STRATEGIES FOR NEXT-GENERATION FIXED LINE SERVICE IN JAPAN

by

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M.E., Electrical Engineering, Osaka University, 1986
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SUBMITTED TO THE MIT SLOAN SCHOOL OF MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

at the

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Submitted to the MIT Sloan School of Management on May 7, 2004
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Master of Business Administration

ABSTRACT

Although Japan had fallen far behind the United States in the extent and sophistication of its IP technology and information/communication industry, today it is beginning to catch up. By May 2003, the number of broadband Internet users in Japan exceeded 10 million, and the shift from narrowband to broadband continues to increase. Japan now enjoys one of the world’s best broadband environments in terms of both pricing and speed of offerings.

However, the environment for the domestic fixed-line telecommunication business is getting tougher. Demand is down, both in terms of volume and value, as traffic migrates to mobile communication technologies. For NTT’s regional carriers, NTT East and NTT West, prospects for sales growth are slim, making cost reductions vital if those companies hope to remain profitable. It is imperative for NTT East and NTT West to expand into the broadband-related business as well as to slash costs further.

In this thesis, I analyze industry structure, market trends, and the position of companies within the fixed-line communication industry in Japan. I also identify NTT’s strategies for next-generation fixed line services, which I believe can still make a substantial contribution to the industry and to revitalizing the Japanese economy.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Trends in the Information Industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.1 Diffusion of the Internet</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2.2 Growth in the Broadband User Population</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2.3 Economic Impacts of Broadband</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>2.4 Broadband Internet Access Business</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2.5 Mobile Internet Business</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2.6 The Broadcasting Business</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Recent Activity in the Telecommunication Industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.1 Overview and Regulatory Framework of the Telecommunication Industry</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>3.2 Fixed-Line Telecommunication Carriers</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>3.3 Mobile Telecommunication Carriers</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>3.4 Internet Service Providers</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>3.5 Introduction of a new Competitive Framework</td>
<td>31</td>
</tr>
<tr>
<td>4</td>
<td>Analysis of Broadband Internet Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.1 Overview of broadband Internet</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>4.2 ADSL broadband Internet</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>4.2.1 History</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>4.2.2 Configuration</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>4.2.3 Industry Structure</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>4.2.4 Players</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>4.2.5 ADSL Access Speed</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>4.2.5 Price structure of ADSL broadband Internet</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>4.3 FTTH broadband Internet</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>4.3.1 History</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>4.3.2 Configuration</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>4.3.3 Industry Structure</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>4.3.4 Players</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>4.3.5 Varieties of FTTH User Access and User Premises</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>4.3.6 Price Structure for FTTH broadband Internet</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>4.4 Traditional Internet Service Providers</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>4.4.1 Internet access</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>4.4.2 IP Telephony</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>4.4.3 Portals</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>4.4.4 Video Contents Delivery</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>4.3.5 E-commerce</td>
<td>68</td>
</tr>
</tbody>
</table>
Table of Contents (continued)

<table>
<thead>
<tr>
<th>Chapter 5</th>
<th>NTT’s strategies of fixed wire services for next generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>VI&amp;P Vision ................................................................</td>
</tr>
<tr>
<td>5.2</td>
<td>Practical Steps for FTTH .......................................</td>
</tr>
<tr>
<td>5.3</td>
<td>A New Vision Plan ..................................................</td>
</tr>
<tr>
<td>5.3.1</td>
<td>Vision for a New Optical Generation ..........................</td>
</tr>
<tr>
<td>5.3.2</td>
<td>Practical Steps for the New Vision Plan .....................</td>
</tr>
<tr>
<td>5.3.3</td>
<td>Establish a New Company .........................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 6</th>
<th>Recommendations and Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Recommendations ................................................................</td>
</tr>
<tr>
<td>6.1.1</td>
<td>Local Access Business ............................................</td>
</tr>
<tr>
<td>6.1.2</td>
<td>ISP Business ................................................................</td>
</tr>
<tr>
<td>6.1.3</td>
<td>NTT’s “Vision for the Next Generation” .......................</td>
</tr>
<tr>
<td>6.2</td>
<td>Conclusion ...................................................................</td>
</tr>
</tbody>
</table>

| References       | ..................................................................................| 91   |
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This thesis is dedicated to all the people of NTT Group.
Chapter 1

Introduction

The rapid expansion of the Internet, with its myriad information and communication resources, has been led largely by the United States, while Japan has fallen well behind the U.S. in the extent and sophistication of its IT technology and information/communication industries.

In January 2001, Japan took steps to reverse this scenario by announcing its “e-Japan Strategy,” which has as its goal to make Japan “one of the world’s most advanced IT nations” by 2005. Strategic efforts have been expended in both the public and private sectors, and today Japan is well on its way to catching up with other IT-advanced countries in terms of developing a strong broadband environment.

In September 2001, a new business called “Yahoo!BB” commenced its asynchronous digital subscriber line (ADSL) broadband Internet service. Yahoo!BB offers its service at rates that are impossibly low compared to traditional services, so it has grown into the number one broadband Internet service provider in a very short period of time. In April 2002, Yahoo!BB also began to offer a free telephone service, called “BB phone,” which provides Yahoo!BB users with a closed connection. BB phone bypasses the public telecommunication networks that use a conventional telephone, phone number, and dial-up. The new service has had a huge impact on the traditional telecommunication industry.

In November 2002, NTT Group announced its “Vision for a New Optical Generation – broadband leading the world of resonant communication,” which NTT Group expects will
propel the company into full-scale broadband, thus bringing the company closer to its goal of being a major player in today’s telecommunication era. As part of its vision, in December 2003, NTT established a new company known as NTT Resonant, Inc. The new company’s mission is to identify and develop new broadband markets.

Since 1992 when NTT announced its “VI&P vision,” NTT’s vision for next-generation fixed line service has always been fiber to the home (FTTH). At the present time, however, the number of FTTH users is only one million, while broadband Internet users exceed ten million.

The thesis begins with an overview of the telecommunication industry and its environment. Then I provide a detailed analysis of the industry structure, the major players, and the competitive environment in the broadband Internet business. I conclude by identifying NTT Group strategies that I believe will enhance next-generation fixed line service.
Chapter 2

Trends in the Information Industry

2.1 Diffusion of the Internet

The Internet user population is constantly increasing in Japan. By the end of 2002, the Japanese Internet user population was estimated to be 69.42 million (a 24.1% increase over the previous year), and the number continues to increase by 13.5 million per year. Today, over half the population of Japan uses the Internet in some form, which means that at least one of every two persons is using the Internet. Figure 2.1 shows the transitions in Internet use and penetration.

![Graph showing transitions in the Internet user population and penetration rate from 1997 to 2002.]

Figure 2.1 Transitions in the Internet user population and penetration rate
2.2 Growth in the Broadband User Population

The development and use of broadband has grown rapidly in Japan, and soon Japan will have the largest number of broadband users in the world (see Figure 2.2). The user population for broadband services, i.e., fiber to the home (FTTH), digital subscriber line (DSL), cable TV Internet, and fixed wireless access (FWA), was estimated to be 19.55 million at the end of 2002. Broadband users account for 28.2% of the 69.2 million Internet users, indicating that one of four Internet users are using broadband.

Figure 2.2 Current and future status of the broadband user population

Predictions about the future growth of the broadband user population are also shown in Figure 2.2. Based on current transitions in the number of broadband subscribers and other data, it is predicted that in the next five years (by 2007) the Internet user population will become 88.92 million (penetration rate: 69.8%), among which 59.67 million (penetration rate: 46.7%) will be broadband users. This means that 67.1% of the entire Internet user population
will be using broadband, and mainstream Internet use will switch from narrowband to broadband.

Major changes occurred in 2003 with respect to the type of lines used to access the Internet. To date, narrowband (i.e., analog and ISDN dial-up connections) has been the customary method for accessing the Internet via fixed lines from households. But in mid-2002, the number of narrowband users began to decline (see Figure 2.3). Surveys reveal that the number of dial-up connections via modem and/or ISDN has dropped substantially, and the usage ratio has decreased to about 10% for both types. Instead, use of ADSL is rapidly growing. After starting at 0.8% in 2001, increasing to 20.2% in 2002, ADSL now accounts for 62.1%. As the ratios for cable TV and FTTH have also increased, it can be said that broadband has virtually replaced narrowband.

Source: “Information & Communications in Japan 2004”, InfoCom Research

Figure 2.3 Internet access methods
2.3 Economic Impacts of Broadband

The widespread diffusion of broadband has had a major impact on the Japanese economy. As the broadband user population increases, the demand for broadband equipment and terminals also increases. Beyond that, consumers now have many more opportunities to pursue online shopping, so broadband is also expected to boost e-commerce transactions among individual consumers. In addition, businesses will establish new systems and networks to deal with increases in the broadband user population, and broadband is expected to produce new businesses that utilize the high-speed communication aspects of broadband.

The rate of growth can be estimated by categorizing the broadband-related markets, as follows: (1) device and system construction markets, (2) network market, (3) platform market, (4) content and application markets, and (5) B2C e-commerce market. By 2007, the size of the broadband-related markets is expected to increase from ¥2.0 trillion in 2002 to ¥10.2 trillion, a 5.1 growth factor. The current status and growth prediction for the broadband market size is shown in Figure 2.4. The ripple effect of broadband diffusion on production in various industries is estimated to be ¥18.1 trillion by 2007, as is shown in Figure 2.5.
2.4 Broadband Internet Access Business

In 2001, Japan set the goal to “become the world’s most advanced IT nation” by 2005, as part of its “e-Japan Strategy.” This strategy set specific targets—the number of households with high-speed Internet available (via DSL, cable TV, Internet, and FWA) as 30 million, and the number of households with ultra high-speed Internet available (i.e., FTTH) as 10 million. From that point, efforts have been made by both the public and private sectors.

The number of broadband Internet users has been rapidly increasing since 2002 (see Figure 2.6). While the figure was only about 860,000 at the end of fiscal 2000, it had reached 13.6 million by December 2003, an increase of 1,580% in about three years.
A major factor supporting this substantial growth was ADSL Internet, which recorded a net increase of 400,000 or more every month for the eight consecutive months between October 2002 and May 2003.

For CATV Internet, which compares poorly with other methods in terms of communications speeds and prices, efforts are being made to recover the momentum and expand the subscriber base through speed increases and rate reductions.

Full-scale commercial FTTH Internet service was started in August 2001. Although sales were slow at the initial stage, the subscriber base has gradually expanded as service areas have expanded, as well as via rate reductions and various sales promotional campaigns.

As competition among various types of access and among providers has stimulated the market for broadband Internet, there has been considerable progress toward service
diversification, higher speeds, and lower prices. As a result, there has been a corresponding rapid increase in the number of users.

Japan ranks third in terms of the number of subscribers, following 18.7 million subscribers in the U.S., and 9.86 million subscribers in Korea, and the number of subscribers in Japan is increasing rapidly (see Figure 2.7).

![International comparison of broadband subscribers](source)

Figure 2.7 International comparison of broadband subscribers

The continuing decline in rates for broadband is one cause for the rapid diffusion of broadband. When rates for DSL and cable Internet services in various countries are compared by converting them into rates per 100 Kbps, the rates in Japan are the lowest in the world (see Figure 2.8).
Figure 2.8 International comparison of broadband rates (rates per 100kbps)

2.5 Mobile Internet Business

The number of mobile Internet subscribers in Japan exceeded 60 million in only four years after the service began, reaching 62.46 million by the end of fiscal 2002 (see Figure 2.9). The proportion of mobile Internet subscribers among total cellphone subscribers was 82.6% as of the end of fiscal 2002.

Figure 2.9 Trends in mobile Internet subscribers

Source: MPHPT, White Paper 2003
If one considers the diffusion of mobile Internet usage in various countries, the proportion of mobile Internet subscribers among total cellphone subscribers, for major carriers in the country, is the highest in Japan with 79.2%, followed by Korea and China. Thus, Asian nations lead the diffusion of the mobile Internet (see Figure 2.10).

* The figures show the proportion of mobile Internet subscribers among the total number of cell phone subscribers for major carriers in the respective countries.  

Source: Based on "3G Mobile" materials.

Figure 2.10 International comparison of the proportion of mobile Internet
The number of subscribers who have moved to third-generation telephones was 7.16 million at the end of fiscal 2002, a steady increase (see Figure 2.11). The majority of these, 6.81 million subscribers use telephones that utilize the CDMA2000 technology.

![Graph showing transitions to third-generation cell phones.](image)

**Figure 2.11 Transitions to third-generation cell phones**

### 2.6 The Broadcasting Business

The year 2003 marked the fiftieth anniversary of terrestrial television broadcasting in Japan, which was first launched by NHK in February 1953 and by Nippon Television Network Corp. in August of the same year as the first commercial broadcaster. Colorcast, which began in 1960, is now widely diffused as the most popular media. At the end of fiscal 2002, the number of broadcasters was 1,023. A breakdown of commercial broadcasters is shown in Figure 2.12.
The numbers in brackets indicate the numbers of broadcasters at the end of fiscal 2001.

Source: MPHPT, White Paper 2003

Figure 2.12 Breakdown of commercial broadcasters (end of FY 2002)

The first digital broadcasts in Japan started with the launch of communication satellite digital broadcasting in 1996. In 1998, digital broadcasting also became available on cable television in some areas. In 2000, digital broadcasting using a broadcasting satellite commenced. In Fall 2003, test broadcasting of terrestrial digital sound broadcasting service and terrestrial digital television broadcasting was launched. The shift from analog to digital broadcasting is expected to be complete by 2011 except for terrestrial radio broadcasting. Digital terrestrial broadcasting commenced in December 2003 in the Kanto, Kinki, and Chukyo regions. As a result, digital broadcasting is now used for all broadcasting media—terrestrial, satellite, and cable television.

Since television is diffused to almost all households in Japan, by promoting digitization of terrestrial television broadcasting, it will be possible to establish a home
infrastructure to support the IT Revolution, which will enable everyone in Japan to easily use advanced services through television which enjoys the broadest penetration.

The number of subscribers to cable television was 23.3 million at the end of fiscal 2002. Cable television facilities are used not only for broadcasting but also for providing Internet connection services and communication services such as IP telephone service. Thus, cable television has developed into a local comprehensive information and communication infrastructure providing full service, which encompasses communication and broadcasting services. Internet connection services using cable television networks were provided by 282 companies and used by 2.07 million subscribers as of the end of fiscal 2002.
Chapter 3

Recent Activity in the Telecommunication Industry

3.1 Overview and Regulatory Framework of the Telecommunication Industry

The Japanese telecommunication industry is divided into two classifications, Type I and Type II. As stipulated in the Telecommunications Business Law, a Type I carrier is one that provides telecommunications service by building and installing its own transmission vehicles and facilities; a Type II carrier is one that provides service by leasing transmission vehicles and facilities from other sources. As of the end of FY 2002, there were 11,318 telecommunication carrier companies. This number was broken down into 414 Type I carriers and 10,904 Type II carriers. Among carriers, 7,527 provided Internet connection services, an 11.7% increase over 2001, and a steady annual increase.

Telecommunication carriers recorded sales of ¥18.69 trillion in FY2001, an 1.8% increase over the previous year. This figure breaks down to ¥17.25 trillion earned by Type I carriers, a 1.5% increase over the previous year; and ¥1.45 trillion earned by Type II carriers, a 5.2% increase over the previous year.

With regard to revenue growth, in FY 2002 Type I carriers saw a decrease in revenue growth for the first time. NTT East, NTT West, and other fixed-line telecommunication carriers also reported negative growth. NTT DoCoMo and other mobile telecommunication carriers reported positive growth, but not enough to compensate for the negative trend registered by the fixed-line telecommunication carriers.
The change in number of subscribers for fixed-line and mobile telecommunications is shown in Figure 3.1. Comparing fixed-line (i.e. analog and ISDN) with mobile telecommunications (cellphones and PHS), the number of mobile telecommunication subscribers surpassed that of fixed-line subscribers in FY2000, and the gap continues to widen.

![Graph showing trends in fixed-line and mobile subscribers](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fixed line</th>
<th>Mobile</th>
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<tr>
<td>1996</td>
<td>62.6</td>
<td>26.9</td>
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<td>1997</td>
<td>62.9</td>
<td>38.3</td>
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<td>2001</td>
<td>61.3</td>
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<td>2002</td>
<td>60.8</td>
<td>81.1</td>
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Source: MPHPT

Figure 3.1. Trends in fixed-line and mobile subscribers

### 3.2 Fixed-Line Telecommunication Carriers

The 1985 Telecommunications Business Law defined the state of competition in the Japanese telecommunication sector. Prior to 1985, there were only two companies in the market, NTT (Nippon Telephone and Telegram Public Corporation) and KDD (Kokusai Denshin Denwa Corporation).

NTT was established as public corporation in 1952 and enjoyed a monopoly in the domestic telecommunication market. KDD was established as private enterprise in 1953 and held a monopoly in the international telecommunication market. In the early 1980s, as a
result of demands for liberalization, and to keep abreast of the U.S. following the breakup of AT&T, deregulation occurred.

In 1985, NTT was privatized and some measure of competition was introduced into the international, long-distance, and local telecommunication markets. It was at this point that Japan’s telecommunication market became open to a handful of so-called “new common carriers” (NCCs), and several began to compete in the market. International Digital Communications (IDC) and International Telecom Japan (ITJ) both entered the international telecommunication sector; Daini Denden (DDI), Tele Way Japan (TWJ), and Japan Telecom (JT) entered the long-distance telecommunication sector; and Tokyo Telecommunication Network (TTnet), Osaka Media Port (OMP), Chubu Telecommunications (CTC), and seven other regional electric power affiliated carriers entered the local telecommunication sector.

In the late 1990s, after the NTT reorganization was decided in 1997, the long distance and international telecommunication sectors were hard-hit by fierce price competition. As a result, the NCCs began looking at domestic mergers as a way to survive. The following changes occurred:

- In 1998, TWJ merged with KDD; then in 2000, KDD, DDI (including DDI cellular group) and IDO merged as KDDI.
- In 1999, Cable & Wireless invested in IDC. (NTT was also planning to invest in IDC to gain an international telecommunication infrastructure, but C&W ultimately gained the right to invest in IDC.)
- In 1999, PNJ was established as an affiliate of the ten electric power affiliated local NCCs; in 2001, PNJ took over the local NCCs’ data communication services, and the
corporate name was changed to POWEREDCOM; in 2003, POWEREDCOM and TTnet merged; in November 2003, POWEREDCOM and Fusion Communications began discussing integration of their telecommunication business. (Fusion Communications is a new entrepreneur established in 2000. Fusion Communications commenced long-distance service at a nationwide flat rate using VoIP (Voice over Internet Protocol) technology for the first time in Japan. They gained over 1.5 million subscribers in about one year.)

Eventually, the TYPE I carriers were reorganized into five major groups: NTT group, KDDI group, JT group, Cable & Wireless group, and POWEREDCOM group. The structure and financial information for NTT Group are shown in Figure 3.2 and Table 3.1; similar information for KTTI, JT and C&W are shown in Figure 3.3 and Table 3.2; and information about POWEREDCOM is given in Figure 3.4 and Table 3.3.
Information about NTT Group

![Diagram of NTT Group regions](image)

Source: Author, 2004

Figure 3.2 Formation of NTT Group

<table>
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<tr>
<th></th>
<th>NTT (consolidated)</th>
<th>NTT East</th>
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<td>Operating Revenues</td>
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<td>Operating Income</td>
<td>1,363,500</td>
<td>48,300</td>
<td>42,600</td>
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<td>Recurring Profit</td>
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<td>Net Income</td>
<td>233,300</td>
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Source: 2002 Annual Report of NTT

Table 3.1 Financial information for NTT Group(FY2002)
Information about KDDI, JT, and C&W

Figure 3.3 Formation of KDDI, JT, and C&W groups

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<tr>
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<th>C&amp;W IDC group</th>
</tr>
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Source: Author, 2004

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<th></th>
<th>KDDI (consolidated)</th>
<th>KDDI (single)</th>
<th>JT (consolidated)</th>
<th>JT (single)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Revenues</td>
<td>2,785,343</td>
<td>2,202,762</td>
<td>1,796,915</td>
<td>340,100</td>
</tr>
<tr>
<td>Operating Income</td>
<td>140,652</td>
<td>107,158</td>
<td>275,606</td>
<td>25,600</td>
</tr>
<tr>
<td>Recurring Profit</td>
<td>113,210</td>
<td>95,430</td>
<td>271,869</td>
<td>28,700</td>
</tr>
<tr>
<td>Net Income</td>
<td>57,358</td>
<td>-</td>
<td>79,502</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: 2002 Annual reports from the companies

Table 3.2 Financial information for KDDI and JT (FY2002)
Figure 3.4 Formation of POWERDCOM group

<table>
<thead>
<tr>
<th></th>
<th>POWERDCOM M+TTNet</th>
<th>POWERDCOM (single)</th>
<th>K-OPTICOM</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Revenues</td>
<td>181,973</td>
<td>64,855</td>
<td>38,899</td>
<td>41,386</td>
</tr>
<tr>
<td>Operating Income</td>
<td>▲ 5,096</td>
<td>▲ 13,566</td>
<td>▲ 8,339</td>
<td>5,455</td>
</tr>
<tr>
<td>Recurring Profit</td>
<td>▲ 10,132</td>
<td>▲ 13,941</td>
<td>▲ 9,553</td>
<td>3,181</td>
</tr>
<tr>
<td>Net Income</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: 2002 Annual Reports of companies

Table 3.3 Financial information of POWERDCOM, K-OPTICOM and CTC (FY2002)
3.3 Mobile telecommunication carriers

Real competition in the mobile telecommunication market began in 1988. The Japanese market was divided into nine regional service areas, and two cellular carriers served each area.

- DDI Cellular group entered Hokkaido, Tohoku, Kansai, Chugoku, Shikoku, Kyusyu and Okinawa region based on AMPS.

- IDO group, funded by TWJ and Toyota, entered Kanto and Tokai region using NTT method. In 1991, IDO also launched AMPS as a way to differentiate itself, targeting mainly their handsets to NTT DoCoMo.

In 1992, NTT spun off its wireless phone service division as a separate entity named NTT DoCoMo, and competition in the mobile telecommunication industry entered the second generation. In 1993, NTT DoCoMo launched its PDC service. The following year, DDI Cellular and IDO did the same. A third carrier, Digital Phone Group (J-Phone group), funded by JT, entered Kanto, Kansai, and Tokai regions based on PDC. However, in April 1999, DDI Cellular and IDO launched their CDMA-one service as a differentiating strategy.

As mentioned in Section 3.2 above, in the late 1990s after NTT reorganized, the NCCs began looking at possible domestic mergers as a way to survive. As a result, the mobile communication operators were reorganized into three major groups: NTT DoCoMo group, au group (former IDO and DDI cellular), and Vodafone group. The formation of each group is shown in Figure 3.6 and their financial information is shown in Table 3.5.
Figure 3.5 Formation of mobile telecommunication carrier groups

<table>
<thead>
<tr>
<th>Frequency</th>
<th>NTT DoCoMo group</th>
<th>au group</th>
<th>Vodafone group</th>
</tr>
</thead>
<tbody>
<tr>
<td>800M</td>
<td>1.5G</td>
<td>800M</td>
<td>1.5G</td>
</tr>
<tr>
<td>800M</td>
<td>1.5G</td>
<td>800M</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author, 2004

Table 3.4 Financial information for mobile telecommunication carrier groups (FY2002)

<table>
<thead>
<tr>
<th></th>
<th>NTT DoCoMo group</th>
<th>au group</th>
<th>Vodafone group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Revenues</td>
<td>4,899,000</td>
<td>1,686,000</td>
<td>1,461,000</td>
</tr>
<tr>
<td>Operating Income</td>
<td>1,090,000</td>
<td>161,000</td>
<td>244,000</td>
</tr>
<tr>
<td>Recurring Profit</td>
<td>1,073,000</td>
<td>150,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Net Income</td>
<td>618,000</td>
<td>84,000</td>
<td>138,000</td>
</tr>
</tbody>
</table>

Source: 2002 Annual Reports of the companies
In 1999, NTT DoCoMo group, au group, and Vodafone group (all former 2G carriers) successfully acquired the 3G license. At this time, the Japanese government adopted a comparative evaluation method for awarding licenses instead of using the auction method which is commonly used in Europe. Therefore cellular operators did not suffer financial damage as a result of acquiring the 3G license (as compared with European operators).

In August 2001, NTT DoCoMo launched its 3G service based on W-CDMA, and Vodafone group followed in December 2002. In contrast, au group launched its 3G service using CDMA2000-1x, in April 2002. CDMA2000-1x service is provided on the 2G infrastructure, that is, using 800MHz, which meant that au group could rapidly spread its service area on well-established existing infrastructure. They were able to accelerate replacement of PDC handsets, which meant they rapidly increased their 3G customer base.

3.4 **Internet Service Providers**

The function of Internet service providers (ISP) is to provide Internet access service to end users and to continually diffuse the Internet to the general public. In contrast to fixed line and mobile telecommunications, ISPs could come into the market as Type II carriers, leasing their transmitting facilities from Type I carriers. Thus, there are many entrepreneurs of varying size who come from diverse business backgrounds.

The first commercial Internet service was launched by AT&T Jens in 1992, followed by Internet Initiative Japan (IIJ) the next year. In those days, Internet access was expensive and targeted primarily to corporate customers, so the number of ISPs was small. About 1994, personal computer manufacturers began to offer communication services for their users. Soon new entrepreneurs flocked into the market offering dial-up telephone connection service to the Internet and targeting users among the general public.
When Windows95 was released, home use of personal computers diffused rapidly. Internet access service was in the spotlight as a sunrise business, and new entrepreneurs joined the ISP business one after another. In 1997, Fujitsu and NEC, the major personal computer manufacturers at the time, started their own ISP business, pre-loading their personal computer communication business, @Nifty and BIGLOBE, as the installed ISP carrier. Soon other computer manufacturers following, including Sony, Toshiba, and Matsushita.

Personal computer manufacturers (including electrical appliances) are spearheading the synergistic effects of personal computer vendors and the ISP business. As corporate solution business vendors, NEC and Fujitsu are also targeting the synergistic effects of business solutions with their ISP customer base.

In the late 1990s, Type I carriers NTT, KDDI, and JT also entered the ISP business as another way to diversify their telecommunication business. In the beginning, they lagged behind their competitors because they targeted corporate customers using proprietary Internet access, but they soon changed their target to individual customers, began offering dial-up access, and soon caught up with the major vendors, helped immeasurably by their brand name and the operating power of a huge telephone enterprise.

Today, the ISP players can be classified into three types: vendors (computer manufacturers), carriers (incumbent Type I carriers), and new entrepreneurs. The current major ISP players are shown in Table 3.5.
Table 3.5 Major ISP Players (as of March 2003)

<table>
<thead>
<tr>
<th>Rank</th>
<th>ISP brand name</th>
<th>Management company</th>
<th>Type</th>
<th>Customers (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>@nifty</td>
<td>Nifty (Fujitsu)</td>
<td>vendor</td>
<td>5,320</td>
</tr>
<tr>
<td>2</td>
<td>BIGLOBE</td>
<td>NEC</td>
<td>vendor</td>
<td>4,190</td>
</tr>
<tr>
<td>3</td>
<td>OCN</td>
<td>NTT Communications</td>
<td>carrier</td>
<td>3,504</td>
</tr>
<tr>
<td>4</td>
<td>DION</td>
<td>KDDI</td>
<td>carrier</td>
<td>2,373</td>
</tr>
<tr>
<td>5</td>
<td>Yahoo!BB</td>
<td>BB technologies</td>
<td>new entrepreneur</td>
<td>2,363</td>
</tr>
<tr>
<td>6</td>
<td>So-net</td>
<td>Sony communication network</td>
<td>vendor</td>
<td>2,300</td>
</tr>
<tr>
<td>7</td>
<td>Panasonic Hi-Ho</td>
<td>Matsushita Electric</td>
<td>vendor</td>
<td>1,880</td>
</tr>
<tr>
<td>8</td>
<td>ODN</td>
<td>Japan Telecom</td>
<td>carrier</td>
<td>1,794</td>
</tr>
<tr>
<td>9</td>
<td>Pulala</td>
<td>Pulala networks (NTT East)</td>
<td>carrier</td>
<td>1,670</td>
</tr>
<tr>
<td>10</td>
<td>livedoor</td>
<td>EDGE</td>
<td>new entrepreneur</td>
<td>1,600</td>
</tr>
</tbody>
</table>

Source: New Media Development Association

3.5 Introduction of a New Competitive Framework

In response to rapid changes in recent years in the market environment surrounding the information and communications field, propelled by the shift from telephones to the Internet, the MPHPT embarked on a complete review of the Telecommunications Business Law. Its final report, entitled “Appropriate Policy on Competition in the Telecommunications Business in Order to Promote the IT Revolution” was released by the MPHPT’s Information and Communications Council in August 2002. Then in July 2003, a bill to amend the Telecommunications Business Law was adopted, and the law is scheduled to go into effect in April 2004.

Among other things, it includes an amendment that repeals the regulatory framework that has governed the classification of providers based on ownership of telecommunications facilities, i.e., abolishing the Type I/Type II business classifications. Because this framework has been the backbone of telecommunication administration, its repeal is expected considerably ease the telecommunication regulations.

With respect to services for users, the MPHPT’s Study Group Concerning Suitable Methods to Evaluate Competition in the Telecommunications Field for IP-Based Services
worked on building mechanisms to properly evaluate the competitive status of the market in an effort to promote further competition among providers and to ensure fair competition. Based on this study, the MPHPT is planning to design a detailed system for monitoring the market in the future.
Chapter 4

Analysis of the Broadband Internet Business

4.1 Overview of Broadband Internet

In Japan, the first broadband Internet was launched by a cable television (CATV) company, Musashino Mitaka Cable Television, in 1996. After that, CATV Internet began to spread gradually. In 1999, Tokyo Metallic Communication launched the first ADSL Internet service as a venture business, and the broadband Internet market expanded even further.

At the time, NTT was considering a gradual changeover from telephones to optical via ISDN. But the rapid advance of ADSL technology and a shortage of “killer” applications that require fiber-optic bandwidth hampered this plan.

What really changed NTT’s plans was the emergence of a powerful ADSL broadband Internet service provider, Yahoo!BB, in September 2001. Yahoo!BB, a new entrepreneur in the field, began offering ADSL broadband Internet service at a speed of 8Mbps (upstream), and its monthly fee was so low that it was considered unthinkable by the traditional services. And in April 2002, Yahoo!BB offered free telephone service, called “BB phone,” which gave Yahoo!BB users a closed connection. With such a strong platform of services, Yahoo!BB quickly grew to become the number one broadband Internet service provider in a very short time.

Figure 4.1 illustrates how traffic emigrated to mobile telecommunications, and how broadband Internet service accelerated the migration from analog and ISDN dial-up to ADSL. Today, both analog and ISDN telecommunication service are declining.
4.2 ADSL Broadband Internet

4.2.1 History

The history of ADSL broadband Internet in Japan is brief compared to Korea and the U.S. In the 1990s, NTT was planning a gradual changeover from analog telephone to ISDN and then to fiber-optic. Therefore NTT was skeptical about installing ADSL services and preferred a more cautious course of action.

However, with the rapid development of ADSL technology, Tokyo Metallic Communication launched the first ADSL broadband Internet as a venture business in 1999. This resulted in making the technical criterion of local loop copper for ADSL service. Then in 2000, NTT announced its open access policy for fiber-optic, which meant that NTT’s competitors could lease NTT’s fiber-optic (both transfer and user access) based on a cable core. Shortly thereafter, two new entrepreneurs entered the local access market—eAccess
and ACCA Networks. They provide ADSL local access wholesale services and offered ADSL broadband Internet with traditional major ISPs.

At that time, incumbent Type I carriers, such as NTT East, NTT West, Japan Telecom, also entered the market. NTT East and NTT West commenced an ADSL local access direct sale service, called "FLET'S ADSL," and offered ADSL broadband Internet with traditional major ISPs. Japan Telecom commenced its "J-DSL" service as a local access service for their ISP business, ODN. At this stage, ADSL service was viewed as a service for high-end users, and big traditional ISPs set their prices high compared to dial-up Internet access in order to maintain a high profit margin.

In September 2001, Soft Bank BB entered the market with its Yahoo! BB service and low rates. Fierce price competition followed, and subscribers of ADSL broadband increased quickly. The transition among ADSL local access subscribers is shown in Table 4.1.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NTT East, NTT West</td>
<td>0</td>
<td>652,000(42.8%)</td>
<td>2,136,000(37.8%)</td>
<td>3,774,000(36.7%)</td>
</tr>
<tr>
<td>Softbank BB</td>
<td>0</td>
<td>360,000(26.6%)</td>
<td>1,691,000(30.0%)</td>
<td>3,694,000(36.0%)</td>
</tr>
<tr>
<td>Others</td>
<td>10,000</td>
<td>512,000(30.6%)</td>
<td>1,819,000(32.2%)</td>
<td>2,804,000(27.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>10,000</td>
<td>1,524,000</td>
<td>5,646,000</td>
<td>10,272,000</td>
</tr>
</tbody>
</table>

Source: MPHPT

Table 4.1 Transition among ADSL local access subscribers

4.2.2 Configuration

ADSL broadband Internet is configured as shown in Figure 4.2. There are four segments: user premise, user access, local aggregation, and Internet access. Each segment is configured as follows:

✓ **User premise** — splitter, modem, and customer equipment (telephone, PC, etc.).

Splitter and modem are specified by the local aggregation provider.
✓ **User Access** — twisted-pair copper for the local loop, part of the existing telecommunication network owned by NTT-East and NTT-West.

✓ **Local Aggregation** — terminating ADSL and transferring Internet protocol data communication from NTT's regional building to the ISP building.

✓ **Internet Access** — authenticates end user, provides connectivity to the Internet and to Internet applications.

Source: Author, 2004

Figure 4.2 Configuration of ADSL Broadband Internet

4.2.3 **Industry Structure**

The structure of the ADSL broadband Internet industry is shown in Figure 4.3. There are two types of players—local access integrated players and local access separated players. Local access separated players can be further subdivided into two types: local access wholesale and local access direct sale. The local access integrated type is typically new entrepreneurs, while the local access separated type is typically traditional ISPs.
4.2.4 Players

Today there are four major players, Yahoo!BB, NTT East and NTT West, eAccess and ACCA. Alliance between major ADSL players and major ISPs is shown in Figure 4.4. A profile of each major ADSL players is given below.
Figure 4.4  Players and alliance of ADSL broadband Internet

⇒ SoftBank BB is the largest operating company within the SoftBank Group. SoftBank was established in 1981 and began distributing PC software. The founder and current President and CEO of SoftBank is Masayoshi Son. In January 1996, SoftBank established Yahoo Japan Corp., an Internet-related business. SoftBank
also established BB Technologies Corp. in May 2000. BB Technologies completed
the acquisition of Tokyo Metallic Communication, the first entrepreneur of ADSL
broadband Internet, and began offering ADSL Internet service. In January 2003,
SoftBank BB was established, and SoftBank Group’s Internet-related subsidiaries
were reorganized as part of SoftBank BB.

⇒ NTT East and NTT West, subsidiaries of NTT, were established in 1999.
Historically, their services have always been regulated by NTT Law so they could
only provide intra-prefecture service. They could not provide Internet service as an
ISP. Currently, NTT East and NTT West provide only Internet local access service
which is named FLET’S. That means NTT East and NTT West cannot allocate
global IP addresses. FLET’S service was commenced as an ISDN flat-rate Internet
access service in July 2000. Its network is constructed with a modem pool in each
NTT regional building and an Internet protocol data communication network.
FLET’S offloads Internet traffic just after the local exchanger. In December 2000,
FLET’S service was extended to ADSL local access service, which is called FLET’S
ADSL. In August 2001, FLET’S service was extended to fiber-optic (FTTH) local
access service which is called B FLET’S.

⇒ eAccess was established in November 1999 as a new entrepreneur to provide
ADSL local access wholesale service, and it began commercial service in October
2000. eAccess formed a strategic alliance with Japan Telecom in 2001, and
completed acquisition of Japan Telecom’s consumer J-DSL business in 2002. The
CEO of eAccess is Sachio Semmoto, co-founder of DDI (now KDDI) and a former
professor at Keio University. Semmoto retired from DDI as vice president in 1995.
Note that KDDI and eAccess do not have specific capital relation and alliance.
ACCA was established in March 2000 and in August 2000 received investment funds from NTT Communications (a subsidiary of NTT) and Covad Communications. In contrast to NTT East and NTT West, NTT Communications is not regulated by NTT Law. NTT Communications provides long distance telecommunication (including intra-prefecture service), international telecommunication services, and Internet access service. NTT Communications’ Internet service, called OCN, is the third-largest ISP in Japan. OCN planned to use only FLET’S service provided by NTT East and NTT West. However, after eAccess announced it would offer ADSL wholesale service, NTT Communications decided to invest in ACCA Networks as an alternative wholesale ADSL service to compete with other major ISP competitors and new entrepreneurs. ACCA Networks commenced commercial service for @nifty and OCN (NTT Communications) in January 2001.

These top four players provide nationwide area service and hold about 90% of the ADSL local access market.

Following the top four there are several regional ADSL service providers. The largest is Tokai Group, which came into the Kanto and Tokai markets as a local access integrated type. They also support local access separated type as an ISP. Tokai Broadband Networks Communications (T-com) covers the Kanto area and Tokai Network Club (TNC) covers the Tokai area. Tokai Group’s core business is energy; it provides gas and liquefied natural gas in the Tokai area. Electric power affiliated players also provide ADSL services; however, the number of subscriber is smaller than Tokai Group.
4.2.5 ADSL Access Speed

ADSL broadband Internet access originally began with a speed of 512Kbps (upstream 224Kbps) when it was offered by Tokyo Metallic Communication in December 1999. NTT started its commercial service with a speed of 1.5Mbps (upstream 512Kbps) in December 20000. In September 2001, Yahoo!BB entered the market with its 8Mbps service (upstream 1Mbps) and other players followed. In the autumn of 2002, each player commenced 12Mbps service (upstream 1Mbps). In July 2003, 24Mbps (or 26Mbps) service (upstream 1Mbps) was commenced. In November 2003, 40Mbps service (downstream 40Mbps/ upstream 1Mbps) was commenced.

Improvements in ADSL speed are realized by expanding the frequency band and extending the number of bits. Frequency band is extended with 1.1 MHz (12Mbps service) to 2.2 MHz (24Mbps service) and currently 3.75 MHz (40Mbps service). The maximum number of bits carried by an every 4 KHz carrier wave is extended from 15 to 16. ADSL speed is not guaranteed for the customer, but instead offers the highest value in an ideal environment. The expansion of the frequency band and extended number of bits increases the influence of attenuation by distance and a noise from other local loops.

The relationship between the distance from an NTT regional building and effective speed is shown in Figure 4.5. Service of 40Mbps is effective in an area less than 1.5km from the NTT regional building; 24Mbps service is effective in an area 1.5km to 2.5Km from the building; and 12Mbps service is effective from 2km and out. Ultimately, the practical speed is lower depending on the actual environment.
4.2.6 Price Structure of ADSL Broadband Internet

Because of the way the industry is structured, there are three types of systems: local access integrated, local access separated and wholesale, and local access separated and direct sale.

The local access integrated type is used primarily by new entrepreneurs, such as Yahoo!BB. The local access separated type (both wholesale and direct sale) is used by the major ISPs. The local access separated and direct sale service is provided by FLET’S ADSL with ISPs.

Local access wholesale service providers, such as eAccess and ACCA, are
targeting metropolitan areas and expanding their service areas based on market research and activity by their competitors. Therefore, the major ISPs use the wholesale type to compete with Yahoo!BB in urban areas, and the direct sale type to complement the area covered by the wholesale type.

In December 1999, Tokyo Metallic, a new ISP, began offering a trial service of ADSL broadband Internet with a monthly fee of just over ¥6,000 including local access fees. The following year, most of the major ISPs and incumbent Type I carriers also adjusted their fees to the ¥6000 level using ADSL local access wholesale providers such as eAccess and ACCA.

At the time, the flat rate for a dial-up IP access service such as “FLET’S ISDN” service was just over ¥8,000 and the speed was only 64Kbps. However, in September 2001, Soft Bank BB entered the market and began offering Yahoo!BB for ¥2280 including local access fee. This greatly reduced rate inevitably accelerated price competition, and soon @nifty, the largest traditional major ISP, reduced its fee (including local access fee) from ¥5,800 to ¥3,980 and other competitors followed. Currently, the monthly fee for Yahoo! BB remains the lowest at ¥2,280. The monthly fee cost structure is shown in Figure 4.6.
(1) Local access integrated type

Charge A  Charge B  Charge C

Total Charge = A + B + C
(For ISP = A + C, For NTT East and NTT West = B)

(2) Local access separated & wholesale type

Charge A  Charge B  Charge C  Charge D

Total Charge = A + B + C + D
(For ISP = A + C + D, For NTT East and NTT West = B)
(Local access fee (C) is aggregated by ISP & rate is not disclosed)

(3) Local access separated & direct sale type

Charge A  Charge B  Charge C  Charge D

Total Charge = A + B + C + D
(For Local access provider = A + C, For NTT East and NTT West = B, For ISP = D)

Source: Author, 2004

Figure 4.6 Monthly fees for ADSL service
Regarding local access direct sale service, NTT East and West began offering their trial service for ¥5,100 in December 1999, and FLET’S ADSL began at a fee of ¥4,600 in December 2000. Currently the price is around ¥3000.

Changes in the monthly fees among ADSL Internet service providers is shown in Figure 4.7, where I compared a typical representative of each of the three types—Yahoo!BB as a local access integrated type; @nifty +eAccess as a local access separated and wholesale type; and @nifty + FLET’S as a local access separated and direct sale type. Each major ISP has multiple alliances with local access providers, so I chose the largest traditional major ISP, @nifty, and its basic service plan to compare with Yahoo!BB.

One can see the huge impact of Yahoo!BB’s 8Mbps on traditional players. Their price was about half of @nifty, and the speed was ten times faster. @nifty continues to try to catch up with Yahoo!BB but to date has not been successful. Yahoo!BB does not have to change its price because it was set strategically low from the beginning. That makes their service plan simple and straightforward—another advantage of the Yahoo!BB service.
(1) Local access integrated type (Yahoo!BB)

(Provided by Tokyo Metallic communication)

(2) Local access separated & wholesale type (@nifty + eAccess)

(3) Local access separated & direct sale type (@nifty + FLET'S)

(Note 1) Detail fee (AtnD) is broken down based on Figure 4.6
(Note 2) User access fee is adapting NTT East's fee

Source: Author, 2004

Figure 4.7 Monthly fees among various ADSL Internet service providers
Local access wholesale service players do not disclose their monthly fee, so I was unable to compare the local access monthly fees. But I can make a good estimate based on each ISP’s monthly Internet access fee for local access direct sale type. Figure 4.8 shows these various local access and Internet access fees. It is not exact, but will give the reader sufficient information to compare the wholesale type, and the direct sale type simply is not capable of competing with Yahoo!BB. That is one reason why NTT Communications invested in ACCA and began its local access wholesale service with OCN.

![Diagram of monthly fees among ADSL Internet services](image)

Source: Author, 2004

Figure 4.8 Comparison of monthly fees among ADSL Internet services

Today, end users can choose the price and speed that best suits their needs from among a range of alternatives. However, it is difficult for the general public to identify which service is the least expensive. I made the above analysis based on the standard rates but the actual situation is much more complicated.

Currently, most players have an introductory campaign that offers such things as a free initial installation, first three months free, and an additional service bundle fee. In addition, any user who previously had a Type I carrier for their analog long distance
telephone service, and then subscribes with that same carrier’s ADSL broadband Internet service, will be given a lower price. And finally, users can choose either buy or lease their user premise equipment.

4.3 FTTH Broadband Internet

4.3.1 History


In contrast to ADSL services, FTTH uses fiber-optic which is installed by FTTH local access providers. FTTH broadband subscribers of local access providers are shown in Table 4.2.

<table>
<thead>
<tr>
<th></th>
<th>2003.10</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTT East/West</td>
<td>547,000(72%)</td>
<td>Nationwide</td>
</tr>
<tr>
<td>USEN</td>
<td>104,567(14%)</td>
<td>Nationwide</td>
</tr>
<tr>
<td>K-Opticom</td>
<td>72,000(10%)</td>
<td>Regional (Kansai area)</td>
</tr>
<tr>
<td>Others</td>
<td>32,644(4%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>756,211</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: MPHPT

Table 4.2 FTTH broadband local access, number of subscribers
4.3.2 Configuration

FTTH broadband Internet has four segments: user premises, user access, local aggregation, and the Internet access. The features of each segment are somewhat different from ADSL broadband Internet. A brief explanation of each segment follows:

✓ **User premises** includes customer equipment. User premises are either homes and apartments.

✓ **User access** is by fiber-optic cable which is the only thing used for FTTH broadband Internet. There are two types of user access: media converter and passive optical network.

✓ **Local Aggregation** is accomplished by terminating the optical fiber and Internet protocol data communication from local access building to ISP building. Each local access player shares its local aggregation network with ADSL broadband Internet.

✓ **Internet Access** provides authentication of the end user and connectivity for the Internet and applications.

The configuration of FTTH broadband Internet is shown in Figure 4.9.

![Figure 4.9 Configuration of FTTH broadband Internet](image)

Source: Author, 2004
4.3.3 Industry Structure

There are two types of players in the FTTH industry—local access integrated and local access separate. The local access separate type is further subdivided into wholesale and direct sale types. The local access integrated type is typical used by new entrepreneurs, while the local access separated type is used for the major traditional ISPs. In some cases, a major ISP may connect direct to the end user by leasing fiber-optic, but direct connection is generally limited to specific high-margin end users. The structure of FTTH broadband Internet industry is shown in Figure 4.10.

Source: Author, 2004

Figure 4.10 Industry structure of FTTH broadband Internet
4.3.4 Players

Currently there are three major players—NTT regional companies (NTT East, NTT West), USEN, and the electric power affiliated companies (K-Opticom, TEPCO etc.). The major FTTH players and major ISPs and their alliances are shown in Figure 4.11. A profile of each major FTTH player follows below.

⇒ NTT East and NTT West were established in 1999 (as noted earlier in the chapter). In the 1990s, NTT was considering a gradual changeover from analog and narrowband ISDN to broadband ISDN. Therefore, NTT installed fiber-optic in order to renew its copper pair and prepare for broadband ISDN. NTT East and NTT West took over these fiber-optic properties and started offering a trial service in December 2000, with its formal service, B FLET’S, beginning in August 2001.

⇒ USEN Corp. was established in 1964 and is engaged primarily in broadcasting. It established the world’s largest cable broadcasting service for music, and it holds an overwhelming 80% share of the domestic market. USEN installs coaxial cable in homes and businesses, and provides music and information broadcasting services to subscribers via leased tuners. The company also broadcasts via communication satellite. It expanded into other arenas including karaoke, Internet services, and broadband. Its broadcasting services is currently its mainstay business and broadband will be its future core business.

⇒ K-Opticom is one of the most successful players among the electric-power-affiliated companies. K-Opticom is one of the Kansai electric power affiliated companies. Kansai electric power company group had two companies that provide communications. One was K-Opticom; the other was Osaka Media Port Corporation (OMP). K-Opticom has provided FTTH broadband Internet service to residential customers since it was established in 2000. OMP, established in 1986, delivers data
communication service over its fiber-optic network, primarily targeting corporate customers. In December 2003, K-Opticom and OMP merged as K-Opticom.

- Two other major electric power affiliated players are Tokyo Electric Power Company (TEPCO), and Chubu Electric Power Company. In contrast to K-Opticom, TEPCO and Chubu came into the market as a local access wholesale provider. They also have telecommunication group companies, including POWERDCOM and CTC, but these are not used for FTTH broadband internet service.

- Other electric power affiliated players, HOTnet (Hokkaido Electric Power Company group), Energia Communications (Chugoku Electric Power Company group), and QTNet (Kyusyu Electric Power Company group) commenced FTTH broadband Internet service as a local access integrated type, and ST Net (Shikoku Electric Power Company group) is planning to follow. However, the number of subscriber for these companies remains quite small.
Figure 4.11 Major players and alliances in FTTH local access broadband Internet Services
4.3.5 Varieties of FTTH User Access and User Premises

FTTH has two types of user access—Media Converter (MC) and Passive Optical Network (PON). MC type is composed of single star (SS) fiber-optic and the media converter, which is located at either end of the SS fiber-optic and converts the Ethernet interface to a fiber-optic interface.

The PON type is composed of passive double star (PDS) fiber-optic network, center equipment (OLT), and user terminal equipment (ONU). The PDS fiber-optic network is composed of fiber-optic and an optical splitter. The optical splitter provides point-to-multipoint optical connectivity aggregating two-way laser beams. OLT and ONU provide point-to-multipoint connectivity. They also provide dynamic bandwidth allocation for each ONU depending on user traffic.

The configuration of each type is shown in Figure 4.12.
The user premises for FTTH local access has two types—homes and apartments. The home type includes fiber-optic terminating equipment (MC or ONU) and customer equipment (PC, etc.). The apartment type includes fiber-optic terminating equipment (MC) and a distribution system.
The distribution system for apartments has three types—LAN, VDSL, and wireless. VDSL is composed of VDSL equipment, existing telephone wiring premises, a splitter, and a VDSL modem. Both the VDSL type and wireless type are adapted to existing apartments that are unable to install a new LAN wiring system. The LAN type is used in recently constructed apartment.

NTT East and NTT West use the MC type for apartment users and the PON type for home users. Other players, such as USEN and K-Opticom, use the MC type for both apartment and home users. NTT East and NTT West and their competitors use similar methods of the distribution system for apartments.

FTTH broadband Internet access began with a speed of 10Mbps (10 BASE-T) which expanded to 100Mbps (100 BASE-T). The apartment (VDSL) type uses a 100Mbps interface but because of the capabilities of VDSL technology, the speed is less than 40Mbps.

The configuration of each type is shown in Figure 4.13.
(1) Home type

(2-1) Apartment & LAN type

(2-2) Apartment & VDSL type

Source: Author, 2004

Figure 4.13. Configuration of user premises
4.3.6 Price Structure for FTTH Broadband Internet

In December 2000, NTT East and NTT West began trial service of FTTH broadband Internet access at 10Mbps. The monthly local access fee for homes was ¥13,000 while the rate for apartments was ¥3,800. In addition, customers paid an additional Internet access fee to their ISP.

In February 2001, USEN entered the market and launched 100Mbps service for ¥4,900 including the local access and Internet fees. USEN could charge this low price because it limited service to high-demand areas and set the same price for both homes (i.e. detached houses) and apartments.

In June 2001, K-Opticom began offering apartment service of 10Mbps in the Kansai area for ¥3,980, including local access and Internet access fees. K-Opticom began its home service (100Mbps) for ¥5,500 in April 2002.

In August 2001, NTT East and NTT West began to offer B FLET'S with a fee for homes (10Mbps) of ¥5,000 and for apartments (100Mbps) ¥3,800. The additional ISP fee ranged from ¥4,000 to ¥8,000.

Changes in FTTH broadband Internet monthly fees are shown in Figures 4.14 and 4.15. In contrast to ADSL, competition among FTTH providers is facility-based, including user access fiber-optic. In addition, the background of the various FTTH broadband Internet players is infrastructure. Therefore players are cautious when considering price competition.

Currently almost all players have low-price campaigns with features such as free installation fee, first three months free, and no additional service bundle fee. The free initial installation has had a major impact on increasing the number of FTTH users because the standard price is around ¥30,000 for home users.
(1) Configuration

Total Charge=A+B
(For ISP=A+B)

(2) Monthly fee

Source: Author, 2004

Figure 4.14 Monthly fees for local access integrated type
(1) Configuration

Total Charge = A + B + C
(For ISP = C, For NTT East/West = A + B)

(2) Monthly fee

(Note 1) Apartment house service is based on VDSL premise type
(Note 2) User access fee is adapting NTT East's fee

Source: Author, 2004

Figure 4.15 Monthly fees of local access separated type (B FLET'S)
4.4 Traditional Internet Service Providers

4.4.1 Internet access

The traditional major ISPs began their Internet access business with narrowband using dial-up modems and existing telecommunication networks. When broadband Internet began, the environment of the traditional major ISPs changed quickly. Basically, traditional major ISPs outsource their local access business. So they promoted their customers’ shift from narrowband to broadband in order to retain customers and increase their profit margin.

However, new entrepreneurs like Yahoo!BB, USEN, and K-Opticom came into the market and set their rates very low compared to the traditional narrowband services. And incumbent telecommunication carriers joined the market by sharing their networks with telecommunication services.

Consequently, the monthly fee for broadband Internet is set as the same level or even less compared to narrowband. In the past, the major ISPs’ strength was in having nationwide dial-up modem pools that served as access points, but today that is no longer an advantage. Now they must outsource broadband Internet local access and do not have local access facilities for broadband Internet. Thus they cannot easily control the cost structure for local access services.

It is expected that users will continue to demand lower monthly fees for broadband, which makes it difficult for traditional ISPs to increase their basic Internet access service fee. On the other hand, ISPs must reinforce their network or extend their operation and management to deal with the increasing number of broadband users. As a result, the major ISPs are now pursuing a larger market of broadband users as well as exploring new profitable markets such as IP telephony, portal, video contents delivery, and e-commerce. These are discussed further below.
4.4.2 IP Telephony

Communication is one of the most fundamental services and spreads quickly because its size advantage helps it to work easily. In addition, by developing various contents and applications using communication tools, it is easy to diversify and differentiate the service. Based on these points, communication service is one of the most important auxiliary services.

In April 2002, Yahoo! BB released “BB phone,” a VoIP free phone service for Yahoo! BB customers, and included it in the basic ADSL broadband Internet service. The service mechanism of BB phone is shown in Figure 4.16. BB phone service is user-

![Diagram of IP Telephony](image)

Tel: 03-xxxx-xxxx  Tel: 03-yyyy-yyyy  Tel: 03-zzzz-zzzz

*1) fire police call, special dial call (operator, weather, time signal etc.), advanced telephone call (free dial, mass calling etc.) are directly detour to the public telecommunication network by an adaptor.

Source: Author, 2004

Figure 4.16 BB phone service
friendly; also customers do not have to change their telephone, phone number, and dialing method. Because of its adapter, BB phone automatically bypasses the public telecommunication network. With these advantages, BB phone obtained about two million customers in one year.

In March 2003, incumbent Type I carriers, such as NTT Communications (OCN), JT (ODN), KDDI (DION) followed Yahoo!BB’s lead. Major ISPs such as @nifty, BIGLOBE, So-net, and Panasonic hi-ho also followed, using IP phone wholesale service provided by these incumbent Type I carriers.

Today, there are six major IP phone wholesale players—NTT Communications, NTT-ME (subsidiary of NTT-East), Pulala Networks (subsidiary of NTT-East), KDDI, JT and POWERDCOM.

⇒ KDDI, JT, and POWERDCOM constitute one group. They connect their IP phone networks directly and provide free IP phone service within their group.

⇒ NTT-ME and Pulala networks constitute a second group. They too connect their IP phone networks directly and provide free IP phone service within their group.

⇒ NTT Communications does not have a strong relationship with other IP phone wholesale players. It provides IP phone interconnection service with NTT-ME and Pulala networks via PSTN network. Calls for other IP phone wholesale players are detoured to PSTN directly using an adapter function.

All of the above players provide both traditional-telephone-to-IP phone service and IP-phone-to-traditional-telephone service based on measured rates. Yahoo!BB is only one providing IP-phone-to-traditional-telephone service. They have not distributed the “050” number to their customer so they cannot provide traditional-telephone-to-IP-phone service. They also do not provide IP phone wholesale service for other players. The structure of IP phone service industry is shown in Figure 4.17.
Currently, the major ISPs are using multiple IP phone wholesale players and multiple local access players. There are strong relationships between both IP phone wholesale players and broadband local access players, therefore combination of IP wholesale players and local access players have some restrictions.

Figure 4.18 illustrates the IP phone service provided by @nifty. Customers can choose from @nifty phones K, C, and F. The range of free phone service and the rate of charged phone service is different depending on which service the customer chooses.
4.4.3 Portals

Major ISPs have developed their own portal websites for their users coming out of narrowband Internet service in order to increase advertising fees for their portal site. Major ISPs have developed their own portal websites for their users who are coming out of narrowband Internet service, thus enabling the ISPs to increase the advertising fee for their portal site. In addition, the ISPs hope to build their portal into a platform for advertising their products and services.

However, since Internet service is a pull-type media viewed by a user’s spontaneous click, users can also utilize other providers’ portal site freely without being
bound to one ISP. Moreover, if users try a service and are satisfied, the possibility of returning to that same portal site increases. Therefore if a special portal site operated by an entrepreneur with excellent know-how in a specific field receives good evaluations from customers, the customers will tend to concentrate on that specific site.

Table 4.3 shows the ranking of popular portal and search engine websites. Based on customer surveys, the major ISPs do not hold good positions. Their portal sites are too generic and cannot compete with a specific site. Therefore the major ISPs cannot efficiently use their customer base to increase use of their portal site.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yahoo! Japan</td>
<td>84.6%</td>
<td>ISP portal site</td>
</tr>
<tr>
<td>2</td>
<td>Google</td>
<td>46.2%</td>
<td>Search engine</td>
</tr>
<tr>
<td>3</td>
<td>goo</td>
<td>37.2%</td>
<td>Portal(NTT associated)</td>
</tr>
<tr>
<td>4</td>
<td>MSNsearch</td>
<td>28.9%</td>
<td>Portal</td>
</tr>
<tr>
<td>5</td>
<td>infoseek</td>
<td>28.1%</td>
<td>Portal(RAKTEN affiliated)</td>
</tr>
<tr>
<td>6</td>
<td>LYCOS Japan</td>
<td>12.5%</td>
<td>Portal(RAKTEN affiliated)</td>
</tr>
<tr>
<td>7</td>
<td>Excite Japan</td>
<td>12.2%</td>
<td>Portal</td>
</tr>
<tr>
<td>8</td>
<td>BIGLOBE search</td>
<td>11.1%</td>
<td>ISP portal site</td>
</tr>
<tr>
<td>9</td>
<td>Fresh eye</td>
<td>5.4%</td>
<td>Portal</td>
</tr>
<tr>
<td>10</td>
<td>OCN search</td>
<td>4.8%</td>
<td>ISP portal site</td>
</tr>
</tbody>
</table>

(total group=1969, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.3 Popular portal and search engine websites

4.4.4 Video Contents Delivery

Video contents delivery service is one of the services that help to understand the merit of broadband Internet. It is also as an application that generates additional fees. Therefore, the major ISPs are positioning this service as a potential high-profit-margin service by providing a video contents delivery service on their portal site.
Table 4.4 shows the popularity of video contents pay programs. Based on a customer survey of a base group of 2,743, 1,456 (53.1% of 2,743) had used a video contents program but only 218 (7.9% of 1456) had used the pay program; and regrettfully an adult site was ranked first. Table 4.5 shows the potential for using pay programs in the future. In the base group of 2,743, 2,333 (85% of 2,743) were willing to use a pay video program, and the first choice was movies and TV programming. Clearly, there is potential willingness among users to pay for good programs.

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>adult</td>
<td>35.3%</td>
</tr>
<tr>
<td>2</td>
<td>Movie, TV program</td>
<td>32.1%</td>
</tr>
<tr>
<td>3</td>
<td>Animation, Comic</td>
<td>17.9%</td>
</tr>
<tr>
<td>4</td>
<td>Concert, Live show</td>
<td>14.2%</td>
</tr>
<tr>
<td>5</td>
<td>Music(promotion video)</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

(Base group=218 of 2743, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.4 Popularity of video contents pay programs

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Movie, TV program</td>
<td>46.8%</td>
</tr>
<tr>
<td>2</td>
<td>Concert, Live show</td>
<td>31.7%</td>
</tr>
<tr>
<td>3</td>
<td>Music promotion video</td>
<td>25.6%</td>
</tr>
<tr>
<td>4</td>
<td>Education</td>
<td>19.4%</td>
</tr>
<tr>
<td>5</td>
<td>Live sports program</td>
<td>16.0%</td>
</tr>
</tbody>
</table>

(Base group=2,333 of 2743, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.5 Potential for using pay programs in the future

The major reasons why ISPs have not increased their broadband video contents delivery service are:
• The traditional broadcast Industry has a huge accumulation of video programs that were originally used for television programs. These television programs involve complicated rights that must be observed among scenario writers, presenters, actors, actresses, players, television stations, etc. Therefore it is not easy to ask for permission from all these sources. As a result, broadband contents delivery cannot easily use high-quality valuable television programs as part of their content service.

• Contents delivery network (CDN) entrepreneurs, such as All and Hip pops, are building a contents distribution system without including the ISP networks. They have coordinated a direct path from the contents provider to the customer by cooperating with the local access provider. In addition, several television stations have begun to provide their contents as a pay service on CDN.

4.4.5 E-commerce

The major ISPs have developed comprehensive online shopping malls that deal with a variety of goods and services. They are developing an agency-type business model to collect commission fees for opening shops and monitoring the amount of sales, etc.

Table 4.6 shows a breakdown of website usage for purchasing at Internet shopping malls. "Apparel, Jewelry" is first, followed by "Furniture, small article", "Grocery, Beverage", "Health food, Diet food", and "Book, Magazine" follow. The most popular online shopping mall (including mail order site) is shown in table 4.7. Rakuten, new online shopping entrepreneur, ranks first, followed by mail-order companies such as NISSEN, Cecile, BELLE MAISON.
<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apparel, Jewelry</td>
<td>55.5%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Furniture, small article</td>
<td>30.4%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grocery, Beverage</td>
<td>24.3%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Health food, Diet food</td>
<td>24.3%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Book, Magazine</td>
<td>5.2%</td>
<td></td>
</tr>
</tbody>
</table>

(Base group=186, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.6 Most visited websites for purchasing at Internet shopping malls

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RAKUTEN</td>
<td>43.1%</td>
<td>Internet mall (new entrepreneur 1997)</td>
</tr>
<tr>
<td>2</td>
<td>NISSEN</td>
<td>21.4%</td>
<td>Catalog mail order</td>
</tr>
<tr>
<td>3</td>
<td>Cecile</td>
<td>15.6%</td>
<td>Catalog mail order</td>
</tr>
<tr>
<td>4</td>
<td>BELLE MAISON</td>
<td>11.2%</td>
<td>Catalog mail order</td>
</tr>
<tr>
<td>5</td>
<td>Yahoo shopping</td>
<td>5.2%</td>
<td>Portal</td>
</tr>
</tbody>
</table>

(Base group=997, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.7 Most popular online shopping malls (including mail-order sites)

Table 4.8 shows the most popular auction site. Yahoo! Auction ranks first, followed by online shopping entrepreneur such as RAKUTEN, BITERS, then portal site such as Excite auction, Lycos auction.

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yahoo! auction</td>
<td>77.7%</td>
<td>Internet Portal, ISP</td>
</tr>
<tr>
<td>2</td>
<td>RAKUTEN</td>
<td>35.6%</td>
<td>Internet shopping</td>
</tr>
<tr>
<td>3</td>
<td>BIDDERS</td>
<td>22.8%</td>
<td>Internet auction &amp; shopping</td>
</tr>
<tr>
<td>4</td>
<td>Excite auction</td>
<td>2.4%</td>
<td>Internet Portal</td>
</tr>
<tr>
<td>5</td>
<td>Lycos auction</td>
<td>1.4%</td>
<td>Internet Portal</td>
</tr>
</tbody>
</table>

(Base group=1,141, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.8 Most popular websites for Internet auction purchases
The ISPs also track the kinds of websites visited by users to collect information when they purchase a product or service. A breakdown of website usage is shown in Table 4.9. “Books/magazines” is first, followed by “Travel-related,” “Electrical appliances,” “Videos/CDs/DVDs,” and “Computer-related” follow. The most popular online book and magazine websites are shown in Table 4.10. Amazon ranks first, followed by other online shopping entrepreneur, such as RAKUTEN books, BOOK1, e-Shopping!Books, then traditional book resellers such as Kinokuniya.

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Books, magazine</td>
<td>50.6%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Travel, hotel, air,</td>
<td>48.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Electric appliances</td>
<td>44.3%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Video, DVD, CD</td>
<td>40.7%</td>
<td>Online download is excluded</td>
</tr>
<tr>
<td>5</td>
<td>Computer peripheral</td>
<td>40.4%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Personal computers</td>
<td>39.1%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Audio-visual apparatus</td>
<td>35.1%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Computer software</td>
<td>34.3%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Apparel, Jewelry</td>
<td>25.5%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Event tickets</td>
<td>25.1%</td>
<td></td>
</tr>
</tbody>
</table>

(Base group=2,513, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.9 Most visited websites for purchasing

<table>
<thead>
<tr>
<th>rank</th>
<th>field</th>
<th>rate</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amazon</td>
<td>40.4%</td>
<td>Including co.jp and .com</td>
</tr>
<tr>
<td>2</td>
<td>RAKUTEN books</td>
<td>11.6%</td>
<td>portal</td>
</tr>
<tr>
<td>3</td>
<td>BOOK1</td>
<td>5.8%</td>
<td>online book shopping</td>
</tr>
<tr>
<td>4</td>
<td>e-Shopping!Books</td>
<td>5.6%</td>
<td>online book shopping</td>
</tr>
<tr>
<td>5</td>
<td>Kinokuniya BookWeb</td>
<td>4.2%</td>
<td>Book reseller</td>
</tr>
</tbody>
</table>

(Base group=708, multiple responses allowed)

Source: Internet White Paper 2003

Table 4.10 Most popular online book purchasing websites
Based on above customer surveys, it is clear that major ISPs do not have enough competence. Major ISPs’ shopping malls are linked with their portal site so their e-commerce sites are not recognized well. On the contrary, new online shopping entrepreneurs and traditional resellers hold good position. Especially, traditional resellers are developing their click and mortar type e-commerce helped by their brand name and operating power.
Chapter 5

NTT's Strategies for Next-Generation Fixed Line Service

5.1 VI&P Vision

In 1992, NTT established the concept of “VI&P” (Visual, Intelligent, and Personal) as its vision of a future multimedia world and what NTT could offer as a network provider. This notion is not so different from the company’s previous “INS World” concept, but this time the vision was revised based on technology changes and having learned from the failure of the previous experiment. The components of the VI&P concept are described below.

- **Visual**: a high-speed broadband visual communication services that uses ATM switching and light-wave technologies. It offers customers clear, colored, motion pictures in office and home.

- **Intelligent**: a communications that utilize knowledge processing by computers, thus offering consumers a convenient and user-friendly data transaction service that can be used in office and home.

- **Personal**: a communication service that utilizes ultra-small portable terminals and network ID searcher technology. It will offer every consumer a compact, less-expensive personal terminals which are available everywhere and convey data and visual information.

The services that would become available in VI&P was shown in Figure 5.1. NTT also announced its release schedule for FTTH. As shown in Figure 5.2, NTT plans to build broadband ISDN networks (i.e., FTTH) by 2015, which would then be available to support VI&P services.
Figure 5.1 Services offered in VI&P
5.2 Practical Steps for FTTH

In 1994, NTT announced that it would make FTTH available to every home by 2010. NTT’s vision for bringing multimedia communications services to private residences had always been planned around FTTH. However, due to the popularity in other countries of analog coaxial cable and wireless technologies, these technologies could be another alternative. Therefore, NTT revised its FTTH timetable as follows: instead of reaching every home by 2010, NTT will make FTTH available to every home from a nearby terminus by 2010. This means terminating the optical fiber connection close to a group of homes and then providing service on a willing-to-pay basis.

With the advent of its VI&P vision, NTT embarked on a program to replace metallic feeder cables with optical fiber cables (up to the feeder point) using the remote
terminal (RT) system. With this system, fiber-optic was made available to homes from a nearby terminus point where the RT is installed.

In 1997, NTT introduced its so-called “New Optical Access System,” which uses a passive optical network (PON) system and provides analog telephone (ISDN 64bps), low-speed exclusive line services. With this system, fiber to telephone poles near customers was installed, at a cost almost equivalent to that of metallic cable. As a result, existing metallic cables, which are used primarily for telephone service, could be replaced with fiber-optic cables.

5.3 A New Vision Plan

5.3.1 Vision for a New Optical Generation

In November 2002, NTT announced its “Vision for a New Optical Generation—Broadband leading the world of resonant communication,” which offers NTT’s vision for full-scale, ubiquitous broadband that will be realized using fiber optics in the next five years. Concept of the “Vision for a New Optical Generation” is shown in Figure 5.3. This common vision binds together the NTT Group of companies so it can work toward realizing a resonant communication network environment that offers superior usability and a wide range of new services and new business opportunities.
"Resonant communication" refers to the new-generation communication environment that uses optics that resonate and evolve with society. In such an environment, people, companies, and general society will:

- become interactive using broadband;
- be connected by an ubiquitous network “anytime, anywhere and with anyone or anything”;
- enjoy superior usability that is “safe, reliable, and simple.”
An illustration of the network that supports the resonant communication environment is shown in Figure 5.4. In this environment, where such things as sharply defined videos are connected interactively, globally, and ubiquitously via a network, it is essential that the environment provide safe, reliable, and simple connections to the general public, and that it enables information sharing regardless whether the user environment consists of terminal clusters with operating systems or protocols like advanced PCs, cellular phones, home information appliances, etc., or other advanced access methods such as local LAN and wireless LAN.

Source: NTT

Figure 5.4 Image of network supporting resonant communication environment
In addition to the existing high-speed broadband Internet services, NTT Group will be offering highly reliable network services with an end-to-end, advanced, real-time connection in order to respond to the diverse needs of users. NTT’s aim is to anticipate needs and changes in the IT market, and then dynamically utilize the Group’s resources to the greatest extent possible, making every effort to quickly realize an environment of full-scale resonant communication that uses optics.

5.3.2 Practical Steps for the New Vision Plan

In April 2003, NTT Group announced its three-year business plan. Guided by the new “Vision for a New Optical Generation,” NTT Group will concentrate the entire Group’s capabilities on creating a sound business foundation by cultivating new markets that are centered on information communication and IT services.

In pursuit of this purpose, NTT Group has identified super high-speed, interactive, and reliable optical access services as the mainstay of its broadband services, and will concentrate its marketing efforts on this strategic field. The goal is improve marketability of ADSL services by engaging competitively, responding to diverse user needs, and identifying potential users of optical services.

NTT management goals for FY 2005 are shown in Tables 5.1 and 5.2 which show NTT’s consolidated operating income, EBITDA margin, operating cash flow, and ROCE.

<table>
<thead>
<tr>
<th>Operating Income (¥, trillion)</th>
<th>FY 2005</th>
<th>FY 2002 (reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBITDA Margin (%)</td>
<td>33%</td>
<td>36%</td>
</tr>
<tr>
<td>Operating FCF (¥, trillion)</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>ROCE (%)</td>
<td>7%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

Source: NTT

Table 5.1 NTT Group’s Three-Year Business Goals (consolidated)
<table>
<thead>
<tr>
<th></th>
<th>FY 2005</th>
<th>FY 2002 (reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Revenues (¥, trillion)</td>
<td>11.7</td>
<td>10.9</td>
</tr>
<tr>
<td>Capital Investment* (¥, trillion)</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Outstanding Interest Bearing Debt (¥, trillion)</td>
<td>5.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Number of Employees (thousands)</td>
<td>197</td>
<td>207</td>
</tr>
</tbody>
</table>

Source: NTT

Table 5.2 NTT Group's Three-year Business Goals (Reference Indicators-consolidated)

5.3.3 Establishing a New Company

To realize the “Vision for a New Optical Generation,” NTT announced in December 2003 that it was establishing a new company, NTT Resonant Inc. The new company has the dual mission of developing new broadband markets and contributing to the e-Japan strategy.

As NTT Group’s principal engine in the broadband business, NTT Resonant will function as a leading developer of services, such as high-quality interactive video communications services featuring superior usability. These services will be marketed through the NTT Group of companies. In addition, NTT Resonant will help develop new applications and platform functions, including developments in collaboration with other companies.

For this purpose, NTT-X Inc. and NTT Broadband Initiative Inc. were merged with the new company through a transfer of operations in April 2004. Furthermore, the development resources of NTT Laboratories and those of NTT Group companies will be concentrated in NTT Resonant.

The business areas of the new company are shown in Figure 5.5. Targeting businesses, communities, and individual customers, the new company will utilize state-of-the-art technologies to develop a line of low-cost products featuring video
communications services, broadband portals, and packages of such services designed to meet specific needs.

![Diagram showing the business areas of the new company.](image)

Source: NTT

Figure 5.5 Business areas of the new company

A conceptual diagram of services to be offered is shown in Figure 5.6. The NTT Group companies will provide customers with one-step access at reasonable rates, while maintaining competitive rates. They will provide video communications services and broadband portals offered by the new company as their own services or as package services by combining them with their own applications to meet the diverse needs of users.
In the area of broadband portals, the so-called "goo" function, provided by the former NTT-X, will be expanded at an early date, and linkages with various sites will be strengthened and upgraded.

Regarding video communications, the company aims to launch high-quality service in the major metropolitan areas beginning in the second half of FY2004 and thereafter gradually expand the coverage area.
Chapter 6
Recommendations and Conclusion

6.1 RECOMMENDATIONS

6.1.1 Local Access Business

The main strategic recommendations focus on three areas: local access integrated versus local access separated; local access wholesale versus local access direct sale; and FTTH versus ADSL.

Local access integrated versus local access separated

It has been suggested that NTT could launch a new local access integrated type broadband service from an NTT affiliated company. However, I do not recommend this solution. NTT affiliate companies should not become involved in unbundling copper pair and fiber-optics to provide local access integrated service, for the following reasons:

- Local access broadband service is the only growth market for NTT East and NTT West. Because user access is the critical demand, current regulatory policy does not and will not allow NTT East and NTT West to offer Internet access service. So local access service is the only potential source of revenue that would sustain the maintenance costs associated with their huge user access facilities such as copper-pair and fiber-optics.

- The environment for the domestic fixed-line telecommunication business is getting tougher. Demand is down in both volume and value as traffic emigrates to mobile
communications, while revenue bears the brunt of rate cuts and escalating discounts, as evident in the sliding average revenue per user.

⇒ Prospects for sales growth are slim, making cost reductions vital if NTT East and NTT West hope to remain profitable. It is imperative for NTT East and NTT West to expand into the broadband-related business as well as to slash costs further.

⇒ There is little room left in the market for commencing new local access integrated type service, and trying to implement such a service would deteriorate relations between NTT East and NTT West, and traditional major ISPs.

⇒ The current trend in broadband Internet usage is migration from narrowband to broadband. Current Internet users number is about thirty million and about one-third are broadband users. Therefore about twenty million customers still use narrowband Internet provided by traditional ISPs. This means the major traditional ISPs already have a potential base of broadband Internet users. But at least for next few years, traditional ISPs will be strongly urging the changeover of their narrowband Internet users to broadband Internet, in coordination with NTT East and NTT West, and directly competing with integrated type players such as Yahoo!BB and K-Opticom.

*Local access wholesale service vs. local access direct sale service*

Another suggestion is that NTT East and NTT West support local access wholesale service. I do not recommend this solution at this time, for the following reasons.

⇒ Repositioning FLET’S (the broadband local access service of NTT East and NTT West) is not a good strategy. FLET’S is the only service supported by virtually all ISP players. Middle-class ISPs and regional ISPs use FLET’S as the only option offered to their customer. This segment in not especially profitable, but FLET’S holds the dominant position. Even NTT’s competitors, such as KDDI and JT, offer
FLET'S as an option. That means FLET'S can offer a complementary service for wholesale services. Therefore, repositioning FLET'S to target wholesale service will decrease FLET'S profit margin in both its dominant and low-profit segments.

⇒ Because of the recent deregulation, there is a possibility that NTT East and NTT West may be allowed to offer a special wholesale tariff targeted to specific ISPs. This would be a good strategy for the future but not right now. Currently, each traditional ISP's position is not sustainable on its own. In the future changeover from ADSL to FTTH, an accompanying changeover among ISPs and a reorganization of ISPs to include local access wholesale players might happen. Therefore it is difficult to designate the potential winner in the future and it is not a good strategy coordinating with specific ISP just now.

⇒ NTT Group's largest ISP, OCN by NTT Communications, already offers an alternative wholesale service provided by ACCA Networks. As mentioned in Chapter 4, local access separate and wholesale services enjoy an advantage over local access separate and direct sale service, and OCN already has this alternative.

**FTTH versus ADSL**

I am optimistic about the future of FTTH. The number of FTTH broadband users is accelerating this year and should continue into the near future, and migration from ADSL to FTTH will follow. My reasons are as follows.

⇒ Currently, FTTH broadband Internet competes primarily in the apartment market. In Japan, the total number of households is about 44 million, and about 19 million households (43%) are apartments. In addition, the proportion of apartment households is higher in metropolitan areas. For example, in the Tokyo area apartments comprise about 70%, and in the Osaka area it is about 60%.
⇒ In the FTTH broadband market focused on apartments, there are two sub-categories: newly built apartments and existing apartments. In 2002, 170,000 apartments were added to the Japanese housing market. As long as the newly built apartment market is sustained, FTTH broadband Internet can increase its user base.

⇒ The speed of ADSL is a huge advantage, but a continuation in the current rapid increase of speed is not sustainable for a majority of customers. As I mentioned in Chapter 4, the speed of ADSL achieves its highest value under ideal circumstances, but 40 Mbps is effectively achieved only in areas less than 1.5km from the regional station and 24 Mbps is effective only in regions ranging from 1.5 km to 2.5 km—even under ideal situation. This distance means the real distance of the copper pair cable length from the ADSL equipment installed in NTT regional building to the user premise’s ADSL modem. NTT regional buildings are usually located in the center of town; so cable access to the user premise is sometimes detoured because cable route is limited by roads and buildings around the NTT regional buildings. Therefore, it is difficult to find users in areas less than 1.5 km (40 Mbps effective area), especially in urban areas.

6.1.2 ISP Business

Currently, the major ISP's business models are not sustainable. In my opinion, a major reorganization of ISP players to include local access wholesale players is inevitable in the future. My reasons are as follows.

⇒ The broadband Internet market is in the midst of a fierce pricing war, and traditional ISPs are rapidly losing their profit margins. The current ISP's business models were established in mid-1990s and targeted narrowband Internet services. At that time, the
ISPs possessed user terminating facilities (modem pool), and they enjoyed a first-mover advantage. So it was easy for them to control their costs. However, in broadband Internet services, the ISPs must outsource their local access segment. Therefore it is difficult to reduce their operating costs, especially when compared with new local access integrated entrepreneurs such as Yahoo!BB.

- Internet access service has become a commodity, and ISPs are losing the synergy effects they formerly enjoyed with PC products. Major ISPs such as @nifty and BIGLOBE are trying to build synergy effects via PC sales and their network solutions. However, in the narrowband Internet era, their network solutions worked together with their personal computers sales. Today, however, Internet access service is already commoditized, and there are few synergy effects.

- The new business model that targets their customer base no longer works well. As I mentioned in Chapter 4, the traditional major ISPs have found few new chargeable businesses to offer their customer base. The only successful new service to date is IP telephony, but that is based on a wholesale service provided by telecommunication carrier affiliated ISPs.

Because of these conditions, I recommend that NTT should not reorganize its ISP businesses too quickly or carelessly. NTT Group has six major nationwide ISP players as shown in Table 6.1. For historical and regulatory reasons already discussed, NTT’s ISP business formation is very complex. However, NTT’s six ISPs represent only a fraction of the overall ISP market, and given some time they will find their own niche in the market and increase the number of users.
<table>
<thead>
<tr>
<th>ISP brand name</th>
<th>Management company</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCN</td>
<td>NTT-Communications</td>
</tr>
<tr>
<td>Dreamnet</td>
<td>Dreamnet (subsidiary of NTT-Communications)</td>
</tr>
<tr>
<td>InfoSphere</td>
<td>NTT PC communications (subsidiary of NTT-Communications)</td>
</tr>
<tr>
<td>Pulala</td>
<td>Pulala Networks (subsidiary of NTT-East)</td>
</tr>
<tr>
<td>Wakuwaku</td>
<td>NTT ME (subsidiary of NTT-East)</td>
</tr>
<tr>
<td>BROBA</td>
<td>NTT Rena (subsidiary of NTT)</td>
</tr>
</tbody>
</table>

Source: Author, 2004

Table 6.1 NTT affiliations with major national ISP players

There is little possibility that customer will switch between NTT’s ISPs just now, and current ISP formations are not sustainable enough. Therefore NTT should be patient and tolerant regarding the autonomy of its subsidiaries and trust their current competence.

6.1.3 NTT’s “Vision for the Next Generation”

As discussed in Chapter 5, NTT’s vision is an important indicator of research and development, and is vital for maintaining cohesiveness and sustaining the long-term vision of the Group’s companies. Therefore NTT should carefully consider the following points.

⇒ NTT’s vision statement, “Vision for a New Optical Generation,” should be simplified in a way that the general public can understand and accept. As presently constructed, the concept is R&D-driven, and therefore its expression is dense and difficult for the general public to understand.

⇒ In my view, one of the key concepts of the vision is creating a new C-to-C marketplace. The current business model of ISPs is not able to successfully implement a C-to-C business. However, if NTT can successfully create a C-to-C marketplace, the need for upstream bandwidth will increase and the shift from ADSL to FTTH will be remarkable!
⇒ In order to install a new business model, substantial differentiation with current Internet access service will be necessary. However, unless the general public understands NTT's new vision, they will be unable or unwilling to rise to the new C-to-C marketplace.

⇒ NTT's vision has a tendency to adhere to the old notion of an integrated network solution, but NTT should let go of this outdated notion. Basically, the Internet is a customer-oriented market, and it is difficult to push one carrier's solution and attempt to make it fit all customers' needs.

⇒ Historically, NTT's vision has always had a grand framework that is often not fulfilled as originally designed. However, at least some portion of the vision served as a driver for developing the existing network. For example, the INS vision was installed as a fully digitized communication network coupled with an intelligent telecommunication network. The new VI&P vision was installed as an ultra-high-speed backbone network, FTTH system, the personal handy phone system (PHS), and an open computer network service (now OCN). Therefore NTT should concentrate on identifying a good portion or some fraction of the next-generation infrastructure and ensure that it is installed prior to implementing the integrated solution.

6.2 Conclusion

In Japan today, the Internet access business was developed and is promoted by computer manufacturers, such as Fujitsu and NEC, since the narrowband era when they sought synergy effects between their PC sales and network solutions. Recently, however, new entrepreneurs, such as Yahoo!BB and USEN, are propelling the diffusion of broadband Internet. Traditional ISP players are still major entities, but they are losing
their competence. ISP service has become commoditized, and traditional ISP players are unable to successfully create profitable new services. In the near future, most ISP players will likely be reorganized, similar to what happened to the long distance telecommunication players in the late 1990s.

Yahoo!BB is a good example of the fact that the Japanese telecommunication industry can be competitive even in today's Internet era. I believe that broadband Internet competition and diffusion may even help revitalize the Japanese economy, which has suffered through a decade of stagnation.

However, the current competitive situation of broadband Internet is heavily dependent on NTT's network unbundling and co-location of regional buildings. NTT has requested deregulation of its activities in order to diversify their playing field. In return, NTT has accepted a policy that calls for opening its network.

But network opening is a double-edged sword, not only for NTT but for the telecommunication industry in general. Such opening accelerates a distorted type of competition in which competitors do not find merit or affordability in installing user access themselves. This new world is far from facility-based competition.

FTTH broadband Internet is the first attempt at this new competitive market, and NTT and its competitors are competing on a facility-based, user access that targets residential customers in the fixed-line communication market. FTTH broadband is on the right track for facility-based competition. However, growth in demand for FTTH will inevitably lead to lower costs, and the current policy should begin to focus on promoting the use of fiber-optic owned by NTT.

Indeed, some competitors are requesting a more delicate opening policy for the FTTH system, such as individual user pieces based in the PON system. Clearly, NTT must carefully analyze this issue.
Sometimes industries consolidate naturally as they mature, particularly if the primary source of fragmentation was newness in the industry; or exogenous industry trends that lead to consolidation by altering the course of the industry. Recognizing the ultimate effect of such trends, and positioning the company to take advantage of them, can be an important way to overcome current fragmentation. In my opinion, NTT is pursuing the right course of action in the current market and policy environment. NTT should not be impatient to shorten this situation by targeting specific segments or specific players. NTT should urge the government to improve the rules in order to ensure fair facility-based competition among broadband connection services.
REFERENCES


91
REFERENCES (continued)


