BUTTERWORTH HEINEMANN

Telecommunications Policy, Vol. 19, No. 7, pp. 515–529, 1995

0308-5961/95 $10.00 + 0.00

0308-5961(95)00029-1

Japanese Information Infrastructure initiatives

A politico-economic approach

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This article provides an empirical–analytic survey of initiatives toward the Japanese Information Infrastructure (JII), with reference to the aspired-for 'Intellectually Creative Society' of the 21st Century. The politico-economic analysis examines the policy network, interests involved, major strategies, plans and pilot projects, and discusses multidisciplinary factors which influence the choice of strategies and the degree of difficulty in their realization.

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I would like to thank the Japan Society for the Promotion of Sciences for their three-month invitation to Tokyo, Professor Minoru Sugaya from the Institute for Communications Research of Keio University for hosting my visit and for his generous support for my research, and Professor Harumasa Soto from Konan University for his valuable assistance. For comments on an earlier draft of this paper I would like to thank Hideo Morimoto, Minoru Sugaya and Takahiro Ozawa.

[1]For an analysis of the telecommunication reform see Sato, H *The Political Economy of Japanese Telecommunications* Working Paper, Konan University, Kobe (1994)

Multimedia, that is to say the electronic info-communications market, has evolved into a central topic in the triadic competition between the USA, Japan and Europe. Highly promising market forecasts encourage companies; anticipated socioeconomic impacts, including both opportunities and risks, motivate and alarm politicians and interest groups. At first glance, the initiatives toward the establishment of national information infrastructures show broad conformity; however, a politico-economic analysis reveals and helps to explain national/regional peculiarities and the partially hidden agenda behind them. The analysis starts with a short introduction on the Japanese info-communications sector, followed by an overview of major initiatives toward the Japanese Information Infrastructure (JII). Various factors are discussed which influence the formulation of JII plans and their realization.

JII initiatives

In general, the recent changes in the Japanese telecommunications and broadcasting sector reflect worldwide trends: liberalization, harmonization and privatization.[1] The central player in Japanese info-communications is the Ministry of Posts and Telecommunications (MPT), which regulates both telecommunications and broadcasting. The policy network of the Japanese info-communications sector is outlined in Figure 1. This gives a rough overview of interconnections and major players involved in the JII initiatives. Basic background information on various institutions is provided in the Appendix.

In Japan, as in the USA and Europe, initiatives toward the future-oriented design of electronic info-communications increased heavily in recent years. In the following, the major visions, plans and activities are briefly summarized, broken down according to the central players in the field.

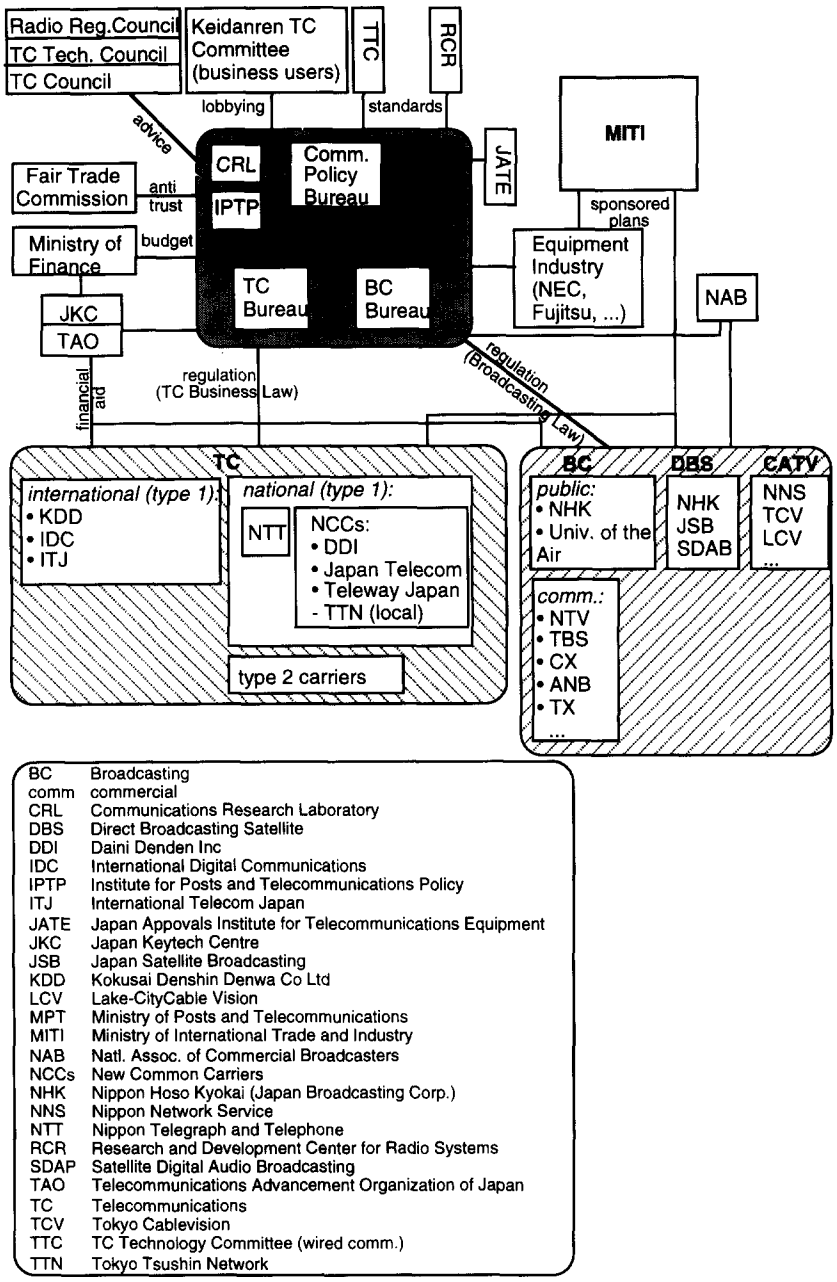

Figure 1. The Japanese electronic info-communications sector: major players, policy network.

Ministry of Posts and Telecommunications

The MPT establishes *ad hoc* study groups for the analysis of specific topics, starts strategic initiatives and promotes pilot projects for infrastructure and applications development. The budget for infrastructure and multimedia was about 22 billion yen in 1994, 16 billion of which are spent on the infrastructure.[2]

The conceptual basis of the current MPT policy is the report, *Reforms Toward the Intellectually Creative Society of the 21st Century. Programme for the Establishment of High-Performance Info-Communications Infrastructure,*[3] which was elaborated by the Telecommunications Council. The central vision of this report is that the construction of an info-communications infrastructure can be used to help or even solve current socioeconomic problems, such as the necessary structural

[2]The budget cited comprises the (estimated) regular budget for 1994 and the supplementary budget for the financial year 1993. Half of the infrastructure budget of the MPT was used for projects in Kansai Science City; *MPT News* 1994 **5** (1).

[3]Telecommunications Council *Reforms Towards the Intellectually Creative Society of the 21st Century: Programme for the Establishment of High-Performance Info-Communications Infrastructure* Report (Summary) Tokyo (May 1994). The study group included experts from the industry, academia and social partners.

Table 1. Structure of the planned Japanese info-communications infrastructure.

Infrastructure		Implications	Social requirement
Value Legal framework	Level 4	Lifestyle Workstyles	Reforming personal values and the socioeconomic system
Informatization of education, medical care, government services (Contents)	Level 3 (relevant industry)	Applications databases, applications	Developing creative technologies Making public services more efficient Diversifying applications
Information circulation system (Platform)	Level 2 (Type 2 business)	Information processing and transceiving devices, etc	Diversifying and enhancing functions
Information transmission system (Distribution)	Level 1 (Type 1 business)	Physical transmission media	Stable supply Fair use Affordable tariffs

Sources: Telecommunications Council *op cit* Ref 3, 2; MPT *Outline of Telecommunications Business in Japan* Tokyo (1995) 25

change of the Japanese economy, the rapidly ageing population, overconcentration in the urban areas, realization of a more comfortable lifestyle, change toward a more open society and the need to solve environmental problems.[4] The broadly defined info-communications infrastructure[5] is conceptualized as having four layers, including traditional components like network infrastructure, terminals and software, but also taking in social values and lifestyles related to the informatization of society (see Table 1). All these components have to change if the original goals of the JII initiative are to be achieved.[6] The main hurdle on the way to realizing the positive vision of the info-communications infrastructure is expected to be the question of how to make the necessary changes in lifestyle and working style. Anticipated problems like job loss, privacy, security and reliability issues also have to be solved.

As technical infrastructure, a homogeneous fibre-optic network is suggested by the group of experts. According to the plans, a nationwide fibre-to-the-home (FTTH) network will be provided within 15 years, by 2010, connecting 75 million subscribers, including 54 million private households. At 123 trillion yen by 2010, the multimedia market[7] is expected to be the biggest economic sector, in terms of both sales and employment. The construction of the fibre-optic network is expected to create 2.43 million jobs.[8] Just the construction cost of the network will be in the range of 33–55 trillion yen. Another 42 trillion, however, will have to be spent in the case where the cables are laid underground. The timetable envisages three steps: (1) In the year 2000 all major urban areas plus schools, hospitals, community halls, etc, are to be connected nationwide (a diffusion of 20%). (2) All cities with more than 100 000 inhabitants (60% in all) will be connected by the year 2005. (3) The nationwide fibre-optic network will be complete in 2010.[9]

The recommendations of the council report concentrate on the building of the fibre-optic network:[10]

- support for competition between telecommunications companies and cable companies at infrastructure level;
- financial incentives and support to reduce the cost of private investment;
- underground cable installation;
- development and introduction of new leading applications in public fields;[11]
- promoting universities' and public research institutes' support for pilot model projects;

[4] *Ibid* 3

[5] The info-communications infrastructure is defined as 'a comprehensive entity that encompasses network infrastructure, terminals, software applications, human resources, public and private info-communications systems, as well as social value and lifestyles related to the informatization of society': *ibid* 2.

[6] For example, it would not be enough only to offer various services for private households; the amount of leisure time also needs to change if these services are to be utilized. Another change of values has to take place in the evaluation of face-to-face communication compared to other forms.

[7] The share of the already existing related markets is expected to be 67 trillion yen. However, a definition or specification of the 'multimedia market' is lacking.

[8] For criticism of these figures see Makino, Noboru *Japan Times* 6 June 1994

[9] Telecommunications Council *op cit* Ref 3, 5

[10] *Ibid* 10ff

[11] In particular in education, medical care and the welfare system.

Table 2. Study groups set up by the MPT to analyse selected topics of the info-communications sector.

Name/Topic	Content/Results
Multimedia mobile communications	A central criticism of the Telecommunications Council was its ambition of building a homogeneous fibre-optic network. The MPT reacted by establishing a study group. Report, issued April 1995, underlines high potential and provides schedule for implementation of FPLMTS (Future Public Land Mobile Telecommunications System). Market size of mobile communications services and equipment 1994: 1.7 trillion yen, 40 000 employees; forecast 2010: 15.7 trillion yen, 520 000 employees. Implementation of FPLMTS in two phases: up to 2 Mbps (around the year 2000); up to 10 Mbps (by the year 2010).[a]
Convergence of telecommunications and broadcasting	Established July 1994 to analyse institutional, regulatory and technical aspects of convergence.
Digitalization of broadcasting	Report, issued April 1994, shows development in direction of 'intelligent broadcasting systems', combining digitalization, multichannel functions and interactivity. The expert group proposes a shift in the direction of 'Integrated Service Digital Broadcasting' (ISDB), the promotion and use of MPEG-2 for compression and of 'Orthogonal Frequency Division Multiplex' (OFDM) as modulation method for terrestrial broadcasting. Standardization to be completed by 1996 (in cooperation with the Telecommunications Technology Council). Digitalization to be integrated for terrestrial broadcasting, satellite and cable TV.[b]
Broadcasting in the multimedia age	Established May 1994 to draw up a picture of the future of broadcasting. Central topics are measures to promote the diffusion of hi-vision (HDTV with MUSE standard) and the digitalization of broadcasting. Report, issued March 1995, proposes a time schedle for the introduction of digital broadcasting (see Table 3).[c]
Environmental benefits of info-communications	Established February 1994 to assess the potential of info-communications for the solution of environmental problems. Topics include the environmental impact of changes in lifestyle and business activities resulting from the use of info-communications and the potential of the utilization of teleservices (teleconferencing, telework) for improvement of the environment.[d]
Info-communications for the ageing society	Report issued January 1995, recommending measures to improve life handling of elderly people by the use of info-communications. Tele-medical consulting, automated emergency contact services and tele-learning will be tested in regional experiments.[e]

Sources: [a]*MPT News* 1995 **6** (4); [b]*MPT News* 1995 **5** (5); [c]*MPT News* 1995 **5** (6); [d]*MPT News* 1995 **5** (1); [e]*MPT News* 1995 **5** (21)

- a new regulatory framework, considering the convergence of telecommunications and broadcasting;
- redefinition of universal services and reorganization of the tariff system (based on public hearings);
- creation of the environment for an 'intellectually creative society'.[12]

Study Groups, CATV promotion. Based on, and in addition to the central vision and plan described above, the MPT installs *ad hoc* study groups on selected topics. A range of study groups is summarized in Table 2. A timetable for the introduction of digital broadcasting proposed by the study group on broadcasting systems is summarized in Table 2.

The promotion of competition in the telecommunications infrastructure is a central recommendation in the report of the Telecommunications Council. In 1994 the MPT changed its strategy regarding CATV. The central goal of the new strategy is to increase competition for the market-dominating telephone company NTT by strengthening the – by international comparisons – very weak Japanese CATV industry. The MPT is expanding the area of operation, allowing multiple system

[12]The necessary environment is to be reached by: cooperative reforms of the various systems established by the ministries, eg educational and medical system, government; promotion of information literacy in every community; improvement of intellectual property rights; enforcement of standardization; and international cooperation (at global and regional level and with developing countries).

Table 3. Outlook for the introduction of digital broadcasting, proposed by the MPT Study Group on Broadcasting Systems in the Multimedia Age.

Type of broadcast			Possible timing for introduction
Satellite BC	CS TV BC BS TV BC	 12 GHz	From 1996 *Proposal A*: Considering introduction after 2007 *Proposal B*: Preparing environment in which broadcasters will be allowed to choose an appropriate system from the various BC systems available, including digital BC, when the next BS-4 satellite is launched
		21 GHz	From around 2007
Terrestrial BC	TV BC Radio BC		Within five years following the turn of the century To be available by around 2005 at the latest
Cable TV			From around 1996

Source: MPT News 1995 **6** (3)
BC = Broadcasting; CS = Communications Satellite; BS = Broadcasting Satellite.

Table 4. Major JII projects supported by the MPT.

Name	Description
Multimedia Pilot Model Project	Launched in Kansai Science City with finance from the 1993 supplementary budget resulting from Japanese government New Social Infrastructure Initiative.[a] Started in July 1994 in the Seika-Nishikizu district, the centre of Kansai Science City, and planned to last for three years. Carried out by the Association for Promotion of New Generation Network Services (PNES). Central goals: to provide subscribers with new multimedia info-communications services; to integrate telecommunications and broadcasting using fibre optics, to provide information on making fibre-optic network multimedia services a viable business. The project also aims at the development and production of terminals for household and business use and transmission facilities. The main beneficiary (44.3%) is expected to be the info-communications equipment manufacturing industry.[b] The project investigates usages, cost and technology. Around 300 households will be equipped with FTTH, installed by NTT. Over the fibre-optic line ISDN, CATV, videoconferencing and VOD (analog in the first stage) will be offered. The VOD service will include Karaoke soundtracks and games software. The analysis of the usage of the new services will be included in the evaluation of the project.[c] The project is expected to generate more than twice the project's original investment.
B-ISDN Experiment	Started in 1994 in close combination with the Multimedia Pilot Model Project.[d] Will last for two years, to test the network for converging telecommunications and broadcasting services, including multimedia teleshopping, electronic libraries, multimedia TV conferences with multiple images on a single PC screen, and communication between high-speed LANS. Approximately 300 users expected to take part in the 5 billion yen project.[e]
Full-service Network Support Centre	Initiated and realized, in contrast to other projects, by a local government, the city of Okazaki. Based on CATV networks and financed by the TAO, which provides funding for the establishment of a centre and the development of new technologies, eg image compression technology.
Cable-telephony	A pilot project started by the MPT in Nagano in December 1993 to test the provision of CATV and telephony over the same cable. The project will connect 500 households, is carried out by the CATV company LCV and will last for two years. The results will be provided to the whole CATV industry.
Teletopia Project	Originally established in 1985 to promote an 'information-oriented society' in Japan. Now heading toward the promotion of multimedia applications. Mainly promoted use of electronic communications in regions (rural areas), using tax incentives, low-interest and interest-free loans from the Development Bank of Japan. Focus on introduction of CATV and videotex systems in model cities. In May 1994 there were 127 designated areas, 171 companies were established to promote teletopia projects[f] and 589 systems[g] were established in designated areas. The selection of the future projects is based on an evaluation of the Teletopia programme by the MPT.

[a]Other projects financed from the supplementary budget supported the use of computers at universities and schools; [b]*MPT News* 1994 **5** (11); [c]*MPT News* 1994 **5** (11); [d]The B-ISDN Experiments are organized by the Broadband-ISDN Business Chance and Culture Creation (BBCC), established in 1992; [e]*MPT News* 1994 **5** (18); *BBCC Brochure; MPT News* 1994 **5** (11); *Japan Times* 30 May 1994; [f]The projects were often joint ventures between the public and the private sector; [g]For example community, agricultural and local industry information system.

operators (MSOs), encouraging CATV to enter the telecommunications business, enhancing cooperation with foreign companies and promoting new-generation pilot projects and the development of optical CATV systems.[13] In November 1994 the MPT announced its guidelines for the commercialization of cable telephony, considering licensing (Type 1 carrier), the telephone numbering system, the interconnection among carriers, tariffs and services.[14]

Pilot projects, experiments. Alongside regulatory measures, the MPT supports multimedia pilot projects and experiments (see Table 4). The central projects are based in Kansai Science City, a virtual city with strong symbolic importance. Geographically it is based in the prefectures of Kyoto, Nara and Osaka and is seeking to revive a region which was of great importance in the earlier history of Japan. Kyoto, Nara and Osaka initiated a law, passed in 1987, which secured financial aid in the forms of funds and tax incentives through the Japanese Development Bank. The biggest project in the region, the Advanced Telecommunications Research Institute (ATR),[15] was established in 1986 and is mainly funded by the Japan Keytech Centre. The existence of the ATR was a decisive reason in the MPT's choice of Kansai Science City for its central JII experiments, the Multimedia Pilot Project and the B-ISDN Experiment. The separation of the closely connected JII projects is only necessary because of different sources of funding.[16]

Enhanced cooperation. Alongside the above-mentioned initiatives, the MPT has strengthened its cooperation in the info-communications sector. The MPT carries out JII-related projects in cooperation with

[13]*MPT News* 1994 **4** (19), 1994 **5** (15); MPT Press Release 7 December 1993

[14]For example emergency and directory services: *MPT News* 1994 **5** (19)

[15]In the ATR about 300 employees are working on the aim of achieving 'human-oriented communications systems', automatically translating telephone machines, ideal man/machine interfaces and high-capacity communications systems.

[16]Financial support for the projects in the info-communications sector is provided by two independent, specialized government agencies: the B-ISDN Experiments are funded through the Telecommunications Advancement Organization of Japan (TAO), the Multimedia Pilot Model Project through the Japan Keytech Centre.

various ministries. Interestingly, and at the same time symptomatic of the competitive situation, there was no ongoing cooperation with the Ministry of International Trade and Industry (MITI). However, there are joint projects with the Ministry of Welfare (information and communication systems for aged people), the Ministry of Education (on intellectual property rights), the Science and Technology Agency (regarding the National Research Information Network), the Ministry of Transport and the Environment Agency (on environmental effects of the application of info-communication systems in the transport sector).

Closer cooperation is sought not only externally but also internally. For example, the three central organizations for info-communications within the MPT (Telecommunications Bureau, Broadcasting Bureau and Communication Policy Bureau) changed their decision-making process by introducing weekly meetings between their general directors in 1993. In March 1994 the Multimedia Promotion Office was established within the Communications Policy Bureau. The central task of this unit is the formulation of policy goals for the 'multimedia society' and the dissemination and explanation of these goals, especialy through contacts with private companies.[17]

Ministry of International Trade and Industry

Info-communications is not traditionally a core area of MITI activities. Of its 3000 employees, close to 100 people of the Machinery and Information Industries Bureau are centrally involved in info-communications. However, these activities are rising sharply, as is rivalry with the MPT.

For decades the Industrial Structure Council, a central consulting institution of the MITI, has recommended the priority areas for the ministry's industrial policy. In the 1960s MITI concentrated on the heavy and chemical industry, in the 1970s on computers and semiconductors and in the 1980s on computer software and environmental technology. In the 1990s MITI has concentrated on economic reform and enhancing the quality of life, including deregulation, competition and the Social Infrastructure programme.[18]

The strategy and role of MITI changed dramatically in the early 1990s. It now argues for extensive liberalization and the reduction of state intervention. A role change from the promoter of the industry to the advocate of the consumer can be observed. Critics interpret the change in terms of a loss of power and an identity crisis. Furthermore, MITI is accused of following a one-sided strategy in that it only promotes liberalization selectively, according to its own power interest, eg not in the energy sector, which it oversees.[19]

Programme for Advanced Information Infrastructure. In this strategy paper,[20] MITI describes its focus on activities on the demand side, in cooperation with related ministries and agencies. In particular, five areas were chosen in the public sector where the utilization of information technology will be promoted: (1) education (multimedia software, databases); (2) research (interministerial research information networks, ultra-high-performance computers); (3) medical and welfare services (pharmaceutical databases, exchange of X-ray photographs); (4) administrative services (LAN, databases); (5) libraries (electronic library systems). Furthermore, MITI is working to improve the environment for the advanced utilization of information technology, eg by

[17] *MPT News* 1994 **5** (4)
[18] *Nikkei Weekly* 6 June 1994. The proposal within the Social Infrastructure Programme includes a countrywide fibre-optic network, the computerization of schools, the improvement of housing conditions and the environment.
[19] *Nikkei Weekly* 6 June 1994; *Economist* 22 January 1994; expert interviews
[20] MITI *Programme for Advanced Information Infrastructure* Tokyo (May 1994)

promoting security measures and standardization, and by dealing with intellectual property right issues.

In 1994 MITI invested about 30 billion yen in the information infrastructure.

Programme 21. This programme, the Programme for Creating New Markets, was introduced at the beginning of 1994 to lead the economy into the 21st Century. Eight promising markets are identified in the programme, with 'information and communication' being one of them. The programme concentrates on the demand side, aiming at the general liberalization of markets and the promotion of technology, financing options and qualified personnel.[21] Four new business areas are to be established: (1) services that create or provide information (eg video software, 'electronic museum'; (2) services in which information networks are utilized (eg tele-education); (3) services that provide network infrastructure (eg mobile communications); and (4) hardware and computer software. According to the MITI prognosis, the info-communications market will triple between 1992 and the year 2000, from 23 trillion yen to 61–70 trillion yen, which would be 5–6% of the expected total domestic production value in the year 2000. By comparison, the car industry had a market of 40 trillion yen in 1990, 4.6% of the total domestic production value.[22]

Nippon Telegraph & Telephone

The market-dominating telephone company NTT had already announced its vision of future info-communications, the 'Visual, Intelligent and Personal Service' (VI&P) in 1990, before the NII initiatives were put together in the USA. It described the construction of a B-ISDN network, connecting all households with fibre-optic lines. With an investment of 45 trillion yen the network was targeted to be built within 20 years, between 1995 and 2015. In the USA, as stressed by Hayashi,[23] this vision was often mistaken as definite plan, and as a Japanese national strategy.

In January 1994 NTT's Basic Concept and Current Activities for the Coming Multimedia Age was presented, analysing major changes in the info-communications sector and the specific role of NTT.[24] The assistance of the state is considered central for the positive development of info-communications. The government should deregulate, use the new technologies itself and, in particular, promote the software industry. NTT plans cooperation with national[25] and international[26] partners, fast digitalization and FTTH for all private households up to 2015. NTT's advantage is that it seems to be the only Japanese company which is capable of financing and building large-scale fibre-optic networks. In 1994 the Multimedia Promotion Office was established within NTT in order to coordinate these activities.

Nippon Hoso Kyokai

The public broadcaster NHK plays only a minor role in JII initiatives, leaving most of broadcasting strategies to the MPT. The absence of NHK in the JII policy debate is explained by its delicate political position as public broadcaster. The 'Hi-Vision City' project was introduced to promote regional markets.[27] To promote HDTV, ten hours of (analog) hi-vision programmes have been broadcast daily by satellite since 1991.[28] In cooperation with other companies, NHK takes part in

[21]MITI *Programme for Creating New Markets (Programme 21)* Tokyo (24 February 1994)

[22]*Ibid*; MITI *op cit* Ref 20, 15. The info-communications market includes telecommunications services (NTT and NCCs), equipment (computer, telecommunications, audiovisual), new services (teleshopping, etc), information services, computer and multimedia software.

[23]Hayashi, K 'Information infrastructure: who builds broadband networks?' *Information Economics and Policy* 1993 **5** (4) 295–309

[24]NTT *NTT's Basic Concept and Current Activities for the Coming Multimedia Age* Tokyo (1994)

[25]NTT is planning pilot projects with over 80 national partners, including equipment companies (eg NEC, Sony, Canon), trading companies, media companies (Asahi Shimbun, Mainichi Shimbun), other companies (eg Imperial Hotels, Sumitomo Bank, Dai-ichi Mutual Life Insurance, Sega Enterprises, Japan Cable Television), universities and public institutions (eg Oita Prefectural Government, National Space Development Agency): see *Nikkei Weekly* 25 July 1994.

[26]NTT has changed its rather isolated strategy at the international level. For example, there is now cooperation with the US companies Microsoft and Silicon Graphics Inc (to develop a set-top box for VOD): see *Nikkei Weekly* 27 June 1994.

[27]At the end of 1994 there were about 40 hi-vision model cities, equipped with a city-wide video information network: *MPT News* 1994 **11** (5).

[28]Five hours of daily programming come from NHK and another five hours from commercial TV companies. By mid-1994 about 30 000 hi-vision TV sets had been sold in Japan. The development of flat plasma screens is expected to help the diffusion of hi-vision: *New Breeze* 1994 **5** (3) 10.

the B-ISDN experiments in Kansai Science City. Fifty of the planned 300 users will test an NHK system for video-on-demand (VOD), which allows the reception of three or four channels at the same time.[29] In addition, NHK promotes research on an ISDB (Integrated Services Digital Broadcasting) system which is to raise flexibility when various broadcasting services are offered.[30]

In its press information, *Vision for the 21st Century and its Challenge – NHK's Future Framework*,[31] NHK identifies perspectives, redefines its role and lays down its strategy, including the following goals: (1) justification of public broadcasting (enhancement of quality); (2) coexistence in competition with commercial broadcasters (improved efficiency); (3) combination and integration of terrestrial and satellite broadcasting; (4) extension of hi-vision broadcasting; (5) promotion of transnational activities; (6) transition to digital broadcasting.

According to the MPT timetable, three stages of digitalization are planned: (1) 1996 (communications satellites); (2) 2008 (broadcasting satellites); and (3) 2000–2010 (terrestrial TV). However, NHK experts are rather sceptical regarding rapid digitalization, arguing that a later start on digitalization would shorten the expensive transition period (10–20 years) from analog to digital, when both transmission modes will have to be provided. Furthermore, the danger of investment in the wrong direction will be lower the later the transition is started. The Telecommunications Council proposed that NHK and the five commercial broadcasters should switch from wireless to fibre-optic transmission (over the NTT network) by 2010.[32] Again, experts are sceptical, in particular as they consider the universal service function to be jeopardized by this change in transmission mode.

Other players and activities

The CATV industry, promoted by the MPT, is increasingly active in the JII initiative. As a step in the direction of integrated interactive teleservices over the cable network[33] the Cable Television Council[34] established a Full-Service Net Committee in May 1994. The *ad hoc* committee carries out research and experiments, and is supported by the MPT on technical matters.

Greater involvement of the government in coordinating and promoting info-communications was widely recommended.[35] The government itself argued for increased involvement in dealing with 'bureaucratic red tape' which has prevented speedy progress in the info-communications sector so far.[36] In June 1994 Prime Minister Hata announced organizational steps and in August the Cabinet set up a bureau for the Promotion of the Advanced Info-communications Society. The central goal of this institution is the development and promotion of a comprehensive policy. The organization is chaired by the Prime Minister and will include the ministers of MPT, MITI and the Chief Cabinet Secretary as his deputies. Private sector members will not be included, but there will be strong cooperation.

The importance of stronger international cooperation has been stressed in various reports and recommendations.[37] Japan has institutionalized bilateral consultation with the USA and the EU for information infrastructure initiatives on national (JII) and global (GII) levels. Furthermore, there is an initiative for an Asian Information Infrastructure (AII).[38] Japan is showing an interest in taking the lead in the construction of an AII.[39]

[29]The other 250 households will test a more expensive VOD system by NTT, which allows reception of 80 channels simultaneously.
[30]*New Breeze, op cit* Ref 28, 11
[31]NHK Press Information, 3 February 1993
[32]*Japan Times* 30 May 1994
[33]For example telephone service, TV shopping and ticket reservation services.
[34]The Cable Television Council is an interest organization of the cable industry set up in 1988.
[35]For example by MITI and the Multimedia Info-communications Technology Committee, which was formed by the Telecommunication Technology Council (TTC): *MPT News* 1994 **5** (5).
[36]*Japan Times* 27 June 1994
[37]For example, the importance of international cooperation is stressed in the report of the Telecommunications Council for the MPT, by the ITU, OECD, APT (Asia–Pacific Telecommunity) and APEC (Asia–Pacific Economic Cooperation).
[38]The APT provides a forum for discussion of the AII, which is considered essential to solve economic and social problems of the region.
[39]On a bilateral level with South Korea, first agreements about the cooperative construction of an AII could be reached. See *Japan Times* 7 May 1994, *MPT News* 1994 **5** (6); 1994 **5** (12); *South China Morning Post* 29 June 1994.

The liberalization of the Japanese telecommunication sector allows the entry of new players. However, as regards JII initiatives they are predominately active in the second rank.[40]

Factors influencing JII plans and their realization

Japanese initiatives to shape the electronic info-communications sector of the 21st Century are manifold, extensive and ambitious. In this section, factors are identified and analysed which influence the formulation and the degree of difficulty in realizing the plans described above. For an assessment of the JII initiatives, the technical, social, cultural and political frameworks must be considered. What is the agenda behind the JII initiatives? To what extent do these multidisciplinary factors favour or prevent the speedy realization of the JII initiatives? The analysis starts with observations on political and societal factors in Japan and then turns to the analysis of the specifics and peculiarities within the info-communications sector.

Societal embededness of Japanese info-communications developments

In any analysis of Japanese info-communications it must be remembered that not only this particular sector, but the total political and economic system, is in a process of far-reaching change. Hence the reform of telecommunications is happening in an unstable and changing environment. In the 1990s, instead of the expected golden decade, Japan entered a decade of disillusion.[41] A political crisis, with seven governments within five years, demonstrates the problems of departing from a one-party system.[42] Moreover, there are crucial changes regarding management principles[43] and the educational system.[44] The reform of info-communications should be seen in interaction with these changes and with structural problems, while taking into account the cultural peculiarities of Japan: the rapidly ageing population (*koreika shakai*), a comparatively low quality of life[45] and large regional disparities with an over-dominant centre, Tokyo–Osaka.[46] According to the JII vision, modern info-communications are expected to help solve all these problems.

On the one hand, there is a bloated service sector, and management hallmarks like lifetime employment impede technologically induced rationalization.[47] At the same time this system depends on high economic growth for finance. The fear of increased unemployment with the shift to an information- and service-based economy seems to be higher in Japan than in other countries. On the other hand, there is strong faith in the use of technology to solve social problems as well. The belief in the potential of technology is comparatively high, and the reluctance to apply it is low. Ambitious projects like those in broadband info-communications are not an exception in Japan; there are others, for example, in architecture.[48] The cultural/societal framework seems to promote such projects more than in other countries. Possible negative effects of new technologies (regarding privacy issues, consumer rights, etc) are hardly discussed. Technology assessment plays a negligible role in politics and academic life.

Use of info-communications

A specific starting position for JII initiatives is provided by the comparatively low computerization of households, penetration of com-

[40]Electrical companies are mainly active in the local telecommunications market. They started with telemetry services, but want to construct a fibre-optic network for a variety of services. They are backing TTN and eight further companies. However, only TTN offers a switched telephone service; railway companies, for instance, are backing the NCC Japan Telecom; financially strong trading companies in particular are entering the CATV sector; the electronic games industry is trying to enter the JII market as software supplier for future applications.

[41]*Fortune* 13 June 1994, 21. By referring to the present as Heisei Reformation, its importance is raised to the level of the historical decisive Meiji period in the 19th Century. 'Heisei' is the name of the reign of Emperor Akihito which started in 1989.

[42]From the 1950s the conservative LDP ruled the country alone.

[43]The challenged management principles are, for example, lifetime employment, consensusal decision making and the seniority principle in strictly hierarchical systems. Moreover, new research results show changes in the views of Japanese on work: in accordance with other countries, payment is the top priority goal of workers in Japan. See Bosse, F 'Leidet Japans Moral unter seinen eigenen Tugenden?' *Politik und Zeitgeschichte* Beilage zur Wochenzeitschrift *Das Parlament* 1994 B50 19–26 (16 December 1994).

[44]Changes point in the direction of enforced promotion of creativity.

[45]The MPT project 'Hi-vision City' is, for instance, explicitly promoted as a measure to raise the standard of living: *MPT News* 1994 **5** (11).

[46]Two decades ago, decentralization was aimed at with the improvement of the train system (Shinkhansen). However, it failed and actually had the opposite impact: the metropolitan concentration increased. The periphery is not perceived as an attractive location, but as a place which now can be better served (accessed) from the metropolitan offices.

[47]Hence the potential of electronic info-communications to reduce personnel can only be used to a limited extent.

[48]Plans include an 800 m tall Millennium Tower of the Obayashi Corp for 17 000 offices and 2000 m tall pyramid of the Shimizu Corp, providing space for one million people. Another Takenaka/Esco plan aims at a 1000 m tall building. For comparison, the Sears Tower in Chicago is 447 m tall. The Tokyo Teleport is planned to be constructed on land reclaimed from the sea. Suzuki wants to build accommodation for 100 000 employees and 60 000 residents. See *Asiaweek* 11 May 1994, 35.

Table 5. The use of info-communications in the USA and Japan.

	USA	Japan
Personal computers linked to local area networks (%)	52.0	8.6
Penetration of personal computers (%)	15.8	5.7
Database market (billions of yen)	1 276	216
Number of CD-ROM titles	4 000[a]	1 000[a]
Cable TV operators	11 075	149[b]
Cable TV subscribers (millions)	57.21	1.08[b]

Source: MPT, cited in *Nikkei Weekly* 16 May 1994
[a]Approximate. [b]Urban-type CATV only.

puter networks and diffusion of CATV. Table 5 illustrates the lag in Japan compared with the USA. The proportion of computers equipped with modems is, according to estimates, around 20%. Regarding the diffusion of the Internet,[49] Japan was reported to be even behind newly industrialized countries like South Korea. However, already in 1994 rapid progress was being made regarding PC networks and the Internet.[50]

Individual 'virtual communities' such as COARA, which is described by Rheingold,[51] are innovative but not representative of general development in Japan. There is no strong tradition of grassroots approaches in info-communications and no extensive experience in the use of electronic community networks via CATV or computer networks.[52] Altogether, there are different starting positions and different requirements for the design of future info-communications in Japan compared with Europe and the USA. This is underlined by a comparative study of business communication in the USA and Japan which shows differences in the usage of services and technology.[53]

CATV development

Further important differences exist regarding CATV. According to the JII plans of MPT and MITI, support for CATV is intended to enforce competition at infrastructure level. However, it is often doubted that the Japanese CATV industry is strong enough to provide effective competition with NTT. Until 1993 the MPT followed a strategy which impeded the growth of CATV. With the aid of the licensing policy, companies were kept small, the creation of multiple system operators was made impossible and foreign investment and cooperation was limited. Furthermore, there were problems with rights of way, in particular as cable companies with more than 500 subscribers need an additional permit from the Ministry of Construction.[54] Alongside government policy, the attractiveness and wide variety of terrestrial TV programmes on offer, the comparatively high cost of CATV,[55] the homogeneity of the Japanese population, the weak outside orientation and limited knowledge of foreign languages are often given as major explanations for the low penetration of CATV in Japan.

In order to assess the role of CATV in the Japanese Information Infrastructure initiative, the distinction between two categories of CATV has to be understood:[56] (1) the far bigger group is limited to the retransmission of terrestrial programmes in areas with reception problems. Users do not pay subscription fees.[57] The infrastructure cannot be upgraded to modern multichannel systems; (2) the second group is called 'urban-type' CATV by the telecommunications establishment and can be compared to multichannel systems in other countries.[58]

With 1.6 million subscribers in March 1994, the penetration of urban-type CATV was below 5%.[59] Total CATV penetration was

[49]In the Internet business, Fujitsu is very active on the one hand with Nifty-Serve, and on the other it started setting up a countrywide Internet access system in mid-1994.
[50]The largest PC network in mid-1993 was the 'PC VAN' of NEC Corporation with 578 000 subscribers. See InfoCom Research *Information and Communications in Japan 1993–1994* Tokyo (1994) 130. Until the end of 1994 Internet access for the half-million subscribers of the second biggest PC network, Nifty-Serve, was limited to the mail function. By the beginning of 1995 both networks had reached one million subscribers each.
[51]Rheingold, H *The Virtual Community* Addison Wesley, London (1993)
[52]Neither with bottom-up nor with top-down approaches.
[53]In 1994 a comparative study was commissioned by the Institute for Posts and Telecommunications Policy of the MPT. This shows that there are differences in the choice of communications media. In Japan telefax is most used, whereas in the USA the use of telephone and electronic mail predominates. Japanese employees make twice as many business trips as their US colleagues. See *MPT News* 1994 **5** (1).
[54]The right of way was often denied, as CATV companies had to compete with public utilities, eg the electrical companies, for permission to dig up streets. The Ministry of Construction itself plans to lay a fibre-optic network along its 420 000 km of roads. See *Japan Times* 30 May 1994.
[55]Installation fees for CATV in Japan range from 30 000 to 50 000 yen and monthly charges from 3000 to 4000 yen.
[56]However, there is no distinction in the legislation between the two CATV categories.
[57]Because of universal service obligations the costs are either covered by the broadcasting company or by owners of buildings, etc, that cause the reception problems.
[58]There are three criteria for urban-type CATV: (1) more than five original services (not including satellite programmes and Japanese terrestrial channels; (2) two-way communications capacity (not to be confused with interactive services!); (3) the number of potentially connected households is higher than 10 000.
[59]Compared with NHK households.

24.3% in March 1993, with about 8.3 million subscribers. The single-cable systems are extremely small. The largest Japanese CATV operator is Nippon Network Service with 100 000 subscribers. In 1992 there were 24 666 systems with a maximum of 50 subscribers, 30 400 with 51–500 subscribers and only 1371 systems with more than 500 subscribers.[60] Finally, most of the existing cable systems cannot be upgraded to the 1000 MHz systems planned to be used in the JII.[61] The figures demonstrate the major difference between the CATV industry in Japan and in its counterparts in the USA and Europe. However, with its new policies to promote CATV in Japan, the MPT hopes that the numbers of homes passed by CATV will be 20 million by the year 2000. Another forecast predicts a 40–60% diffusion by 2010, which would mean that the current US penetration will be reached with a delay of more than 10 years.[62]

Regulation, institutions and responsibilities

The specific institutional setting of the info-communications sector, the peculiarities of state regulation and the distribution of spheres of responsibility between ministries are further important factors in the formulation of plans and strategies and their chances of success.

Japanese state regulation[63] in info-communications can be characterized as pragmatic, flexible and 'soft' regulation realized in the form of 'administrative guidance' (*gyousei shidou*). Weinberg calls it the Japanese 'bargaining model' of regulation in contrast to the US model of 'formal rationality'.[64] Administrative guidance means that the ministry agencies create strategies and recommend specific policy steps companies should take.

This model is not limited to info-communications. More than two-thirds of the activity of the Japanese civil service is estimated to be executed in form of *gyousei shidou*, through non-binding recommendations for industry. The importance of formal, documented regulation is low. Hence there is flexibility but little transparency in decision making. The relationship between the administration and the industry it guides is very strong. In contrast to the USA, regulations are seldom challenged in the courts, which play a negligible role.[65] Administrative guidance is only in theory non-binding; it works because the companies need the favour of the public administration, for instance in the granting of licences and regarding public procurement. The regulatory agency works by means of unspoken incentives and threats.

Another reason for the close relationship between companies and administration is the institutionalized exchange of personnel. Not only the flow of information, but also the flow of personnel is considered to be efficient, and has at least an indirect influence on Japanese policies and their realization. Many civil servants move to well-paid jobs in the private companies they previously guided. The relation between ministries and industry is – in general – better than in Europe or the USA. The exchange of personnel is also practised between departments and regions within ministries.

There is another particular situation regarding advisory councils, which play an important role in the formulation of JII strategies. In contrast to the USA, there are no rules regarding the representative make-up of councils, neither to include all possible groups concerned nor to publish their activities and results.[66] Altogether, the Japanese framework for information infrastructure initiatives not only differs

[60]InfoCom Research *op cit* Ref 50, 110. NHK and NTT are not allowed to offer CATV, but they are allowed to hold limited shares in CATV companies.

[61]Digital compression might help this problem, but according to experts a satisfactory solution is not in sight.

[62]For an analysis of the Japanese CATV sector, see Sugaya, M 'Cable television and government policy in Japan' *Telecommunications Policy* 1995 **19** (3) 233–239.

[63]Glynn, S 'Japan's success in telecommunications regulation: a unique regulatory mix' *Telecommunications Policy* 1992 **16** (1) 5–12; Marcus, M J and Marcus, G H *Japanese Regulatory Institutions and Practices* Working Paper, Konan University (February 1994)

[64]Weinberg, J 'Broadcasting and the administrative process in Japan and the United States' *Buffalo Law Review* 1991 **39** (3) 615–733

[65]See Marcus and Marcus *op cit* Ref 53, 2. A major explanation is the general cultural norm of avoiding confrontation.

[66]*Ibid* 5ff

because of specific laws[67] but also because of different societal norms, organizational principles and administrative processes.[68]

Japan belongs to the minority of countries where telecommunications and broadcasting are under the jurisdiction of one institution, in this case, the MPT. This advantage regarding upcoming regulatory problems caused by the convergence of broadcasting and telecommunications is reduced by growing rivalry over the info-communications sector between the MPT and MITI.[69] The division of responsibilities between the two ministries in the converging info-communications sector has not yet been solved, which is reflected in the contradictory interpretations of various experts. This unclear situation is an indicator of the convergence, and the same time of the dominance, of informal rules in the Japanese civil service. Part of the explanation for the rivalry between the ministries is the above-mentioned exchange of personnel in the form of '*amakudari*', which might be translated as 'descent from heaven'. Basically, it has the effect that civil servants who cannot rise further in the hierarchy[70] are transferred to well-paid jobs in one of the companies which are overseen by the ministry. The bigger the economic sector guided by the ministry, the better are the jobs for 'retired' civil servants, which raises the reputation and status of the ministry.[71] Hence competition for the very promising info-communications market is especially high.

The downside of the resulting rivalry is loss of momentum in the formulation and realization of JII initiatives. However, the *amakudari* principle has itself come in for increasing criticism. In favour of *amakudari* it is argued that it strengthens the motivation to work for ministries and there is a higher incentive for civil servants to work in the interests of the industry they oversee. Conflict over the transfer of civil servants to decisive positions in private companies is rare.[72] Nevertheless it occurred when the MPT wanted its former vice-minister,[73] Shigeo Sawada, who had entered NTT via *amakudari*, to become NTT president in 1994. The NTT management preferred Masashi Kojima to remain president and finally prevailed. The reason was a strategic mistake by the government. The much desired local tariff rate increase had been denied before the decision on the new NTT president was made. This robbed the government of its leverage on NTT management.[74]

NTT reform

A factor with considerable influence on the JII initiatives is the restructuring of NTT, which has already been discussed for more than a decade. NTT was partly privatized in 1987;[75] the Ministry of Finance still holds the majority share (66%). The MPT wants to divest the company in order to nurture competition. NTT management and the Zendentsu trade union are against divestiture, which would jeopardize their power.[76] The shape of NTT reform and the future strategy for JII are closely connected, especially regarding the question of who will build and finance the fibre-optic network and how much competition there should be. NTT is the company with the necessary technical know-how and financial capability to lay a fibre-optic network to homes, and it has demonstrated its willingness to do so. However, this solution is conditional on a reform which does not seriously financially weaken NTT. This scenario carries the risk of making NTT's market dominance even greater. In the alternative scenario, the highest priority

[67]The Japanese telecommunications laws are facility based. Hills argues that the MPT strategy to distinguish according to the ownership of facilities and the scope of the service, and not between basic and enhanced services as in other countries, was motivated by the fear that in this case MITI would have claimed enhanced services as its territory: Hills, J *Deregulating Telecoms: Competition and Control in the United States, Japan and Britain* Frances Pinter, London (1994) 117.

[68]For an analysis of the public administration in Japan see Tsuji, K *Public Administration in Japan* University of Tokyo Press, Tokyo (1984)

[69]MITI is traditionally responsible for the computer sector. According to experts, the rivalry between the MPT and MITI concentrated on CATV in the 1970s, on telecommunications (value-added services) in the 1980s and extended to multimedia/info-communication in the 1990s.

[70]The Japanese personnel system is strictly hierarchical. In the pyramid organization of the civil service the only choice is up through the hierarchy or out into private industry.

[71]There is an official ranking of ministries regarding prestige and power. Traditionally, the Ministry of Finance, the Ministry of Foreign Affairs and MITI are at the top. The MPT has been able to raise its importance dramatically in the last decade, to which the partial privatization of NTT has made an essential contribution.

[72]*Amakudari* has a strong impact in the broadcasting and telecommunication sectors. For instance, not only in NTT, but also in DDI, KDD and various broadcasting companies, former MPT civil servants hold important management positions.

[73]The top-ranking civil servant in the ministry holds the title of vice-minister.

[74]*Nikkei Weekly* 23 May 1994, 8

[75]Based on the 1985 NTT Law.

[76]Sato *op cit* Ref 1. Zendentsu is one of the most powerful trade unions.

is given to the goal of strengthening competition in the Japanese market. In this case NTT would be divested drastically, the financial involvement of the state would be stronger, more competition could be achieved, but the development of a fibre-optic network might be slowed down. The option of abandoning the reform of NTT is unlikely as this would involve considerable loss of face for the government. A decision on the NTT reform is scheduled for 1995.[77]

Discussion and summary

The central strategies and activities in the JII initiative come from the traditional players in the electronic info-communications sector, the Ministry of Posts and Telecommunications, the telecommunications company NTT and the Ministry of Trade and Industry. The CATV industry, which is comparatively underdeveloped in Japan, is gaining strength in the course of the JII initiatives. It is backed by the MPT, which wants a stronger CATV industry in order to create competition on the infrastructure level – in particular for the market leader, NTT. The JII involvement of the public broadcaster NHK and its commercial competitors is comparatively low and rather passive. New market entrants, made possible by the liberalization of telecommunications, tend to be active more in the second rank, mostly by means of increasing their share in info-communications companies.[78] Although the major changes are seen in telecommunications and broadcasting, other branches such as computer software, consumer electronics, game software, newspapers and publishers will also be affected. The future industry structure of info-communications will include a rising number of players, among which the software industry is expected to play a key role. There is not only a convergence of telecommunications and broadcasting, but other borderlines are also becoming blurred.[79]

The central JII visions of the MPT, NTT and MITI show wide conformity regarding the motivation, envisioned applications, anticipated societal chances and new social problems of info-communications. More explicitly than in the USA and the EU, Japanese plans aim at an integrated broadband network connecting all households. Acording to the MPT plan, the network should be completed within 15 years, by 2010. With the help of various pilot projects and experiments, the technology is being tested, and attractive applications are being sought. In order to utilize info-communications efficiently, a change in personal values, life and work styles is explicity called for, together with necessary changes in the physical infrastructure, information processing and application. Altogether, Japanese strategies imply a strong belief in the steerability of info-communications developments by the state. The political/administrative system, with strong central power in the hands of the ministry at the local and national level, and an unusually close relationship between the civil service and industry support this approach.

There is growing interaction between the information infrastructure visions and plans of the USA, Japan and the EU.[80] Competition for the promising global info-communications market has already begun at a symbolic level. The choice of a homogeneous fibre-optic network in the MPT plan, which is even more advanced and capable than its hybrid US and EU counterparts, seems to be motivated by the goal of outdoing US and EU strategies. However, it must have been clear that this was

[77]For the discussion of an adequate industry structure of the future Japanese info-communications sector see Hayashi *op cit* Ref 23; Oniki, H *Japanese Telecommunications as Network Industry: Industrial Organization for the BISDN Generation Technology* Discussion Paper No 324, ISER, Osaka (1994); Naoe, S 'Japan's telecommunications industry' *Telecommunications Policy* 1994 **18** (8) 651–657.

[78]Trading companies are increasingly investing in CATV and electrical companies are backing telecommunications companies, but not very aggressively, which is partly explained by the monopoly situation in their core business.

[79]Nintendo, for example, has entered satellite broadcasting, buying 19.5% of SDAB – Satellite Digital Audio Broadcasting. Furthermore it is cooperating with the US Silicon Graphics Inc, which specializes in multimedia applications. Sony has entered the games industry, aiming at the application of 3D graphics (*International Business Week* 23 May 1994, 21). Some sectors are already closely connected. All of the five biggest newspaper companies (Asahi, Yomiuri, Mainichi, Nikkei and Sankei) are active in broadcasting as well. There are cross-owner restrictions (shares have to be below 10%) which, however, can be avoided.

[80]Hayashi, S and Sueyoshi, T 'Information infrastructure development: international comparison between the United States and Japan with some implications for European Union countries' Paper presented at the ITS European Regional Conference, Khania (D1994). These authors point out the importance of the NTT vision (Visual, Intelligent and Personal Communications Systems, announced in 1990) for the formulation of the US initiatives.

unrealistic. Even shortly after the publication of these plans, it became obvious that a hybrid solution was more likely to work in Japan as well.

As in other countries, the Japanese discussion of multimedia and future info-communications is considered hyped, eg regarding the market prognosis. Critics observe a 'multimedia fever' with vague or absent definitions of multimedia, overoptimistic market prognoses and underestimated costs.[81] As opposed to the USA and EU, there is hardly any public controversy regarding social consequences of JII, which can be explained by the low priority generally given to the assessment of possible negative social consequences of technology in Japan, and by the negligible role of non-profit organizations and users in the political debate.

The government crises, the long-discussed but still unresolved NTT reform and the rivalry between the MPT and MITI weaken the formulation and realization of current JII initiatives at different levels. Organization and institutional changes to improve the framework for JII initiatives are being discussed. However, the options to improve the coordination and administration by forming a new ministry, either an information ministry consisting of parts of the MPT and MITI, or an infrastructure ministry responsible for public utilities from various sectors, do not seem to be politically feasible in the short and medium terms. A more pragmatic solution would be the formation of integrated committees composed of representatives of various ministries involved. In order to solve the convergence problems of telecommunications and broadcasting, a study group was formed which is elaborating a reform of existing telecommunications and broadcasting laws.

Broadly defined cultural factors are also in a process of change, which affects the utilization of info-communication, and hence the realization of JII initiatives. The long-cultivated management hallmarks are also under discussion, and there is an understanding that a sector-by-sector restructuring of society is needed, changing life and working styles to better utilize info-communications. Furthermore, experts foresee a step-by-step reform of the unique regulatory and administrative process in Japan.[82] The trend is expected to bring a gravitation towards the US pattern: more transparent decision making, more formal rules and stronger courts.

Another factor, which is generally interpreted as disadvantage for JII development, is the low penetration of computer networks, including the Internet, and in particular the extremely low diffusion of so-called urban-type CATV, which calls for different infrastructure strategies than in other countries.[83]

However, less well-defined societal/cultural factors are expected to compensate to some extent for the disadvantages listed above. It is argued that there have been other sectors where the Japanese came from far behind and finally did very well. In interviews and articles, success stories of the car industry, the banking and computing sector are cited as arguments that Western scepticism regarding the feasibility of Japanese strategies has often proved wrong in the past. 'Japan started with zero 40 years ago and has accomplished in the last ten or 15 years what the rest of the world spent 100 years building.'[84]

Whatever the accuracy of this assessment, it is clear that JII strategies are not primarily demand driven, but are informed by other factors and goals. The announced visions and plans of the MPT, MITI, NTT and the government have shown a tendency to be driven by their sectional

[81] *Japan Times* 6 June 1994. In this article Noboru Makino from the Mitsubishi Research Institute criticizes the market forecast. The MPT prognosis suggests a multimedia market of 123 trillion yen in 2010, roughly 1.23 million yen per person. The automobile, steel and information industry (computers, software) has a market of only 10 trillion yen. Other economists criticize the market forecast because it contains both intermediate goods and final consumption goods, so some of the values are counted twice. A further criticism is that the forecast regarding employment effects only accounts for the creation of new jobs by the construction of the fibre-optic network (2.43 million), without taking into account the accompanying loss of jobs.

[82] Dominance of administrative guidance, the lack of formal rules, pronounced flexibility in the decision-making process, the minor role of courts and the close relationship between the administration and the industry.

[83] However, some experts argue that the low CATV penetration offers a chance to technologically leapfrog developments in other countries.

[84] Kazuo Nukazawa, managing director of the powerful industry association Keidanren, cited in *Fortune* 13 June 1994, 24

interests on these issues. The only partly hidden agenda behind the JII initiatives is the impending NTT reform, further liberalization of the telecommunication sector, the nurturing of new competitors in the market, the conflict of interest between ministries, the fight against recession and the restructuring of Japanese industry.

Appendix

Basic background information on major players in the Japanese info-communications sector

The Ministry of Posts and Telecommunications is the central player in the sector. Its activities are not limited to post and electronic communications but also include a profitable postal savings and life insurance division. The Telecommunications Bureau, Broadcasting Bureau and Communications Policy Bureau are responsible for the regulation and coordination of activities in the electronic info-communications sector. The Communications Research Laboratory (CRL, responsible for technical aspects) and the Institute for Posts and Telecommunications Policy (IPTP, responsible for economic aspects) are research facilities of the MPT.

The independent advisory council – Telecommunications Council, Telecommunications Technical Council (Standards) and Radio Regulatory Council – were established through the 1985 Telecommunications Business Law.

With the convergence of informatics and telecommunications the Ministry of International Trade and Industry gained influence in the electroninc info-communications sector. Its main activity in the sector is the support of strategic projects.

Infrastructure and service providers can be broken down into international and national providers, and so-called 'Type 1' and 'Type 2' (special, general) carriers, which are subject to different regulations. Type 1 carriers own the facilities; Type 2 carriers lease the capacities as needed.

- In January 1995 there were three international Type 1 carriers, the former monopoly KDD and its two competitors IDC and ITJ.
- The national market leader is the Type 1 carrier NTT, which is also, for example, active in mobile communications.[85] The three competitors in the national long-distance market are DDI, Japan Telecom and Teleway Japan. On the regional level, 11 companies offer leased-line services and are mainly backed by electricity companies. Only TTN offers a switched telephone service. The railway companies back Japan Telecom and transport sector companies (eg Toyota) back Teleway Japan. Altogether there were 87 Type 1 carriers in January 1995.
- The number of 'general Type 2 carriers' rose fastest; 2101 general and 43 special Type 2 carriers offered services in January 1995.[86]

In the broadcasting sector the public broadcaster NHK is the market leader. It is also active in satellite broadcasting, next to four commercial broadcasters. The University of the Air is a publicly owned terrestrial broadcaster. Altogether, there were 198 commercial broadcasters in October 1994.[87] The five biggest commercial networks are NTV, TBS, CX, ANB and TX.

The main CATV companies are those in the railway sector (eg Tokyo Cable), trading companies and local government. In 1993, 151 so-called urban-type CATV operators offered multichannel services.

Financial support for projects in the info-communications sector is mainly channelled through two independent, specialized government organizations:

- The Telecommunications Advancement Organization of Japan (TAO) was founded in 1979. In the beginning it concentrated on satellite communication. Since then its activities have spread to wide areas of telecommunications and broadcasting. The close relationship with industry and the administration is helped by the exchange of personnel with MPT, NTT, NHK and other companies.
- Further financial support to the private sector, not exclusively to telecommunications, is provided by the Japan Keytech Centre.

The Fair Trade Commission is a subordinate commission to the office of the Prime Minister. One of its tasks is to regulate media concentration.

[85]NTT was partially privatized in 1985; however, the majority share is still held by the Ministry of Finance.
[86]MPT *Outline of Telecommunications Business in Japan* Tokyo (1995) 1
[87]*Ibid*