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Building Japan's Information Superhighway
by Joel West

If you want to know about U.S. plans for an "information superhighway," one of the best places to find out is Japan. Seemingly obscure U.S. proposals that are little-noticed here are cited in Japanese newspapers, magazines, books and speeches on Japan's own plans to build a nationwide digital communications network.

Such a network--usually referred to as a National Information Infrastructure (NII)--would be Japan's largest public works project since the construction of the shinkansen in the 1960's, so the possibilities are being debated by leading industrial companies, corporate think tanks, academia and several government ministries. The debate seems to have little to do with the questions of how or why such a network would be used, but instead--largely reacting to the recent U.S. NII plans--is driven by technological competitiveness and a desire by electronics manufacturers to find new, large and as yet untapped markets.
As with all important issues involving national policy in Japan, bureaucratic rivalry is central to both the process and likely end result of the NII debate. Also involved is the mutual dependence and rivalry between ministries and industry as they seek to gain both support and wrest leadership from each other.

This brief paper summarizes the policy-making processes at work in the contemporary Japanese NII debate. Because much of the debate is an explicit reaction to U.S. NII plans, it also highlights a few of the major contrasts between those plans.

Key Elements of the Process

The discussion of Japan's digital communications future is actually framed in terms of three inseparable code phrases: multimedia, information infrastructure, and fiber optics. At one end, "multimedia" --the anticipated convergence of audio, video and computing--has been the great anticipated growth market for Japan's large electronics companies for many years. They have developed both new products--such as Sony's handheld Data Discman and Fujitsu's home PC series FM Towns--and hyped existing products as part of an anticipated "multimedia revolution."

The link from multimedia to an information infrastructure is straightforward. Only multimedia content--home movies (video on demand), interactive video games, interactive education, and so on--requires the bandwidth to justify a nationwide digital telecommunications network supplanting the existing telephone network. Such a network is the cornerstone of the plans of Japan (and other nations) for an "information society" in which information is conveyed digitally between citizens, business and government, rather than via mail, fax, telephone or television. Meanwhile, Japan has already decided that this multimedia system will be delivered via a fiber optic network. In the U.S., current plans call for a hybrid system for itself based on fiber optics and coaxial cable, because existing coaxial cable TV lines serve the vast majority of U.S. homes.

In Japan, expensive, tightly-regulated cable TV has not caught on, available to only around 20% of all TV households and subscribed to by a mere 5%. So Japan has chosen the more expensive route of building a pure fiber optic system from scratch. Although such an all fiber-optics system would have a greater theoretical bandwidth than the U.S.'s hybrid system, there may be little practical difference for many years.

One similarity to the U.S. is that the system is being planned despite any demonstrable public demand for such a system. This huge task is nonetheless likely to foster the competitiveness of Japanese fiber-optic cable manufacturers.

There are three key aspects of the current internal Japanese NII debate. Together with the familiar issue of bureaucratic rivalry, they constitute the main elements of the policy discussion as it has played out thus far.

The "Catch Up" Mentality

Although elements of what is now considered NII have been discussed in Japan for many years, the rhetoric in the last two years seems to be driven by a "catch up" mentality--the view that Japan is behind in both plans for an information infrastructure, and key technologies such as networking and software.

A visit to a Tokyo bookstore will reveal dozens of books on multimedia, NII and the coming revolution in the information industries. Many examine technological issues, while others examine U.S. policies or explicitly paint an imminent economic rivalry with the U.S. As an example, Glen Fukushima in his January *Tokyo Business Today* column cited the recent book *Joho Superhighway no Kyoi: Nihon Joho Sangyo Kaimetsu no Kiki* (The Threat of the Superhighway: The Crisis of the Annihilation of the Japanese Information Industry).

In the words of Teruyasu Murakami, a prominent Japanese multimedia expert at the Nomura Research Institute:

Last year [1993], we had a new social infrastructure boom (*shin shakai shihon seibi*). The argument suddenly erupted around March. The point was [made] that in the Japanese budgeting system, only hardware investments such as [in] construction of bridges or

highways or airports are the subject of construction bonds (*kensetsu kokusai*). [It was argued] that bonds should be able to fund software development, including communication development.

This argument was made by [those in] politics and industries from mid-1992. Throughout the year 1992 there wasn't any enthusiasm [for it], but in February-March of 1993, suddenly this argument came to the surface in mass communications such as TV and newspapers. A very important reason was the Clinton administration's manifesto on the information superhighway development. That was the starting point of the whole information infrastructure in Japan.

Gore's superhighway idea triggered the whole argument about a national information infrastructure in Japan....It's a sort of artificial social phenomenon, not driven by Japanese society's national indigenous needs. (Interview, August 29, 1994)

Murakami cited a very concrete reason why Japanese politicians and businessmen had become concerned about the U.S.'s NII plans. In May 1993, the Council on Competitiveness in the U.S. published a report (*Vision for a 21st Century Information Infrastructure*) stating that U.S. NII plans could boost the competitiveness of U.S. industries.

This report was taken very seriously in Japan, according to Murakami, because an earlier commission, headed by then Hewlett-Packard CEO John Young, published a report (*Global Competition: The New Reality*) in 1985 that also "dramatically changed" (in Murakami's words) U.S. science and technology policy toward Japan.

But here we have one of the curious points of the Japanese examination of U.S policy discussions: many of the proposals cited are taken far more seriously in Tokyo than New York or Silicon Valley. Except for the Washington Post, which did two major articles, the 1985 Young commission report was limited to small stories buried on the business pages of the major newspapers. But at least this 1985 group--formally the President's Commission on Industrial Competitiveness--got one-day U. S. coverage. Eight years later, its successor, the industry-run Council on Competitiveness issued the 12-page NII report cited by Murakami. Despite Young's prominent role, the report was ignored by newspapers (and leading university libraries) and only briefly covered by trade magazines.

One explanation that must be considered is that the competitive threat is being used in Japan as a tool. It is well understood within Japan that government and industry do better when competing with an external economic rival, because it provides the external pressure necessary to speed up the decision-making process and force things to a conclusion. A crisis of competitiveness--real or imagined--seems to have moved the Japanese closer to an information revolution in the last two years than anything in the preceding twenty.

Others (mainly in the U.S.) have suggested that Japan lacks the creativity or other elements necessary for technological leadership, and thus need to have a model to emulate. According to John Stern, Vice-President for Asian Affairs of the American Electronics

Association, “The Japanese catch up better than they lead. . . .This is a nation that got rich following the taillights of America.” (Interview, Sept. 1. 1994)

Despite the “catch-up” rhetoric, there is little sense among Japan’s business and government leaders that the country is irretrievably behind. They face a number of problem areas in their NII plans, but, according to telecommunications executive Teiichi Aruga, “If these issues are resolved, playing rapid catch-up is Japan’s forte.” One of these issues, Aruga notes, is the emphasis in existing NII tests and discussions on producer rather than user motivations (“Japan’s Current Status: The Formation of a Next-Generation Social System,” presentation at The Future of Japan’s National Information Infrastructure conference, Palo Alto, California, Oct. 5, 1994.)

And most recently, voicing of Japanese strengths and American weaknesses has become more open. The January 2 issue of the *Nikkei Weekly* contained a lengthy (if often inaccurate) critique entitled “Piecemeal nature putting potholes in the U.S. info highway” by a Kobe university professor. Such outward criticism may be intended to rebuild Japanese self-confidence after excesses of “catch-up” rhetoric, or it may be intended to focus Japanese energies on building within the country, rather than constantly watching the competition.

Producer Motivations

Much of the debate about the Japanese NII has been framed around the potential revenues and jobs it would generate for many of Japan’s struggling industries, which have been pinched since the bursting of the “bubble economy” led to the current recession and an end to four decades of almost uninterrupted economic growth.

Adding to weak domestic demand, exports of Japanese-made goods are also declining due to *endaka*, or the strong yen. The large Japanese electronics firms are cutting back production in the home islands, moving manufacturing to China and Southeast Asia and are searching desperately for new products to manufacture in Japan to sustain both the health of their companies and, by providing jobs, their standing in Japanese political debates.

It is no coincidence that the “catch up” panic came in 1993, in the middle of a 10% two-year decline Japan’s industrial production. Advocates of NII investment have used job creation as a justification: a much-cited report by the Telecommunications Advisory Council (*denshi tsushin shingikai*) to the Ministry of Post and Telecommunications includes a table that explicitly equates NII with jobs [emphasis in the original]:

MULTIMEDIA MARKETS (approximate values at 2010 prices)

New markets related to fiber-optic network: 56 trillion yen

Existing multimedia markets: 67 trillion yen

Total: 123 trillion yen

Jobs created through the construction of fiber-optic network:

Approximately **2.43 million**

Source: "Reforms toward the Intellectually Creative Society of the 21st Century,", May 1994

This emphasis on domestic job creation is consistent with Japan's postwar economic policies, but sustaining this attitude into the 1990's could potentially cause two sources of trade friction. At the high end, Japanese industries are on a par with U.S. rivals in some areas, and at a disadvantage in others. Nonetheless, the implication that all the jobs created by the Japanese NII will be in Japan suggests a continuing policy of favoring Japanese products over imports. This, in turn, would create new sources of potential trade friction with the United States.

At the low end, both Japan and the U.S. are at an economic disadvantage compared to low-cost producers in the rest of East Asia, so it is natural to assume that (absent explicit governmental policy) many of the jobs involved in manufacturing mass-market consumer electronics products (such as the "set-top box" that will be the digital interface for TVs) will be created in other East Asian nations, and not in Japan.

As the wealthiest country in East Asia, Japan's potential for political leadership in the region lies in its using that wealth to promote regional economic growth. Some Asian specialists believe that Japan should absorb the manufactured exports from other Asian countries, the way the U.S. did in the 1960's, which would also improve the quality of life of Japanese consumers.

But the tone of the current NII debate shows that any shift from a producer-driven economy to a consumer-driven economy has not yet begun.

Top-down, Not Bottom-Up

In fact, the consumer is noticeably absent from the NII debate in Japan. The assumption seems to be "if we build it, they (the consumers) will come," and the talk is almost exclusively of the economic benefits accruing to the producers, the influence gained by Japanese ministries, and so on, rather than of any demonstrable consumer demand.

Of course, nominal consumer desires are postulated, with video-on-demand and long-distance medical imaging being the ubiquitous examples. But these are prototypical needs, placeholders used to advance the discussion of the technology until a real reason can be found. This problem is not unique to the Japanese debate. As John King and Ken Kraemer note in an article in the March 1995 issue of Informatization and the Public Sector, the U.S. NII debate revolves around providing wiring to homes even though initial market demand is likely to be from businesses.

Such an approach is symptomatic of technology-driven rather than market-driven thinking. The sharing of chest X-rays with specialists 200 kilometers away could be done by extending existing high-speed trunk lines to a few hundred hospitals, without the expense of building the information superhighway to the front door of each of 60 million Japanese households. And postulating an interest in video-on-demand ignores the ready availability of an established, much lower-tech alternative: the corner video store. (The presumed advantages of video-on-demand over the corner video store include availability but not price; forecasts all assume consumers will pay significantly more for the marginal convenience.) Such an absence of market-driven thinking does not bode well for the huge unanswered question of the NII: the cost of wiring each of those 60 million households by the target date of 2010.

A few Japanese have framed their thinking on NII around its potential benefits for individual members of the society, rather than for producer companies. Shumpei Kumon, a social economist who heads the Tokyo-based Center for Global Communications, predicts that in addition to spawning a "third industrial revolution" (he credits the phrase to the American economist George Gilder), the developing information infrastructure will also spawn a social revolution, creating a new class of network-aware citizens, or "netizens":

Just as during the 17th, 18th, and 19th centuries bourgeois citizens wanted to take part in their societies, [netizens] will demand something different from mass democracy in the 20th century. They will demand a freedom of informational activities--just as the original bourgeoisies demanded freedom time. . . .
The netizens want to have much greater freedom in terms of sending out information and having access to information. . . . Today, broadcasting is monopolized, chartered to a chosen few of society. Netizens are demanding that anyone should have access. (Interview, August 30, 1994)

While Japan has conceived of a national information infrastructure since the early 1970s, when the slogan *joho-ka* (always translated by the quasi-English word "informatization") came into fashion, Kumon's social revolution does not appear to be among the stated goals of big business and the bureaucracy, which have been leading the NII debate. Nor do any of them, including Kumon, anticipate as an outcome the transformation of Japan into a "consumer economy," as is so often postulated by American economists.

Bureaucratic Rivalry

Given the central role of the Japanese bureaucracy in the nation's economic miracle over the past 50 years, it is not surprising that business and the media eagerly await each new glimpse into the plans of the unelected officialdom. But despite its spectacular successes with Japan's auto and electronics industries, the Ministry of International Trade and Industry seems consigned to play a consultative--if not subordinate--role in developing Japan's digital communications industries.

MITI's problem is, in fact, summed up by the two words, "digital" and "communications." Regulation of industries in digital technology (i.e., computers) is under MITI's authority--except when it involves communications, which are governed by the Ministry of Post and Telecommunications. As Murakami put it: "In the past, industrial policy was masterminded by MITI. Now you have to think about the Ministry of Post and Telecommunications." (Interview, August 29,1994)

The debate is not limited to MITI and MPT. Because the information infrastructure represents the first major new industry for Japan in 30 years, various ministries and independent agencies are jockeying for a piece of the action. Participants in NII conferences are treated to a parade of representatives from Japanese ministries, always including MITI and MPT but often featuring the Science and Technology Agency (currently headed by the late Kakuei Tanaka's politically astute daughter Makiko) and other groups. Each speaker presents a "Vision of a Multimedia Society" that differs more in who is saying it in than the details of how the vision would be implemented. Similarly, various ministries have demonstration projects for the city of the future (MITI calls them "new media communities," whereas MPT sponsors "teletopias," and the Ministry of Agriculture has its own "greentopias").

Various ministries are also sponsoring competing private or quasi-private nationwide fiber optic communications networks. MPT, of course, has strong ties to Nihon Telephone and Telegraph (NTT). Among the three new common carriers (NCC's) that are NTT's long-distance competitors, MPT favors DDI (Daini Denden Inc., or "2nd phone company"), co-founded by a former NTT executive; the Ministry of Construction favors Teleway, whose lines are buried alongside of the ministry's national highways; and the Ministry of Transportation has encouraged Japan Telecom, a spin-off of Japan Railways, which built its fiber optic lines along JR tracks--much as SPRINT used the track of the Southern Pacific Railroad in the U.S. Meanwhile, MITI favors various regional carriers tied to MITI-regulated electric power companies, such as Tokyo Electric Power (TEPCO) affiliate TTNET.

Such diffusion of interests has its price. As Teresa Watanabe of the *Los Angeles Times* noted in a recent article ("Tide Turns on Mighty Tokyo Elite," Dec. 25, 1994), many Japanese believe that these turf wars jeopardize the nation's multimedia future.

Nonetheless, the jockeying for influence--primarily the rivalry between MITI and MPT--permeates the NII debate. The recent clash between these two ministries has reopened the "VAN wars" of the early 1980's, in which they fought for jurisdiction over Value-Added-Networks that provide on-line information and digital communication services. Aided by Keidanren, MPT won that battle in the Diet, and the net result was a liberalization of the VAN's to permit competition for NTT. But, as Steven Vogel has concluded in a forthcoming study, it also led to a net increase in regulatory power for MPT.

As in the earlier turf battle, MPT is again holding the high cards. In the final analysis, it is hard to see how a national information infrastructure that replaces analog voice circuits to each home with digital data circuits could be considered anything but a

telecommunications, and thus MPT, affair. If it wins major control, MPT will guide both the nature of the network itself, as well as the specifications for the equipment to be manufactured for use in homes, offices, and switching stations throughout the nation. For this reason, reports from MPT and its allies, such as the Telecommunications Advisory Council, offer the clearest glimpse into the future of Japan's NII.

Despite some liberalization, MPT's continuing bias toward regulation will continue to impede the diffusion of network services. For example, because of MPT regulatory restrictions on certain Type II carriers, approximately 30% of the Internet sites in Japan today cannot receive E-mail from international destinations. In the U.S., where no state or federal permits are required to provide worldwide E-mail, services and service providers are sprouting up weekly.

Other Factors

In addition to the four major factors framing the Japanese NII debate--the "catch up" mentality, producer motivations, the top-down approach, and bureaucratic rivalry--a number of additional factors must be considered in examining the NII policy-making process.

Centrality of NTT: As noted above, all existing NII plans assume that NTT will be building the information infrastructure to the consumer's door. There are no cable TV franchises or Regional Bell Operating Companies (RBOCs) to rival NTT's claim to power, and the new common carriers (NCC's) are too small and weak to seriously challenge NTT. Until 1985 NTT was a government agency, part of MPT; today, in terms of both equity (after stock sales from 1986 to 1988, the Ministry of Finance still holds about 65% of the shares of NTT) and MPT influence, NTT has become at best a quasi-private corporation. MPT has used the threat of an AT&T-style break-up of NTT to assert its control over NTT, but NTT uses its central role in the NII future to enlist support in resisting such a break-up.

Financing: The minimum cost for extending fiber optic lines to every business and individual neighborhood is put at 16 trillion yen; with associated switching systems, extending a line to every home and undergrounding the entire system, the total could be as high as 95 trillion yen. Because the development model is not based on pay-as-you-go market-driven development, and because of an ambitious deadline of 2010 (not coincidentally, 2010 is 5 years ahead of the Clinton Administration's target date for the U.S.), most of this cost will have to be advanced ahead of actual revenues. To prime the pump, MPT last month announced an FY 1995 32.3 billion yen loan program via the Japan Development Bank for building fiber optic networks, with the money offered to NTT, other Type I carriers, and cable TV operators. But where will the other trillions come from? One possibility is government financing, another is raising rates for existing NTT subscribers, who already pay far more than consumers in many industrialized countries: both face potentially crippling political and practical obstacles. A third possibility, of course, is for the Japanese to reinvest the profits from their huge foreign trade surplus.
Artificial schedule: Given that the financing mechanism (and basic consumer demand) is completely unresolved, the dates announced for completion of the NII reflect more the

pride, power ambitions, and national competitiveness of the sponsors than realistic projections of Japan's information future. As an example, at a June 1994 conference in Tokyo, the NTT representative anticipated completion of the national network by 2015; but the MPT representative set a deadline of 2010; and all subsequent NTT presentations used the 2010 date. While Japan's "catching up" is second to none, until the details become more concrete, the announced dates must be considered goals rather than predictions.

Perpetual joho-ka: The phrase "*joho-ka*"--meaning change to an information-oriented society--has been a slogan of government policy for at least two decades. Shumpei Kumon attributes the phrase to Ugiro Hayashi of the Economic Planning Agency in the 1960's, and Chalmers Johnson in *MITI and the Japanese Miracle* dates MITI's first detailed vision plan of a "knowledge-intensive industrial structure" to 1974. Since then the government has spawned many research and demonstration projects in software and other information technologies. However, public policy debates are still dominated by considerations of manufacturing and selling hardware--perhaps because the major electronics *keiretsu* still have far more political influence than smaller software-only firms.

Limited consumer experience: Japanese homes and businesses have relatively limited experience with public networks in particular (e.g., the Internet) and computers in general. Despite its leadership in many component technologies, Japan ranks only 17th worldwide in per capita computer installations. Even though visionaries in Japanese industry, government and academia may be able to look beyond immediate experience, this limited experience will make both accurate market research and demonstration projects far more difficult to implement.

Impact of Great Hanshin Earthquake: All government budgets prior to Jan. 17 are called into question by the unanticipated 10 trillion yen or more to be spent rebuilding the Kansai region. The painful vulnerability of Japan's urban areas to inevitable quakes has rekindled talk of decentralization, which would be greatly aided by an NII--as will temporary telecommuting during the Kobe's reconstruction. Meanwhile, the Internet showed a small fraction of its potential, with real-time eyewitness reports, photographs and casualty lists posted online at Kobe University and elsewhere for readers throughout Japan and the world.

Direct Influence of U.S. Policy: Japanese policy-makers are intently studying the U.S. government's NII proposals, and more people in Tokyo can recite Vice-President Gore's "Five Points" (1. encourage private investment; 2. promote competition; 3. quick regulatory response; 4. network access for all information providers; and 5. universal service) than in Silicon Valley or New York. Given past history in many other fields of endeavor, even if the Japanese recognize the stumbling blocks between rhetoric and reality, there is still a good chance that White House policy will be more quickly implemented in Tokyo than in Washington, D.C.

JOEL WEST is president of Palomar Software, Inc. and technical adviser to the Japan Policy Research Institute. This report is based on research performed for the Center for

Research on Information Technology and Organizations (CRITO) at the University of California, Irvine. He has previously worked as a computer industry columnist and has authored a book on Macintosh programming.