튜토리얼

Next Generation Information Infrastructure and Database Service Policy Frame and Market Development in Japan

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ABSTRACT

Author outlines briefly developments of policies relating to telecommunication infrastructure and databases since latter half of 1970's. There exist three phases. The first phase was from later 1970's to 1985, which was an initial stage of electronic information service in Japan. In the second phase, 1985~1990, basic policy change made possible the privatization of telecommunication services and proliferation of database products and vendors. The third phase began in early 1990's with downsizing in computer usage, wide-spreading information networks and rapid dissemination of personal computers.

Then author describes effors on policy formation for "novel information infrastructure" and current situation concerning the "Internet" in Japan. Finally, tasks and problems for implementing new generation program for information infrastructure and database usage are pointed out. These are knowledge resource, cost, copyrights and cultural problems including language.

1. Where we stand now

Development Phases:

In Japan, we have passed through 3 phases of development of policy framework relating to information infrastructure and to database service since 1970. The first phase was the period between 1970's

and 1985, an initial stage of policy formulation for new information era. New electronic information services in the form of online database have been inaugurated by several public institutions like **JICST** and **JAPATIC** and by private firms like Nikkei, Dentsu, Maruzen and Kinokuniya. Basic policies for informatization of society and industry were formulated by **MITI**, **STA** and **MPT** to promote emergence of new systems and new industries. In 1985, Telecommunication Service Act was revised drastically, deregulating data communication service and opening the way to inaugurate private value added network services. It caused proliferation of commercial database service, too.

The second phase was the period between 1986 and 1990, take-off period for commercial online database services in Japan. A substantial number of new entries to electronic information services occured and further promotion policies of government ministries and agencies were implemented. The number of domestic database service provides (both producer and distributor) exceeded 100 in 1985 and 200 in 1989. The market scale, in terms of annual sales of commercial databases, reached to 10 billion yen in 1985. In the area of academic information system, National Center for Scientific Information System (NACSIS) was established in 1987, as a central bibliographic utility for academic libraries in Japan.

The third phase is current years since 1990, in which several basic changes in information technology and market are taking place. The technological innovation brings out an increasing availability of small size and inexpensive, but in high quality, personal computer and workstations. These downsizing trends are changing dramatically the mode of use of computer networking. It makes users possible to build up small and flexible size local information networks in various types. Widespread networkings denote one aspects of basic change since early 1990's. These trends lead to emergence of a network of networks, i.e., an internetworking.

New Information Infrastructure:

In terms of basic information infrastructure for coming century, we need a new national telecommunication trunk circuit, based on high capacity and high speed optical fibre networks. According to the "Information and Communication Basic Infrastructure Program" of the

Council of Telecommunications of the Ministry of Post and Telecommunications, which is made public in May 1994, new national and local information network using high quality optical fibre net, will be constructed by 2010. It has several alternatives, but in its highest estimation of cost, total amount of investment would be on an order of 53 trillion yen by target year. It is estimated that these new national optical fibre networks will produce new industries and enlarge current information service market upto 123 trillion yen. This is one of visions and programs of Japanese version of "Information Super Highway". Downsizing trend in information infrastructure could make a strong impact upon information service industry and commercial database market in later half of 1990's.

2. Current Situation of Internet in Japan

Here, I use the word of Internet as a common noun, meaning network of networks, and not as a particular noun that denotes the Internet, an American networking system. Internet is a logical evolutional phase of computer networking. It has preceding forms of computer network. These are prerequisite of network of networkings. There exist four types of network, i.e., **LAN** (Local Area Network), Regional Network, **WAN** (Wide Area Network) and International Network. Recent rapid innovation in information technology, especially downsizing and dispersing of compute usage, gave rise of various variations of networking. The total number of networks in the world, which have IP addresses, was 19,622 as of November, 1993, out of which 1,400 networks have been working in Japan.

LAN have been bulit in large industrial enterprises, national, local and public research institutions and in universities. Regional Networks are linking universities and research institutions within particular regions such as Tokyo, Tsukuba, Tohoku, Osaka, Hokkaido, Kyushu, etc. The experimental program of Wide Area Network among several universities started in 1984 as **JUNET** in which University of Tokyo, Tokyo Institute of Technology and Keio University are acting as founding and leading members. It has over 300 members. Another pioneering effort in WAN type of network is **WIDE** which was initiated by a volunteer group at the Keio University and its membership consists of nearly 100

organizations. Another active wide area network are **SINET** of **NACSIS** (National Center for Scientific Information System), **BITNet/JOIN**, which is using **IBM** protocol and **RWC** which was initiated by **JIPDEC**, Japan Information Processing and Development Center, under the guidance of **MITI**. These wide area networks are providing link with international networks, especially the Internet. Further commercial access providers starts their services, mainly among private enterprises since 1993. These are **IIJ** (Internet Initiative Japan) and **AT&T** Jens.

Development of Internet is in its initial stage in Japan. The numbers of computers that links up with the Internet is only 45,000 as of November 1993 in Japan, while nearly one million and a half computers are linked with it in USA. These exist several important issues that have to be implemented before substantial part of domestic computer networks be connected with Internet as its member. These are:

(1) Further enhancement of information freedom mechanism among government sector. It composes a basis for public information networking among various government organization.

(2) Construction of a national trunk circuit for new generation information network, which is already mentioned above.

(3) Enlaging networks among schools and public libraries.

(4) Education and training of personnel who have special technical know-how and knowledge relating to Internet and networking operations.

3. Issues relevant to Database Services

(1) Market Effects

Commercial database service market has now reached to a scale of US $2.0 billion annually in Japan. However major users come from private enterprises. In universities, use of online databases are usually made possible through academic and library networks, if it were provided free of charge and/or on special discount rates.

Public libraries prefer **CD/ROM** type off-line datadases to expensive commercial online services. Introduction of Internet services could open new channels for information searching for the users in academic institutions, schools and public libraries. Arrangements for use fee have to be made for these potential users in advance. Further, personal computer uses among individuals and in homes are now opening wide market for online information search service. There exist a dozen of PC communication services, of which Nifty-Serve and **PC-VAN** are two largest service providers, both link up their services with Internet.

(2) Needs for Two-way Traffic

Information Super Highway is a social infrastructre for information exchange. Its final purpose is to support and to implement balanced and reciprocal traffics between information producers and its consumers. Internet clientele tend to travel through complicate networks in searching appropriate information and data for their problem solving. However, it is other thing than to connect to Internet to transmit unique and original information over users worldwide. Original knowledge and data resources plus processed information is basic necessary factor to be a core player in a novel milieu of international networks. As far as transmitting capability concerned, the language problem became one of the central issues for those who generate their information in the languages other than non-roman character basis. Machine translation system will be an effective tool for overcoming these language barriers, but it is too early to evaluate the effectiveness of machine translation in mitigating the barriers.

(3) Copyrights Clearance

Information transmission involves traffic of literal works that have copyrights. Existing legal system relating to copyrights clearance could not accommodate tremendous volume of traffic of papers, documents, articles, computer programs and multi media softwares through domestic and international information networks. **GATT** Uruguay Round made it possible to harmonize among nations their basic policies concerning trade related intellectual property issues. Internet and Information Super Highway bring about an new issue of copyrights clearance procedure for transaction of various

kinds of copyrighted works through internatinal information networks. In this case, current individual rights clearance procedure will be incompetent. We need an international discussion forum to find an appropriate collective arrangement for solving this issue.

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