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ABSTRACT

This paper outlines the market developments, governmental promotion policies, and efforts by private industries for online database services in Japan since the late 1970s. The combination of these efforts over the years has resulted in an online database service market of US$20 billion annually, of which approximately one third is Western online services. Growth in the conventional database service market leveled off in the early 1990s, partly because of the general economic stagnation and partly because of rapid and profound change in the environment for information usage. New opportunities have been provided by the changes in computer usage as a result of corporate downsizing trends, rapid progress in multimedia and digital technology, wide-spread information networks--especially the Internet, and a steadily emerging personal and home market. Experimental programs for digital libraries have already started. The idea of end-user searches of digital libraries through a network is exciting but threatening for everyone in the online services industry. In addition to Japan, online database producers and vendors are now emerging in newly industrializing countries and areas in Asia such as Korea, Taiwan, Singapore, Thailand, and Malaysia. The market has started to grow, and within a decade the fourth largest market for online services will be in Asia, after the American, European, and Japanese markets. (Author/SWC)

Development of online database services in Japan and perspectives on Asia

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Abstract: *The author outlines briefly the market developments, government promotion policies and efforts by private industries for online database services in Japan since the latter half of the 1970s. With these efforts and effects combined, the online database service market reached an order of US$20 billion annually. Approximately one third of this market is Western online services.*
Then growth levelled off, partly because of the general economic stagnation since the early 1990s and partly because of rapid and profound change in the environment for information usage. New opportunities are provided by downsizing in computer usage, rapid progress in multimedia and digital technology, wide-spread information networks (especially the Internet) and a steadily emerging personal and home market. Experimental programmes for digital libraries have already started. The idea of end-user searches of digital libraries through a network is exciting but threatening for everyone in the online services industry. The author describes the current situation in Japan.
In newly industrialising countries and areas in Asia such as Korea, Taiwan, Singapore, Thailand and Malaysia, online database producers and vendors are now emerging. The market has now started to grow, so within a decade there will be a fourth large market for online services in Asia after the American, European and Japanese markets.

1. Twenty years of growth of the online market in Japan

1.1. Initial phase (1970–1985)

The database service industry is a sub-sector of the information service industry which had annual sales of 6.2 trillion Yen (US$62 billion) in 1994. Nearly 60% of the industry's sales are for software developments and programming: database services is the smallest segment. It has a history of over a quarter of a century and the domestic market has already reached 200 billion Yen (approximately US$2 billion) in 1994 (Figures 1 and 2). The scale of the market is still not so large as an industrial sector, but it has been growing steadily in the past decades.

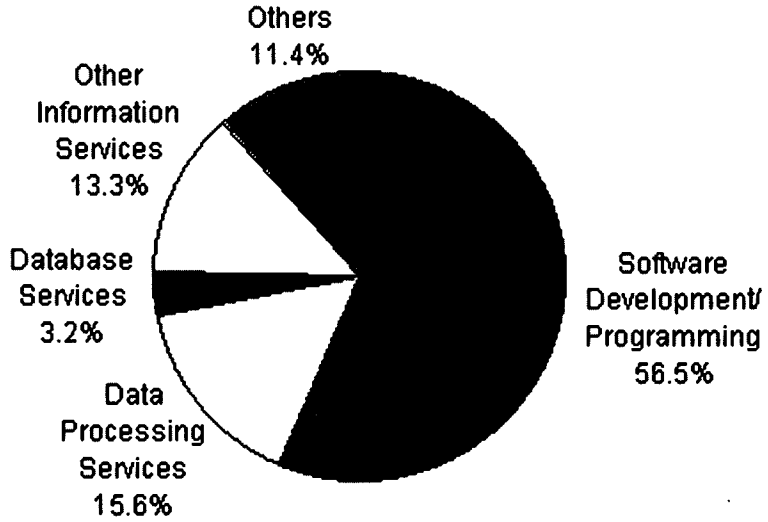


Figure 1: Sectors of the information service industry, 1994.

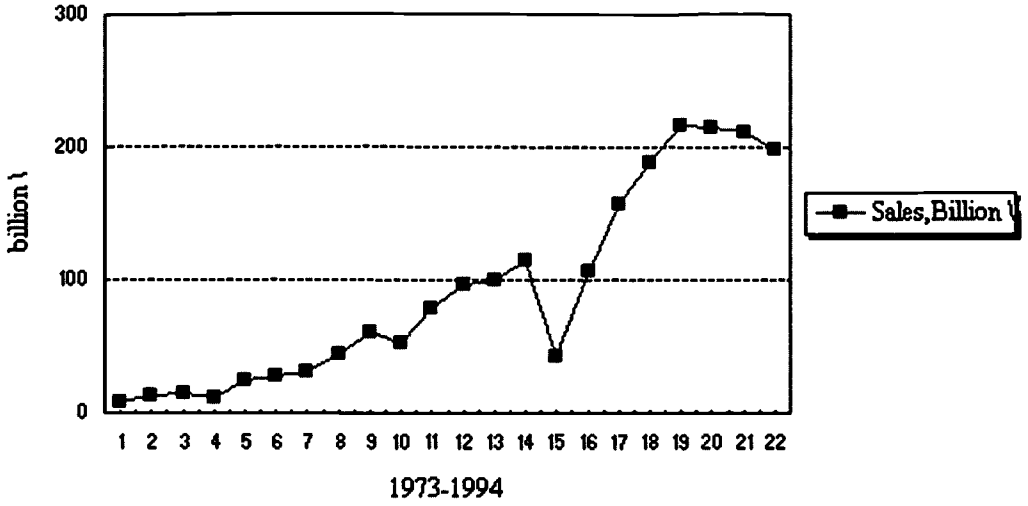


Figure 2: Database sales in Japan (billion Yen), 1973–1994.

There are three phases in the development of the industry. The first commercial database services were introduced into Japan in the early 1970s by several public organisations and private firms: for example science and technology information were introduced by JICST (Japan Information Center for Science and Technology); patent information by JAPATIC (Japan Patent Information Centre); and stock market quotations and companies financial data by Nihon Keizai Shimbun (Nikkei) and Quick. Foreign database services such as DIALOG were introduced to the Japanese market through representative agencies, Maruzen and Kinokuniya — the largest book retailers — in the first half of the 1970s. The technology upon which database services were based was a combination of large-scale host computers at the distributor's service centre and dedicated user's terminals connected with the hosts through low-speed government regulated public telephone circuits.

Government ministries and agencies created a set of promotion policies to make the electronic database service industry a vital part of the information infrastructure. One of the visible result of MITI's basic promotion policy was the establishment of the Database Promotion Centre (DPC), a public foundation devoted to supporting basic research and development of database production efforts financially, assisting regional promotion and training programmes, and so on.

1.2. The second phase (1985–1990)

Database services entered the second stage, the take-off phase, after 1985. In this phase there were a substantial number of new entries and several government promotion policies were implemented. According to the Database Directory (MITI), the number of database service providers (producers and distributors) exceeded 100 in 1985 and 200 in 1989. The number of databases commercially available to third parties in Japan exceeded 1000 in 1985 (Figure 3).

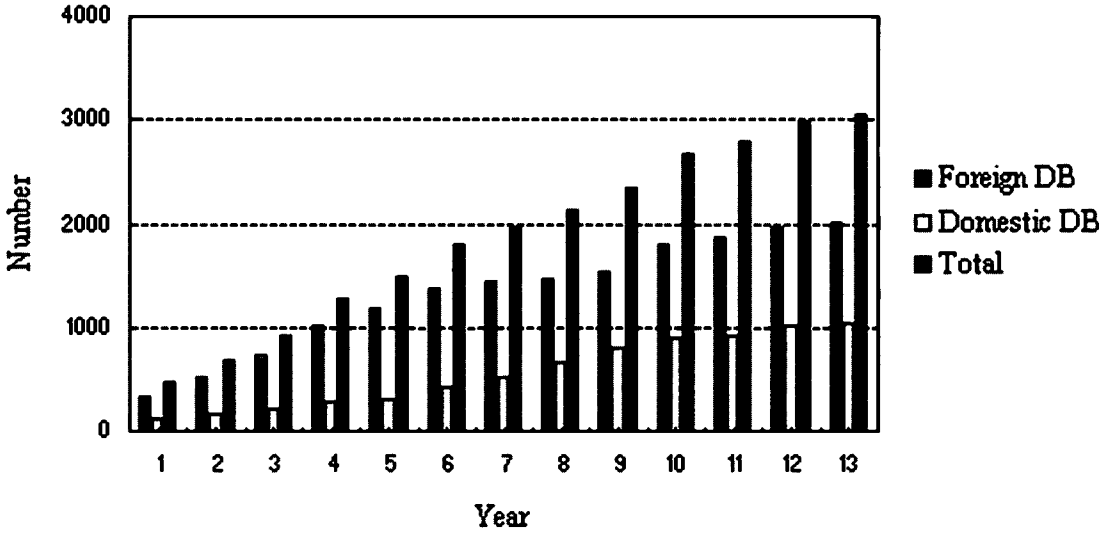


Figure 3: Databases commercially available in Japan, 1982–1994.

The most important policy relevant to electronic information services was the New Telecommunication Act of 1985 which privatised NTT (Nippon Telephone and Telegram Corporation, a state owned monopoly body) and started private VAN services. This was a trigger to the proliferation of new online services. It also stimulated private enterprises to construct their own in-house information networks.

In 1989, NTT's ISDN (Integrated Service Digital Network) began serving the public. In the area of academic information, the National Centre for Scientific Information System (NACSIS) was established by the Ministry of Education in the same year. NACSIS operates as a centre for a national network linking nearly 400 academic libraries — the first bibliographic utilities in Japan.

The technology basis of this second phase was the downsizing of hosts and terminals with the privatisation of telecommunication networks. Most customers of electronic database services were still in industry, so the databases were mainly concentrated in the areas of business and science and technology.

1.3. The third phase (since 1990)

For the third phase, since 1990, two things have had serious impact: economic depression and a fundamental change in the usage milieu. The Japanese economy experienced a relatively long stagnation after the collapse of the 'Bubble Economy' at the end of the 1980s, and the annual growth rate of the general economy in terms of GDP fell down to zero in 1993. These general economic trends were an unfavourable background for the growth of a market for information service industries.

Coincidentally, the milieu of the utilisation of electronic information services is changing rapidly and profoundly. Change has taken place in both the technology and the market. The conventional mode of use of commercial databases had begun to stagnate, and annual sales of database services — mainly online databases — had stopped growing at the level of annual sales of 200 billion Yen (US$20 billion) (Table 1). Does this mean database services in Japan are saturated at the market limit? The author interprets that the structure of the market and the players within the industry are changing so rapidly that annual government statistics do not reflect these changes properly. Survey samples selected by the government are not appropriate for reflecting a rapid change of market structure, nor for including entries of new players. There is contradictory data and evidence that proves my supposition.

Table 1: Market growth in the early 1990s, Japan.

	Information service	*Annual growth %*	*Database service*	*Annual growth %*
1989	4351.4	32	157.6	3.6
1990	5826.7	35	188.6	19.7
1991	6886.1	17.3	216	14.5
1992	7127.6	1	214.1	-0.9
1993	6514.4	-8.6	211.5	-1.2
1994	6177	-5.2	198.8	-6

(1) According to the user survey of the Database Promotion Centre in September 1995, annual expenditure per user firm or organisation for database usage in 1994 increased by 17% (large firm 16.3%, small and medium size firm 17.9%) on the previous year.

(2) The providers' survey of September 1995 shows that even though 13% of firms replying recorded a loss, the average increase rate of sales of these firms was 25.4%. There is no news of serious withdrawal from the market among domestic database providers.

(3) Despite the stagnant general economic condition, the number of databases available commercially is increasing steadily(Figure 3).

(4) Access to commercial databases via PC networks is increasing. Frequency of use of database menus on PC networks increased from 35.5% in 1987 to 56.8% in 1994. The number of ID holders of PC network services reached over 3.7 million in June 1995. Therefore, the author's supposition is that due to downsizing technology and networking, the database service industry is now entering into a new phase of development after 1995.

2. Saturation and renovation since the early 1990s

2.1. Factors of change

Since the early 1990s the growth of the conventional database service market has levelled off, partly because of economic depression and partly because of rapid and profound change in the information use environment.

Multi-aspect innovation in digital technology, downsizing of computer usage, wide-spreading of information networks, construction of a high-speed digital circuit infrastructure, and a steadily emerging personal and home market are all factors which provide new opportunities. The idea of end-user searches at a digital library through a network is exciting but threatening for everyone in the conventional online services industries.

(1) *Personal computers*. The strongest factor is the increasing availability of small, inexpensive but high-quality personal computers and workstations. With the recovery of the general economic condition, domestic shipment of PCs in Japan exceeded 5. 7million units in 1995. This is a firm sign of the digital revolution proceeding in every aspect of social and economic activities.

(2) *PC communication networks*. Downsizing trends have drastic impacts on the mode of use of computers among end-users. The spreading personal computer network in Japan, represented by major network communication service suppliers like NIFTY-Serve and NEC PC-VAN, provides an effective gateway function to online databases. The 1994 survey shows that nearly three-quarters of providers expect database access via PC network to be the most common method five years from now. The next most effective new medium for database services is offline services by CD-ROM, followed by current online database services which are recognised by 40% of database service providers as the most effective way of accessing their services(Figure 4).

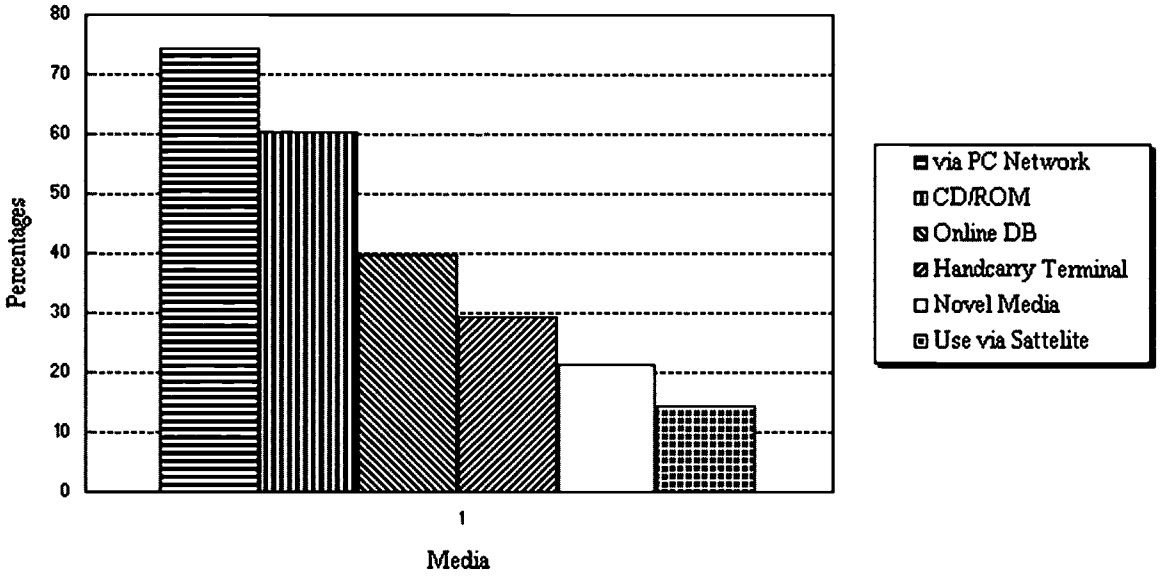
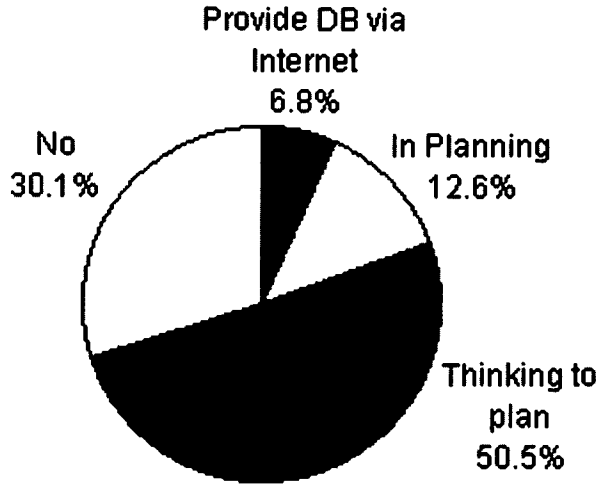


Figure 4: Expected means of database use in five years: providers' survey, 1994.

(3) *In-house databases*. The downsizing trend makes it possible for users to build small and flexible local information networks of various types. These networks, in many cases under contract, allow end-users to access database hosts and download information through their PCs for their own purposes. Within the local area networks of private companies or public organisations in-house databases are compiled, maintained and used by employees. In-house database use differs by industry. Nearly 70% of private enterprises operate their own in-house databases and a significant number of them can be accessed by every terminal connected to the in-house networks.

(4) *Internet*. Until the early 1990s, the Internet was mainly used in academic circles and several computer manufacturing firms as the vehicle for information exchange in scientific research. In 1992 the first commercial provider for Internet connection began to serve general users. As far as database services are concerned, the Internet provides new ways of accessing database resources with inexpensive access costs. From the user's point of view it opens vast access to commercial databases. Database providers find huge numbers of potential customers through the Internet. While database providers who allow users access via the Internet are gradually increasing, there are still only a few, i.e. 13% in 1995. If one includes those who are considering doing so it will be about 40% of the total database providers, but still the majority of providers express a certain degree of concern about the opportunities the Internet offers their services. The most frequent apprehensions they express are about security of communication, followed by the difficulties of fee collection, and ambiguous accountability when errors occur (Figures 5 and 6).

1993



1994

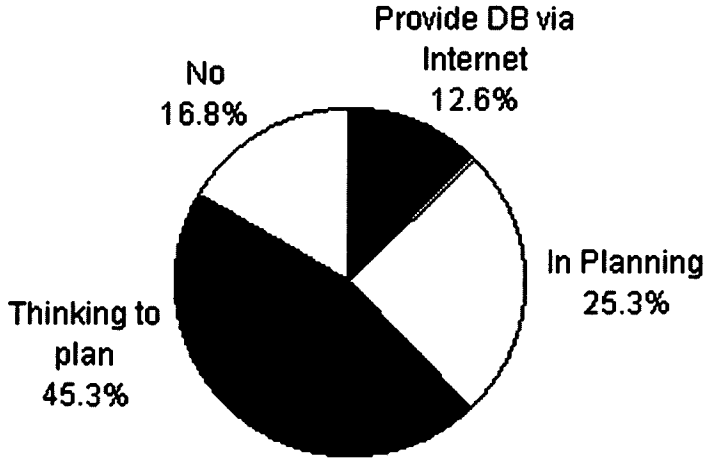


Figure 5: Database services via Internet, providers' view, 1993 and 1994.

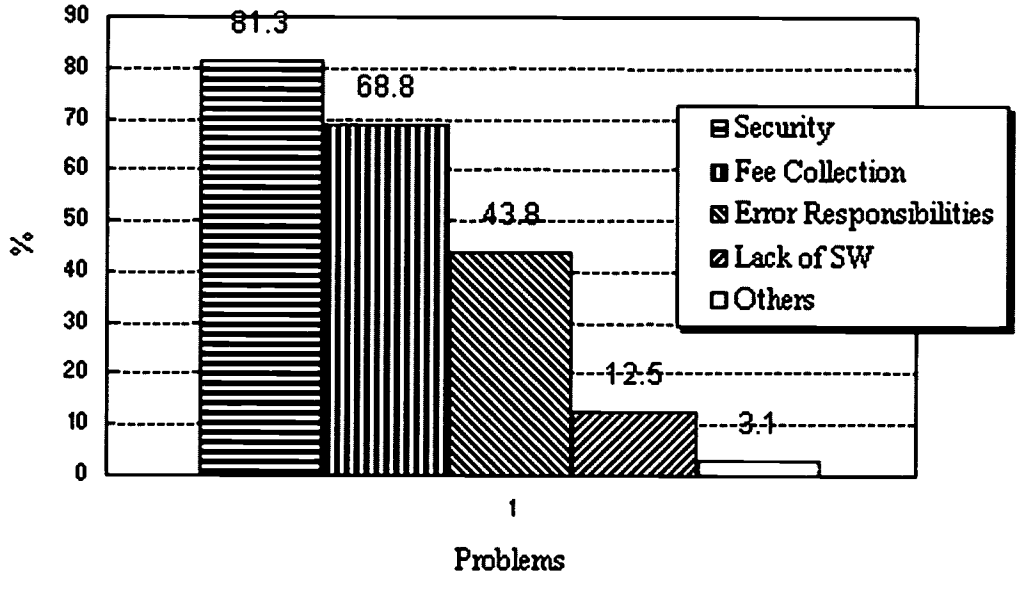


Figure 6: Problems of database services via the Internet, 1994.

(5) *CD-ROM*. Some types of databases are converted to CD-ROM. These CD-ROMs have been increasing year by year since the early 1990s. The survey shows that providers of databases on CD-ROM increased from 20% in 1990 to over 40% in 1995. Those CD-ROM databases are mainly dictionaries, encyclopedias, directories, maps, catalogues and various indexes. Some 430 CD-ROM database titles have been made available to the public and an additional 130 new titles are being planned.

(6) *Personal and home market*. Personal and home use of databases has increased in recent years through the spread of inexpensive and high-quality PC terminals. The Survey on Personal and Home Use in November 1995 reveals that 41% of usage is simply for personal purposes: 51% of respondents said this is for daily work. Home use opens a new market in which the files most frequently accessed are for searching newspapers and books. Favourites for young people are CD/Video Soft, Quiz/Game/Divination, Theatre/Movie and Education/Culture; housewives like Shopping/Seat Reservation, Cuisine and other Household-help files (Figure 7).

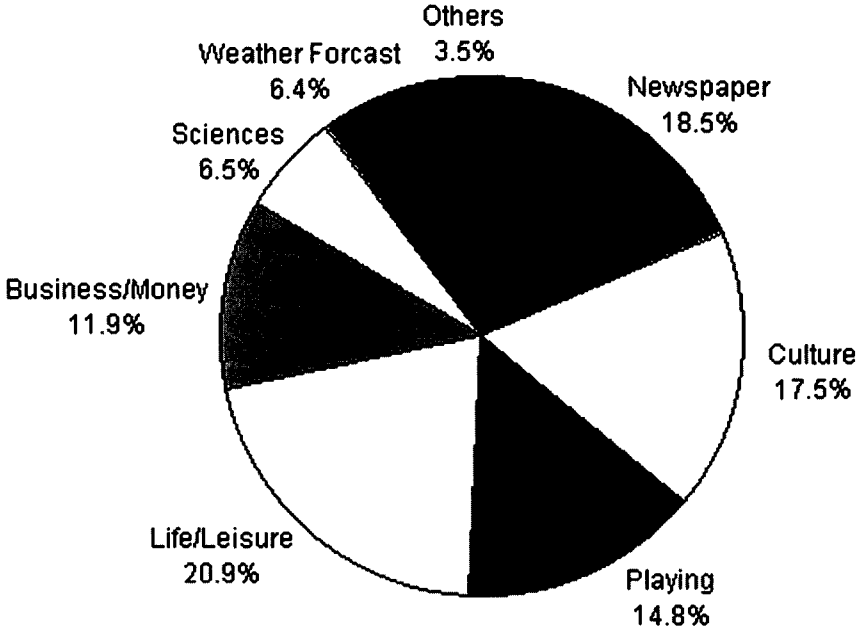


Figure 7: *Personal home use of databases, Japan, 1994.*

(7) *Pilot Programme of Digital Library*. Experiments in digital libraries have already begun as pilot programmes by several public organisations, and the programme for a National Digital Library was announced in early 1995 as the Second National Diet Library or NDL-Kansaikan, for which the first phase of construction work has already started at the site in the Kansai Science/Culture City south of Kyoto. It is scheduled to open to the public in 2002.

(8) *Kobe Earthquake*. On 17 January 1995 the city of Kobe was hit by a serious earthquake directly underneath. In a catastrophe people want information as well as food and beverages, and they realised the usefulness of the quick delivery of simple messages on several surviving PC networks. The role of personal PC networks in natural disasters or large scale accidents will be a new issue for crisis management in our society. The people of Kobe proved it.

3. New trends in Asian countries

3.1. A conceptual image of the stages of development for database usage in developing countries

Information technology has a tremendous impact on every aspect of economic and social activities in the newly industrialised and industrialising countries in Asia. Observing these developments from Japan, the present author dares to draw a conceptual image of the development phases of database usage. The first stage is a preparation period for the application of information technology in economic and social activities. The government designs a promotion policy for information utilisation. Pioneering efforts for database use and local data file compilation are put forward, mainly in the public sector, for example by government organisations and universities. A high degree of dependency on imported Western database services continues for a decade or more.

In the second stage, government efforts are concentrated in building a domestic information infrastructure, extending telecommunication networks, and promoting and training the professional capabilities of information specialists. Database producers still lead in the public sector, such as National Science and Technology Information Centres, and related information dissemination systems such as administrative, academic and patent information. In the private sector, database services usually start in the areas of stock exchange quotations and newspapers.

In the third stage of development of database services, private firms enter the industry and the production of domestic databases based on vernacular languages becomes a major part of their effort. The online market for electronic databases in various subject areas is supported by widespread use of PC terminals among administration, academies and business enterprises. The information industry, including computer hardware manufacturing, is firmly established as a new industry in its industrial structures. The author observes that three countries and economies in East Asia — Korea, Taiwan and Singapore — have already entered the third stage of development in recent years.

3.2. Korea

3.2.1. Production of Korean databases

The production of electronic databases in Korea began in the early 1980s, and the number of databases produced and distributed commercially to third parties in Korea reached 1061 titles as of the end of August 1995 (Directory of Korean Databases, issued by the Korea Database Promotion Centre). Compared to the previous year, 1994, in which the number of database titles available was 907, the rate of increase is over 30% within a year. These databases are produced by 438 various organisations of which government organisations account for one fifth, private companies one fourth and specialised information service companies one sixth. In recent years, increasing numbers of organisations and institutions in the private sector are entering into information service industries. Sales of commercial databases in Korea reached 74.6 billion Won (approximately US$96.3 million) in 1995, including sales of Korean produced databases and those for imported databases as well (Figure 8). Due to stagnant general economic conditions in 1993 and 1994, sales of database services fell. Perhaps this could be interpreted partly as the impacts of downsizing and networking technology on domestic information services.

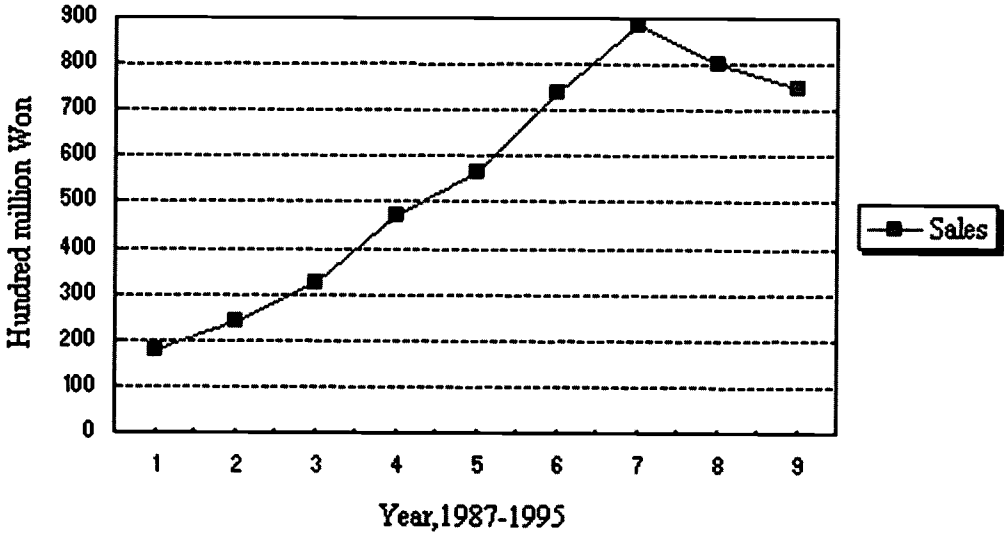
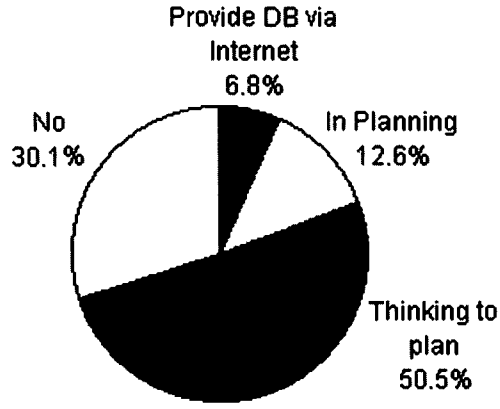


Figure 8: Sales of databases, Korea, 1987–1995.

The number of databases relating to industrial and business information has been increasing since the early 1990s, and reached nearly 40% of the total number of 1061 in 1995. Those for social life account for one fourth, i.e. over 100 databases. Seventy three cover science and technology, including medical science, i.e. 6.9% of the total number in 1995 (Figure 9).

1992



1995

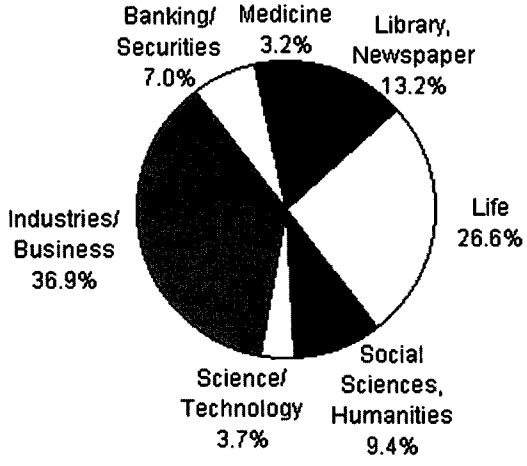


Figure 9: Subject areas of Korean databases, 1992 and 1995.

3.2.2. Distribution systems in Korea

There are 51 organisations and companies distributing online databases, of which 13 major vendors provide online services. A substantial part of commercial services, including those for Western and Japanese databases, are concentrated on large telecommunication companies such as Datacommunication Company of Korea, and specialised database services firms like Korea PC Communication. DACOM's service system is called 'Chonli-Won' (meaning Clairvoyance), which mounts 396 files, and Korea PC Communication's 'Hitel' serves 391 files. Then come service systems such as NAUCOM's NAUNULI, Atel, Lucky-Goldstar 's GINS and KINITI's (Korea Institute for Industrial and Technological Information) KINITI-IR.

3.3. Taiwan

3.3.1. Production and distribution

Taiwan is an important area of China where foreign reserve exceeded over US$80 billion in 1995 — one of the most economically prosperous areas in Asia. Information service industries have recorded remarkable growth since the early 1990s, which reflects the growing manufacturing activities of electronic products and peripheral parts. Online database services began in Taiwan in the early 1980s: domestic producers' and vendors' host systems increased gradually, and database files available to the public exceeded 500 titles in 1994. Annual sales of these commercial database services are reported as 1500 million New Taiwan dollars (approximately US$50 million) in 1995 (Figure 10).

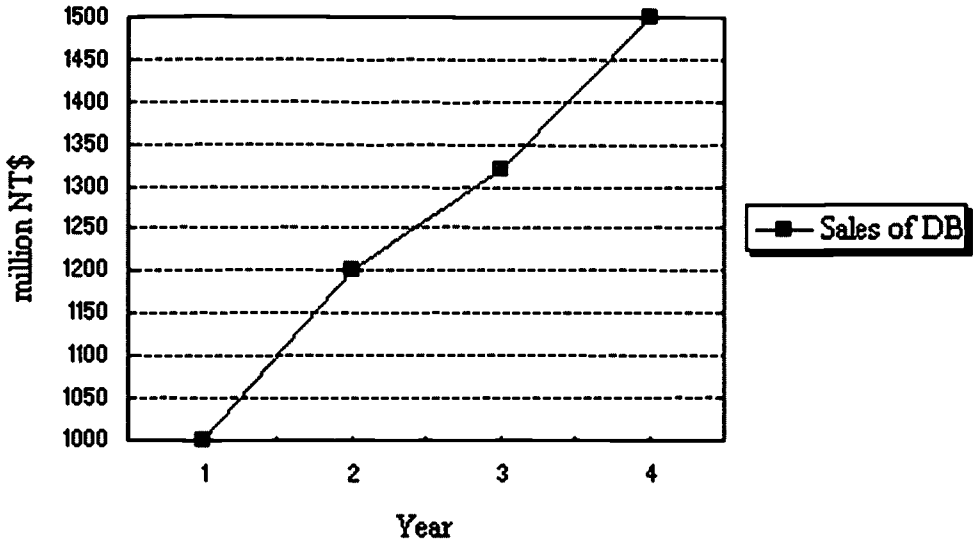


Figure 10: Sales of databases, Taiwan, 1992–1995.

In 1994 there were 180 public institutions and private companies producing Taiwan domestic databases, and 56 distributors serving domestic, Western and Japanese databases.

The largest share for subject area is over 40% for business, which covers finance, economy, market trends, credit information and foreign trade (Figure 11). This reflects the active business of Taiwan as the most vital trading area near the Chinese mainland and the Japanese archipelago. Commercial firms tend to pursue and collect basic economic and financial data of foreign importing corporations and wholesalers. Developments and trends of import/export regulations of foreign governments, patents and trade marks information are important to them. Academic institutions are one of the most intensive users of online service, therefore a quarter of available databases cover science/technology and medicine.

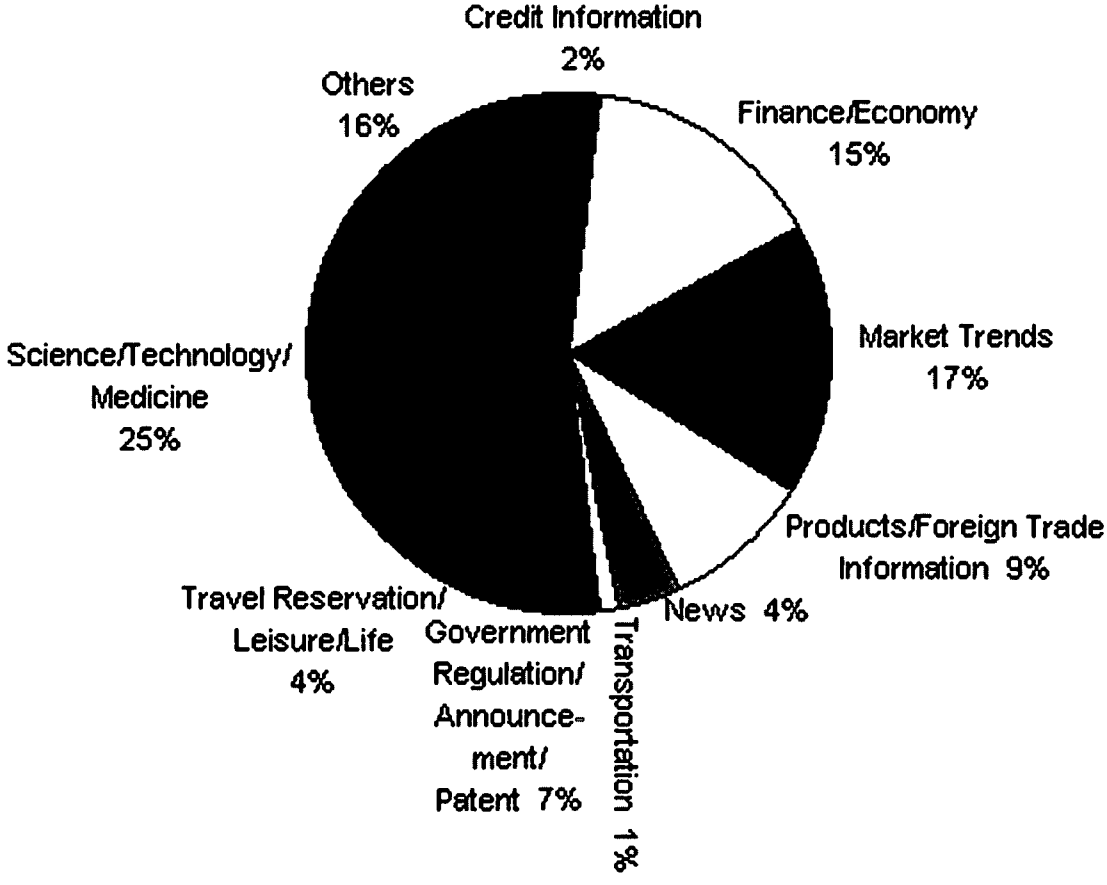


Figure 11: Database subjects area, Taiwan, 1994.

While the number of databases relating to consumers' life and leisure is still few, it is seen to be growing due to the improvement of living conditions and people's abundant disposable income.

3.3.2. Government's promotion policy

Since 1992 the Taiwan government has pursued the Five Year Plan for Promotion of Database Usage and Dissemination. Tasks for Taiwan database service providers are as follow. From the database producer's point of view, the most pressing task is to improve the quality of domestically produced databases and to enhance providers' technical capabilities, especially software technologies for improvement in user-interfaces.

As for tasks related to users, education in effective searches of deeper levels is the most important. Training professional searcher service consultants who can intermediate between database vendors and end-users is another target.

The most imminent task for the government related to the enhancement of the new information infrastructure is a gradual deregulation of telecommunication regulation. This is to prepare a new telecommunication infrastructure for a much higher level of networking, such as Internet connections. Revision of Copyright Law and new issues of regulation to protect personal data from unfair use of electronic data files are other jobs for the administrative agencies.

3.4. Singapore

3.4.1. Growing information industry

The information industry is one of the key industries in Singapore. Since the late 1980s the annual growth rate of sales has been nearly 30% (29.5% on average between 1987 and 1994). The information industry consists of three major groups: hardware manufacturing, software development and information services (Figure 12). Hardware manufacturing and assembling activities are predominant — over 70% of total sales. Being in a favourable location as the regional centre of the flow of trade and traffic, and with a heritage of a long established mixed cultural and social milieu of Malaysians, Indians, and Chinese, Singapore is becoming the modern economic centre of trade and information in this part of the world.

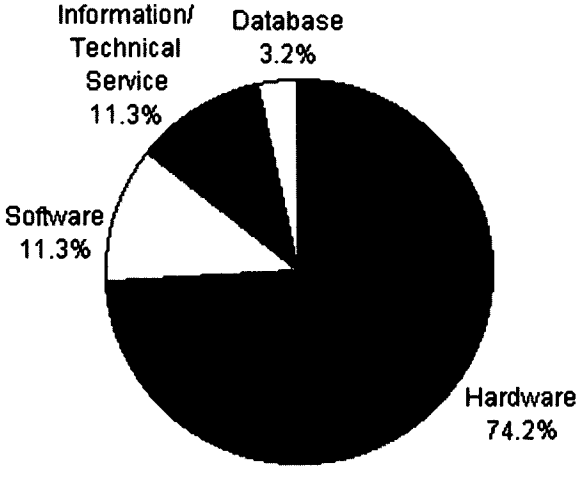


Figure 12: Singapore information industry sales, 1994.

The government information policy, IT 2000, aims to remodel Singapore as an information-oriented, high-tech equipped country in the coming century. The information industry's share of export to neighbouring countries such as Malaysia and Indonesia has been gradually increasing since the late 1980s, and now exceeds over 40% (Figure 13). Information technology services are about 15% of the information industry — over 750 million Singapore dollars (US$490 million) — in 1994, which include various professional services such as out-sourcing facilities services, account auditing, technical training and consulting, and online database services.

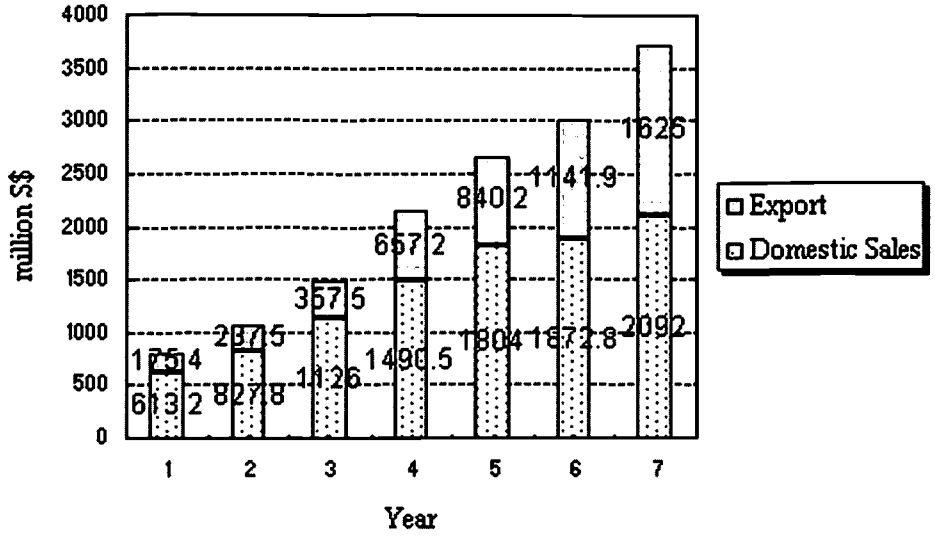


Figure 13: Information industry sales, Singapore, 1987–1994.

3.4.2. Database services

Sales for database services in 1994 were 21% of the sales of information technology services, i.e. 157.8 million Singapore dollars (US$103 million). This include sales for foreign clientele.

Online database services started with the Singapore Libraries Catalog System in 1988. In the same year Singapore Telecom started its first videotex service system, called Teleview. Next year in 1989, the VAN service of SNS began to operate its networking service, connecting various online database services — such as legal, medical and financial — on its Tradenet (EDI). SPH (Singapore Press Holding Co), a major database service provider, inaugurated a newspaper information online service called News Link in 1994. This now covers newspapers published in Singapore in English, Malay and Chinese, and others published in Singapore, Kuala Lumpur and Jakarta. Furthermore, SPH recently opened the 'Asia One' home page on the Internet which covers newspaper headings and articles, and Singapore stock market quotations, travel and leisure information, classrooms announcements and so on.

3.5. Thailand

Commemorating the 50th year of the reign of the King, the Thai government designated 1995 as The Year of Thai Information Technology. The National Information Technology Committee (NITC) drafted a basic policy on national information, complying with the Seventh Development Plan of Thailand. NITC has set three basic targets for the information era:

(1) construction of a National Information Infrastructure. A nationwide telecommunication network will be constructed by the year 2000;

(2) education and training of specialists for information technology;

(3) enhancement and improvement of government services.

The Computer Association of Thailand (CAT) and its Vendor Group (CAT-VG) jointly carried out a comprehensive survey and estimation of the Thai information industry in April 1995. According to this survey, information industry sales — including hardware, software and information technology services — were estimated at 29,872 million Baht (approximately US$1187 million) in 1995. The sales increased at a rate of 37% on the previous year, CAT reports. The size of the market for information technology services was estimated as 2336 million Baht (about US$93 million) in 1994 and 3480 million Baht (about US$139 million) in 1995. This is a significant increase of 49% annually. Since the late 1980s, government technological institutions and universities have been producing electronic databases and information networks, and organisations in the public sector have been leading efforts. Private database service firms have just started offering their services such as stock market and investment information, newspaper headings and industrial information from government agencies. Several Western vendors like Dow Jones News Retrieval and Reuters' s Business Information are active through their local agents' firms. The commercial online market has just opened in this country.

4. Concluding remarks

The market for conventional online services of databases in Japan, approximately US$20 billion in annual sales, is undergoing much change. Giant new players such as broadcasting corporations and software developing

corporations are now entering into the borderless market of information services. Digital libraries, electronic newspapers and CD-ROM books could be accessed, at relatively low cost, through Inter- and intranet services by customers who operate their own personal computers at home and in the office as well. What, then, is the role of information professionals who intermediate a huge population of end-users with information resources?

On the other hand, newly industrialised countries in Asia are entering into the information age. The scale of market for information services is still small but it is growing rapidly (Figure 14). It will reach a substantial size as a self-sustaining industry. Twenty years ago, when online database services appeared to the public, nobody could have imagined the current situation.

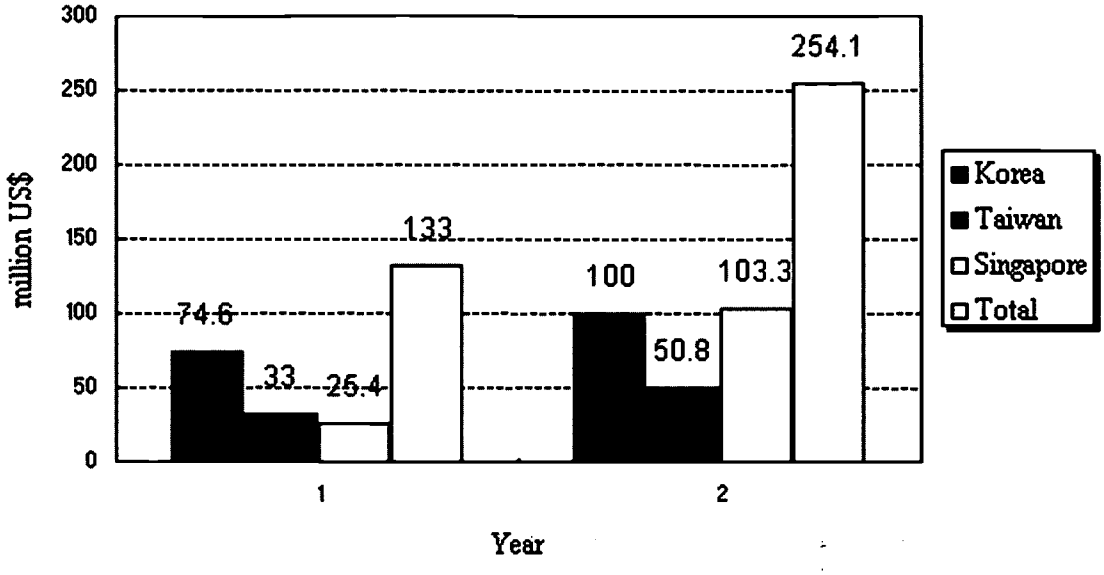


Figure 14: Sales of databases, East Asia, 1991 and 1994.

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References

The author mainly relies on the information and data published in the Database Promotion Centre's Database White Paper, in Japanese, every year. It devotes one chapter to overviewing developments in Asian countries.

The latest issue is: Detabesu Shinko Senta, Detabesu Hakusho, (Database Promotion Center, Database White Paper), 1996, Tokyo, 369pp.

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