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# Utopianism and National Competitiveness in Technology Rhetoric: The Case of Japan's Information Infrastructure

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*Abstract: The ideologies of technological utopianism and national competitiveness are two common strands of 20th Century technology policy in developed nations. The former is the tendency to paint an unrealistic picture of schedule or benefits for a planned technological shift, while the latter is the use of a (real or imagined) advantage held by another nation as a justification for domestic policies. Both are techniques that can and have been used to sell technology policies to government, industry and the public at large. This theoretical framework is used to analyze the emergence of the "multimedia"/information infrastructure boomlet in Japan in the mid 1990's, and, in the context of the country's history and institutions, used to explain the policy distortions that resulted.*

Since 1993, Japan has witnessed a debate between leading companies, think tanks, academics and various government ministries over how to build a national digital communications network. The plans for this network were decoupled from demonstrable market needs, but instead seemed driven by ideologies of technological utopianism and national competitiveness.

Such a discussion of national information infrastructure is hardly unique to Japan, or, for that matter, NII plans in general. The history of technology policy in the 20th century is marked by such ideologies, which are used to market emerging technologies to various political and economic constituencies.

## Between-Nation Technological Competition

International technological competition among developed nations was both a cause and effect of the industrialization of Japan. In the century leading up to the 1970's, Japan was driven by a desire to achieve technological parity with the West. After it succeeded, this success motivated

much of the newfound desire of many Western nations to improve the "competitiveness" of national industries to regain parity (or advantage) to meet the Japanese challenge.

***Japan's Push for Technological Parity with the West***

Japan's relations with the West over the past four centuries have been frequently colored by its actual (or perceived) technological inferiority to Western nations. Japan's first extensive contact with the West came from visits by Catholic missionaries in the late 16th Century. But concerned with the subversive influence of Christianity and potential Spanish colonialism — as well as the impact of Western guns on social order — the ruling Tokugawa shôgun banned both the religion and contact with Westerners.[1] The subsequent two-and-a-half centuries of isolation left Japan technologically frozen in time during the period when the Industrial Revolution swept through Europe and the U.S.

This isolation ended on July 8, 1853, when Commodore Matthew Perry brought his ships to Tôkyô Bay, including the first steamships ever seen by Japan. Facing this superior military technology of the U.S. Navy, the shôgun felt little choice but to accede to Perry's demands to open the country to Western visits and trade.[2]

The resultant political instability brought a 1867 coup by dissident samurai, who replaced the shôgun with the Meiji emperor, and then set out on a 21-month voyage to study Western institutions and technology for adaptation in Japan. They then embarked on a series of economic, social and political reforms, organized around the slogan *fukoku kyôhei* (rich nation, strong army), because of the realization that political independence could only be regained by technological development providing military strength necessary to stand up to the West (Samuels 1994).

The end result was a period of rapid industrialization and development of a modern navy — culminating with unexpected victories over China (1895) and Russia (1905), and a restoration of national sovereignty through the end of extraterritoriality. Nearly thirty years later, the Japanese army invaded Manchuria to provide raw materials for Japanese industry, while the military-

dominated government gradually closed the country to foreign trade and centralized economic control in the run up to World War II.

This pattern matches Gerschenkron's (1962) archetype for late-industrializing nations of 19th century Europe. In Meiji Japan, strong institutions (the ex-samurai bureaucracy) combined with a national ideology (*fukoku kyôhei* ) and mobilized economic resources (a national postal savings system) to overcome a legacy of backwardness (a feudal, agrarian system with enforced seclusion). As with other late developers, Japan was unwilling to spend 200 years to industrialize as had England, but instead wanted to quickly achieve technological parity with international rivals.

Japan achieved this parity by the time of World War II, 75 years after the Meiji Restoration. In an approach that foreshadowed its postwar "miracle", national laboratories were set up for aeronautical research, Western designs were copied (under license or otherwise), and indigenous improvements were developed that went far beyond the imported designs. Symbolic of this success was the Mitsubishi Zero fighter plane — superior to any plane that the Allies could field during the early part of the war, and directly copied by the Americans in the design of the F6F "Hellcat" (Morris-Suzuki 1994; Boyle 1993: 250). ~~Japan's inevitable defeat stemmed more from the quantity — rather than quality — of armaments manufactured by the U.S.~~[3]

In the postwar era, Japan rebuilt its economy both to end the U.S. Occupation and achieve industrial parity with the West. It did so by shepherding its capital, restricting imports and foreign investment and aggressively promoting exports under the central direction of various national government ministries, notably the Ministry of International Trade and Industry (MITI) and the Ministry of Finance (Johnson 1982).

This period also saw a heavy use of imported technology, which was a major factor in the economic growth of Japan through the late 1960's (e.g., Minami 1994: 110-113). In some cases, government policies such as restrictions on foreign direct investment were used to encourage licensing of technology on terms favorable to Japanese firms, as in the case of basic patents for

integrated circuits (Mason 1992: 174-187). In other cases, cooperative R&D projects (with both public and private funding) were used to develop technologies not available to license.

***Japan's Information Industry Catch Up***

Beginning with a 1957 law for the promotion of the electronics industry, MITI used a variety of tools to protect and nurture Japan's infant information industries. This included negotiating for rights to IBM's computer patents on behalf of Japanese firms, using foreign exchange and technology controls to restricted IBM's attempts to produce its Model 1401 computer in Japan until these patent rights were obtained. MITI similarly delayed IBM's attempts to produce the Model 360 computer series until 1965; other U.S. firms were forced into enter into joint ventures to gain access to the Japanese market, providing both foreign technology to Japanese firms and a counterweight to IBM in the Japanese market. It also pressured government and quasi-government organizations to use Japanese computers, and provided low-interest loans to a public corporation that subsidized the rental of these computers to business customers. (Anchordoguy 1987: 20-31, 59-91).

These measures helped Fujitsu, NEC, Hitachi and other firms develop a solid base in the Japanese market and thus improved production economies of scale. But they did nothing to raise the technology levels to help the marketability of exports. For this, MITI sponsored a series of cooperative R&D projects to help Japanese computer makers catch up with IBM in mainframe computers. These included FONTAC (1962-1965) targeting the Model 1401, the Super High-Speed Computer Project (1966-71) seeking to surpass the IBM 360 series, and the New Series Project (1972-1976) in response to the IBM 370 series computers. Government spending on these three projects totaled approximately $260 million (Anchordoguy 1987: 43-108; Okimoto 1989: 78). Similar efforts were sponsored by MITI for supercomputers (1981-1989).

At the same time, Nippon Telephone and Telegraph (NTT) spent $98 billion on two other research projects — DIPS-I (1968-72) and DIPS-II (1973-76). The public corporation's money effectively commercialized the results of parallel MITI mainframe projects, providing NTT with

improved domestic computers and, not incidentally, strengthening the market position of NTT's key suppliers (Flamm 1988: 190-191; Anchordoguy 1989: 54-55, 121-122). The combined results were to reduce IBM's share of the Japanese mainframe computer market from approximately 70% in 1960 to less than 25% in 1980, while Japanese computer firms gained major market positions in mainframes in Europe and North America.[4]

In conjunction with mainframe computer research projects, both MITI and NTT sponsored research efforts by Japanese firms to catch up in semiconductors. This included what is generally considered to be the most successful MITI-sponsored R&D effort, its $150 million VLSI project (1976-1980) that focused on manufacturing process improvements (Okimoto 1989: 71-80).[5] In addition to enabling Japanese firms to make mainframe computers to compete with IBM, the MITI effort — in conjunction with a parallel NTT-sponsored project — helped Japan surpass the U.S. for the first time in 1986 in global semiconductor market share.

Less successful were MITI's software-related efforts, include the Japan Software Company portion of the Super High-Speed Computer Project, the Pattern Information Process System (1971-1980) the Fifth Generation Computing Systems (1983-1995), and project Sigma (1985-90). Most of the recent MITI efforts have focused on software, including the Real World Computing Project (1992-present) and various NII-related plans discussed below. The plans have been handicapped by ambitious efforts to "leapfrog" U.S. technology, as well as the lack of direct transferability of electronics and semiconductor research skills to software development. MITI also two backed two unsuccessful proposals to reduce legal protection for software intellectual property rights in 1983-1985 and 1993-1994, which would have made it easier for Japanese firms to imitate successful (largely U.S.) software (West 1995b).

Finally, not directly sponsored by MITI was the TRON (The Realtime Operating system Nucleus) consortium, headed by Professor Ken Sakamura of the University of Tokyo. Begun in 1984, the project had wildly ambitious "leapfrog" goals that would have been difficult for an established operating system vendor: special versions of the operating system that would support telecommunication networks, realtime industrial computers, personal computers and even

handheld computers.[6] TRON supporters say the PC version would have succeeded in Japanese schools if not for U.S. trade pressure in 1989, but Callon (1996) argues that consortium member NEC had delayed TRON's PC efforts for years to protect its overwhelming lead in domestic PC sales with its proprietary NEC PC-98 computer architecture.

***"National Competitiveness" Mantra of 1980's***

By 1980, successful export strategies by Japanese industries — not only in electronics, computers and semiconductors, but also steel, automobiles and machine tools — inspired anxiety in many North American and European producers facing intense competition and even technological inferiority for the first time.

So by the mid-1980's, global competition was the rule for technologically-driven firms in these three regions, dubbed the "triad" by Ômae (1985). First firms, and then their corresponding national governments, sounded cries to increase the "national competitiveness" in this global market. The goal was — depending on who you asked — to regain parity or leadership in key markets.

In the U.S., reports on industrial competitiveness came from a blue-ribbon panel (President's Commission 1985) and the nation's leading engineering school (Detrouzos et al. 1989). In 1986, the private Council on Competitiveness was formed to identify policies that enhance American competitiveness and to promote those policies to government and the general public. General policy proscriptions included macroeconomic (savings, investment, budget deficits), social (education), industrial priorities (process engineering) and technology policy (e.g., R&D consortia).

"Competitiveness" articles published in major U.S. newspapers, business magazines and mixed practitioner/academic journals — as well as all listings for ABI/Inform — show similar patterns.[7] The buzzword was infrequently used in the early 1980's, but it increases dramatically in 1987 and again in 1988. The year 1988 was an election year, the first year the Baldridge Award for quality management was given, and the year of the Omnibus Trade and

Competitiveness Act of 1988 (which enabled the "Super 301" unilateral trade sanctions). The concept got comparatively low level coverage during the Bush administration — except for the politics of the President's Council on Competitiveness (headed by Vice President Dan Quayle) — but rose again in 1992 with another election year and then new policy initiatives by the Clinton administration.

The earliest three of the mixed-audience academic articles — Scott (1984), Lodge and Crum (1985) and McCulluch (1985) — sounded what would become familiar themes: the loss of U.S. manufacturing prowess, need for an industrial policy and the macroeconomic origins of the nation's trade deficit with Japan. After preparing his own article lamenting the loss of U.S. "technological leadership" (Nelson 1990), Nelson (1992) critiqued the various U.S. writings on competitiveness as falling into these same three camps — firm-level policies, industrial targeting policies, and macroeconomic policies — camps which talked past each other and offered mutually-incompatible proscriptions.

Meanwhile, while the U.S. was trying to catch up with Japan's manufacturing quality, industry targeting and high investment rate, the Japanese leaders worried that their nation lacked the creativity and advanced higher education of the United States, which would cripple its ability to compete in the information age. Prime Minister Nakasone instituted a 1983 commission to consider educational reform, which was succeeded by a national council on reform reporting directly to the prime minister — bypassing the powerful Ministry of Education seen by many as a major impediment to reform. The council called for strengthening the system of higher education, while decreasing rote memorization which promotes conformity at the expense of creativity (Leetsma 1987). At the same time, such competitiveness has been a major concern of European Commission president Jacques Delors, as well as an overriding factor in the rethinking of social insurance programs by Germany, Sweden and the United Kingdom.

This theme of "competitiveness" was recently criticized by Krugman (1994). He attacked the metaphor of competition between nations (rather than firms), and the particular emphasis on promoting high technology industries. His proscription allows for national policies to promote its

industrial capabilities, but these are linked to more conventional macroeconomic remedies, such as promoting education and investment.

***Positive Feedback Loops: The Fifth Generation and Semiconductor R&D Consortia***

In the 1980's, MITI-led R&D projects inspired reactions in the United States and Europe, until there was a positive feedback loop in technology competition between the three regions. The two most salient examples are cooperative research on semiconductor process improvement and Japan's so-called "Fifth Generation" project.

While MITI's research projects of the 1970's had enabled Japanese firms to catch up or surpass U.S. technology in electronics, similar efforts in computer software had been ineffectual. In response, MITI launched the ambitiously-named Fifth Generation Computer Systems (FGCS) project[8] to leapfrog U.S. computer architectures in hopes of achieving a breakthrough in artificial intelligence (AI) and parallel processing. FGCS was run by the Institute for New Generation Computer Technology (ICOT) from its formation in April 1982 until its termination in March 1995.

The project inspired perceptions that the U.S. was slipping behind in computer software and needed to develop its own competing industrial policy — largely as the result of one book (Feigenbaum and McCorduck 1983). This result was intentional, as the book explicitly stoked American fears:

> The Japanese plan is bold and dramatically forward-looking. It is unlikely to be completely successful in the ten-year period. But to view it therefore as "a lot of smoke," as some American industry leaders have done, is a serious mistake.…

> We now regret our complacency in other technologies. Who in the 1960s took seriously the Japanese initiative in small cars? Who in 1970 took seriously the Japanese national goal to become number one in consumer electronics in ten years? … In 1972, when the Japanese had yet to produce their first commercial microelectronic chip but announced their national plans in this vital "made in America" technology, who would have thought that in ten years they would have half of the world's market for the most advanced memory chips? Are we about to blow it again? The consequences of complacency, of our spirited attention to the near-in at the expense of the long view, will be devastating to the economic healthy of our most important industry. The Japanese could thereby become the dominant industrial power in the world (Feigenbaum and McCorduck 1983: 2).

The result was a series of publications predicting likely Japanese successes in AI and parallel computing, increasing (as the authors had hoped) research budgets in the U.S. and Europe. It also prompted U.S. predictions of future Japanese success in computer software; the culmination of this trend can be seen in the following passage by one M.I.T. researcher:

> If Japanese firms were to transfer the same type of skills they have cultivated in other industries to software...users would probably become better off, with improved products at lower prices. The Japanese, however, would then also confront the United States, where Americans have not only dominated in technological invention and innovation for software but, in contrast to many other industries, seemed to retain a daunting lead over all other nations—including the Japanese. (Cusumano 1991: 5).

However, few of the Fifth Generation project's original goals were achieved: critics pronounced it a complete failure, while supporters were confined to citing collateral benefits such as researcher training.

One reason was that in trying to "leapfrog" existing Western technology, the project made a series of technical miscalculations. Like Cusumano's "Software Factories," and the early MITI-sponsored projects, the focus of FGCS was on mainframes-class machines. But two months before the October 1981 "International Conference on Fifth Generation Computer Systems", IBM legitimated the real fifth generation computers — those based on microprocessors. Today, microprocessors are the basis of the world's largest computer software firms, and McCorduck's "second computer revolution…the important one" (to quote a section title) proved to be the personal computer. ICOT's prototype parallel inference machines were doomed by the same

microprocessor economies of scale — where production runs are the millions rather than hundreds — that doomed LISP machines, supercomputers and other specialized complex instruction set computing (CISC) processors of the 1980's.

In retrospect, Feigenbaum and McCorduck's rhetoric on the FGCS project was heavily colored by their own belief in the imminent AI revolution — a revolution predicted for three decades and still not yet realized. There's even some question whether the original project had the same AI emphasis attributed by its American promoters (Unger 1987: 181).

FGCS also faced severe institutional problems. The project's goals were oversold — predicting that it would enable, among other things, computerized medical diagnosis, language translation, voice typewriters and computer-aided manufacturing (CAM) robots (Doi *et al.* 1989). Such ambitious goals were necessary to build government and industry support: a project with more modest but realistic goals would have been unlikely to receive Finance Ministry funding or key industry researchers. Early on, even MITI officials began to doubt the project's feasibility, but, Unger (1987: 185) concludes, the Japanese translation of Feigenbaum and McCorduck's book stopped that sentiment.

Finally, one of the early target areas — machine translation — quickly became commercially attractive and the member companies pressured ICOT to drop it from the FGCS research (Unger 1987: 191). As the technology of individual firms has grown stronger and MITI's checkbook proportionately smaller, such tensions have become an inherent difficulty of such joint public/private research projects (Callon 1996).

Feigenbaum and McCorduck proved more prescient on memory chips: by the mid-1980's, the Japanese share increased from 50% to 80%, while the U.S. share fell to 15% as firms such as Intel abandoned the market to NEC and Toshiba. In a direct attempt to catch up to Japanese technology in memory chips, IBM, DEC, HP and AT&T attempted to organize the U.S. Memories consortium to manufacture DRAMs; the effort failed in the face of indifference by US computer companies such as Apple and Sun, who were by then heavily dependent on Japanese DRAMs (West 1989). Instead, the primary DRAM competition for Japanese firms has come

from Korea in a market that is projected to grow 20% annually for the next decade (Hamilton and Glain 1995); profits are from assured, however, in a market that has been chronically plagued by under- and over-capacity due to the large investments and long lead times necessary to expand production capacity.

Two other major U.S. electronics industry research consortia were successfully organized in the 1980's explicitly in response to Japanese competition: the Microelectronics and Computer Technology Corporation (MCC) in 1982 and SEMATECH in 1987. Such between-firm cooperation had previously been considered illegal collusion under the 1890 Sherman Anti-trust Act, which clouded MCC's future when it began. Such restrictions were swept away in response to the perceived Japanese threat. As the *Economist* put it:

> In 1984 American antitrust law was rewritten as a result of heavy lobbying by computer firms. They claimed that the Japanese government's $1.3 billion "fifth-generation computer project" would leave them in the dust if they were not allowed to mount a collaborative response. Japanese semiconductor firms had leap-frogged American chip makers thanks, it was claimed, to a collaborative project organized by the Ministry of International Trade and Industry in Tokyo. Now Japan was going to do the same in computers. … Congress panicked and passed the National Co-operative Research Act unanimously in 1984. ("Uncle Sam's helping hand" 1994)

Supported by member firms, MCC was set up in direct response to the Fifth Generation project (Fischetti 1986), and for a while it shared the Japanese project's perceived AI emphasis (Leibowitz 1987). Like FGCS, it was criticized for failing to deliver useful technologies and, ironically, for failing to slow Japan's technological advance as promised (Rifkin 1990).

These controversies were nothing compared to those associated with U.S. government funding for SEMATECH. Prompted by concern over dependence of Japanese semiconductors in American weapons systems, the Defense Department agreed to pay half the initial cost — which will total $950 billion by the time subsidies end in 1997; this was attacked as a government effort to "pick winners." At the same time, a U.S. General Accounting Office study found that the matching industry contributions were essential in keeping the program focused on commercially relevant technologies ("GAO finds," 1993) The project was plagued by the same competitive

suspicions that faced the FGCS, but it "provided a sort of neutral ground on which 'blood enemies' can cooperate within certain agreed-upon boundaries" (Browning *et al.* 1995). It was credited with saving the U.S. semiconductor equipment industry, narrowing the Japanese advantage in production yield, helping to improve production quality and generally achieving "manufacturing parity" (Spencer and Grindley 1993; Stratton 1995).

In response to the U.S. and Japanese initiatives, European governments, too, felt pressured to improve competitiveness in semiconductor manufacturing processes. In 1989 they launched the Joint European Submicron Silicon Initiative (JESSI) joint research project. Its seven-year budget was originally projected to be $4 billion, with half from government (both individual nations and the European Commission) and the remainder from industry (de Bony 1992; government budget cuts have reduced that and the program's future is uncertain if government funding ends as scheduled in 1996.

## Technological Utopianism

If "competitiveness" rhetoric emphasizes the importance of producing a technological product for companies and thus job creation, then "technological utopianism" is the consumer flip side, stressing societal benefits accrued when citizens consume a technology.

This consumption is not that associated with products introduced into an existing market. Instead, it assumes that emerging technologies require that the market be created by visionaries who anticipate the future technological evolution — particularly when the development requires public funding. Alas, such visions can be comically ahead of their time, and often articulate only the positive aspects of the new technology.

Kling (1994) classifies writing about the meaning of computer technologies into five categories. Two are ideologies — utopianism and anti-utopianism — which present only the good (or bad) potential of a new technology. The remaining three categories — social realism (journalism, ethnography), analytical reductionism (typical of management research) and social

theorizing — attempt some form of balance, but progress from empirical observation to theoretical abstraction.

The two ideologies — technological utopianism and anti-utopianism — reflect polar opposites on a scale of hypothesized consequences of technology, and strong elements of the former can be found in the promotion of Japanese NII plans in the 1990's.[9] But such themes are also quite common in the Western world, in culture, business and government policy.

***Utopianism in Western Culture***

In Western society, the idea of a spiritual paradise-on-earth begin with the Garden of Eden and extend to John Milton's epic poem *Paradise Lost* (1667).[10] More societally oriented utopias extend from Plato's *Republic* (4th century B.C.) through Sir Thomas More's *Utopia* (1516). Fromm (in Orwell 1961) credits More and subsequent utopian writers with "an imaginative picture of the concrete details of a society which corresponds to the deepest longings of man." The industrial revolution inspired a rash of utopianism in the 19th century, the best known representative being Edward Bellamy's *Looking Backward* (1988)

In the 20th Century, such technology-inspired fiction became the entire genre of science fiction. In between space trips and friendly (or hostile) encounters with alien cultures, various authors anticipated what technology would mean for the future of human society. Many of the most memorable — such as Wells' *Time Machine* (1895), Aldus Huxley's *Brave New World* (1932) and George Orwell's *1984* (1949) were anti-utopias. Most foresaw a life of creature comforts, although some — such as Arthur Clarke's *The City and the Stars* (1956) — foresaw a life where creature comforts had sapped mankind of its spirit of adventure.

But the second half of the 20th century is marked by the displacement of the written word by movies. A key milestone for science fiction movies was Stanley Kubrick's 2001 (1968), which featured commercial picturephones in common use.[11] Negative utopias are certainly common, such as ecological disaster[12] (Silent Running, 1971), the collapse of cities (Escape from New

York, 1981; Blade Runner, 1982) or post-apocalypse civilization (On The Beach, 1959; Planet of the Apes, 1968; A Boy and His Dog, 1976; Mad Max, 1979).

Sibley (1971:46-47) argues there is a marked gap in the attitudes towards technology between those expressed by such fiction and those reflected in the policies of the United States. If new technology had as revolutionary an impact as the utopianists (or 20th century history) would have us believe, then the social impact of such technology should be examined and its adoption debated, rather than debating the marginal issues that are now the primary subjects of public discourse.

***Utopianism in Technology Policy***

Advocates of new technologies often promote them based on claimed societal benefits. Stronger claims correspond to an ideology of technological utopianism, but, more often, the actual benefit reflect merely marginal improvement in consumer convenience that are congruent with (but far less than) utopian vision. Even the strongest claims usually reflect a utopian transformation of one sector of society — such as the elimination of housework or commuting — rather than a completely remade utopian society ala More or Bellamy.

The degree of transformation wrought by a technology is not necessarily not linked to the power of its advocates — at least when it came to changes in transportation in post-war U.S. Futuristic pronouncements in the popular press — such as auto-planes and solar-powered cars — would have had greater societal impact than actual government projects of the 1950's and 1960's, such as nuclear-powered rocket ships, moon bases and manned interplanetary travel.

Meanwhile, individual businesses presented adoption of information technology breakthroughs as delivering near-utopian benefits.

One such example was the picturephone, predicted to rejoin families separated by distance and replace business travel with teleconferencing. As recounted by Noll (1992), AT&T demonstrated prototypes at the 1933 and 1964 World's Fairs, and commercially launched it as a service later in 1964. At one point, AT&T forecast that 2 million picturephones would be in use

by 1985. However, AT&T ignored early survey results that suggested that many home users did not *want* to include a picture with their telephone conversation,. Meanwhile, only certain types of business meetings were suitable for videoconferencing, and even among these, in many cases, what was lost by not physically being present (e.g., the "feel" of the other party in a sales situation) was what was most important about the meeting. All told, AT&T spent an estimated $500 million to develop and launch a service that generated almost no revenues.[13]

A more recent multi-million dollar private initiative was the personal digital assistant. Vannevar Bush's (1948) Memex was reborn via Apple CEO John Sculley (1987) as the "knowledge navigator": an Apple-produced video showed the navigator as an information-seeking robot that was central in the lives of students, busy professionals and senior citizens. Apple's first realization of this vision — its ill-fated Newton personal digital assistant — distracted the firm from its core product line and accelerated Sculley's ouster. As with the picturephone, the long-term vision of the Memex seems sound, but the capabilities and market were less than expected and prices higher than customers were willing to pay.

Such utopianism is, of course, not limited to private sector visionaries. The lull of the technological dream seems as strong in public policy, although it is driven by ideology rather than the lure of spectacular profits. Kling (1983) refers to the example of computers in primary schools in the U.S., where "computer literacy" was an ill-defined metaphor for social transformation used to promote the diffusion of personal computers into classrooms.

Two technologically utopian social policies (using older technologies) anticipate the current NII policy debates: the promotion of wired cities and telecommuting. Dutton *et al.* (1987: 5) note that the origin of the wired city concept in the U.S. dates to Johnson's "Great Society" era of the 1960's, in which the technology was hoped to enable social-services that would enhance urban life. There was some disagreement as to the appropriate metaphor for describing the communications infrastructure — telephone network or electronic highway — with the latter having more nuances of universal service. But, under either name, various U.S. tests of telephone

and cable TV-based interactive systems in the 1970's and 1980's were unable to show economic viability.

One of the long-hypothesized benefits of such wired cities is telecommuting, but it took the introduction of personal computers and other advanced technologies in the early 1980's to make it more than a utopian dream. Not surprisingly, the idea took root in California, where computer technology was widely accepted and rush-hour gridlock legendary — although it met early resistance from union activists trying to enforce 19th century "cottage industry" laws (McGlynn 1983; Armstrong 1984). Despite advancements in enabling technology, it took a combination of social crises to fuel acceptance of such telecommuting by employers. One was the scarcity of affordable middle-class housing, forcing ever-longer commutes from distant suburbs in search of the American dream; the second was seen through a pair of major earthquakes, in northern (1989) and southern (1994) halves of the state that destroyed freeways and disrupted regular commuting patterns.[14] Finally, increasing air pollution and concomitant employer mandates to reduce vehicle trips made telecommuting an inexpensive way for firms to comply with government anti-smog regulations (Smart Valley 1993).

***The "Post-Industrial Society"***

The emergent concepts of "post-industrial society" in the United States and an "information society" in Japan reflected similar (and apparently independent) visions of the future of developed economies.

In the United States, the term "post-industrial society" is credited to Daniel Bell, who acknowledged (Bell 1979) his debt to the earlier work of Fritz Machlup. Beginning in 1958, Machlup sought to categorize and quantify the production and distribution of knowledge in the U.S. economy. So, for example, in his published study of "knowledge-producing" industries and occupations, Machlup (1962:44) notes how embedded knowledge production activities (such as information services) are within existing industries. Even at this early date, his list of information-related industries includes many — such as communications media, computer

programming, data processing services, technical consulting and financial services — that would form the basis for later definitions of a "information society" or "post-industrial society."

It fell to Bell to popularize the shift in economic emphasis through use of the term "post-industrial society." Bell asserts he used the phrase in a conference paper of 1962 (1973:36), and also in a 1964 book chapter and his later book on education reform (1966).[15] However, his greatest influence came from the book of the same name (Bell 1973), which predicted a shift from a machinery-based society to a knowledge-based society, much as the industrial revolution had brought a shift from a land-based society to a machinery-based one.

These themes were extended by Toffler (1980) and Gilder (1989), who updated and further popularized the idea of a shift from industrial to information industries.. The concept was made more credible by the diffusion of personal computers into homes and businesses, as well as the development of online communication services and the Internet. However, U.S. government economic policy (particularly for trade) throughout the 1970's and 1980's generally focused on manufactured and agricultural products.

***Jôhô-Ka: Japan's Shift to an "Information Society"***

The phrase *jôhô-ka* — usually translated by the quasi-English word "informatization" and denoting change to an information-oriented society (*jôhô shakai*) — has been a slogan of Japanese government policy for more than two decades, even though the actual effect of the slogan has been minimal. It is generally associated with two threads — the abstract concept of Japan as an information society, and a shift in government industrial policy away from heavy industries in the late 1960's and early 1970's.

In the early 1960's, the phrase *jôhô sangyô* ("information industry") was coined by Tadao Umesao (1963), while *jôhô shakai* was used in the tile of a 1964 follow-up article (Ito 1991). By analogy to industrialization, the *jôhô-ka* ("informatization") concept was popularized by Yujiro Hayashi of the Economic Planning Agency in 1967. The publication of various *jôhô shakai* books in 1969 led to Japan's "first information society boom" of the late 1960's and early

1970's. Japanese authors assert that the term "information society" entered the English language via translation from Japanese around 1970 (Ito 1991; Hiromatsu and Ohira 1991)

This concept had a much more immediate impact on (stated) government policy in Japan than in the United States. Johnson (1982, pp. 289-290) dates the interest of the Ministry of International Trade and Industry in "knowledge-intensive industries" to 1969 and an increased emphasis proposed by Amaya Naohiro. In 1971, a report of the Industrial Structure Council advocated a transformation of the Japanese economy from traditional heavy industries to "knowledge intensive" ones (Morris-Suzuki, 1988, p. 27). The "oil shock" of 1973-74 made salient home the country's vulnerability as a resource-poor industrial nation, and Johnson places MITI's first detailed vision of a "knowledge-intensive industrial structure" at November 1974 (1982, p. 301).

Hiromatsu and Ohira (1991) argue that though this first "information society boom" had little impact in Japan, it was exported to Europe, from which it inspired a similar boom in North America and started a second boom in Japan in the late 1970's and early 1980's. Certainly from the 1980's onward, the shift to an information society was repeatedly cited as a national goal, as in Prime Minister Nakasone's speech opening the Diet in February 1984, and became the subject of various books, articles and television programs (Morris-Suzuki, 1988, p. 28).

To promote the idea of an information society, Japanese ministries funded a number of demonstration projects. These included:

- *First-Generation Videotext.* Among projects funded by MITI in the 1970's to demonstrate two-way digital communities of the future were the Hi-Ovis fiber optic project in Higashi Ikoma in Nara prefecture and the Tama CCIS coaxial cable project in the Kanto region (Masuda 1980, p. 14). These technologies were often promoted as options for development of Japan's less-urbanized regions, which have suffered economically compared to the main Kanto and Kansai areas, which, until recent political reforms, held a disproportionate electoral representation in the Diet. As with most teletext systems of this era, the services offered to trial customers were not economically viable:

customers were only willing to pay 25% of the installation fee necessary to repay capital costs (Ito and Oishi 1987).

- *Successor Projects.* Rival plans from MITI (New Media Community) and the Ministry of Posts and Telecommunications (Teletopia) were announced just three days apart in 1983. The MPT plan was linked to two other related efforts by NTT, the CAPTAIN videotext system (1984) and ISDN (1988). Other than the choice of transmission media — coaxial cable by MITI and fiber optic cable by MPT — the two ministries' efforts were seen as uncoordinated duplicative efforts driven by ministerial rivalry rather than solid market or technical goals.

## Effect on Japan's NII Plans

The current 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, whcih developed new products and hyped existing ones as part of an anticipated "multimedia revolution."

As will be seen, Japan's recent NII efforts blossomed not because of a maturation of the earlier *jôhô shakai* vision, but as a direct reaction to 1993 U.S. plans for "information superhhighways."

### *US Plans for an NII*

Although NII have links back to the "wired cities" utopian visions of the 1960's and 1970's, it was the technological and social developments of the early 1990's that enabled the idea of an NII to suddenly seem feasible. Personal computing was cheap and ubiquitous, and these PC's were frequently connected via online services and wide-area networks, while the Internet had become ubiquitous among university students and faculty. At the same time, the first generation of "multimedia" content, combining video, text and sound was being offered for home use.

These enabling technologies prompted utopian visionaries in many countries to propose linking businesses and homes via a universial digital communicatons network, much as the analog telephone network had first done so a century earlier.

Among the first to propose such a network was Singapore (NCB 1992). Among the earliest U.S. proponents was then-Senator Albert Gore Jr. who claimed that his interest in promoting information superhighways dated back to 1979 (Gore 1991, p. 21). When Gore became a vice presidential candidate, the vision provided an opportunity for the Clinton-Gore campaign to promote an image of high-tech savvy, by making speeches and position papers available on the Internet. Upon taking office, Gore sponsored various well-publicized NII initiatives including the Internet Engineering Task Force, which collated previously-proposed idealized NII uses — such as medical diagnosis, digital libraries, distance education and increased citizen participation — to support the administration's NII vision.

As with other national plans, these NII plans had both a domestic and international rationale. The former rationale would justify the plan in terms of domestic economic development (absolute economic justification), while the latter was based on imperatives for "national competitiveness" (relative economic performance). King and Kraemer (1995) argue that the improved "competitiveness" realized from developing information infrastructure is consistent those realized from earlier development of sea, rail and air transportation infrastructure.

***Japanese Reaction to US***

Although elements of what is now considered NII have been discussed in Japan for many years, Japanese rhetoric in the period 1993-1995 was driven by a "catch up" mentality — the view that Japan was behind in both plans for an information infrastructure, and key technologies such as networking and software.[16]

Teruyasu Murakami, a prominent Japanese multimedia expert at the Nomura Research Institute, noted that a 1992 proposal for capitalizing government spending on software development had languished until it became linked with NII:

> 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, TV, newspapers. A very important reason was the Clinton administration's manifesto of 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 were concerned about the U.S.'s NII plans. In May 1993, a report published by the U.S. Council on Competitiveness (1993a) stated that U.S. NII plans could boost the competitiveness of U.S. industries. This report was taken very seriously in Japan because an earlier commission headed by Hewlett-Packard's then-CEO John Young published a report (President's Commission, 1985) that, in Murakami's words, "dramatically changed" 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. The 1985 Young commission report received limited publicity: two major articles in the *Washington Post,* and small stories buried on the business pages of other major newspapers. At least this 1985 group (officially the President's Commission on Industrial Competitiveness) got one day of news coverage. Eight years later, its successor, the industry-run Council on Competitiveness issued the 12-page NII report cited by Murakami; despite the leadership of Young, the presidents of M.I.T. and CalTech and the CEO of Motorola, the report was ignored by newspapers (and leading university libraries) and only briefly covered by trade magazines.

Similarly, Japanese policy-makers intently studying the U.S. government can recite Vice-President Gore's "Five Points" for any future U.S. NII: 1. encourage private investment; 2. promote competition; 3. quick regulatory response; 4. network access for all information providers; and 5. universal service. These points have gone generally unnoticed in the popular

media or in the high-tech community. Given the complexity of the U.S. policy-making process, they were likely to face major revisions even before the 1994 elections brought Republican control of the Congress.

Why do Japanese policy makers such attention to U.S. proposals that are little known in their own country? One reason has been the competitive threat of U.S. plans has regularly been used in Japan as a consensus-building tool, by providing the external pressure necessary to speed up the decision-making process and force things to a conclusion. A crisis of competitiveness — real or imagined — has moved the Japanese closer to an information revolution in the last two years than anything in the preceding twenty; or, to use Hiromatsu's formulation, this third "information society boom" has come further than the first two put together.

A darker side of such "catchup" could be seen in the Japanese popular press, when books on NII, multimedia and information revolutions became a fad in late 1994 and early 1995. American telecommunications executive Glen Fukushima (1995) noted the titles include *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"). The dust-jacket of another contemporary Japanese NII book proclaimed "Who Will Control Multimedia? This Book Reveals the Strategy by Which Japan Can Survive the 21st Century Against the Clinton 'Occupation Policy' Toward the Japanese Information Industry." He characterized the pictures portrayed by such books as "a starkly zero-sum game in economic activity between the United States and Japan."

***Japanese NII Policies***

Prospects for an information infrastructure (*jôhô infura)* offered an opportunity for various ministries to propose their own initiatives which would increase their influence of the national budget and development of domestic industries. The major conflict was between the Ministry of Posts and Telecommunications (MPT) and MITI, although other players such as the Science and Technology Agency and NTT offered their own proposals (West 1995a; Latzer 1995).

This Japanese NII-related boomlet linked to "information superhighways" in the U.S. was encompassed under the banner of "multimedia" industrial development. 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 to supplant 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.

In the inter-ministerial rivalry, MPT gained the upper hand over MITI, largely from earlier victories of regulation of digital computer networks (Johnson 1989). The most influential NII-related report came from an MPT advisory panel (Telecommunications Council 1994) that included the chairman of both Hitachi and Nikkei (Japan's leading financial publisher), as well as four professors and a vice president of Rengo, the leading labor union. The origins of the report, its disitribution[17], and its content all contributed to it being the most often quoted of the competing "visions" developed at this time.[18]

Calling for fiber-to-the-home by the year 2010 — five years ahead of the Clinton-Gore plan — the report emphasized Japan's economic challenges for the 21st century, and argued that information communications (*jôhô tsushin*)could facilitate the nation's decentralization, a common objective in Japanese societal reform proposals during this decade.[19] The report also foresaw enhanced creativity in Japan through support of domestic software development, in this case of application databases and applications that informatize education, medical care and government services.

These proposals — and business interest in this "vision" of a technologically utopian NII — were heavily influenced by Japan's lingering recession. With the end of the speculative "bubble" in stock and real estate prices, and exports hurt by the continuing *endaka* (yen appreciation), domestic demand slumped while Japanese firms moved production to less expensive Southeast Asian factories. With a 10% real decline in industrial production in 1992-1993 and heavy losses

by major electronics firms, it is no wonder that the prospect of an entirely new high-tech growth industry captured the attention of business, government and the public.

Thus, the MPT "vision" emphasized two figures — the estimated annual size of multimedia-related markets (¥123 trillion) and the number of new jobs created (2.43 million) — that were frequently quoted in Japanese and U.S. NII articles. Less often quoted were the estimated implementation costs, which ranged from ¥33 to ¥53 trillion, plus an assumed ¥42 trillion for installing utilities underground.

***Reaction to U.S. and Japan***

The NII initiatives in the U.S. and Japan did not go unnoticed elsewhere among industrialized nations. For example, Canada prepared proposals in reaction to the U.S. which (as has been common for the nation's mass media policies) emphasized cultural independence from the economic giant "south of the border" (Raboy 1996). And Korea reshaped its existing information technology initiatives to keep up with Japan's efforts (Jeong and King 1996). In Europe, the most influential response was a blue-ribbon advisory council to the European Council, led by Martin Bangeman, which emphasized the impact of a European information infrastructure on regional competitiveness:

> Why the urgency? Because competitive suppliers of networks and services from outside Europe are increasingly active in our markets. They are convinced, as we must be, that if Europe arrives late our suppliers of technologies and services will lack the commercial muscle to win a share of the enormous global opportunities which lie ahead. … Our export markets will evaporate. We have to prove them wrong. (Bangeman 1994)

Such proposals in new technologies have also allowed the European Commission to seize the policy initiative with respect to the individual member states — far more easily than for existing technologies where the EC must compete with existing national policies.

Among the European Union's three largest nations, France responded the most directly to the Bangeman report with its own report by Gérard Théry in September 1994, emphasizing a nationwide fiber optic links and universal service by the year 2015. Not surprisingly, the man

known as the "father of Minitel" proposed policies that updated the early videotex approach, centered a public/private partnership between France Télécom and private content providers (Vedel 1996). As in the U.S., NII became a presidential campaign issue with strong utopian overtones, in this case for prime minister (and unsuccessful candidate) Edouard Balladur:

> Information superhighways are maybe one of these stars which, if they do not give a meaning to the modern life, shape it in a different way. [They] crystallize hopes and dreams which are already becoming real. Like the equipment programs of the 50s and 60s, like the new frontiers that many times humanity has sought to conquer, information superhighways can rally enthusiasm, mobilize and bring together energies. (Vedel 1996)

Meanwhile, Britain and Germany did not immediately develop NII policies — Britain because of its supreme faith in telecommunications deregulation and Germany because of the almost complete absence of such deregulation. However, both were represented when the G-7 nations had their first information summit in February 1995, in which U.S. proposals for telecommunications liberalization were counterbalanced by the guarantees France and Canada sought for cultural sovereignty.

## Assessing Japan's Information Future

### *Lack of Market Orientation*

Actual consumer interest was notably absent from the initial NII debate in Japan, which focused on economic benefits accruing to the producers, the influence gained by Japanese ministries, and so on. This violates the accepted view of the "marketing concept" which focuses on customer needs (for a comprehensive review, see Kohli and Jaworski 1990).

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. Market tests — both in the 1980's and more recently — have been failures (Kageki, 1994), but plans are proceeding ahead anyway, despite a notable lack of consumer enthusiasm (Sato, 1994).

This problem is not unique to the Japanese debate. In the U.S., Iacono and Kling (1995) argue that "technological utopianism" has been used to sell the NII concept, and the influential Information Infrastructure Task Force report postulated many of the same needs. Instead of consumer uses, King and Kraemer (1995) predict near-term market demand will center on businesses even though public rhetoric has centered on servicing individual consumers. Some element of consumer realism eventually began to enter the Japanese debate, as in this quote by NTT president Masashi Kojima:

> Financing is the real challenge. Here, the "if we build it they will come" model may no longer work. Most customers are satisfied with conventional telephony; they don't want advanced services to be funded by their telephone bill. (Aizu 1994, p. 164)

***End of "Catch Up" Pressure***

Pragmatism — as opposed to utopianism — also had an opportunity to be heard in Japanese policy discussions in 1995 as the pressure to "catch up" with the U.S. faded away.

One important reason was the 1994 Republican Congressional victory, which was seen as shifting U.S. government policy away from the Clinton-Gore cautious interventionism (or "pump priming") to a strictly *laissez faire* market approach to telecommunications. This ideology was most clearly shown with the passage of the Telecommunications Reform Act of 1996, in which the nation's telecommunications modernization is to be enabled by allowing local telephone providers, cable TV firms and long-distance carriers to enter into each other's markets.

Meanwhile, in 1995 U.S. firms began to reveal disappointing results for trial of video-on-demand, which had been assumed to be the first major consumer service to pay for a commercial information infrastructure. Consistent with most teletext experiments on three continents over the past two decades, consumers showed they were unwilling to pay the prices sought by the online providers to recoup network construction costs — particularly when the identical product (recent release movies) was readily available for a lower price at nearby video rental stores.

These lackluster results obviated whatever disadvantage Japanese firms might felt over the early U.S. trials.

At the same time, Japan's major electronics firms ramped up to do what they've done well for the past 20 years — produce hardware, in this case telecommunications network products. To facilitate product development for both domestic and export markets, they placed marketing and R&D resources in a market which has the more experienced user base than Japan — i.e., the United States. The three largest NTT suppliers have already sold Asynchronous Transfer Mode (ATM) telecommunications switches for U.S. NII demonstration projects and telephone companies, and planned ATM manufacturing plants in the U.S. "to get closer to their large customers" (Valigra 1994).

***Japan's Road to the NII***

Unfortunately for the Japanese style of government planning, future NII plans do not lend themselves yet to straight-line extrapolation of trends. Instead of more, faster, cheaper — as with mainframe computers and DRAMs — the communications content providers and carriers are facing radical industrial transformations in the immediate future. As such, government R&D projects are more likely to turn out like the Fifth Generation or Teletopias than the VLSI project, unless they are kept focused in near-term goals.

Also not lending itself to such extrapolation is the likely structure of the Japanese telecommunications industry — which would normally be a safe bet. MPT's current efforts to divide NTT into three companies have already met heavy resistance from NTT's alliances with MITI, major suppliers and its labor unions; on the other hand, such resistance is more likely to defer rather than resolve the breakup issue permanently. Also, independent of the NTT breakup there have been discussions of increased competition in international long-distance service, while wireless telephony, cable TV and satellite broadcasting are beginning to increase rapidly from minuscule levels five years ago.

About the only sure things about the Japanese *jôhô infura* are that the country is unlikely to have a ¥90 trillion fiber optic network built to every home in the next 14 years, and that excessive claims — in the name of technologically utopian "visions" or competitive exigencies — will continue to be made for the infrastructure by policy-makers and industry leaders seeking to mobilize public support.

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# Utopianism and National Competitiveness in Technology Rhetoric: The Case of Japan's Information Infrastructure

Keywords: Japan, telecommunications, information infrastructure,
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utopianism

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[1] The sole exception was a Dutch trading post near Nagasaki. Evidence suggests that trade with China and Korea continued uninterrupted, so Japan was a "closed country" in one direction only.

[2] To this day, Perry's smoke-billowing "black ship" (*kurofune*) steamships have become a metaphor for Western pressure on Japan, so that Compaq's Oct. 1992 new products that undercut high Japanese PC prices were dubbed "kurofune PC" by the Japanese press.

[3] World War II also saw the century's most consequential "catch up" effort — the Manhattan Project — where the U.S. successfully caught up with nuclear research in Nazi Germany. The effort was justified as part of the "War to Save Democracy", but without the war (or the German research) it is unclear when (or if) atomic warfare would have invented.

[4] This does not include Japanese equity in foriegn mainframe makers, including Fujitsu's majority ownership of Britain's ICL and control of the Amdahl, Hitachi's ownership of National Advanced Systems and NEC's 17% stake in France's Groupe Bull (which owns Honeywell's former computer operations) and direct and indirect stakes in Zenith and Packard Bell brand PC makers.

[5] Anchordoguy (1987: 141) notes that the U.S. Department of Defense spent a comparable amount on integrated circuit research from 1979-1984, but focused on VLSI chips with military rather than commercial applications.

[6] By way of comparison, UNIX has made significant inroads on the first two markets and had negligbible impact on the latter two, despite a 10 year headstart on TRON.

[7] The newspapers (*New York Times, Washington Post Wall Street Journal*) show 698 listing from 1982-1995, the magazines (*Business Week, Fortune, Forbes*) 45 from 1988-1995. The listings for the mixed-audience academic journals (*Harvard Business Review, California Management Review, Sloan Management Review*; total 22 articles) like ABI overall (311) cover the period 1973-1995, well before the upswing in "competitiveness" interest.

[8] By MITI's calculations, the first four generations were the vacuum tube, transistor, integrated circuit and VLSI semiconductors. (Doi *et al.* 1989: 14).

[9] Even though (in comparison to Western nations), the Japanese state is generally considered to be less consumer-oriented and more producer-oriented in its policies, Japan's vision of a "information society" has been consistently promoted in terms of postulated societal benefits. Such consumer benefits were also used to promote the NII in the U.S., at the same time both countries tied NII success to national competitiveness.

[10] Japan's native *Shintô* religion lacks such paradise-on-earth, and its influence has diminished in the postwar era — in part because of its association with World War II militarism and the subsequent restrictions imposed by the Occupation (Reischauer 1981: 219).

[11] It also showed space travel services offered by PanAm, failing to anticipate the company's demise in December 1991.

[12] Pollution was also the genesis of the mutant monster Godzilla, star of a popular Japanese series of movies.

[13] Today, the picturephone shows promises of finally being realized as a PC-based peripheral and software based on the Internet. However the two main draws are a low capital investment — only $200 over the cost of a PC — plus the promise of essentially free long-distance service provided under current Internet pricing mechanisms.

[14] These two factors are also recognized Japan, particularly after the Great Hanshin earthquake of 1995 — which killed more people in one day than all the earthquakes in California's recorded history — destroyed transportation infrastructure in the Kansai region. However, a greater reliance on ace-to-face contact in Japanese business suggests that the diffusion of telecommuting in Japan will lag California if not the U.S. as a whole.

[15] Ito (1991) argues that Bell's original unpublished paper of 1962 was unlikely to be seen by Japanese researchers ntil published as part of conference proceedings translated into Japanese in 1967. The concept was also brought to Japan in the 1969 translation of Bell (1966).

[16] This is consistent with Calder's conception of Japan's postwar economic policy as that of a "Reactive State": see (Calder 1988).

[17] The report was printed in both Japanese and English, as well as a widely-distributed 10-page summary. The rapid availability of the English summary contributed to its heavy use outside Japan, as did its publication (in both languages) on the World Wide Web once MPT established a web site later in 1994.

[18] Promulgating a "vision" has become standard practice for a national government ministry (usually MITI or rarely MPT) that frames near-term policy-making discussions through futuristic speculation. This form of inspirational leadership is weaker and more indirect than the traditional incentive (subsidy) or command (regulatory) approach, reflecting the increase in relative power enjoyed by successful Japanese exporting industries; at early stages of technology, it also gives a ministry more room for fallibility than a major government R&D project. These visions clearly fit Kling's (1994) categorization as utopian ideology.

[19] Such decentralization corresponds to "freedom from Tokyo," the first of Ozawa's (1994) explicitly utopian "five freedoms."

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