

## **Diffusion of the Broadband Internet and the Structural Separation**

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### **Abstract**

Since telecommunications markets were opened to competition, pros and cons on conduct regulation and structural separation on vertically integrated incumbent telecommunications carriers have been much discussed. Since the beginning of 2000s, the discussions on AT&T divestiture type 'long distance and regional business separation' have faded out reflecting the rapid growth of the broadband Internet. Alternatively, the discussions on functional separation emerged in the EU, its Member States and Oceania as a complementary remedy for conduct regulation to remove access bottleneck in broadband competition. In contrast, there are almost no discussions on vertical separation in the US, because facilities based competition is intense between large incumbents and cable providers. While rigid conduct regulation has been imposed on NTT's access network in Japan, the discussions on the ownership separation of NTT's subsidiary companies have lingered on. It is planned that the MIC will resume discussions on the ownership separation of NTT's subsidiary companies. It is true that LLU obligation and low rate setting on LLU were effective, as a short period objective to recover the delay in the diffusion of broadband, but discussions on ownership separation were just a tool to induce NTT to accept rigid conduct regulations. As was the case in Japan, the implementation of conduct regulation and the possible implementation of ownership separation helped the development of service based competition. However, it also incurred the concerns that it might hinder the development of facilities based competition not only in DSL but also in its successive broadband technologies. A rigid unbundling regulation should be imposed as a temporary remedy until some degrees of competition develops after the burgeoning of broadband. We should acknowledge the risk of vertical separation forced by regulation in a sense that it is likely to suffocate the development of the facilities based competition based on various new technologies.

### **1. Introduction**

The encouragement of the fair competition between vertically integrated incumbent carriers and new entrants has been one of the most important regulatory issues in telecommunications industry after the introduction of competition. The structural separation of incumbents has been discussed as one of the ways to promote fair competition in addition to conduct regulations such as interconnection rules.

These discussions on structural separation in the telecommunications sector originally began at the time of traditional POTS (Plain Old Telephone Service) era based on the clear classification between long distance and regional communications. Although such classification gets obsolete

with the diffusion of the Internet, structural separation is still on discussion tables in many of the advanced countries except for the US. In the US where AT&T was broken up in 1984, reintegration of divested regional companies (RBOCs) and long distance companies including former AT&T progressed and discussions on the vertical separation is silent these days. On the other hand, in Japan where NTT was reorganized into two regional companies, one long distance company, one mobile company and others under a holding company, the discussion on the ownership separation of NTT subsidiary companies is still continuing despite the rapid diffusion of broadband. In the EU, functional separation of incumbents is hotly discussed during EC 2007 telecommunications regulatory reform discussions.

This paper tries to survey the differences in recent discussions on the structural separation of incumbents among Japan, the US and Europe and explain them from the perspective of broadband market structure in each country. This paper is organized as follows. First, we classify the discussions on structural separation in telecommunications sector and oversee current status of broadband market in Japan, the US and the EU. Second, we evaluate recent discussions on structural separation in the US. Third, we evaluate the history and background of discussions on structural separation in Japan. Fourth, we evaluate recent discussions on structural separation in the EU. Fifth, based on above analysis, we explain the differences between structural separation policies in Japan, the US and Europe from the perspective of the broadband Internet market structure and consider lessons for the future discussions.

## **2. Telecommunications market and structural separation**

It is one of the important issues for a competition policy to constrain the abuse of market power in the upstream market towards the downstream market, in case a dominant company in the upstream market is also active in the downstream market. The measures to secure fair competition in these circumstances are largely classified into ‘structural separation’ and ‘conduct regulation’. As incumbents historically dominated local facilities in the telecommunications industry, securing fair competition between incumbents and new entrants became a big issue. Therefore, separating local businesses and long distance businesses of an incumbent (i.e. ‘structural separation’) as well as ‘conduct regulation’ such as interconnection have been discussed. In the telecommunications sector, in addition to this type of narrowly defined structural separation, functional separation that doesn’t include ownership separation is discussed. As OECD classifies vertical separation into ‘structural separation’ and ‘operational separation’ (OECD [2006]) and Cave defines 8 types of separations ranging from ‘accounting separation’ to ‘ownership separation’ (Cave [2006]), the interpretation of vertical separation varies. As EC defines the separation with ownership unbundling as ‘structural separation’ and the separation without ownership separation as ‘functional separation’ in EC 2007 telecommunications regulatory reform<sup>1</sup>, we follow this EC definition

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<sup>1</sup> For example, see EC [2007b].

hereafter in this paper. And we also define combined notion of ‘structural separation’ and ‘functional separation’ as ‘vertical separation’<sup>2</sup> .

This type of vertical separation is introduced based on the assumption that the merits of promoting competition through the measure outweigh the losses of economy of scope resulting from the separation of an incumbent’s organization and/or businesses. On the other hand, conduct regulation imposes interconnection and other rules on incumbents prohibiting the abuse of their market power while keeping their efficiency by maintaining integrated organization. Under conduct regulation, it is impossible to put ex ante regulation on all of expected enterprise business operations. Therefore, there remain irremovable claims from new entrants that it is impossible to prohibit anti competitive behaviors of incumbents only by imposing conduct regulation.

Vertical separation, however, raises a fundamental issue that certain forms of conduct regulation is nevertheless required as long as a separated company holds market power in the upstream market. And also, vertical separation accompanies a risk that it is likely to prevent the flexibility to respond to the changes in markets such as a shift from traditional POTS to IP services. Since there are various problems in applying conclusions derived from theoretical industrial organization study, policies taken by each country differ significantly. In the US they divested AT&T in 1984, and Japan reorganized NTT in 1999 by establishing a holding company that oversees a long distance, two regional and a mobile operating companies etc. As such, direct or virtual type of structural separation was adopted exceptionally in some nations in the 20<sup>th</sup> Century<sup>3</sup> . Purposes of these separations were to assure the fair interconnection of the long distance networks of the new entrants and the local networks of the incumbents that were used for legacy fixed voice services. In Europe, since the market liberalization in 1980-90s, there has been no case for such kind of ‘long distance-regional business structural separation’ being introduced by regulators.

As is widely recognized that the separation of long distance and regional businesses is not possible in the recent broadband Internet, no one discusses recreation or continuance of AT&T type divestiture. It is, however, actively discussed in Europe and Oceania that it is desirable to functionally separate the access business of the incumbents in order to remove the competitive problems resulting from the bottleneck nature of access networks that sustain broadband services. Functional separation was already introduced in the UK (BT) and New Zealand (TCNZ)<sup>4</sup> . On the

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<sup>2</sup> Theories on vertical separation in telecommunications industry are analyzed in detail in a working paper by Sasaki. (Sasaki [2007])

<sup>3</sup> Though NTT keeps ownership relationships between long distance, regional, mobile and other businesses under a holding company, such organizational structure is a tentative result of discussions on structural separation of NTT that has continued since the privatization of the company. Each operating company is regulated to conduct businesses stipulated by NTT Law and a guideline issued at the time of reorganization in 1999. Therefore, we should regard current NTT group companies as virtually divested companies.

<sup>4</sup> TeliaSonera and Telecom Italia voluntarily established functionally separated access divisions in early 2008.

other hand, the discussions on vertical separation of the incumbents including functional separation of access are currently inactive in the US. In Japan, it is decided that the review of the organizational structure of NTT will be resumed in 2010 based on the common recognition among the related parties that current distinctions between local and long distance businesses is inappropriate in the broadband era.

In general, it is a widespread tendency in the US, based on post Chicago School assertion, to conduct balancing analysis of merits and demerits of vertical integration taking into account each situation<sup>5</sup>. This trend is clearly found in recent reviews of the US M&A cases. It is a prevailing notion in Europe that the application of functional separation is justified only when benefits exceed its costs. This is also the reflection of the balancing analysis of post Chicago School type approach. Functional separation in Europe, however, was invented as a remedy to promote service based competition. Its starting point is different from the US where facilities based competition has developed.

Why dose such discussions on the separation of dominant incumbents in the telecommunications industry differ in Japan, the US and Europe? We assume that the differences derive from the variations in stages and phases of recent broadband diffusion and competition in each country as shown in Table 1.

**Table 1. Status of broadband penetration and competition in Japan, the US and Europe**

<b>Japan</b>	
<b>Penetration</b>	DSL services are the fastest and cheapest in the world (ITU [2006]) and the number of subscribers of FTTx is the largest with 11.33M as of the end of 2007. Broadband market share for cable companies slightly decreased from 15.4% at the end of 2004 to 13.5% at the end of 2007.
<b>Competition</b>	NTT's share in the retail DSL services was 37.4% as of the end of September 2007 due to the intense service based competition. NTT's share of retail FTTx services was 70.5%. FTTx market is characterized by the mixture of service based and facilities based competitions (Fuke [2008]). KDDI, potentially the largest facilities based competitor to NTT, is utilizing assets acquired from an electric power company and a subsidiary cable TV company.
<b>Regulation</b>	Unbundling obligation has been imposed on both DSL and FTTx loops of NTT.
<b>The US</b>	
<b>Penetration</b>	Until several years ago, the transmission speed of DSL services was considerably slow and their rate was expensive compared to Japan and Korea (ITU [2003]) <sup>6</sup> . Verizon and AT&T are recently accelerating FTTx deployment and cable companies are upgrading the transmission speed in their cable modem services
<b>Competition</b>	Incumbent telecommunications carriers and cable companies are competing intensely on facilities base. Triple play competition is intense.
<b>Regulation</b>	FCC abolished line sharing obligation for copper loops and unbundling for fibers excluding voice 64 Kbps path in 2005.

<sup>5</sup> See Yoo [2002] for discussions on post Chicago School.

<sup>6</sup> Prices per 100Kbps were \$0.09(Japan), \$0.25(Korea) and \$3.53(The US) at the time.

<b>Europe</b>	
<b>Penetration</b>	Many of the Member States show penetration rate almost the same as in Japan (21.3%) and in the US (22.1%). In the UK; 23.7%, in France; 22.5%, and in Germany; 21.2% (OECD [2007]). Except for the Netherlands where cable modems are dominant and Sweden where FTTx is widely deployed, the dominant broadband technology is DSL. However, commercial FTTx services are starting to be launched in Germany and France.
<b>Competition</b>	Competition is limited to the intra modal service based competition in DSL market in many of the Member States. To promote service based competition, LLU and bitstream access (BSA: wholesale product for resale) are prepared. Incumbents' share in retail markets and the usage rate of LLU and BSA varies significantly among Member States.
<b>Regulation</b>	The EU has shifted from the unified 'LLU Regulation' to the introduction of LLU and BSA obligations based on market analysis in each country under 2003 regulatory framework. Most Member States impose LLU and BSA obligations on the incumbents. As for FTTx, many countries are conducting regulatory review to decide how to treat FTTx. Remedies such as 'open access to duct as the first step, with dark fiber as the second step' and 'sharing of intra building wire' are under discussion.

(Note) This table explains general situation and details of each European country will be described later.

### **3. Current status of broadband competition and discussions on structural separation in major countries**

#### **3-1. Status of broadband competition**

There are several official broadband statistics used in this paper including *Internet Report* (ITU [2006]), *Broadband statistics* (OECD [2007]) on global basis, and *Number of Broadband Service Contracts* (MIC [2008a]) in Japan, *Report on the Implementation of the Telecommunications Regulatory Package* (EC [2007a]) in Europe, *High-Speed Services for Internet Access* (FCC [2008]) in the US.

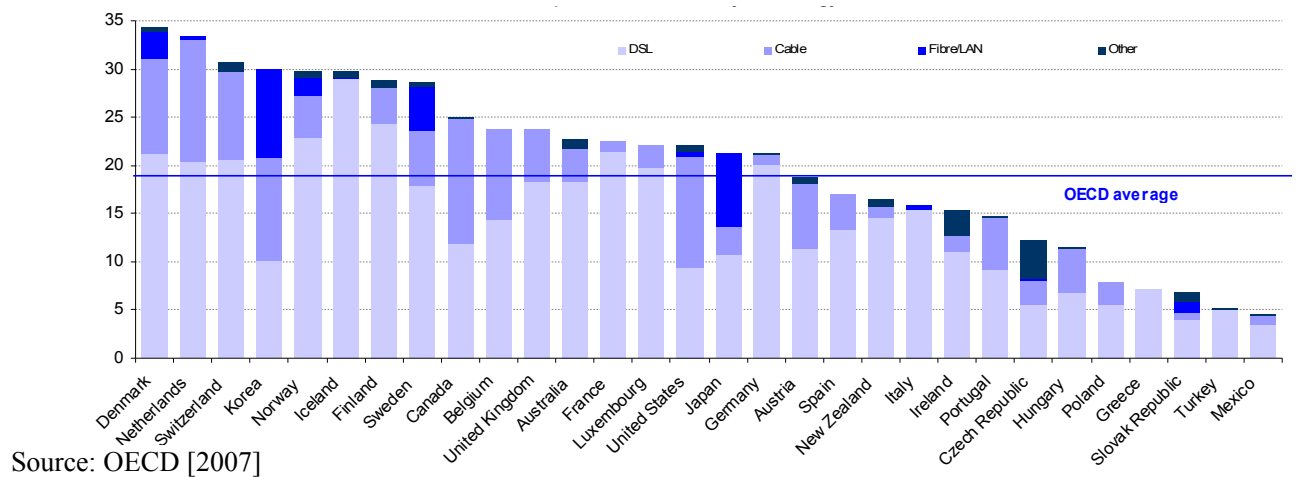
Firstly, we will have a brief look at the outline of world broadband status by OECD statistics (OECD [2007]). Figure 1 reveals the characteristics of broadband diffusion in the countries covered by this paper.

#### **1) Penetration**

- Penetration rates per 100 inhabitants are almost the same among Japan, the US, the UK, Germany and France (around 22%).
- The top 4 countries (from Denmark to Korea) in terms of penetration rate deploy broadband technologies other than DSL (mostly cable).

#### **2) Subscriber shares based on different technology in the whole broadband market**

- DSL is the most popular technology except in the US. The percentage of DSL in the whole broadband services is 95% in Germany and France, 77% in the UK and 50% in Japan.
- Cable has the majority shares in the US with 52%.
- Japan shows the highest FTTx share with 36%.



**Figure 1. OECD broadband subscribers per 100 inhabitants by technology, June 2007**

**Table 2. Broadband penetration rates per 100 inhabitants by technology in major countries.**

Penetration	DSL	Cable	FTTx/LAN	Others	Total
<b>Japan</b>	10.8%	2.9%	7.6%	0.0%	21.3%
<b>The US</b>	9.3	11.5	0.6	0.7	22.1
<b>The UK</b>	18.4	5.3	0.0	0.0	23.7
<b>Germany</b>	20.2	1.0	0.0	0.1	21.2
<b>France</b>	21.4	1.1	0.0	0.0	22.5

Source: OECD [2007]

### **3-2. Status of discussions on structural separation**

As described above, very few discuss vertical separation in the US as of early 2008. In contrast, pros and cons of functional separation have been actively discussed in Europe. One of the recent reports that picked up vertical separation in utility industries including the telecommunications as official review topics is an OECD Recommendation Report of 2001 (OECD [2001]). In the recommendation, OECD proposed that “[w]hen faced with a situation which a regulated firm is or may in the future be operating simultaneously in a non-competitive activity and a potentially competitive complementary activity, [m]ember countries should carefully balance the benefits and costs of structural measures against the benefits and costs of behavioral measures”. OECD issued a report in 2006 to assess the result of the 2001 recommendation and stated that “the potential benefits of ownership separation, such as reduced regulation and stimulation of innovation, may not apply in the case of the local loop”. It added that “[e]ffective operational separation has the potential to allay pervasive, longstanding and potentially unavoidable problems that have affected access regulation” (OECD [2006]). EC quoted this OECD 2006 assessment and pointed out that “[t]he general view, as confirmed by two OECD reports, is that complete structural separation is rarely justified in the communications sector” (EC [2006])

As described above, there are many demerits deriving from structural separation in the telecommunications sector that is characterized by more rapid and intense technological innovation than energy and gas industries<sup>7</sup>. Therefore, many share the same view that it is not appropriate to adopt structural separation in the telecommunications industry. For example, key related parties sent comments opposing structural separation to an EC consultation document issued in June 2006 during the process of EC 2007 regulatory reform. EC itself revealed an opinion recommending functional separation in the explanatory note for the proposed Directives adopted on 13 November 2007, and stated that “[g]iven this experience and the high level and non revocable intervention involved, very significant benefits of mandated structural separation in terms of gains from achieving equal would have to be demonstrated for it to be a suitable remedy in the telecommunications sector” citing the conclusion of the above mentioned OECD report (EC [2007b]). Furthermore, I/ERG (Independent Regulatory Group and European Regulatory Group) said clearly “I/ERG would also support the Commission’s view that structural separation is not appropriate” (IRG/ERG [2006]). Contrastively, there are few voices opposing entirely to add functional separation to the existing regulatory remedies in the proposed EU Directives as an extra regulatory tool for NRAs. ERG, their representative group, sent a statement to EC accepting the proposed revised Directives, although asserting that “ERG takes the opinion that the remedy of functional separation has to be solely within the discretion of NRA to decide upon its applicability”(ERG [2007]).

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<sup>7</sup> See Fuke [2000] and Fuke [2007] for details.

## **4. Discussions on broadband competition and structural separation in Japan**

### **4-1. Telecommunications liberalization and competition policy**

In Japan, the liberalization of telecommunications market and the privatization of Nippon Telegraph and Telephone Public Corporation were implemented simultaneously in 1985. However, as Fuke points out, sufficient discussions were not made on whether conduct regulation should be imposed on NTT or structural separation should be chosen in order to secure fair competition (Fuke [2007]). Though many European countries arranged interconnection rules and rate rebalancing at the time of market liberalization, interconnection rules were not well provided for in Japan until 1997 when the MIC implemented new rules by revising Telecommunications Business Law. One of the reasons for the difference between Japan and the EU is the fact that the timing of Japanese market liberalization was 13 years earlier than the EU and there were very few international benchmark rules at that time. Since the initial arrangement of conduct regulation was insufficient in Japan as mentioned above, discussions have continued on the structural separation of NTT into long distance business and regional business as a tool to promote fair competition. Thus the structural separation of NTT has been discussed in parallel with the arrangement of conduct regulations in 1990s. The persistent discussions on structural separation have been one of the particular characteristics of Japanese telecommunications to this day.

As a result, Japan introduced indirect but practical structural separation of NTT. NTT was reorganized under a holding company structure in 1999, while adopting the same kind of conduct regulations as the EU. However, it became clear that such a ‘regional-long distance’ type of structural separation couldn’t accommodate the changes from POTS to the Internet and mobile communications. In order to resolve this problem, MIC issued a report from a Minister’s panel that proposed the removal of line of business control on NTT regional companies by further arrangement of fair competition rules including the ownership separation of NTT group companies by the disbanding of a NTT Holding company in 2010(MIC [2006a]). However, due to the lack of concrete picture of NTT after the review of its organization and the degree of conduct regulations imposed, the Cabinet and ruling parties decided to suspend the MIC panel proposal with the publication of an agreement to postpone the discussions on NTT reorganization until 2010. The agreement said that “as for NTT organizational structure, we’ll resume the review in 2010 by taking into account the status of broadband penetration and NTT’s Midterm Business Plan”. It promised to reach conclusions as soon as possible after the review.

### **4-2. Service based competition and facilities based competition**

Japan has been taking the most rigid open network policy among major developed countries to promote service based competition since the end of 1990s. For example, unbundling obligation has been imposed on both copper and fiber loops consistently until now. There is no bitstream access

type broadband wholesale scheme because unbundled based competition relying on very low LLU charges (especially for line sharing) have flourished from the beginning and there has been no room for Internet service providers (ISPs) to adopt BSA based competition. Why the US and European countries which prepared more or less the same kind of copper LLU as Japan didn't see the same degree of DSL competition like Japan? There might be no single answer to this question (Ikeda [2005]). As the LLU charges were set very low, new entries by service based carriers were encouraged. Furthermore, there have been competitors with 'animal spirits' that keep on providing alternative DSL services despite long standing fiscal losses.

Softbank, for example, that has been a leader of broadband competition, recorded combined group operating loss totaled to 195.9 billion yen (\$1.8billion) after 4 years since it entered into DSL business in 2001. During the same 4 years period, its operating profit from "businesses excluding broadband and fixed communications" was 95.4 billion yen. That means nearly 300 billion yen losses derived from DSL and other telecommunications related business. Table 3 shows that line sharing charges were set very low during the period in Japan. Nevertheless, Softbank incurred such a huge loss because the company set disruptively cheap retail rate for DSL and spent a large marketing cost to get the majority market share in short term. It is true that such kind of strategy contributed to the realization of 'the world fastest and cheapest DSL'.

**Table 3. Comparison of LLU charges (as of October, 2004)**

	<b>Full unbundling</b>	<b>Shared access (Line Sharing)</b>
<b>Japan</b>	NTT East □ 1,256 yen	NTT East □ 158 yen
	NTT West □ 1,318 yen	NTT West □ 165 yen
<b>The UK</b>	8.76 pound	2.26 pound
	(1,752 yen)	(452 yen)
<b>Germany</b>	11.80 euro	2.43 euro
	(1,652 yen)	(340 yen)
<b>France</b>	10.50 euro	2.90 euro
	(1,470 yen)	(406 yen)

(Note) Calculated by the exchange rate at the time (1 pound □ 200 yen, 1 euro □ 140 yen)

Source: NTT tariff, BT Price List, Ofcom [2004] and RegTP [2004]

Table 4 summarizes characteristics of DSL competition in Japan. Though these characteristics have both merits and demerits, it is probable that demerits exceed merits in some characteristics. Therefore, it is desirable to conduct full assessment of balancing analysis for them.

**Table 4. Characteristics of DSL competition in Japan**

<b>Characteristics</b>	<b>Merits</b>	<b>Demerits</b>
1) Very low LLU charges	LLU based intense competition developed	□ Not only intra modal facilities based competition but also inter modal competition didn't develop.
2) Destructively cheap DSL retail prices	<ul style="list-style-type: none"> <li>□ Only large companies with financial abundance brought sustainable competition.</li> <li>□ FTTx retail rate was set very low because cheap DSL prices became benchmark for broadband prices.</li> </ul>	<ul style="list-style-type: none"> <li>□ Only competitors with large financial base that could bear deficits in several years were able to enter the market.</li> <li>□ Application of margin squeeze regulation set on FTTx wholesale charges restricted the development of facilities based competition (Fuke [2007]).</li> </ul>
3) Excessive DSL competition	NTT shifted its broadband strategy from DSL with less market share and profit to FTTx and the strategy accelerated FTTx deployment and penetration.	□ DSL competitors faced net decrease in the number of DSL subscribers due to the customer shift to FTTx at the time they started to produce profits in DSL businesses. (DSL customer numbers hit the peak in March 2006 and keep on declining after then.)

Eventually, Japanese competitive broadband providers would not have been able to sustain loss making FTTx businesses in the same scenario as DSL services where they initially recorded substantial losses. They, therefore, requested very low wholesale charges for fiber loops in order to avoid FTTx business falling into money losing business. This kind of regulatory interference to set wholesale prices very low is likely to lead to the regulatory preference towards specific technology (i.e. FTTx) and might impair the development of other broadband technologies<sup>8</sup>. Moreover, if the same type of competition is repeated for FTTx just like DSL, it is probable that the same cycle of “below the cost competition” for specific “successor technology of FTTx” would happen in post FTTx phase.

<sup>8</sup> See Fuke [2008] for details.

#### 4-3. Status of broadband penetration and competition

Japanese broadband market entered into FTTx era prior to other countries. Net increase in the number of subscribers of FTTx exceeded that of DSL at the first quarter of 2005(April-June)<sup>9</sup>. As intra modal competition within DSL was described in detail above, total FTTx market share of NTT (70.5%) is relatively higher compared to that of DSL. Some exceptional competitors such as K-Opti.com, a subsidiary communications company of Kansai Electric Company, hold majority FTTx share in several prefectures (MIC [2008a]). Under the situation where even NTT itself is often asked the reason why it is making huge investment into currently less profitable FTTx deployment, it is difficult for competitors to shift wholly into “deficit making” service based competition in the FTTx services just like DSL. Facilities based competition between NTT and electric companies that have large access fiber assets was once thought to be feasible. The electric companies, however, don’t keep passion to promote FTTx business as they had before except some rare cases such as K-Opti.com. Instead, as KDDI purchased a subsidiary communications company and fiber access businesses from Tokyo Electric Company, there are emerging signs that facilities based competition between NTT and other telecommunications providers such as KDDI would occur in some densely populated areas.

As for cable broadband, widely deployed in some countries including the US, penetration rate of cable TV jumped up around 2003 in Japan and its household penetration rate has increased from 33.3% in 2003 to 41.9% at the end of 2007. Nonetheless, cable broadband market share within the whole broadband technologies are slackening around 15%. The characteristics of Japanese cable industry is explained as follows (MIC [2008b]).

- 1) Deregulation for MSO restriction was delayed until 1993 and less than expected large MSOs appeared since then<sup>10</sup>. Though Jupiter Telecommunications Co. (J:COM), the largest MSO, was established in 1995, its subscribers are about 2.18 million (end of Feb.2008). This number is much less than that of Comcast (24.1 million as of end of 2007), the largest MSO in the US.
- 2) Although households penetration rate of cable TV itself has been increasing, cable broadband penetration per 100 inhabitants has been decreasing slightly from 15.4% (end of 2004) to 13.5% (end of 2007).
- 3) Since cable broadband doesn’t play a role to put significant pressure in triple play competition, number of subscribers of IP multicast type broadband broadcasting (i.e. IPTV) is sluggish with 240,000 subscribers at the end of 2007.

As described above, it was unfortunate for cable industry because service based competition has

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<sup>9</sup> Status of broadband diffusion and competition in Japan is described and analyzed in detail by Fuke [2008].

<sup>10</sup> Since it was permitted for one cable operator to extend their businesses in several separated regions and to accept investment from foreign companies, MSOs started to emerge.

been so intense in DSL services that there was little room for them to expand cable broadband. KDDI, however, set its eyes on cable TV as a tool to compete with NTT on its own broadband access network assets through the investment into Japan Cablenet Limited (JCN), the second largest MSO.

Recently, both KDDI and Softbank put more priority on wireless services rather than fixed broadband services. Both of them are eager to enhance mobile broadband and the development of the next generation wireless services (e.g. WiMAX). In fixed broadband services, their strategy is basically to continue service based competition. That is one of the reasons why both companies have strongly requested the maintenance of low charges for wholesale fiber loops.

#### **4-4.Current discussions on vertical separation**

As described above, the discussions on structural separation of NTT in Japan have unique aspects different from discussions in other countries.

- 1) Current discussions in Japan followed the discussions on the ownership separation between long distance and regional businesses of NTT that initially started in 1980s.
- 2) Fundamental issues have not been dissolved yet even after 1999 when the compromise was made to reorganize NTT under a holding company structure.
- 3) The reviews made during 2005-2006 to resolve these issues were suspended as a result of political compromise.

As was pointed out in the MIC Minister's panel report, NTT has been imposed line of business control regulations that doesn't accommodate current technological and market environments. This kind of regulation prohibits NTT from activating its potential. This problem arose because current laws and regulations on the reorganization of NTT in 1999 didn't take into account rapid technological innovation. It is not reasonable to maintain the current regulations that virtually separate long distance and regional businesses of NTT (MIC [2006a]).

It is questionable, however, whether each of separated operating companies of NTT will be able to keep financial sustainability if a decision is taken to simply disband the NTT holding company and put each operating company under separate ownership. Such decision will not resolve any issues in respect of competition policy as a whole. The remedy that separates NTT by political decision and leave the choices after the separation including the reunification of separated companies to market principle will not gain public support because shareholders interests are not well protected. Therefore, it is necessary to entrust the decision on company structure to the self-

disciplined decision of the management of NTT.

## **5. Broadband competition and discussions on structural separation in the US.**

### **5-1.Competition policies since 1996 Telecommunications Act**

In 1990s, FCC imposed LLU obligation for both copper and FTTx loops on dominant incumbents to promote intra modal service based competition. Notwithstanding such mandated LLU service existed at the time, it appeared that:

- 1) Most of small CLECs that entered into DSL market using LLU had failed.
- 2) Cable companies with virtually no regulation on their broadband services emerged as leaders in the broadband market.
- 3) There had been no significant commercial launch of FTTx loops.

FCC had proposed unbundling rules for incumbents' local network including copper loops subject to 1996 Telecommunications Act ('1996 Act'). FCC ordered the first rule in August 1996 (FCC [1996]). As the rule was always confronted with litigations since then, FCC revised and reissued new rules every time they were suspended and remanded by courts. These series of litigations and revision of unbundling rules were finally settled in 2005 by the introduction of new rules (FCC [2003], FCC [2004]).

- 1) Obligation to offer full unbundling of copper loops was maintained.
- 2) Although FCC maintained obligation to offer line sharing of copper loops for existing CLEC customers, line sharing for the new customers would be gradually phased out in 3 years.
- 3) Unbundling obligations for FTTx loops were removed except for 64Kbps voice grade paths.

Then, FCC classified DSL as 'Information Services' defined in the Communications Act in August 2005 (FCC [2005]) to keep regulatory parity with its previous order that classified cable modem as the same service category ('Information Services') subject to the Federal Supreme Court decision (June 2005) that concluded that cable modem is free from open access obligation because it should be regarded as 'Information Services' (USSC [2005]). While it is true that FCC changed unbundling policy and regulation repeatedly as a result of administrative changes and court decisions, the significant transition in communications services from POTS to broadband triple play services took place between 1996 and 2005 and this transition had not been taken into account in their decisions.

### **5-2.Service based competition and facilities based competition**

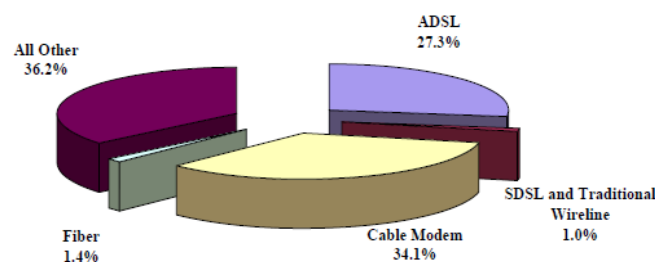
The US abandoned service based competition for below reasons.

- 1) Facilities based competition between incumbents and cable operators had intensified.
- 2) Promotion of market entry through excessive service based competition led to the burst of telecommunications bubble in 2000.
- 3) Implementation and surveillance of consistent nationwide unbundling regulations appeared to be difficult for regulators.

Although Democrats-led FCC in late 1990s took aggressive policy to promote CLECs' market entry, CLECs including AT&T and MCI put more energy on entry into the local voice market than broadband. FCC advocated the supply of wholesale products for the local voice services on conditions that were excessively advantageous to CLECs (i.e. UNE-P). Although UNE-P obligation was later denied by the court, it hindered the development of intra modal competition within DSL until it was finally set aside.

### 5-3. Status of broadband penetration and competition

FCC statistics (Figure 2) shows that competition between incumbent-offered DSL and cable modem are still very intense. Though the share of DSL has been gradually going up, cable modem marks more than 6 points ahead of DSL (FCC [2008]).



Source □ FCC [2008]

**Figure 2. High-Speed Lines by Technology in the US (Status as of June 30, 2007)**

In contrast to the delayed deregulation for MSOs in Japan (1993), regulations on MSOs were relaxed in 1960s in the US. Although 'Cable Competition and Consumer Protection Act of 1992' that regulates cable TV rate was enacted, it was applied only to traditional video services and cable mode has been free from regulations. Though 1996 Act abolished many of cable TV regulations, it did not stipulate regulations for new services provided over cable TV networks such as cable modem and VoIP (Crandall [2005]). That led to later confusion in the disputes over cable modem

open access.

Current horizontal integration rule was arranged in 1990s in the US. Under these rules, the share of one cable operator was limited to 30% of national MVPDs market. Since this rule set definite limit to market shares, its impact on cable industry is significant and it caused lots of disputes (Nuechterlein & Weiser [2005]). According to FCC reports summarized in Table 5 and Table 6, the market share of the top MSO was 25.2% in 1992 and the percentage continued to decline until 2002. As AT&T sold its cable businesses (former TCI) to Comcast in 2002, the share of Comcast as the top MSO had jumped up to 22.69%. It can be easily judged how huge Comcast is when it is compared with the Japanese top MSO, J:COM (Table 7). Existence of these huge cable MSOs and their aggressive investment in cable modem businesses under less restrictive regulatory environment than DSL contributed to the realization of recent facilities based competition in broadband (Crandall [2005]).

**Table 5. Top 1 and top 50 cable MSOs in the US**

MSOs	1992	2000	2001	2002	2003	2004	2005
<b>Top 1</b>	25.2%	19.07	16.44	14.75	22.69	23.37	22.99
<b>Top 50</b>	94.5%	92.14	91.38	92.05	89.29	92.32	95.73
<b>HHI</b>	928	954	905	884	1031	1097	1201

Sources □ FCC [1997], FCC [2001], FCC [2006]

**Table 6. Ranking of MVPDs in the US (as of June, 2005)**

Operator (Cable etc.)	Subscribers (Estimated from share shown by FCC)
1. Comcast	21.66 Million
2. DirecTV (DBS)	14.81
3. EchoStar (DBS)	11.56
4. Time Warner	11.01
5. Cox	6.34
6. Charter	6.00
7. Adelphia	5.18
8. Cablevision	3.03
MVPDs total	94.20 Million

Source □ FCC [2006]

**Table 7. Comparison of the largest cable MSOs in the US and Japan**

	Comcast (the US) (FY2007)	J:COM (Japan) (FY2006)
Revenue	\$30.9Billion ( ¥ 3,000Billion)	\$2.1Billion ( ¥ 221.9Billion)
Subscribers		
□ Video	24.10 Million	2.81 Million
□ Broadband	13.22 Million	1.26 Million
Market share (of video subscriber)	22.99%(Y2005)	Approx.13%(end of 2007)

Source □ Financial reports and web site information published by each company.

#### **5-4.Current discussions on vertical separation**

Large M&A cases between RBOCs took place around 2005-2006 and since then AT&T and Verizon have eventually been dominating the telecommunications market. Main reviewers of those merger plans were DoJ and FCC. FCC conducted balancing analysis between ‘potential harms to public interests’ and ‘potential benefits to public interests’ in its merger approval procedures. FCC judged that merger benefits outweighed harms if attached sort of remedies were implemented. As mentioned below, FCC’s analytical framework depends on the balancing theory of post Chicago School.

During the proposed SBC-AT&T and Verizon-MCI merger reviews, the specific markets (e.g. ‘Enterprise/mass market retail services’ and ‘the Internet backbone market’) that would have been affected by anticompetitive effects were selected. On the other hand, FCC considered four potential benefits shown as below.

- 1) Enhancements of national security and government services.
- 2) Efficiencies related to vertical integration.
- 3) Economies of scope and scale.
- 4) Cost synergies.

In respect of discussions on vertical separation, it should be noted that factor 2) and 3) were regarded as balancing factors which promote public interests. As Riordan wrote, FCC drew this conclusion through more realistic ‘give and take negotiation theory’ of post Chicago School that FCC has been adopting since News Corp. and DirecTV merger case (Riordan [2008]).

Discussions on structural separation are currently silent. If we try to find discussions on vertical separation, they are such kind of discussions in merger cases as “Whether further strengthening of vertically integrated incumbent carriers would outweigh costs over benefits?” This discussion is within the scope of post Chicago School theory. However, even under Republican-led FCC, as shown in AT&T-BellSouth merger review, commissioners from Democrats and Republican showed considerably different opinions on balancing analysis of merits and demerits of the merger. As a result, additional voluntary commitments such as further net neutrality promise were required for merger plan applicants (AT&T-BellSouth).

## **6. Broadband competition and discussions on structural separation in Europe**

### **6-1. Telecommunications liberalization and competition policy**

As for the telecommunications market liberalization, except for the UK that introduced competition in as early as 1984, almost all the original EU Member States opened their markets to competition subject to EC Directive in 1996 (EC [1996]). This was considerably late compared to the US that opened market since early 1970s and Japan in 1985. This led to a great difference between Europe and Japan or the US in the degree of the progress in competition in POTS at around 2000 when broadband competition was beginning to emerge. Thus, even at the time broadband competition heated up in Japan and the US, the focus of competition policy was set in voice services in Europe. Though Germany, for example, experienced rapid growth of full unbundling for local loops in early 2000s, they were mainly used for voice services (Table 8). It was around 2004 when LLU take-up was growing for broadband use in Germany and France. At the time, majority of competitive DSL services were provided using NTT’s line sharing product in Japan. Numbers of line sharing used were approximately 7,100,000 in Japan, 6,000 in the UK, null in Germany and 720,000 in France as of June 2004 (Table 8). Moreover, though the EU initially set LLU obligation by ‘The EC LLU Regulation’ in 1999, the regulation shifted to the rules based on market analysis after the introduction of 2003 telecommunications regulatory reform. That led to the differences in the degree of LLU obligations and the levels of charges among the EU Member States.

**Table 8. Take-up of LLU in the UK, Germany and France (End of June, 2004)**

	Full LLU			Shared access (Line Sharing)	Total LLU
	DSL use	Voice use	Total		
the UK	7,580	0	7,580	6,270	13,850
Germany	650,000	978,699	1,628,699	0	1,628,699
France	13,066	0	13,066	717,654	730,720

Source: ECTA [2004]

The penetration rate of cable TV is high in some European countries and there was a possibility that cable operators might emerge as leading competitive broadband providers just like in the US. However, since Deutsche Telekom owned nationwide cable TV infrastructure with more than 50% penetration rate until EC Directive of 1999 recommended telephone companies in Member States to divest their cable networks, DT was reluctant to provide cable-based broadband services fearing cannibalism with ISDN and DSL. As such, the EU cable TV policy was not able to react to the development of broadband.

## 6-2. Service based competition and facilities based competition

EC is now recommending LLU and BSA as practical methods to promote competition especially in copper loops, though its final goal is to realize facilities based competition. Cave proposed ‘ladder of investment (LOI)’ which prepares initially BSA then LLU for competitors as transitional step towards facilities based competition. Cave asserts that “the objective of one-way access regulation should be to generate sustainable infrastructure-based competition where feasible, and that the twin objectives of promoting competition and promoting investment and innovation can be achieved by providing access opportunities for competitors which are appropriately calibrated over time” (Cave [2004]). EC also supported Cave’s theory in the “Impact Assessment” document (EC [2007b]) published in the process of 2007 telecommunications regulatory reform. As is shown in EC statistics (EC [2007a]), inter modal competition in the EU is slow with some exceptions such as Dutch cable broadband. As for DSL, it is true that the retail market share of the incumbents has been declining, facilities-based competition has not progressed like Japan or the US.

Although LOI is a theory that gives us interesting suggestions, Waverman raised concerns for it. “The set of incentives induced by the LOI approach may produce the wrong investment, i.e. not the investment which maximizes social returns, growth and productivity. There is another serious concern with regulation that aims at one form of infrastructure. Regulating one MIP (“multi-path IP world”) network runs the risk of promoting service based competition on these facilities but at the risk of lowering competition between infrastructures. The original focus of OfTel was infrastructure competition and that’s something we need to return to” (Waverman [2006]). In fact, if a lower rung is too attractive on the investment ladder, incentives for climbing up the ladder might be discouraged. It is, therefore, crucial to balance rate setting and incentives to climb up the ladder.

### **6-3. Status of broadband penetration and competition**

It is true that LLU-based competition had not progressed much in the UK's DSL market, when Ofcom recommended functional separation to BT (Ofcom [2005]) and accepted BT Undertakings (BT [2005]) through Telecommunications Strategic Review (TSR) (Table 8). It is also true that taking up of LLU has been accelerated since BT established Openreach. However, Germany and France that had not introduced any kind of functional separation already experienced explosive use of LLU when Ofcom initiated TSR in April 2004 (Table 8). Japanese DSL market started to show a spectacular growth since 2000 when LLU and collocation was formally mandated<sup>11</sup> following the reorganization of NTT in 1999. These facts throw doubt on full support for the assumption that functional separation itself promotes LLU usage. Therefore, it would be reasonable to think that necessary and sufficient conditions for the promotion of broadband competition is brought not by functional separation but by 'Equivalence of Input (EOI)' and fair rate settings for wholesale inputs.

### **6-4. Current discussions on vertical separation**

Since functional separation was imposed on BT, countries considering the introduction of the same kind of functional separation are increasing. EC is the most active supporter and took up functional separation as 'a remedy of last resort' in the proposals for revised Directives in 2007 telecommunications regulatory reform (EC [2007b]). Even among EC Commissioners, however, some voices opposing to functional separation, pushed by commissioner Reding, arose before the proposals were submitted to EC Parliament and the Council. Among others, Competition Commissioner Ms. Kroes and Enterprise and Industry Commissioner Mr. Verheugen strongly opposed to Ms. Reding's idea according to an articles from The Financial Times as described below.

"Neelie Kroes, EU competition chief, and Günter Verheugen, the industry commissioner, have attacked a proposed overhaul by fellow commissioner Viviane Reding of laws governing the bloc's €289bn-a-year (\$407bn, £201bn) electronic communications sector. They warn that the proposed review could create more bureaucracy and harm investment.....Ms Kroes' officials argue that this move - known as "functional separation" - risks hitting investment in the sector, especially in new, ultra-fast broadband networks. An internal document written by her department, and seen by the FT, said the measure "is not only superfluous but also

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<sup>11</sup> See Fuke [2007] and Fuke [2008] for details. Metrical analysis by Akematsu & Tsuji extracts regulatory policy, competition and technological development as factors for DSL progress in Japan (Akematsu & Tsuji [2006]).

damaging. Functional separation does not prevent discrimination of alternative operators”<sup>12</sup>

ERG announced a statement to accept the functional separation proposal in October 2007 with a condition that final right to decide whether to introduce functional separation or not solely belongs to each Member State (ERG [2007]). Even some NRAs, however, that participated in the ERG statement, refuse adoption of functional separation in their own countries such as ARCEP (France) or CMT (Spain). Also, some government officials such as two vice ministers in German Ministry of Economics and Technologies denied the functional separation remedy itself. On the other hand, several countries such as Sweden and Italy are progressing towards the introduction of functional separation. Tensions are arising there between NRAs and incumbents because the targeted incumbents voluntarily established access business units to avoid regulatory mandated separation.

Though the EU scheduled the completion of the discussions on 2007 telecommunications regulatory reform at the end of 2009 at the latest, it is expected that many Member States will suspend discussions on functional separation until then. They will also judge the effectiveness of functional separation by the case analysis of BT, because it has been already more than two years since BT established Openreach in January 2006.

We should assess Cave’s suggestion that “it is important that this remedy be applied proportionately. This requires that the detriments resulting from non-price discrimination exceed the costs of imposing an operational separation remedy, where those costs are not only those of changing the incumbents' business processes, but also of any chilling effect on investment in new assets, by both the incumbent and competitors” (Cave [2006]) from the perspective of market reality. At the time, we should remember some experiences showed by Japan or France, that effective conduct regulation for mandating LLU and collocation, rather than functional separation, leads to rapid growth of DSL and total broadband market.

## **7. Conclusions**

### **7-1. Assessment of broadband policy and vertical separation**

What kind of implication does structural separation policy have, according to the analysis of broadband market and regulatory policy in Japan, the US and Europe? Firstly, it is adequate to compare Japan and the US as contrastive cases.

Political and regulatory confusion deterred the deployment of DSL in the beginning and non-

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<sup>12</sup> Cited from an article from The Financial Times titled “Brussels divided over telecoms plan” (Sept.25, 2007).

regulated cable modem services spread ahead of DSL in the US. To make up for this delay, the integrated incumbents put their focus on FTTx deployment along with DSL and such activities led to facilities based competition in broadband market. As a result, it becomes unnecessary to implement vertical separation of the incumbents. That is to say, our analysis is that the failure of regulatory policy resulted in an unexpected outcome to exclude the need to impose regulation.

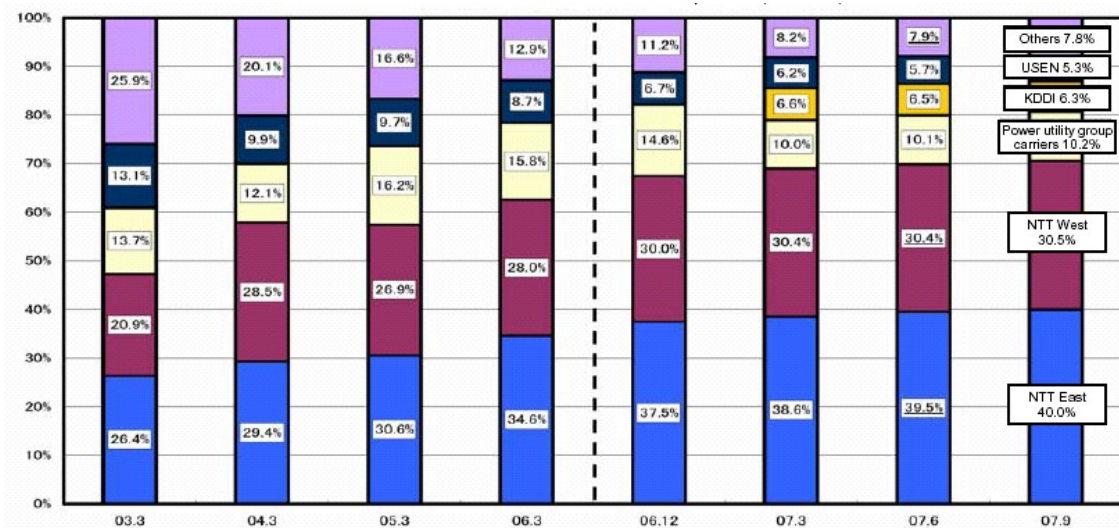
Although the fact that cable companies could survive thanks to the unique cable regulations in the US, we might be right to conclude that there is no significant lessons from the US vertical separation policy in the broadband era.

Though NTT was reorganized in 1999 to promote competition in traditional POTS, contradictions have been coming up with the rapid growth of the Internet, especially the broadband Internet after then. Competitors still strongly demand full ownership separation of current NTT group companies. But the validity for the claim should be assessed in light of market reality. We will look at the market trends again, which will be a basis of the discussions below.

- 1 □ While broadband is rapidly prevailing, the market has shifted drastically from DSL to FTTH. Though service based competition by leasing LLU from NTT played an important role in the rapid growth of DSL market, there are electric companies and KDDI that purchased assets of some electric companies and it is possible that facilities based competition will develop further. However, since charges for dark fiber are set on very lower level under MIC regulatory policy<sup>13</sup>, facilities based competition has developed only in exceptional regions and retail market share of NTT regional companies has been increasing (Figure 3).

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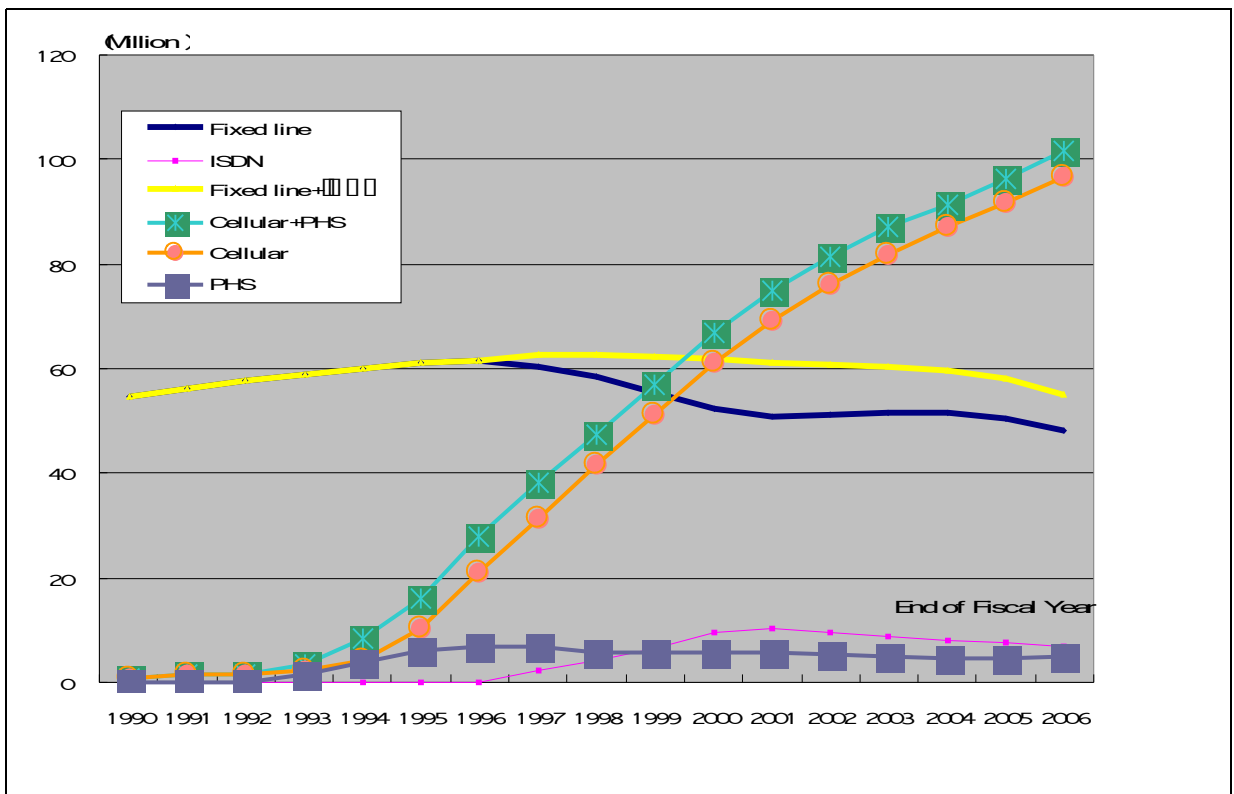
<sup>13</sup> MIC required NTT regional companies to significantly reduce dark fiber charges in March 2008.



Source: MIC [2007]

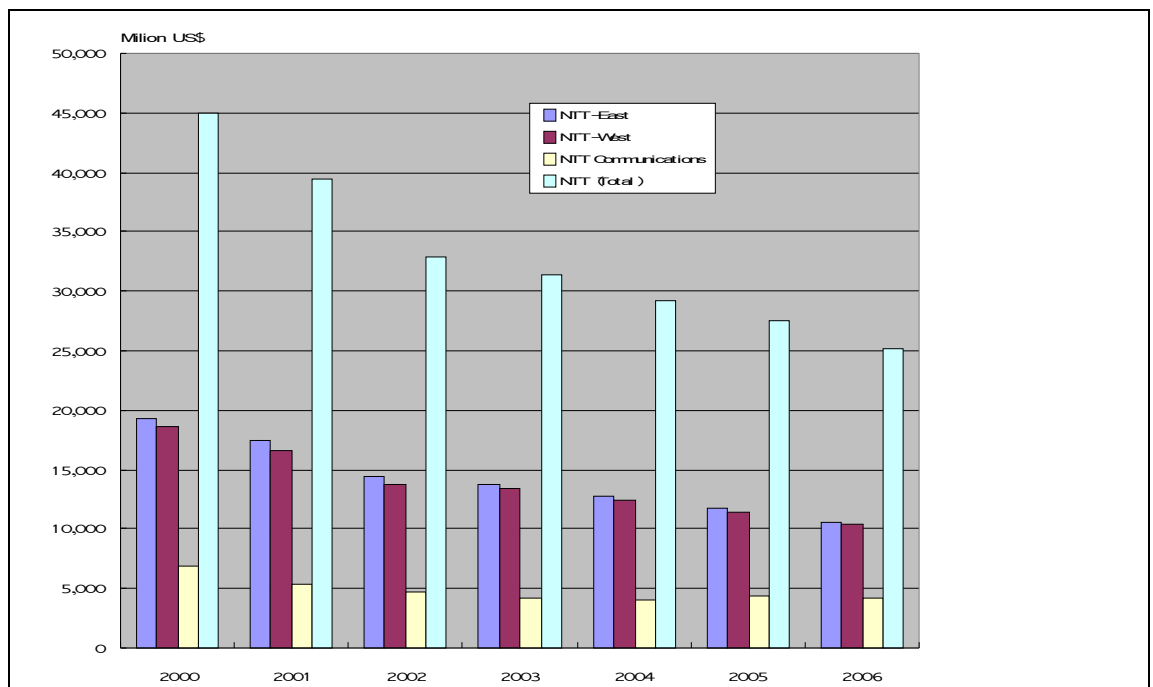
**Figure 3. Carriers Share in FTTH Subscriptions (As of the end of September 2007)**

- 2 □ Voice telephony market has been declining with the wide spread of mobile services as well as the rapid migration to VoIP (Figure 4, Figure 5).



Source: Authors' analysis based on MIC Data

**Figure 4. Changes in Number of Subscribers of telecommunications services in Japan**



Source: Authors' analysis based on NTT's financial reports

**Figure 5. NTT's Decreasing Revenues from Voice**

3 □ NTT regional companies launched commercial NGN services in March 2008. The way NTT provides NGN reveals the contradiction of the regulation that limits NTT regional companies' business areas within intra prefecture communications. As the Internet has developed as a global seamless network, there is no boundary between long distance and regional communications. When NTT regional companies tried to offer NGN, they were required to offer the intra prefecture parts of the service by themselves and to lease inter prefecture parts from other carriers. Regulations puts an artificial line on the Internet.

How should we deal with “vertical separation problems” based on these market trends? It is important to recognize that current market status is also a product of regulation. In fact, it is true that LLU obligation mandated by MIC contributed to the rapid growth of DSL market. However, it is service based competition relied on local loops of NTT regional companies. Though it seemed that facilities based competition would grow in FTTH market initially, MIC's policy to set dark fiber charges at very low level restrains the development of facilities based competition for both in FTTH itself and also in cable broadband and WiMAX<sup>14</sup> .

Under this situation, the competition in Japanese broadband market might remain as service based and no significant facilities based competition will be materialized. Ownership separation of NTT or vertical separation of bottle neck management unit would not lead to the facilities based competition even if it promotes service based competition. Facilities based competition has an advantage over service based competition in the sense that it stimulates incentives for technological innovation. Even if the regulator intervenes in the NTT's organizational issue, the effect of such intervention to promote competition is limited<sup>15</sup> . Ownership separation by itself will not lead to facilities based competition. Our view is that the organizational issue should be left to the voluntary decision of NTT's management.

Then, how should Europe treat vertical separation policy by learning from Japanese and the US experiences? We presume that final goal is to materialize facilities based competition in this paper. It is effective to impose LLU and lower rate setting for LLU in order to promote competition in a short period of time. However, vertical separation itself isn't effective as we analyzed above. It is anticipated that incumbents would show reluctance in accepting a strict unbundling regulation. In such case, it is effective to show an intention to introduce vertical separation as a pressure to induce incumbents to accept the regulation.

Although this kind of remedy brings service based competition, it would hamper facilities based

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<sup>14</sup> See Fuke [2007] and [2008] for detailed discussions.

<sup>15</sup> If issues concerning competition arise, competition law should take enforcement for each wholesale and retail market.

competition as Japanese case shows and it should be regarded as a temporary remedy until adequate degree of competition develops in broadband market. In any case, regulators should be careful in enforcing vertical separation by taking into account the demerits it accompanies.

## **7-2. Future issues**

Recently, in relation to vertical separation, so-called network neutrality has been actively discussed especially in the US. As Crandall pointed out, wide spread opposition to vertical integration for broadband exists and attorneys and engineers are eager for the opposition (Crandall [2005]). ‘Tragedy of the Commons’ is often quoted as a basis to justify the introduction of access-tiering. In case of the Internet, however, the situation is largely different from the Tragedy of the Commons observed by Harding because it is possible for ISPs to expand its network capacity. It is possible to avoid Tragedy of the Commons if we succeed in giving sufficient incentives for ISPs to do so (Fuke [2008]). This is an important perspective when we discuss merits and demerits of vertical integration from the standpoint of network neutrality.

Further, current discussions on structural separation are mainly focused on fair competition between ‘vertically integrated telecommunications carriers’ and ‘non-integrated telecommunications carriers’. Since non-integrated competitors usually lack access assets, current discussions on structural separation are heated up in the form of functional separation of access bottleneck. In the age of core NGN and NGA, however, competition between telecommunications carriers and content/application providers---many of them don’t own network facilities (i.e. ultimate non-integrated providers) ---is expanding. In case where free broadband content subsidized from advertising revenue by content/application providers compete with content from newly entered telecommunications carriers in the market, it is not clear at present that owning network, in other words, holding vertically integrated organization, always accompanies competitive advantages. In particular, as assumed from net neutrality discussion, if incumbents are unable to change flat rate structure for broadband access provision, upgrading and maintaining access and combined backhaul, core network would become a burden for incumbents. Therefore, the perspective of competition that is emerging between traditional carriers and content providers based on new business models should be considered in the future discussions on structural separation.

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