

**Japan's Telecommunications Regime Shift:
Understanding Japan's Potential Resurgence**

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Kenji Erik Kushida*
Graduate Student
Travers Department of Political Science and BRIE
UC Berkeley
kkushida@berkeley.edu

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Introduction: Japan in the Digital Era

In the 1990s, Japan's telecom sector was blindsided by new rules of competition. Up until then, institutions, corporate structures, and the dynamics of competition in the domestic market had allowed Japanese firms to gain technological expertise and master production processes that yielded sophisticated, high quality equipment. With privileged access to the domestic market, Japanese firms could use competition in domestic markets as a springboard for exports.¹

However, with the advent of the Internet and related technologies, Japanese market success was undermined by foreign innovations outside the realm of manufacturing, such as Cisco's control of the de facto software standard for routers. In addition, global cellular standards became critical in international competition, and Japan's proprietary domestic cellular standard prevented Japanese firms from exporting their sophisticated cellular equipment. As a result, the manufacturing prowess of Japanese firms became less relevant in both domestic and international markets.²

By the late 1990s, it was clear to all that Japan's domestic telecom sector was well behind cutting-edge developments in information technology (IT). The government became increasingly aware that the existing regulatory structure and institutional environment hindered firms from using new technologies and pursuing new business strategies, and that the isolation of its domestic cellular market had cost Japanese firms dearly in global markets. Over several years, and in several steps, the government changed the logic of telecom policymaking, dramatically revamping the regulatory structure and creating new institutions for coordination. This new regulatory and institutional framework altered the dynamics of market competition, leading Japan to unexpectedly develop fast, cheap and innovative landline and wireless telecom services.

By 2005, Japan's telecom sector had shifted from a carrier-led, equipment manufacturer-driven, hardware-oriented platform for producer-oriented investment and exports, to a carrier and service provider-driven, service-oriented arena focused on domestic consumption. The new regulatory structure and policymaking logic on the one hand, combined with the resulting new dynamics of competition on the other, constitute the latest *regime shift* in Japan's telecom sector.

The future of Japan's development in the digital era may involve the discovery of a new national comparative institutional advantage. As the market dynamics created by the high-performance, low-priced telecom services unfold, Japan may cultivate new strengths or discover new ways to add value to existing strengths in manufacturing. This future is uncertain, but in order to understand the realignment of Japan in the digital era, and how it may re-emerge in global markets, we must understand the domestic transformation that has taken place.

Japan's New Trajectory of Development in Telecom Services

This paper is motivated by the observation that Japan's telecom services have developed rapidly and unexpectedly since the late 1990s. Japan seems to be forging its own path of development, one that is not adequately captured by existing cross-national indicators of IT.

First, while Internet usage in Japan surged, much of the growth came from Internet subscriptions via cellular services. Overall Internet usage grew from 9 percent of the population in 1997 to over 60 percent in 2003. However, since 1999, over 80 percent of Japan's Internet subscriptions were through cellular services (Soumusho 2004).¹ *How* people connect to the Internet affects *what* people can do with it – firms and individuals are likely to create and derive value from cellular Internet applications in different ways than through PC-based Internet applications. Thus, Japan is one of the first countries in which the level of Internet penetration

¹ See Table 1 "Population penetration of Internet and Proportion of cellular subscriptions" in Appendix

needs to be disaggregated into PC-based and cellular-based Internet access in order to understand the network environment and its implications. The sudden development and rapid growth of Internet penetration via cellular services in Japan begs an explanation.

Second, Japan's broadband services grew abruptly after 2001, giving Japan the cheapest and fastest broadband services worldwide.² In 1999, Japan was one of the most expensive countries in the OECD for consumer access to the Internet, but by 2002, Japan's monthly subscription rates for DSL (Digital Subscriber Line) were the lowest (OECD 2001, Soumusho 2003:7). Japanese consumers also enjoyed the fastest broadband access in the world, with DSL reaching 50 Mbps, (1 to 3 mbps are common speeds for DSL in the US as of mid- 2005), and Fiber-To-The-Home (FTTH) services delivering 100Mbps to 1Gbps.³ By the end of 2001, FTTH networks covered 95% of metropolitan areas (Soumusho 2003). According to the ITU, by 2002, Japan had the highest price-performance for broadband Internet access in the world (defined as the lowest price per 100kbit/s of data) (ibid.).

Moreover, most Japanese broadband services were bundled with Internet Protocol (IP) telephony subscriptions after 2001. IP telephony sends voice signals as packets of data over the Internet (Voice over IP, or VOIP), bypassing conventional telephone circuits and switches. Its most well known form is PC-to-PC, through software such as Skype. The distinguishing feature of Japanese IP telephony subscriptions bundled with DSL and FTTH services is that they can be used without PCs, connecting to conventional telephone sets directly. Moreover, the government allocated a set of telephone numbers to IP telephones, in addition, allowing IP telephones meeting performance requirements to receive regular telephone numbers. Such IP telephones in

² See Table 2: "Table 2: Landline Internet Subscriptions by Type (millions)," and Table 3: "Comparison of Prices per 100kbps, as of July 2003" in Appendix

³ See Chart 1: "Increase of Speeds in DSL and Cable Internet Services"

Japan are essentially functional substitutes for conventional household telephones. The government estimates that by the end of 2004, Japan had close to 8 million IP telephony subscriptions.³ Estimates vary, but a survey by the *Nihon Keizai Shimbun* (Japan's preeminent economic newspaper) found that about 40% of major firms had installed IP telephony, and another 40% were seriously considering doing so.⁴

It is obvious that a wider range of content and applications can be delivered via a high-speed, low cost broadband environment than by a slower, higher-cost network environment, giving Japan the potential to pioneer in a new array of applications. Perhaps less obvious is the potential of IP telephony. Let us recall that cheap long-distance telephone service in the US allowed American firms, led by the financial sector, to move some offices to states with cheap labor. This sparked a broader reorganization of business structures allowing firms to modularize their business processes, which subsequently facilitated outsourcing, as well as off-shoring. It is quite possible that creative firms initially adopting IP telephony to solve a particular problem – cutting telecommunications costs – may find that the technology can be used to solve an entirely different set of problems.⁵ Japanese firms may not be the ones to discover new uses for IP telephony, but *political* implications of an increasing number of firms and households bypassing NTT's conventional telephone network are emerging in the form of calls to reorganize NTT. Our puzzle is to understand how the market for high-speed infrastructure, low cost broadband, and rapid IP telephony diffusion emerged.

Third, Japan developed a cellular environment with the highest price-performance for data transmission and Internet access. By 2003, Japan had three separate third-generation (3G) cellular networks, offering data transmission speeds comparable to DSL speeds for some services, several times faster than landline dial-up connections.⁶ In 2003 and 2004, carriers began

offering flat-rate subscriptions to 3G cellular Internet services, leading Japanese firms to begin searching for ways to add value or increase efficiency through the intensive use of high-speed cellular Internet access and data transmissions. Perhaps even more than IP telephony, flat-rate, high-speed cellular Internet access allows firms the potential to create new applications and discover new uses for the technology.

Thus, by 2004, Japan's landline and wireless network environment was vastly different from what it had been in 1997, its characteristics no longer adequately captured by common IT performance indicators.⁷ Moreover, the trajectory of development seemed a departure from Japan's producer-oriented economic development of the past – postwar consumers had rarely enjoyed low prices for services, regardless of the sector. Taking these unexpected developments as a starting point and investigating their origin leads us to the story of Japan's latest regime shift in the telecom sector.

The Regimes

Telecommunications is a particularly appropriate sector to conceptualize in terms of policies and regulatory structures, which shape market dynamics. It is a sector in which Karl Polanyi's view – that sustained government intervention is necessary for competitive markets to function – is particularly salient (Polanyi 1944).

Telecommunications sectors in most countries began with monopoly incumbent carriers. The rules created after their privatization have been critical in shaping market dynamics (Vogel 1996), and differences in regulatory structures across countries have led to a variety of competitive dynamics. Some countries moved further than others in privileging entrants at the expense of incumbents – the terms at which competitors could lease the last-one-mile of

infrastructure owned by the incumbent can determine the scope of new firms' activities, as well as the technologies they employ. While policies do not necessarily *determine* market outcomes, the regulatory structure powerfully *shapes* market dynamics in the sector by creating incentives and constraints facing firms.

Yet, we cannot stop here. Policies cannot simply be treated as exogenous, but are driven by the logic of policymaking in a particular country. While market outcomes and new technology do affect policymaking decisions, they are not the sole drivers of telecom policy. Differences in policies and regulatory structures across countries are usually the result of political dynamics, bureaucratic interests, and the interaction between governmental and firm-level actors.

My conception of telecommunications regimes is built upon the notion that the logic of policymaking drives policies and regulatory structures, which in turn shape market dynamics. I propose a set of variables that can capture this conception of telecommunications regimes, and which can be used in comparisons across countries or time. They include: the principal government actors involved in telecom policymaking, the orientation of policymaking (ex ante or ex post), the state's method of coordination with firms, the principal industry actors, mechanisms of intra-industry interaction, and the source of standard setting. Applying this set of variables to Japan over time, we see that that there have been at least three regimes in Japan's telecom sector.

Table 1: Regimes in Japan's Telecommunications Sector

| | Regime 1: “Bureaucratic Monopoly” | |
|---|---|---|
| | (late 1800s to 1954) | (1954 – 1985) |
| <i>Government Actors</i> | Ministry of Communications (MoC) | Nippon Telegraph and Telephone Public Company (NTTPC), National Diet, MPT |
| <i>Industry Actors</i> | MoC, cartel of “family” OEM equipment manufacturers (NEC, Hitachi, Fujitsu, Oki Electric) | NTT, KDD, NTT “family” equipment manufacturers |
| <i>Government Industry Coordination</i> | MoC directly operates communications industry, equipment procured as OEM | Diet approves budget, formal oversight by MPT, but NTT with most real control |
| <i>Intra-Industry Interactions</i> | Equipment manufacturers competing on the basis of quality for volume of OEM work. | Same as before. NTT providing large procurement demand. |
| <i>Standard-setting</i> | MoC | NTT (nominally MPT) |

| | Regime 2: “Controlled Competition” (1985- mid/late 1990s) | Regime 3 “Strategic Liberalization” (mid/late 1990s – present) |
|---|--|---|
| <i>Mode of Regulation</i> | Ex ante | Ex post |
| <i>Government Actors</i> | Ministry of Posts and Telecommunications (MPT) | MPT/Soumusho* (renamed and restructured in 1999), Cabinet Office, Dispute Resolution Commission, FTC (Fair Trade Commission), possibly Judicial system |
| <i>Industry Actors</i> | NTT, New Common Carriers (NCCs), NTT “family” firms | NTT, NCCs, startup firms (eg. Softbank, Usen), NTT “family,” firms, non-family equipment manufacturers, foreign firms (eg. Vodafone, Ripplewood) |
| <i>Government Industry Coordination</i> | MPT wields classic “Industrial Policy” tools (Licensing authority, discretionary administrative guidance, etc), MPT interprets law and mediates conflict between carriers. | Increased legalization of rules. FTC, possibly judicial system play larger role in enforcement. New formal institution for dispute resolution between firms. |
| <i>Intra-Industry Interactions</i> | NTT dominates competitors with R&D capabilities and interconnection rates. NCCs closely regulated by MPT. NTT provides stable demand for equipment manufacturers – not all on OEM basis, but advantages to NTT “family” firms. Standards set by NTT force NCCs to procure equipment from NTT “family”. | NTT has less control over interconnection rates. NCCs no longer tightly regulated by MPT. Shift to non-NTT standards allow NCCs to procure equipment from outside NTT “family.” New dynamics of interaction such as price wars, legal battles, use of Dispute Resolution Commission, and complaints to the FTC. |

Bureaucracy/Monopoly

The first regime, which I label “bureaucracy/monopoly,” needs no extensive elaboration for our purposes. The main outcome was the regulatory regime and market dynamics in which the state-owned monopoly, Nippon Telegraph and Telephone (NTT) set national standards, determining the technological trajectory followed by equipment manufacturers.

The National Diet (Parliament) approved NTT’s considerable budget allocations, and the Ministry of Posts and Telecommunications (MPT), created from the prewar Ministry of Postal Affairs, was given formal oversight over NTT. However, NTT’s extensive budget and its powerful R&D capabilities allowed it to essentially regulate itself in setting domestic standards, and to play the role of technological leader to equipment manufacturers.⁸ NTT’s lucrative procurement contracts to its “family” of equipment manufacturers – NEC, Fujitsu, Oki, and Hitachi, effectively subsidized their R&D activities in other areas, such as consumer electronics.⁹ Foreign firms were essentially shut out of NTT’s procurement by its strict quality standards that NTT ensured its “family” firms could pass. Overall, the regime focused on investing in domestic infrastructure using Japanese equipment.

The Regime shift to “Controlled Competition”

The privatization of NTT in 1985 was a critical juncture, enabling MPT to reshape itself as a powerful actor in Japan’s logic of telecom policymaking. Privatization was the culmination of a highly political struggle over power relations and the configuration of markets. Change was precipitated by technological developments that eliminated the economic rationale for a monopoly telecom carrier, and by the ensuing breakup of AT&T in the US, combined with a politically driven wave of liberalization and privatization of state-owned enterprises in Japan. Politicians, MPT, NTT, “family” equipment manufacturers, and other electronics firms were key

actors in this political struggle. The final settlement resulted in a partially privatized NTT, a partially liberalized telecom market, and vastly increased regulatory powers for MPT.¹⁰ However, NTT's R&D capabilities and much of its revenue structure were left intact, allowing NTT to retain its position as technological leader of the sector.

The “Controlled Competition” Regime

After 1985, MPT used its newly acquired regulatory powers to orchestrate the entry of competitors (New Common Carriers, or NCCs) into the sector and micromanage competition, relying on classic tools of industrial policy such as licensing and administrative guidance. Steven Vogel has labeled this regulatory regime “controlled competition” (Vogel 1996). A combination of MPT's micromanagement and NTT's continuing dominance in R&D shaped the market dynamics in this regime. Japan's decline in international competitiveness, as well as its development of cellular Internet services, resulted from these market dynamics.

Japan' Decline in International Competitiveness for Telecom Equipment

Cole (forthcoming) provides a succinct analysis of why Japan's equipment manufacturers saw their exports and global market shares of landline and cellular telecom equipment decline. Equipment manufacturers, following NTT's lead in pursuing ATM technology and obtaining approval of standards from the ITU (International Telecommunications Union), were blindsided by TCP/IP and Cisco's software-based de facto standard for routers.

Discontinuous technology surrounding the Internet also shifted market dynamics in Japan's domestic market. NCCs had previously been hostage to NTT and its “family” of equipment manufacturers, since nobody else manufactured equipment meeting the domestic standards. With the rise of TCP/IP and routers, however, Japanese ISPs found themselves in the

position of purchasing their equipment from unfamiliar American firms, such as Cisco and Juniper. Some were unimpressed with the quality of the American equipment, but NTT's dominance of the domestic network equipment market had been broken.¹¹

In cellular markets, as Cole and others have argued, Japan's NTT-developed digital standard isolated the domestic market, preventing exports as well as imports (Cole forthcoming, Funk 2002). However, the dynamics of competition within this isolated domestic cellular market were what led to Japan's development of cellular Internet services.

The Development of Cellular Internet Services

NTT DoCoMo, a subsidiary of NTT, spun out in 1991 as a result of government policy, exerted a powerful role in shaping Japan's cellular market. DoCoMo had inherited NTT's extensive wireless R&D labs, allowing it to develop the domestic digital cellular standard, PDC, and to lead handset and equipment manufacturers in R&D activities. MPT adopted PDC as the domestic digital cellular standard in 1994, and DoCoMo was able to continually upgrade it. The upgrades were formally approved by the Association of Radio Industries and Businesses (ARIB) and made public, but DoCoMo privileged "family" firms with specifications and information before public disclosure. As a result, "family" firms could roll out new handsets for DoCoMo's service before other manufacturers developed their new handsets for competing carriers. In exchange for early information, "family" firms were forced to delay shipping their new handsets to competitors for several months (Funk 2002, Kushida 2002).

These competitive dynamics tilted the playing field in favor of DoCoMo, pushing desperate competitors to look for alternative strategies. A technologically simple cellular service, known as PHS (Personal Handyphone System), a product of MPT's industrial policy initiative to promote a cheaper alternative to conventional cellular services, revealed significant latent

demand for messaging services.¹² NTT's domination of PDC, the demand for messaging services revealed by PHS, and the general expectation shared by Europeans and Americans that cellular services would eventually connect to the Internet led Japanese cellular carriers to begin developing cellular Internet services.

After 1996, Japan's major cellular carriers, including DoCoMo, were engaged in a race to commercialize cellular Internet services. Each carrier took an independent path to develop the technology and business model, and DoCoMo actually lagged behind for much of the time.¹³ DoCoMo's famous *i-mode* service, with its innovative business model, was rolled out in early 1999.¹⁴ Yet, few observers recognize the significance of the fact that, later that year, all major Japanese carriers rolled out competing services with similar features, but different underlying technologies and networks.¹⁵ Rather than simply the success story of a single innovative firm, Japan's cellular Internet services were the product of competition in the entire Japanese cellular market as it shifted towards the commercialization of cellular Internet services.

Japanese carriers were able to rapidly commercialize Internet services, requiring implementation in the handsets as well as infrastructure, largely due to the nature of handset manufacturer-carrier relations. In DoCoMo's case, its R&D labs could essentially hand specifications to handset manufacturers, who would reliably implement and deliver the new models. The other carriers did not have DoCoMo's R&D capabilities, but they worked closely with manufacturers.¹⁶ Carriers could guarantee demand for the new Internet-enabled handsets, since it was the norm for carriers to purchase handsets outright from manufacturers before selling them to retail outlets.¹⁷ Thus, the domestic dynamics of competition focused cellular carriers on the task of developing and deploying cellular Internet services, and the nature of coordination between carriers and handset manufacturers facilitated the rapid deployment of fully

implemented services. By May 2000, 11 million out of 51 million cellular users subscribed to cellular Internet services, growing to 74 million out of 86 million subscribers by February 2005.¹⁸

The Regime Shift to Strategic Liberalization

The regime shift from “Controlled Competition” to “Strategic Liberalization” was not a political struggle culminating in a radical break, as the regime shift to “controlled competition” had been. Rather, the latest regime shift took place over several years, with a series of incremental changes adding up to a significant transformation.¹⁹ These incremental changes were driven by adjustments in corporate and government behavior, and by a broad reorganization of Japan’s government structure.

Major Japanese corporations were forced to shift their strategies, since the new technological paradigm, with its modular architecture and de facto standards embedded in software, did not play to their strengths. At the same time, the technology opened up new opportunities for start-up firms and entrants.

For the government, Japan’s lag in IT, especially in Internet penetration, created bureaucratic and political incentives to change the logic of policymaking. Government actors became interested in restructuring the regulatory framework in order to facilitate broadband deployment and foster Internet penetration, and to reduce NTT’s influence in shaping the sector. A reorganization of Japan’s government structure aided the political leadership to spearhead policymaking initiatives.

The regime shift was driven by the interaction between these corporate strategies and government actors. Changes in the logic of policymaking led to a new regulatory framework,

which reshaped market dynamics by altering incentives and constraints upon firms. Corporate strategies often informed policymakers, but the regime shift was not simply driven by corporate interests acting upon policymakers. Political and bureaucratic actors had their own interests and agendas as well, though market outcomes did take them by surprise on several occasions.

Strategic Liberalization: The Changing Logic of Policymaking

Government Reorganization – Strengthened Political Leadership

In 1999, a broad set of reforms under Prime Minister Hashimoto restructured Japan's bureaucracies and strengthened the political leadership's policymaking capacities. The Cabinet Office, combining the former Prime Minister's office and Economic Planning Agency, among others, gained new legal capacities to initiate and coordinate policies.²⁰ One of the first strategic policy thrusts of the Cabinet office was in telecommunications policy, as we will see.

MPT was combined with two other bureaucracies, creating Soumusho, whose official English name began as the unwieldy Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), which was changed to the Ministry of Internal Affairs and Communications (MIC) in 2004. With the expanded bureaucracy, non-technical Soumusho officials working on telecom policies one year could find themselves in an unrelated division in the next, such as supervising local elections – a typical rotation lasting up to three years.

MPT had enjoyed political clout in policymaking and bureaucratic turf wars due to the political importance of franchised postmasters and its control of the postal savings and insurance system, the world's largest financial institution at the heart of Japan's developmental state (Johnson 1989). After 1999, much of the actual control of the postal services system shifted to a new Postal Services Agency, later the Postal Services Public Corporation. It is still unclear how

MPT's political clout has been affected, but the strengthened Cabinet Office soon showed it was poised to play a part in strategic policy initiatives.

ex ante to ex post regulation

Japan's logic of policymaking further shifted as the mode of regulation changed from an emphasis on *ex ante* to *ex post* regulation. *Ex ante* regulation by MPT, the hallmark of the "controlled competition" regime, rested upon both formal and informal tools of regulation. Formal tools at MPT's disposal included licensing requirements controlling market entry, pricing changes, and the scope of carriers' business activities.²¹ Informal tools, giving MPT considerable discretionary authority, were enabled by MPT's position as a nexus of information exchange, and its role in mediating and coordinating settlements for disputes between carriers.²²

A wave of deregulation in the late 1990s removed many of MPT's most important formal policy tools of *ex ante* regulation. In 1997, Japan signed the WTO Telecom Agreement, removing most restrictions on foreign ownership of carriers and infrastructure. The following year, MPT abolished most licensing requirements for market entry and price changes, while relaxing restrictions over the scope of carriers' business activities.²³ Overarching political support from the Cabinet's "Three year plan for deregulation," which encompassed several industries including telecom, made it easier for MPT to engage in deregulation requiring amendments to the Telecommunications Business Law. In 2003, the Ministry went on to abolish most of the classification, registration, and notification requirements.²⁴

These waves of deregulation affected MPT's informal policy tools. After 2003, streams of information about carriers' strategies and pricing schemes under consideration no longer flowed automatically through the Ministry. It is common knowledge that administrative guidance and informal regulation are often exercised through the process of firms lining up to consult with

bureaucrats about how to fill out appropriate forms. By 2004, there were no longer stacks of documents waiting for approval on bureaucrats' desks, nor were there lines of businessmen waiting to see the officials in charge of pricing or registration.

In 2001, the Ministry removed itself as the coordinator and mediator of disputes between carriers by establishing the Dispute Resolution Commission (DRC). The DRC was located within the Ministry, but was, in principle, a neutral third-party deliberative organization. Complaint filings, deliberations, and results were made public, removing such decision-making from the government's discretion and potential political interference. In sum, Japan's mode of regulation in the sector shifted from attempting to avoid conflicts *ex ante* by deciding what price changes and business activities could be permitted, towards an *ex post* model of allowing firms to freely engage in their strategies, bringing conflicts to the DRC when problems arose.

The Japanese Fair Trade Commission further strengthened *ex post* regulation by entering telecom regulation for the first time. In 1999, it issued a warning to NTT DoCoMo over its practice of forcing handset manufacturers to delay the shipment of their products to competitors, and in 2000, it issued a warning to NTT over its treatment of DSL providers.

The New Regulatory Framework

As the logic of policymaking shifted, a new regulatory framework emerged. This framework was designed to increase the level of competition in landline telecom markets – in other words, to strategically liberalize the market. The changes entailed creating new rules where none had existed before, a classic case of re-regulation for the purpose of liberalization.²⁵

First, MPT created a new set of interconnection policies governing the terms under which competitors could lease NTT's last-one-mile of infrastructure. Until the late 1990s, few regulations governed interconnection, giving MPT wide discretion in determining

interconnection rules and the prices charged by NTT, thus providing opportunities for political intervention (Fuke 2000:20).²⁶ In 1997, acting on recommendations by the Telecommunications Deliberation Council, MPT revised the Telecommunications Business Law to establish clear rules for interconnection. NTT was required to lease its last-one-mile of infrastructure when requested, and MPT established a formula dictating the prices NTT was allowed to charge (Fuke 2000:43-45). In 2000, this formula was revised to further favor competitors.

Second, actors new to telecom policymaking were involved in creating a set of policies that promoted the deployment of DSL. DSL technology sends a high frequency signal through existing copper lines on top of conventional telephone signals. This requires equipment to be installed on both the user's end and within the facilities of the carrier. The new interconnection rules described above did not include provisions for competitors to place equipment within NTT's switching facilities, known as *collocation*. In the absence of rules for collocation, NTT was able to stonewall requests for information delaying access to its facilities.

In 1999, Tokyo Metallic, a startup firm, became the first company to commence DSL services in Japan. However, NTT had little interest in the technology, preferring to rely on its existing ISDN services and to wait until it could deploy fiber optic networks (ITU 2003).²⁷ Tokyo Metallic and other startups struggled to expand their DSL services. NTT took five to nine months to assess whether collocation space was available within a particular facility.²⁸

In July 2000, the Cabinet Office entered telecom policymaking by establishing an "IT Strategy Headquarters," which produced the *e-Japan* strategy in September. The *e-Japan* strategy identified Japan as lagging behind other advanced industrial nations in the development of IT. The policy goal was to create "ultra high-speed network infrastructure and competition policies," setting a five-year timeline to establish "one of the world's most advanced Internet

networks,” and aiming to provide low cost Internet access within a year.²⁹ The Cabinet Office passed the “Basic IT Law on the Formation of an Advanced Information and Telecommunications Network Society (IT Basic Law)” that November. The Basic IT law strengthened Soumusho (MIC)’s position by creating a broad framework within which many specifics could be determined by Ministerial Ordinances³⁰

In October 2000, the Japanese Fair Trade Commission entered landline telecom policymaking by taking an unexpectedly strong stance against NTT over its treatment of the DSL providers. Citing antitrust concerns, the FTC issued a warning (a form of administrative guidance) to NTT, the first time it had ever done so, though the lack of specific rules precluded it from taking punitive actions. The FTC’s warning brought NTT practices hampering the deployment of DSL into the public spotlight. It also sent a signal that the FTC was closely watching NTT and willing to act once rules were established.

That same month, Soumusho (formerly MPT) revised several Ministerial Ordinances, requiring NTT to clarify the terms under which it offered collocation, and to publicize how it calculated fees. The Ministry also required NTT to “unbundle” its unused fiber optic and copper capacity, allowing any carrier to lease the infrastructure at prices determined by NTT’s cost of operations (preventing them from deriving profit by leasing) (Fuke 2003:180-181). In 2001, the newly established Dispute Resolution Commission ruled against NTT in disputes brought to it by Tokyo Metallic and eAccess, another DSL start-up.

In 2003, the Judicial branch of the government was thrust into telecom policymaking for the first time when five carriers, led by KDDI and including British-owned Cable & Wireless IDC, took the extraordinary step of filing a lawsuit against the government. The lawsuit was over Soumosho’s approval of a 5% hike in NTT’s interconnection rates – an apparent reversal in its

stance of favoring competitors, leading many to suspect pro-NTT political pressure behind the move. While the legal proceedings are expected to take years, the lawsuit brings a new actor with policymaking clout into the telecom policymaking arena.³¹

Thus, by 2001, the new regulatory framework had substantially altered the opportunities and constraints facing firms in the sector. In 1996, carriers were compartmentalized and regulated, while lack of interconnection and collocation rules left them vulnerable to NTT. By 2001, carriers were free to enter or exit the market, and foreign firms were allowed to buy existing infrastructure-owning carriers. NTT's competitors had a set of rules about interconnection and collocation upon which to formulate business plans, and they could reasonably expect the FTC or the Dispute Resolution Commission to enforce those rules if NTT did not comply, with the legal system as a final recourse.

Market Outcomes

Softbank, DSL, and IP Telephony

Japan's emerging regulatory framework supported innovative corporate strategies, unleashing a new set of market dynamics. Softbank, a successful startup from the 1980s, and its founder Son Masayoshi, famous for his early investments in Yahoo, arguably played the most significant role in changing the terms of competition. In 2001, as the market for DSL grew, a subsidiary of Softbank launched a price war, setting monthly subscription prices at about one half the rate of its competitors (Softbank charged about 2400 yen, approximately \$22 at 1 USD = 110 JPY). It also mobilized aggressive sales agents who blanketed metropolitan areas, handing out DSL modems costing over \$100, free to new subscribers. Other DSL competitors were forced to match Softbank's prices, giving Japan the lowest monthly DSL prices worldwide. It is

unlikely that MPT in the “controlled competition” regime would have permitted Son to wage what many saw as a reckless price war, threatening carriers’ ability to invest in the next generation of infrastructure. Softbank then delivered a second price shock. It bundled free IP telephony subscriptions with its DSL service that allowed subscribers to call other Softbank subscribers without charge, and set flat rates for long distance calls to non-subscribers. Flat-fee telephony was unprecedented in Japan, since NTT (and its competitors, who paid interconnection fees to NTT) charged by the minute, with higher fees for longer distances. Softbank was able offer flat-rate service because it had built a completely IP-switched network constructed on top of leased lines from NTT, avoiding any interconnection fees. Son also set IP telephony calls to the US at below cost prices, at 8 yen a minute (6-7 cents), a fraction of what international carriers charged (2-300 yen for 3 minutes). The low monthly fees and attractive IP telephony prices led to a sharp increase in the number of DSL subscribers, and a sudden public interest in VoIP.

The Japanese government was surprisingly quick to support IP telephony by assigning a dedicated array of numbers to IP telephones (a 050 prefix), and later allowing IP telephones to obtain telephone numbers within the existing numbering scheme if they met quality standards.³² Major corporations, interested in cutting communications costs, began adopting IP telephony. Thus, Son Masayoshi, arguably went furthest in taking advantage of the new regulatory framework in a conscious effort to create a new broadband environment in Japan.

Fiber-To-The-Home (FTTH)

Driving forces behind Japan’s deployment of nationwide fiber optic *infrastructure* date back to industrial policy initiatives in the mid-1990s. However, the market for high-speed, fiber optic broadband *services* was shaped by the DSL market – a product of the new regime.

NTT had been pouring money into nationwide fiber optic infrastructure, and MPT had actively promoted the development of nationwide fiber optic infrastructure since the early 1990s. Using classic tools of industrial policy, MPT created incentives for competitors to deploy fiber networks. Through the Development Bank of Japan, it provided low-interest loans, also using a semi-public organization (the Telecommunications Advancement Organization) to help subsidize interest payments. By 1999, over 75 billion yen worth of loans had been allocated.

Market competition in the DSL market – low priced subscriptions bundling IP telephony – shaped the corporate strategies of firms commercializing consumer FTTH services. Usen (pronounced Yu-sen), a landline music broadcasting company that had deployed fiber optic cables to its grid of electric poles, was the first firm to offer household FTTH services in March 2001. Usen decided to charge 6000 yen (approx 54 USD) per month, only slightly more than double Softbank's DSL price. NTT had been expecting to charge more than double that price when it was ready to roll out its own proprietary FTTH service. Other firms entering the FTTH services market, including subsidiaries of regional electric power companies and NCCs, offered prices similar to that of Usen. Seeing Softbank's success with IP telephony, the government's legitimization of it, and firms' interest in adopting IP telephony, FTTH service providers began bundling IP telephony subscriptions as well. They promoted their competitive advantage of enjoying better sound quality and fewer dropped calls due to the higher throughput speeds. By late 2004, Japan had over 2 million FTTH subscribers.³³

Changing function of the domestic market

After the deregulation of FDI into infrastructure in 1997, the Japanese domestic market took on new functions in global competition – especially after its cellular Internet services developed ahead of the rest of the world. Foreign carriers such as British Cable & Wireless had

been in Japan for many years operating mostly corporate-oriented services on top of leased infrastructure, but only after 1997 were foreign firms allowed to own and operate infrastructure as NCCs. A dramatic series of events from 2001 revealed the new Japanese telecom market to be a place from which foreign firms could derive profits and gain technology through mergers and acquisitions.

In 2001, the British cellular carrier Vodafone gained management control and majority ownership of Japan Telecom, one of the original NCCs. Japan Telecom's wireless subsidiary, J-Phone, was one of the three nationwide cellular carriers and the pioneer of camera-phone services. Vodafone proceeded to reorganize the company under a holding company and sold off the landline businesses of Japan Telecom. It took full control of J-Phone, renaming it Vodafone, and transferring technology and know-how of J-Phone's cellular Internet and camera-phone services to its European operations. Vodafone quickly introduced *Vodafone Live!*, using technology taken from J-Phone's J-Sky service, in most of its European markets to quickly become the largest European cellular Internet service provider.³⁴

Ripplewood, the US venture fund that had shocked Japan by purchasing a failed but prestigious bank (the Long Term Credit Bank) in 2000, purchased Japan Telecom from Vodafone. Ripplewood then turned around and sold Japan Telecom to Softbank, making a substantial profit of about 90 billion yen in the process.³⁵

Not only had Japan's domestic market provided value to foreign firms in ways unimaginable in the mid-1990s, but domestic infrastructure had undergone a remarkable change of ownership. Japan Telecom's major shareholders had been former state-owned railway companies. In persuading them to sell, Vodafone had taken a careful diplomatic approach, promising to "preserve the Japanese character of Japan Telecom" and not to immediately split

off the wireless business and sell off the landline business – though that was exactly what it ended up doing.³⁶ It is unlikely that the railway companies would have sold their stakes directly to Softbank, since many established firms viewed Softbank with mistrust, fearing it could launch another reckless price war undermining everyone's profitability. Indeed, immediately upon its acquisition, Son argued that cellular fees were too high, declaring his intent to deploy a new cellular technology that would allow Softbank to add equipment on the ends of Japan Telecom's nationwide landline infrastructure to create a dramatically cheaper cellular service. This attempt was delayed or thwarted by Soumusho, however, who refused to allocate spectrum, citing lack of available bandwidth, a refusal that prompted Son to take them to court.

Strategic Integration into International Markets and 3G market dynamics

From the late 1990s, Japan's cellular market began to reconnect to international markets. Rapid 3G infrastructure deployment was facilitated by government policies, but the market dynamics for 3G services were substantially influenced by the DSL market. Unhappy with NTT DoCoMo's domination of the domestic cellular market, MPT allowed competitors to adopt a new standard in the latter half of the 1990s. IDO and DDI, suffering from DoCoMo's control of the PDC standard was, opted for CDMAOne, a standard based on US-based Qualcomm technology with equipment provided by Motorola, which promised better performance than PDC. MPT fully supported the new standard, going so far as to mobilize the Development Bank of Japan to help fund the infrastructure, enabling the carriers to commence services in 1998.

As international deliberations over 3G standards began in the ITU, MPT took the strategic action of announcing in 1996 that it would only issue three 3G licenses based on MPT's assessment of the applications. The availability of only two licenses for NTT's competitors sparked a wave of consolidations, leaving Japan with three nationwide carriers by 2001: NTT

DoCoMo, J-Phone, and KDDI. Though MPT's official rationale in issuing only three licenses was to conserve spectrum, the Ministry also probably wanted to encourage consolidations in order to ensure that firms would have enough capital to deploy infrastructure – a classic stance of Japanese industrial policy. In hindsight, the contrast with Europe's spectrum license allocations could not be clearer – by 2003, Japan had three separate 3G networks, while many European countries, their carriers having depleted cash by buying auctioned spectrum, had one or none.

KDDI launched price wars in 3G services in late 2003 by offering flat-rate 3G cellular Internet access. DoCoMo and Vodafone had no choice but to follow suit within a year. This move attracted the interest of firms that could count on flat-rate cost calculations and fresh opportunities to create new services and applications.

Conclusion: Towards a Japanese Resurgence?

A New Strategic Policy Thrust

In this paper, I have argued that Japan's telecom sector has undergone a regime shift in reaction to the new logic of competition in the digital era. Firms and government actors adjusted their strategies, recognizing that the institutions and market dynamics of Japan's "controlled competition" regime had led to Japan's declining international competitiveness in IT. Over a few years in the late 1990s and early 2000s, the logic of policymaking was altered by a government restructuring and the interaction between corporate and government adjustment strategies. The new emerging regulatory structure reshaped market dynamics. I label the new regime "strategic liberalization" to capture the policy orientation aimed at liberalization, not for the sake of liberalization itself, but for the strategic goal of rapidly deploying high-speed networks at low prices to a broad segment of the population. In essence, Japan's domestic market shifted from a

carrier-led, equipment manufacturer-driven, hardware-oriented platform for domestic investment and exports, to a carrier and service provider-driven, service-oriented arena focused on domestic consumption.

The next phase of Japan's development may very well involve a change in Japan's comparative institutional advantage, as firms working within the institutions, regulation, and market dynamics of the new regime attempt to augment existing competencies and search for new ways to add value. NTT retains its R&D capabilities, especially in wireless, and its close ties to manufacturers – advantageous in rolling out new services requiring close coordination between infrastructure and consumer hardware, shown in the development of mobile internet services. However, equipment manufacturers, while retaining their manufacturing capabilities, are no longer at the mercy of NTT's standards and strategies. Startup firms are facing new opportunities to implement new technology and offer new services, and foreign firms can use the domestic market in search of new opportunities. The government continues to take an active role in strategic policymaking, with the political leadership gaining strength to set strategic goals.

Indeed, the next thrust of strategic policymaking explicitly aims at accelerating corporate attempts to utilize Japan's high-speed network environment. In early 2004, the Cabinet Office announced the *e-Japan II* strategy. Satisfied with the faster-than-expected deployment of high-speed, low cost broadband infrastructure, the government shifted its focus toward indicating broad directions for future development. Healthcare, knowledge management, and facilitating labor mobility were among the areas it pledged policy support. At the end of the year, Soumusho unveiled its *u-Japan* vision, with similar goals as the *e-Japan II* strategy, focused on facilitating the development of “ubiquitous networks” integrating applications, hardware, and both landline and wireless networks.³⁷

Japan is also learning the value of standards in competition of the digital era. Japan has been working on R&D projects with China and South Korea, at both government and firm levels, to implement the next generation Internet Protocol standard IPv6. The ostensible technical problem fixed by IPv6 is the shortage of possible IP addresses under the current IPv4 standard. Despite possible workarounds to enhance IPv4, the Asian countries seem to be betting that they can use their domestic markets (especially China's) to set and possibly control the de facto global Internet architecture standard. The hope is to privilege their own firms in a variety of software and hardware applications for IPv6, thereby breaking Cisco and other US firms' dominance of Internet infrastructure.³⁸

Japanese telecom equipment firms have been reorganizing their global manufacturing capabilities in preparation for another push towards global markets, especially in cellular equipment.³⁹ Since Japan was early in deploying 3G networks, handset manufacturers have already rolled out several generations of incrementally improved products. In a familiar pattern, possible again as other countries deploy compatible 3G networks, they hope to take products developed in the sophisticated domestic market into international markets.

Finally, it is widely understood that technology moves from breakthrough innovation phases to implementation phases, in which incremental innovations allow the technology to be implemented into production systems (Yamamura 2003). For example, it took decades for the electric motor to become implemented in production, leading to mass production systems. Power grid infrastructure needed to be built, and factory floors were reorganized according to the logic of assembly production rather than a configuration determined by steam power-driven belts linking machines (Cohen et al 2000). The digital production paradigm, as understood in this volume, has arguably been in a breakthrough innovation phase. Japan has been historically

successful in the implementation phase, with its institutions and markets conducive to incremental innovation – for example in transforming mass production into the lean production system, which became a dominant manufacturing paradigm. If Japan successfully implements the latest digital and networking technology into a combination of existing strengths and new capacities, we can expect it to stage a surprising comeback in international telecommunications markets. Of course, Japan may not succeed, but if it does, the telecom regime shift will be the key to understanding Japan's resurgence.

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Appendix

Table 1: Population penetration of Internet and Proportion of cellular subscriptions

| Year (end of FY) | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|------|------|------|------|------|------|------|
| Population Penetration of Internet (% of total Pop) | 9.2 | 13.4 | 21.4 | 37.1 | 44.0 | 54.5 | 60.6 |
| Proportion of Internet Subscriptions via Cellular (%) | | | 0.85 | 0.93 | 0.90 | 0.85 | 0.81 |

Source: MIC White Paper 2004⁴

Table 2: Landline Internet Subscriptions by Type (millions)

| Year (end of FY) | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------|-------|------|------|------|-------|
| DSL | <0.01 | 0.07 | 2.38 | 7.02 | 11.20 |
| FTTH | - | - | 0.03 | 0.31 | 1.14 |
| CATV | 0.22 | 0.78 | 1.46 | 2.07 | 2.58 |
| Dialup | 1.13 | 1.63 | 1.91 | 1.93 | 1.79 |

Note: changes in data collection methods in 2001 account for most of the increase in dialup, according to MIC
Source: Ministry of Internal Affairs and Communications

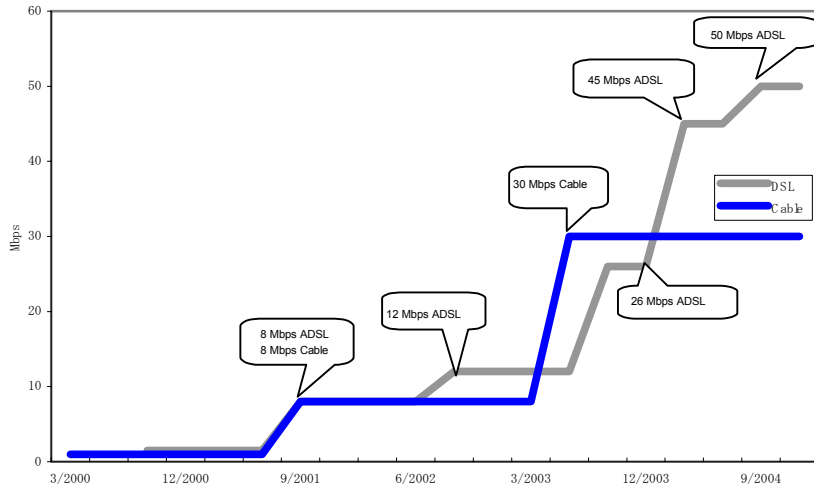
Table 3: Comparison of Prices per 100kbps, as of July 2003

| Country | US\$ |
|-------------|------|
| Japan | 0.09 |
| South Korea | 0.25 |
| Belgium | 1.15 |
| Hong Kong | 1.27 |
| Singapore | 2.21 |
| New Zealand | 2.71 |
| China | 3.07 |
| Canada | 3.25 |
| Netherlands | 3.36 |
| US | 3.53 |
| Germany | 4.42 |

Source: Soumusho 2004

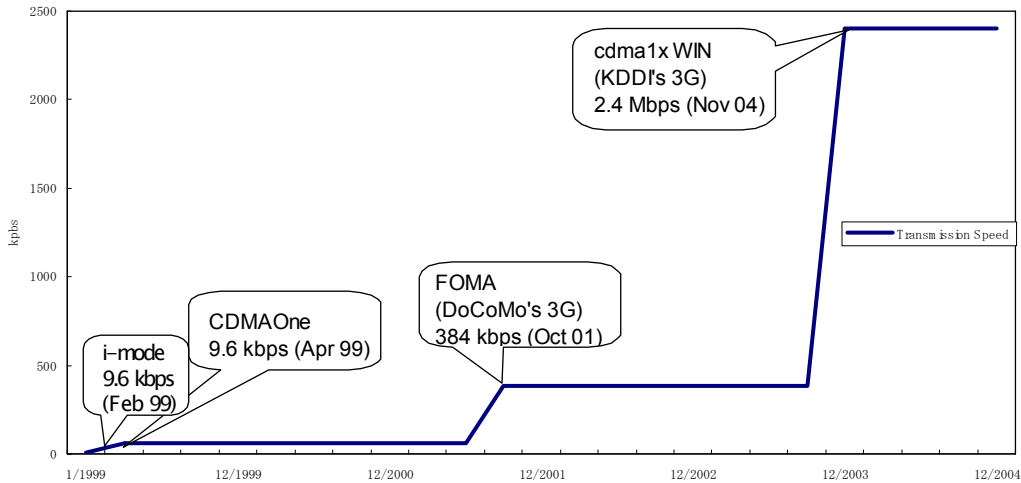
⁴ White Paper: Information and Telecommunications in Japan, 2004. Ministry of Internal Affairs and Communications, and Ministry data.

Chart 1: Increase of Speeds in DSL and Cable Internet Services



Source: Soumusho Joho Tsushin Seikaku Kenkyujo. 2005. *Henbo Suru Kontentsu Bujinesu (The Changing Contents Business)* Tokyo: Toyo Keizai Shinpo Sha: 5.

Chart 2: Increase in Cellular Internet Service Transmission Speeds



Source: *ibid*, 7.

¹ The domestic telecom market was not as spectacular a springboard for exports compared to autos, machine tools, or consumer electronics – especially to the US market. Fransman examines why Japanese firms were not as successful in penetrating US telecom equipment market as other sectors, despite enjoying high global market shares. (Fransman 1995). Analog cellular and

microwave equipment were among the successful products in US markets. (Steinbock 2003: 147, Funk 2002).

² Japan's loss of competitiveness in telecom equipment was not due to the same set of problems that led to Japan's economic problems in the 1990s. Difficulty in adjusting to the post-Bretton Woods international financial system, institutional rigidities, bad macroeconomic policies, and political paralysis, are a few factors to which scholars have attributed Japan's broader problems (Pempel 1998, Katz 2002, Posen 1998, Grimes 2001).

³ IP Denwa, Katei nimo shintou. 2005. *Nihon Keizai Shimbun*, March 29, 35.

⁴ IP Denwa "Dounyu" 9 wari. 2005. *Nihon Keizai Shimbun*, March 3, 1.

⁵ This logic is set out in (Cohen et al 2000)

⁶ As of early 2005, NTT Docomo's FOMA transmission speeds were 384 kbps, compared to 28.8 kbps for conventional telephone lines. KDDI's "au" service delivers up to 2.4 Mbps, compared to 384 kbps to 3 Mbps for typical American DSL services.

⁷ By 2005, Japan ranked 8th among the 104 countries included in the World Economic Forum's Global ICT Competitiveness rankings, up from 21st in 2002. In terms of Infrastructure-readiness, Japan rose from 11th in 2004 to 3rd in 2005.

⁸ MPT also lacked staff with technical expertise. Observers also point out that since NTT had been the Ministry of Communications in the prewar regime, while MPT had been the Ministry of Postal Affairs, many in NTT viewed MPT bureaucrats as little more than postmasters. NTT's large budget, and its extensive R&D labs also contributed to NTT's ability to essentially regulate itself. See (Vogel 1996, Johnson 1989, Anchoroguy 2001, Fransman 1995)

⁹ Okimoto and others have also argued that close relations between personnel in NTT's research labs and those of "family" firms boosted the competence and capacity of family firms. Aside

from joint projects, close relations were facilitated by *amakudari* (descent from heaven) practices, in which NTT personnel were employed at high positions in family firms' R&D operations (Okimoto 1989: 74, Fransman 1995)

¹⁰ See (Kushida 2005). Also see (Vogel 1996, Johnson 1989, Anchordoguy 2001, Takano 1992).

¹¹ I would like to express my gratitude to employees of TTNNet and Nifty for these perspectives.

¹² MPT had been driving R&D efforts to commercialize PHS (Personal Handyphone System), technologically similar to cordless phones, as a cheaper alternative to orthodox cellular services. PHS services commenced in 1995, but after explosive initial growth, the lack of interconnection rules and the improvements in coverage and handset performance it spurred among its cellular competitors, led to its decline and the shift of focus to text messaging and data applications.

¹³ Tokyo Digital Phone (later J-Phone, and then Vodafone) went to a research lab in Keio University known for their work on Internet-related technologies, IDO (later KDDI) joined the WAP forum assembled by the American firm Unwired Planet, and DoCoMo strengthened ties to Access, a Japanese startup company. J-Phone's first cellular information service, "Sky-walker," in late 1997, took DoCoMo by surprise. DoCoMo's president at the time, Ohboshi Koji, was reportedly furious about being behind the game. When J-Phone rolled out an early text-only version of its cellular Internet service in December 1998, DoCoMo was behind in the race for the second time (Kontentsu kakumei no kishu tachi: "kokusaikijun" de dokomo ni taikou. 2003. *Nihon Keizai Shimbun*, October 8, 5.; Kontentsu kakumei no kishu tachi: shanai benchaa, nankan toppa. 2003. *Nihon Keizai Shimbun*, October 9, 5.; Kontentsu kakumei no kishu tachi: shameru de onnagokoro tsukamu. 2003. *Nihon Keizai Shimbun*, October 10, 5.)

¹⁴ In DoCoMo's business model, *i-mode* was a portal, modeled loosely on AOL, rather than a channel for providing in-house content (Natsuno 2001). The main innovation was that, for

websites officially approved by DoCoMo, DoCoMo offered revenue sharing with content providers and billing services integrated with DoCoMo's own billing service (Funk 2001).

¹⁵ After Docomo began I-mode services in February of 1999, KDDI introduced its *EZWeb* service in April, and J-Phone its *J-Sky* service in December.

¹⁶ For examples, see an illuminating series of Nikkei articles analyzing the development of Japan's Internet connection services through interviews with key participants, titled "Kontentsu Kakumei no Kishu tachi (flagholders of the contents revolution)" (Kontentsu kakumei no kishu tachi: shameru de onnagokoro tsukamu. 2003. *Nihon Keizai Shimbun*, October 10, 5.)

¹⁷ For details on how the distribution system worked, see (Kushida 2002:58).

¹⁸ Telecommunications Carrier Association of Japan (TCA). <<http://www.tca.or.jp/>>

¹⁹ For an analysis of gradual transformative institutional change, see the Introduction of Thelen and Streeck's volume on institutional change. (Thelen and Streeck 2005).

²⁰ Prime Minister's Office. Seiji Shudou no Kakuritsu: seiji no riidashippu ga issou hakki sareru shikumi e. 1999. *Toki no Ugoki*, September.

²¹ MPT limited the scope of businesses in two ways. First, it had categorized telecom carriers into three types. *Type I* carriers owned infrastructure and consisted of NTT and the NCCs. *Type II* carriers leased facilities from *Type I* carriers. *Special Type II* carriers could provide services across prefectures, while *General Type II* carriers limited their operations to local areas.

MPT controlled market entry, exit, and prices charged by *Type I* carriers. A "Supply Demand Adjustment Clause" in the Telecommunications Business Law gave MPT wide discretion over the market entry of firms. This clause allowed MPT to cite factors such as "a mismatch between the business and existing demand in the proposed region of operation..." to deny an application,

without needing to cite any specific criteria (Fuke 2000:16). Likewise, no specific criteria existed for MPT to approve price changes, allowing them broad discretion.

Second, MPT compartmentalized competition by dividing the scope of business activities into long distance, local, and international service. There was no explicit legal basis for this division, but in the application form for carrier businesses, MPT created a “business area” category that needed to be filled in. This led to an unwritten understanding that carriers were not to cross business lines – for example, NCCs engaging in long distance service were not to move into international service, and vice versa (Fuke 2000:32).

²² The Telecommunications Business Law stipulated that when carriers could not reach an agreement, the complainant could appeal, and MPT could issue an order for the carriers to reach an agreement or engage in arbitration.

²³ Specifically, MPT changed most requirements on Type I carriers to “notify” rather than “require permission.” See (Fuke 2000) for an overview.

²⁴ Soumusho removed the classification of Type I, Type II carriers altogether.

²⁵ Vogel divides liberalization into deregulation as well as re-regulation (Vogel 1996).

²⁶ Two issues are important in interconnection: the Point of Interface (POI) and price. POI refers to the level of the incumbent’s network, such as regional, prefectural, and national, that competitors connect to. Initially, there were essentially no regulations governing how NTT arranged POI contracts with NCCs. Competitors wanted NTT to charge end-to-end fees in order to duplicate the least costly national infrastructure and connect only to the most lucrative prefectures. NTT, of course, wanted to charge NCCs according to the level of the POI they connected to. In 1991, MPT stepped in to restrict POIs to one per prefecture for each NCC, creating a competitive structure that increased competition between prefectures, but retained

NTT's monopoly within each prefecture. In 1993, MPT promulgated regulations forcing NTT to charge NCCs on an end-to-end basis (Fuke 2000: 20, 35)

²⁷ NTT's ISDN services also mostly charged by the minute, rather than having flat-fees.

²⁸ Kotorii, NTT wo chousa, Kousoku tsushin senryaku misu utsusu -- shinki sannyyuu gyousha to toraburu. 2000. *Nihon Keizai Shimbun*, October 24, 3.

²⁹ "Information Superhighway" initiatives by the US in the early 90s, and South Korea's cyber Korea strategy were among the international factors behind the political initiative. See Prime Minister's Office. 2001. IT Kakumei no Suishin ni Mukete: "e-Japan senrayku" kettei. *Tokino Ugoki*. (Mark Tilton rightly identifies the e-Japan Strategy as a classic example of Industrial policy, with aims of catching up, and (Tilton 2004).

³⁰ Juten go bunya no kyoka: IT senryaku honbu. 2002. *Nikkei Communications*, July 1, 106-116.

³¹ 5 Carriers File Suits against NTT Fees. 2003. *Asahi Shimbun*. (July 18). A former MPT official asserts that the key figure leading KDDI in its lawsuit was an MPT official who took a post-retirement (*amakudari*) position in KDDI. This official had apparently long been an advocate of using the courts as a new avenue for policymaking (Nakamura, Ichiya. Executive Director, Stanford Japan Center Research. Personal Communication, December 19, 2003).

³² IP denwa demo bangou ga kawaranai riyuu: mittsu no kufuu de soumushou no jouken wo kuria. 2003. *Nikkei Communications* Nov 24: 66-68.

³³ Soumusho website at <<http://www.johotsusintokei.soumu.go.jp/>>

³⁴ Kontentsu kakumei no kishu tachi: Nihonhatsu no jouhou saabisu kaishi. 2003. *Nihon Keizai Shimbun*, October 6, 3. By the end of 2004, Vodafone had introduced Vodafone Live! in 21 countries, mostly Europe, with over 28 million subscribers (Vodaphone website <<http://www.vodafone.com/>>). At about that time, i-mode was offered in nine countries with only

3 million subscribers, through local carriers licensing the technology from DoCoMo (NTT Docomo website <<http://www.nttdocomo.com/presscenter/facts/index.html>>).

³⁵ Ripplewood targets big bids for hefty investment returns. 2004. *Nikkei Weekly*, June 21.

³⁶ Nakamoto, Michiyo. 2001. Japan Telecom succumbs to a gentle touch: Michiyo Nakamoto on the success of Vodafone's diplomatic approach to the takeover. *Financial Times*, September 21, 35.

³⁷ In an interesting departure from previous industrial catch-up style thinking, both *e-Japan II* and *u-Japan* argue that the era of playing catch-up with the West in terms of IT infrastructure is over, and that cooperation with other Asian countries will be a key to future development.

³⁸ I thank Bob Cole for sharing his insights on this point.

³⁹ Matsushita ga hokubei de keitai daikousei. 2004. *Nikkei Business*, April 26, 9.; Beikeitai shijou ni NEC saisannyuu -- netto setsuzoku gijutsu ikasu. 2003. *Nihon Keizai Shimbun*, July 16, 1.