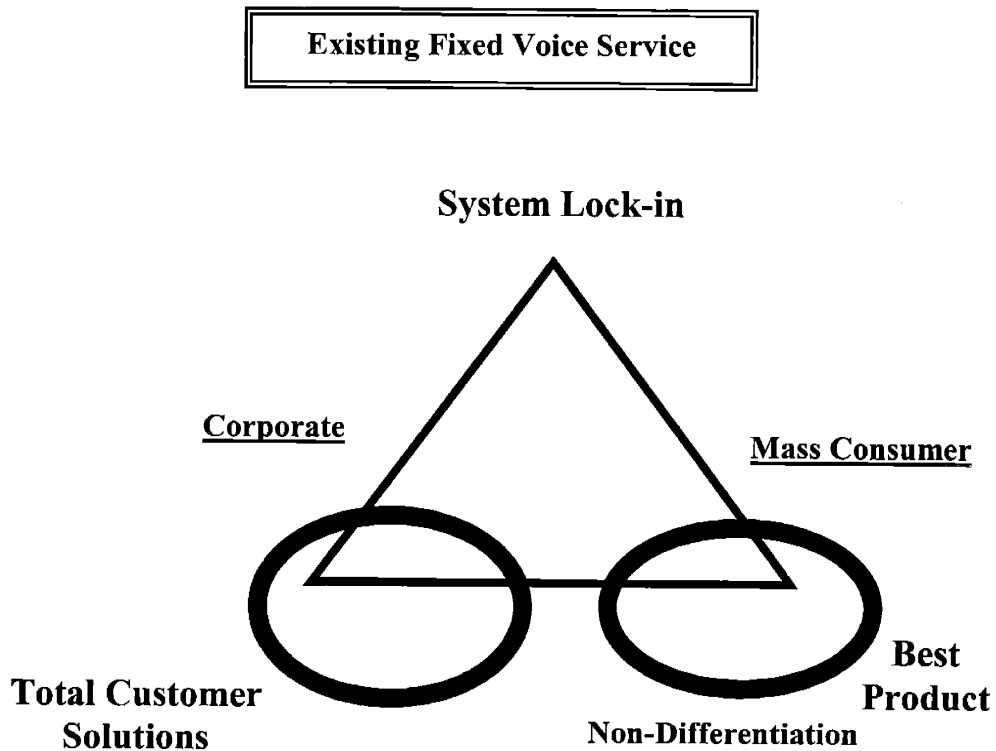
8.3 SERVICE MANAGEMENT

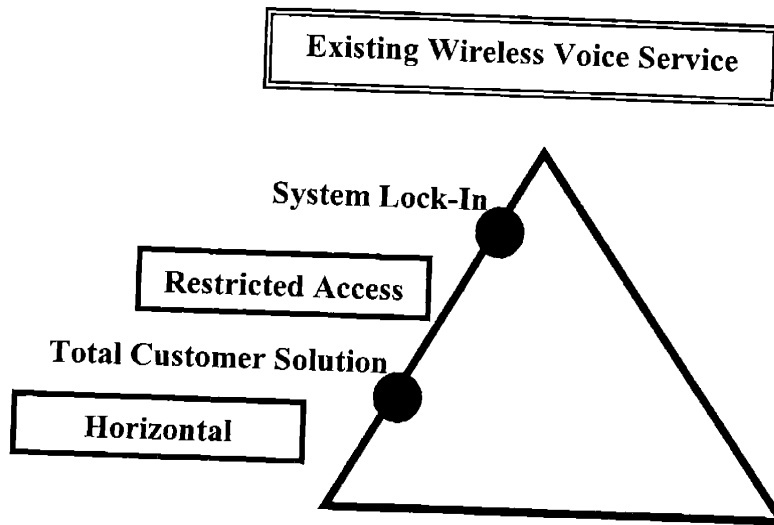
8.3.1 System lock-in

NTT Group's fixed service (including Internet service) is currently almost a commodity and occupies two positions in the Delta Model (Hax & Wilde, 2001) as shown in Figures 8-6.

On the other hand, NTT Group's wireless service (including Internet) has high switching costs for i-mode, videophone, and FOMA combined with terminals. It also occupies two positions in the Delta Model shown in Figure 8-6.

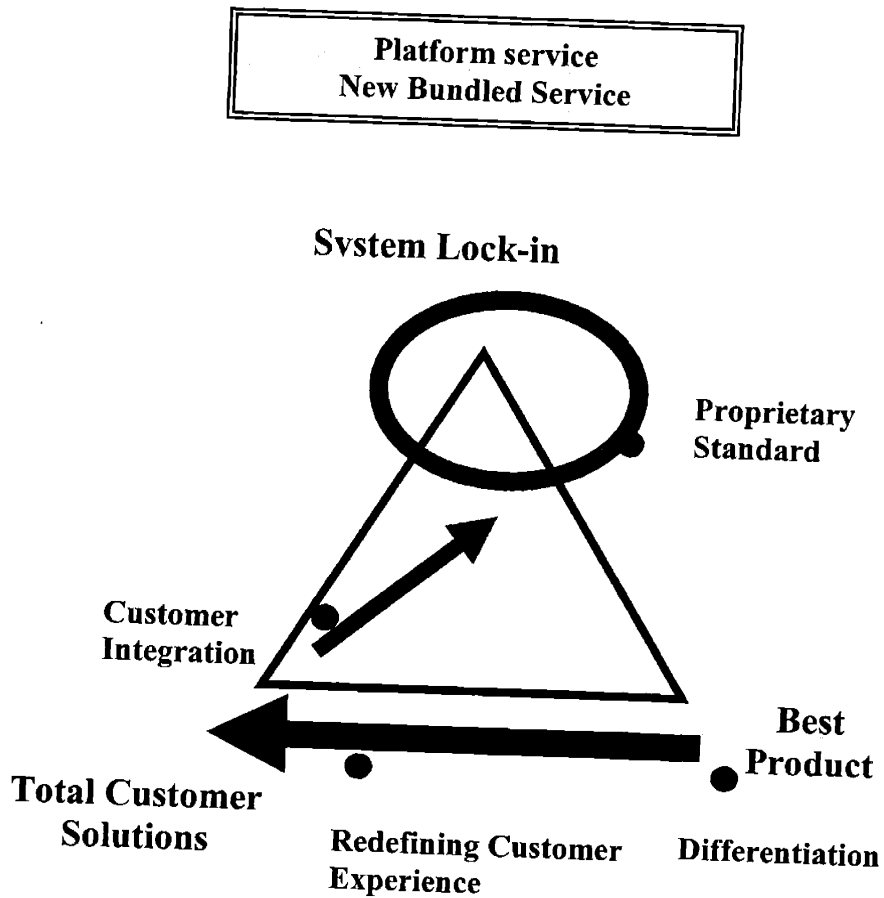
Figure 8-6 The Delta Model Applied to an Assessment of Current NTT Positioning





Today, it is combined into a future strategic positioning, as shown in Figure 8-7.

Figure 8-7 Future Strategic Positioning



System Lock-In

- Bundled Service (Voice and Data)
- Brand Power
- High Switching Cost
- Network Externality (3G,FTTH)
- Superior Customer Care Service
- Complementors (Content Providers, New Channels)
- Complementary Services
 - Network business
 - Terminal business
 - Financial enabler business

Information Complements are a mechanism that subsidizing a market with free goods or services that can increase demand and profits in one market thereby offsetting losses in another market. For example, Microsoft sells MSExplorer in market 1 and Windows, PowerPoint, Word, or Excel in the market 2. NTT Group should do the same by leveraging its last one-mile base of customers.

8.3.2 Customer Segmentation

As mentioned in Chapter 3, private customers are the most valuable. Therefore, to retain these valued customers, NTT Group will not change the basic network service and will propose to bundle Information Complements at favorable prices, on a one-to-one basis.

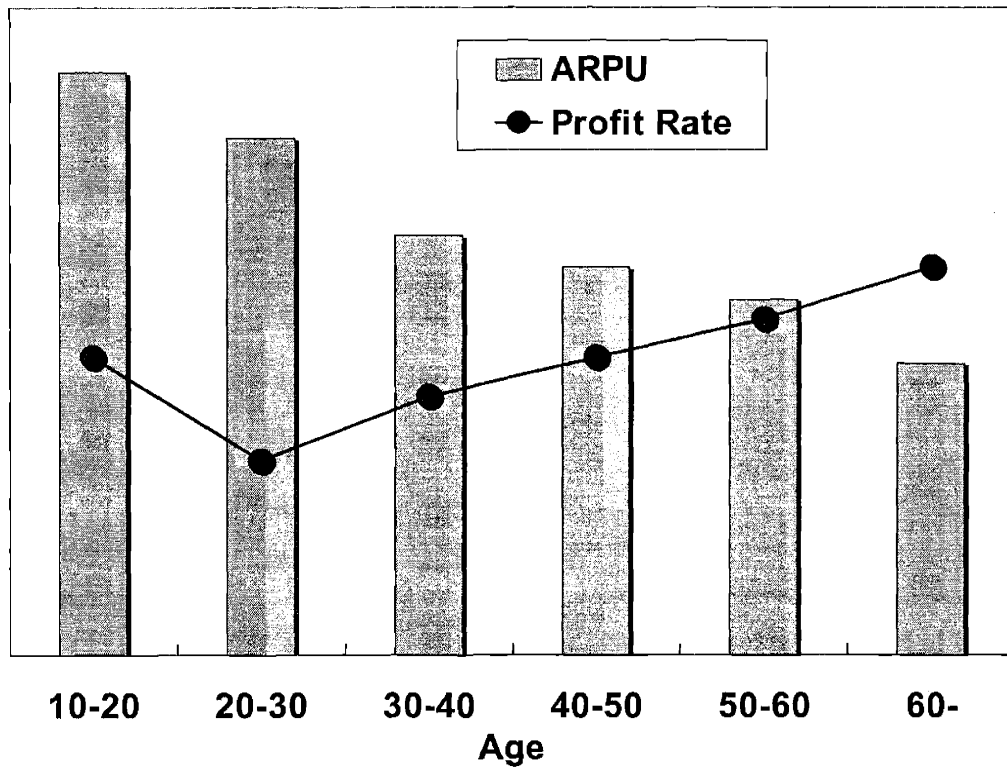
Table 8-1 Customer Segmentation (Case of NTT DoCoMo)

Customer tier		Description
Cellular customer (NTT DoCoMo)	Corporate Customer (B2B2C)	Corporate Wireless Internet Service Security Trading Companies Automobile companies
	Corporate Customer (B2B)	Corporate Wireless Internet Service Logistics company Transportation company Insurance company General companies
	Private customer (Mania)	PDA, Telematics, Smart phone service Mania (Addictive to use cellular service)
	Private customer (IT Friendly)	Phone, PDA, Telematics, Smart phone service Ages up to late 30
	Private customer (General)	Phone, PDA, Telematics, Smart phone service Ages over 40

In terms of cost and profit, variable costs by the mobile phone carrier are offset by customer acquisition costs and agent subsidiaries, and these depend on cancellation rates and terminal equipment renewal rates.

Figure 8-8 shows the customer value segment by age for NTT DoCoMo. For customers in their twenties, ARPU is quite high; but due to high cancellation rates and high terminal equipment renewal rates, profit rate are extremely low. On the other hand, for customers in their sixties, ARPU is quite low, but due to low cancellation rates and low terminal equipment renewal rate, profit rate are extremely high (discussed in section 4.5).

Figure 8-8 Customer Value Segment by Age



Source : NTT DoCoMo

8.4 e-CRM

As an IT leader, NTT Group should focus on digital and Internet services and should introduce some form of personalization software for Web-based e-CRM (electronic Customer Relationship Management) as a symbol of its revival. NTT Group's competitors already have some advantage in Web personalization services, but they lack the instantaneous and two-way communications. So the introduction of personalization software will bring some competitive advantage to NTT Group.

Of course NTT Group must also pay attention to privacy issues. However, customers are generally willing to disclose their personal information if they believe they will benefit from this disclosure, because they trust NTT Group (an excellent example of the brand value of NTT Group!). NTT Group holds some advantage with the delicate information. The system based on TCP/IP is inexpensive, flexible, and diverse.

Therefore, we believe now is the best time for NTT Group to introduce personalization software from the standpoint of technology penetration, cost-performance, and the probability of general and multi-purpose use for a long time.

NTT Group should itself promote e-CRM. We recommend the introduction of personalized software in its platform service and content delivery services, for the following reasons:

- NTT Group has not built a strategic system based on precise customer segmentation. If the Group wants to be revitalized as an IT leader, it should become more customer-oriented and provide more attractive bundled services within the Group over the long term.
- NTT Group should reorient itself as a learning organization.
- NTT Group has the advantage of possessing a longstanding, nationwide customer database which is, by itself an excellent intangible brand asset.
- NTT Group should activate direct communications between itself and its customers and use its assets to further revitalization.

If e-CRM is introduced, we offer some details to be considered during the introduction:

(a) Objectives

- Enhance the NTT Group brand through visualized Web branding
- Acquire and maintain (lock in) customers with customized and just-in-time promotions.
- Increase customer satisfaction and convenience of use on the website.

(b) Outline of new services

- Customized portal site for each customer
- Billing details and On-line payment in a tie-up with an e-bank
- Promotions, including mileage points, coupons, or special discounts
- New services offer, such as bundle services
- New content promotions, such as CATV cinema, Net music and games, financial information with discount pricing.

(c) Benefits

- Profitability by locking in brand-loyal customers
- Reduced number of calls to Call Centers, thereby dramatically reducing costs.
- Billing & DM (push-type) cost reduction (cost includes postal, printing costs)

Postal cost reduction/year = $(\$0.7*12*60M + \$0.4*6*60M)*0.1 = \$65M$

(Estimated on billing/month, DM/2months, switching to Web =10%)

- System flexibility, with low cost based on of XHTML, interfacing with existing mainframe system and the customer database.

- Can track the behavior of all NTT Group stakeholders. Will replace the high-cost tracking systems that NTT Group currently operates.

(d) Cost

- Initial software-related costs (about \$500K) + running cost (about \$2M/year)
- The culture and structure of the organization must be reformed to adjust to the new e-CRM. So there will be transition costs. NTT Group should proceed step by step to avoid collapse. We believe there is a high probability that the cost will be offset by the benefits.

8.5 IT BRANDING

Some marketing experts believe that since the beginning of the 1980s, commercial power has shifted from manufacturers to mass distributors and now to the end customers. E-business accelerates customer empowerment. In today's environment, multiple loyalties and increased mobility continue to drive new buying criteria, possibly diluting the role of branding. Should this continue?

Some insist that customization, such as one-to-one contact, is largely a tool for the customer's convenience, not for enhancing the brand. Is that true? We consider customization, which often comes out of one-to-one contact, enhances the ability to obtain products and services sought by customers, and thus reduces their research costs. In that meaning, one-to-one dilutes the brand. The brand premium of a commodity tends to decline with the reduction of research costs to the customers, particularly in the case of high customer involvement and trust.

On the other hand, we believe brand represents trust in a product or service when little information is available. But in the case of low customer involvement and lack of information about the service, brand is a dominant tool for Web-based research.

We consider branding of a shop, its products, an enterprise, and/or content is still important because e-commerce and electronic transactions on the Web are easy to pursue.

How should the NTT brand be changed? The NTT brand logo does not need changing. But the corporate name—Nippon Telegraph and Telephone—does not match its current and future business. “Navigator of IT Transaction” (NTT) matches more with NTT’s future plans.

8.6 ADVERTISING AND TARGETING

As we repeated, a mass customer base is crucial in the telecommunication industry, but that does not mean mass advertising is best. While the business target is the overall customer market, marketing itself is one-to-one. “Blank ads,” where the contents change depending on the customer’s profile is one tool for advertising.

8.7 HUMAN RESOURCE MANAGEMENT

8.7.1 Efficient re-allocation

Efficient replacement of human resources, especially between fixed and wireless, legacy network and VoIP and broadband, domestic and global is of key importance. We should have a centralized-oriented system like GE.

8.7.2 Compensation

In the past NTT Group has endeavored to eliminate traditional seniority practices and the uniform treatment of employees. Today it is committed to assigning greater weight to individual performance and productivity. Various new programs have recently been introduced to further promote these approaches, to encourage employees to adopt a “can-do” spirit, and to take the initiative toward positive action.

But such a policy does not work so well when NTT Group enters the IT platform business which concentrates on management resources. A lack of differentiation among services has sparked a price-cutting war of attrition in this area.

In view of the need to enlarge the scale of operations in preparation for anticipated growth in pier-to-pier communications, NTT Group companies are pursuing gradual integration of the services currently offered by each company. This is accelerated by a new compensation system model based on total compensation, group management, and mid-term incentives, similar to the system used by Johnson & Johnson, as shown in Table 8-2.

Table 8-2 New Compensation System Model for Executives and Senior Managers
(Based on Johnson & Johnson’s Model)

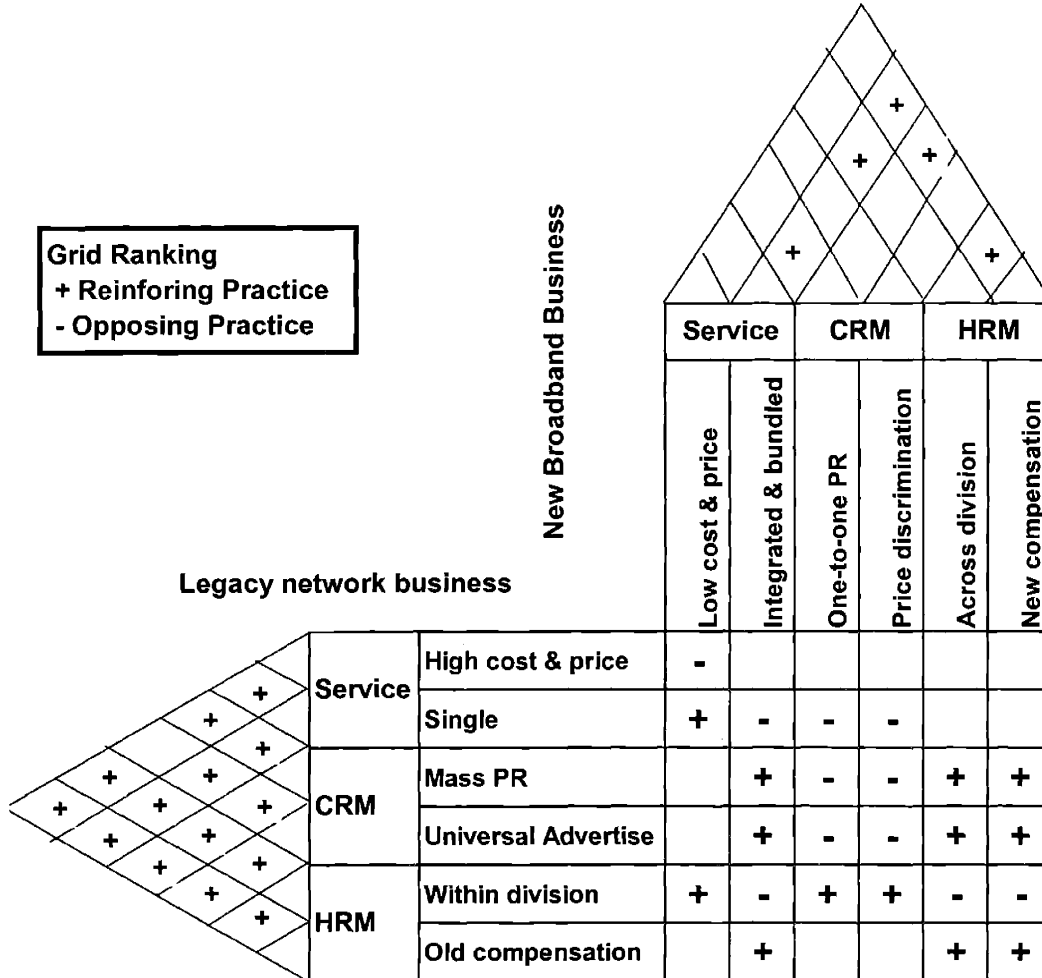
	Short term (3years)	Long term (7years)	Evaluation based on:
	Individual company evaluation	Group Corporation evaluation	
Individual evaluation	Basic Salary	Retirement payment	The performance of Individual manager
Group evaluation	Bonus Stock grants	Stock option	The performance of group (project team, division)
Weight	Individual / Group = 2:1	Individual / Group = 1:2	
Evaluation based on:	The performance of each company (Individual)	The performance of corporation (Group)	

Source: Authors 2003

8.8 THE MATRIX OF CHANGE

During NTT Group's transformation, there will be various critical enforcing and conflicting interactions within the existing organizational system, within the proposed organizational system, and in the transition itself. We have analyzed these potential conflicts from the perspectives of service, CRM, and HRM, and our results are shown in Figure 8-9, which is based on the methodology of Erik Brynjolfsson's "Digital Business Transformation". Based on this, we must plan the detailed transition program.

Figure 8-9 The Matrix Change



Source: Authors 2003, based on Brynjolfsson

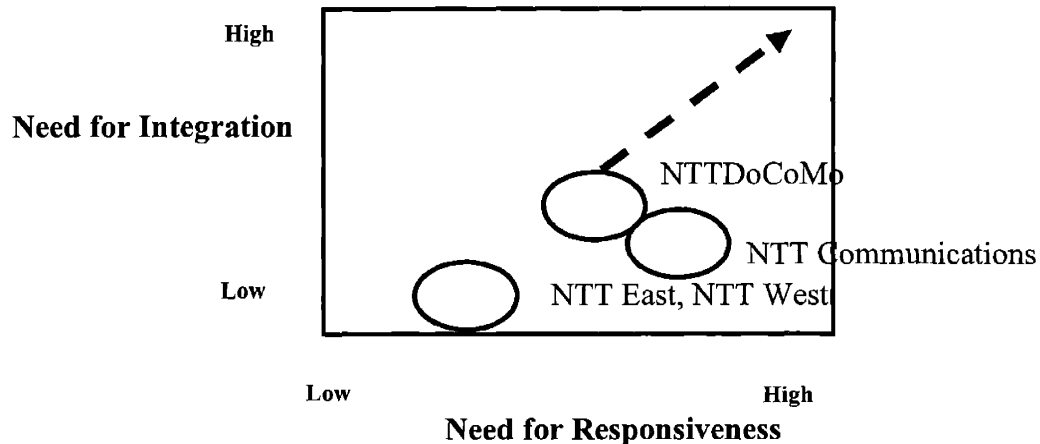
8.9 ORGANIZATION STRUCTURE FOR GLOBALIZATION AT NTT GROUP

NTT Group’s organization structure resembles that of a domestic company group. NTT DoCoMo, NTT Communications, NTT East and NTT West—all part of the parent NTT—have international departments, but there is no single department with responsibility for the region across all companies within NTT Group. NTT Group has no organization for an international matrix of business function and geography.

The organization features corresponding to the positioning of NTT DoCoMo, NTT Communications, NTT East, and NTT West are shown in the IR Grid in Figure 8-10. The telecommunications industry is itself a business that is high on local responsiveness and high on global integration (Think global, act local!).

NTT Group has just started in the global business. As we outlined in Chapter 7, NTT Group should aim to be a transnational company group. So in its transformation, NTT Corporation should build an organization with an international matrix of business functions and geographic regions within the Group as part of its new strategy and to produce more efficient operations.

Figure 8-10 IR Grid of NTT Group



Source: Authors 2003

CHAPTER 9

Conclusion

We believe it is possible that NTT Group's transformation to a global broadband company group may help revitalize the Japanese economy which has suffered for ten-plus years of stagnation. Such improvement of a major Japanese corporation could also have a positive impact on the world economy. While it is true that the U.S. dominates Web computing, it is equally true that in society in general, Japan has some possibility of competing with U.S. in the fields of (1) information equipment, such as games, car navigation, and digital TV, (2) content, such as i-mode, video games (PlayStation), and animation, cartoons (Picachu), and Karaoke where language is not a barrier, and (3) in FTTH.

The key in every case is *de facto* standardization. The Japanese has weakness in building *de facto* because of low-communication capability. Therefore, Japan should not attempt to compete with the U.S. but should instead make alliances with U.S., and aim to become part of the *de facto* group. This is the best scenario we can identify for helping Japan to recover. NTT Group also should consider the scenario.

APPENDIX

Glossary of commonly used acronyms

2G	second generation (cell phone system)
3G	third generation (cell phone system)
ARPU	average revenue per units
B2B	business to business
B2C	business to consumers
DSL	digital subscriber line
FCC	Federal Communications Commission
FTTH	fiber to the home
FWA	fixed wireless access
GSM	global system for mobile communications (cell phone system)
IP	Internet protocol
IPv6	Internet protocol version 6
ITU	International Telecommunication Union
LAN	local area network
LRIC	long run incremental cost
NTT	Nippon Telegraph and Telephone Corporation
PDC	personal digital cellular (cell phone system)
PSTN	public switched telephone network
RFID	radio frequency identification
SPC	stored program control
TCP/IP	transmission control protocol/ Internet protocol
VoIP	voice over Internet protocol
W-CDMA	wide band code division multiple access
WTO	World Trade Organization

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