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Japan Information Processing Development Center

Database Service in Japan

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The Development and Future Outlook of Database Services in Japan

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1. Utilization of Database Services in Japan

(1) Services and Systems

Commercial on-line database services currently available in Japan are listed in Table 1. These services can be divided into the following two types:

[1] Domestic Distributor Services

Domestic distributors supply databases that have been prepared either here in Japan or overseas under such names as JOIS-II, PATOLIS, NEEDS-TS, NEEDS-IR, QUICK, SEARCH-J AND JIP/BRS.

The special characteristic of these services is the fact that they are Japanese language database services. This means that users can obtain document database outputs written in Japanese (KANJI and KANA), and that they have access to fact (numerical) databases that offer information peculiar to Japan such as domestic economic statistics and business/financial data as well as Japanese stock updates and the like.

[2] Overseas Distributor Services

Representative of the fact database service systems supplied to Japan from overseas distributors are the MARK III, DRI, Interactive Service, CALL, CIS, and CAS ONLINE. Document database services from abroad are supplied by DIALOG, ORBIT, and The Information Bank, to name a few.

MARK III, CALL and a few others provide their services via dedicated (private) lines. The remainder of these systems, however, rely on ICAS (International Computer Access Service), a service established by Kokusai Denshin Denwa (KDD), Japan's public international telegraph and telephone company, in September 1980.

(2) Number of Users

With the start of ICAS, the information-rich databases of the U.S. became available to Japanese users as well. America's three biggest document databases, DIALOG, ORBIT and BRS, were particularly instrumental in raising the number of database users here in Japan. (BRS is currently supplying its services to Japan via JIP/BRS, but is scheduled to begin utilizing ICAS in the near future.) There are currently a total of 2,200 users of DIALOG database services in Japan. Of these, 1,200 access that system via the Maruzen system and the remaining 1,000 users

Table 1. On-line Database Services Available in Japan

Distributor	Name of Service (System)	Principal Databases Offered	Payment System
Japan Information Center of Science and Technology (JICST)	JOIS-II	Science and Technology Document Database.	Meter Rate System
Japan Patent Information Center (JAPATIC).	PATOLIS	Domestic Patent and Utility Models and U.S. Patent Information (Document Database).	Meter Rate System
Nihon Keizai Shimbun, Ltd. Nippon Tel	NEEDS-TS	Japanese Macro- and Micro-economic Information and U.S. Macro-economic and Stock Information (Fact Database).	Membership Fee
Nippon Telegraph and Telephone Public Corporation (NTT).	NEEDS-IR	Newspaper and Magazine Articles (Document Database).	Meter Rate System
NTT	TSR-BIGS	Domestic Business Finance Overviews.	Meter Rate System
Quotation Information Center (QUICK)	QUICK	Stock Prices (Domestic and Foreign) and Foreign Exchange Information (Fact Database)	Membership Fee
System Development Corp. of Japan Ltd. (SDC)	SEARCH-J	Patent, Pharmaceutical and Chemical Document Databases from around the World.	Membership Fee
G.E. Information Service Co. (*) (Dentsu International Information Service)	MARK-III	Fact Databases Containing Foreign and Domestic Macro-economic, Industrial Statistics and Stock Price Information	Meter Rate System
DIALOG Information Services, Inc. (Maruzen, Kinokuniya)	DIALOG	Approx. 100 Different Scholarly Document Databases on Science & Technology, Economics, Business, Social and Humane Studies.	Meter Rate System
CIS Corp. (Kinokuniya)	CIS	Fact Databases Containing Information on Chemical Structures, Spectrums and Toxicity.	Membership Fee
SDC	ORBIT	Approx. 60 different Scholarly Document Databases on Science & Technology, Economics and Business, Social and Humane Studies.	Meter Rate System
The N.Y. Times Information Service Co. (Nihon Keizai Shimbun, Ltd.)	The N.Y. Times Information Bank (The Information Bank)	Approx. 90 different Newspaper and Magazine Document Databases including that for the New York Times.	Meter Rate System
CDC (Nihon CDC).	SBC Database Service (CALL)	U.S. Business Finances and Economic Statistics Fact Databases.	Membershi Fee
Dr. Dvorkovitz & Associates (Dvorkovitz & Associates, Japan).	DDA Service	Technical Information on approx. 40 thousand licenses (Document Database).	Membership Fee.
DRI (Nihon Keizai Shimbun, Ltd.)	DRI	American and European Economic Statistics and Industrial Information.	Membership Fee
CAS (Chemical Abstracts Service) (Chemical Information Association).	CAS ONLINE	A CAS fact Database Containing Data on the Structures of Millions of Chemical Substances.	Meter Rate System
Japan Information Processing Service Co., Ltd.	JIP/BRS	Document Databases Containing World Medical and Electrical Engineering Information.	Meter Rate System
Interactive Data Corp. (Nomura Research Institute).	Interactive Service.	World Economic Statistics and Industrial Information.	Membership Fee

(*) Organizations in parentheses are sales representatives.

Table 2. Current Industrial Database Utilization

Type of Industry	Mode of Utilization	Information Utilized	Number of Respondents	Documentary Data: Scientific and Technical Fields	Documentary Data: Patents	Documentary Data: Industrial, Economical, Social and other Fields	Factual Data: Scientific and Technical Fields	Factual Data: Industrial, Economical, Social and other Fields	Still Picture Data	Motion Picture Data	Audio Data	Cumulative Responses
Current Utilization	Batch*	Number of Companies	82	24	22	14	14	37	3	0	0	114
		%	100	293	26.8	17.1	17.1	45.1	3.7	0.0	0.0	139.0
	On-line*	Number of Companies	116	50	33	15	21	48	11	0	1	179
		%	100	43.1	28.4	12.9	18.1	41.4	9.5	0.0	0.9	154.3
	Actual Number of Users	Number of Companies	171	64	53	26	34	73	13	0	1	264
		%	100	37.4	310	15.2	19.9	42.7	7.6	0.0	0.6	154.4

*Figures for batch and on-line utilization include a certain number of users who utilize both.

are serviced through the Kinokuniya system. Japanese users of the ORBIT system number 900 in all.

The number of Japanese-produced databases and their users are also increasing. For example, JOIS has about 800 users now, and PATOLIS about 520. Both of these systems offer their services in both KANJI and KANA, making for a more accurate and easy-to-understand service.

NOTE: The term 'users' here refers to the number of passwords currently being used to access the systems involved. There is undoubtedly a degree of overlap then, and the total number of users of Japanese-produced document database services is estimated at around 1,000.

(3) Database Utilization

Table 2 shows the results of a survey on user trends conducted by JIPDEC and directed at database users. Out of the 1,277 companies that responded to the questionnaire used in the survey, 171 were utilizing databases in either the batch or on-line mode. The most often used document databases are those dealing with the fields of science and technology, whereas the fact or numerical databases most frequently utilized are the ones containing information on industry, economics and social matters.

2. The Market for Database Services

In order to effectively analyze trends in database services a considerable amount of data on user utilization is required. Unfortunately, the amount of such data available to us at this time

is summed up in sections (2) and (3) above, and can hardly be considered sufficient.

There is also no information currently in existence which accurately describes the market for database services in Japan. There is one survey that was conducted by the Ministry of International Trade and Industry (MITI) on special service industries which contains a smattering of information on database services. According to the data compiled therein, sales for the information service industry as a whole reached 31.6 billion yen in 1979.

3. Current Trends and Future Prospects

(1) Increasing the Number of Japanese Language Databases

There have been quite a few Japanese language (KANJI) databases produced since 1981. These include a number of science and technology related document databases such as JOIS-II, business information databases like TSR-BIGS and newspaper databases such as NEEDS-IR and Technopac. The popularity of portable KANJI terminals capable of being leased for less than 20,000 yen per month has contributed considerably to this phenomenon.

The preparation of Japanese language document databases such as these should prove instrumental in fostering the growth of database services here in future as well.

(2) Expanding the Scope of Information Gathering

By expanding the scope of ICAS services, it should be possible to gain access to the rich databases of Euronet. France's Telesystems Co. has already decided to offer its wide range of database services in the fields of science and technology, patent and legal information on the Japanese information market.

Should Euronet become accessible from Japan, then the majority of databases currently in existence in the world would become available to the Japanese user. This in turn would demand that Japanese users then be capable of employing these database services appropriately.

(3) The Creation of In-house Databases

In addition to utilizing externally generated databases such as those cited above, quite a few Japanese companies have been striving to efficiently apply DBMS technology to their own collections of data recently to produce in-house databases. Whereas the preparation of fact and particularly numerical databases has been taking place at a relatively fast pace, when it comes to in-house document database production nothing much has happened yet at all. When they finally do get around to making document databases, companies will find they have a choice between two approaches.

[1] They can purchase commercially prepared DBMS software and produce

their own document databases utilizing their own computers. FAIRS-I, ADABAS, or STAIRS commercial DBMS software packages, for instance, would be ideal for this purpose.

[2] They can produce their own document database in the form of a private file on one of the major on-line systems such as DIALOG, ORBIT or BRS.

No matter which approach a company chooses, it must be certain to select the most optimal system and to base its judgement on experience and know-how accumulated as a user of database services.

(4) Making Document Delivery More Efficient

Up until recently it was necessary for Japanese users to order full texts retrieved from document databases via telex or telephone. However, in 1981, it became possible for users of JOIS to place their orders for hard copy information via the terminal. Following this, in 1982, users of DIALOG database services became able to do the same thing via ICAS. The latter is called a DIAL ORDER. These capabilities have been a reality overseas for some time now, and although late in getting around to it, Japan has at last reached utilization levels commensurate with those in foreign countries. In future, the trend will probably be towards electronic document delivery.

(5) Distributed Database Systems

As we have seen, utilization of independent databases is increasing. This, in turn, has generated the need for integration, i.e. integrated utilization. Distributed database systems that make use of a number of distributed host computers linked via a network are the answer to integrated utilization. Construction of these kinds of systems has been being promoted in Japan since 1981 by means of a national project called "Research into Advanced Utilization of Chemical Databases Via Shared Networks," supported by the Japanese Science and Technology Agency. This system will make it possible for government and related agencies to gather a wide range of information on chemical substances quickly and easily from a number of relevant databases linked to the same computer network. Figure 1 shows a schematic representation of that network's configuration. This project is scheduled to continue for five years and should prove a source of valuable information to private organizations in future as well.

(6) Attitudes of Users and Suppliers

The results of a survey to obtain the opinions of Japanese users and suppliers of databases concerning trends in that field during the next five years are shown in Tables 3 and 4. The most striking point, and the one that both sides agreed on, was the fact that the supply and utilization of document databases in the fields of industry and economics can be expected to increase significantly over the next five years. The predicted size of demand for numerical databases

in the fields of science and technology in particular was also interesting. In general, the need and willingness to supply numerical databases was high, indicating that the trend towards producing fact databases for the market will continue in future.

Fig. 1. Concept for A Chemical Compounds Information System. Furnished by Nihon Kogyo Shimbun (November 27, 1981)

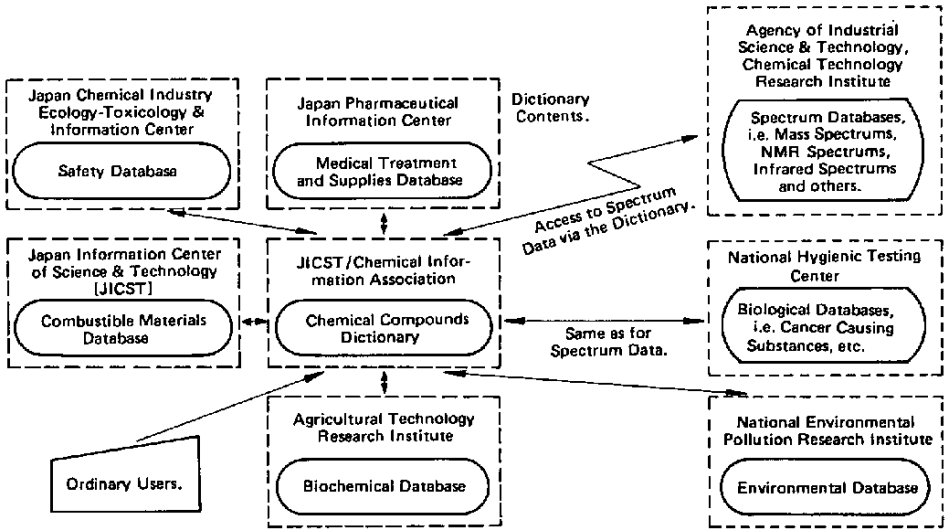


Table 3. Database Service Utilization: Present and Projected (Next Five Years) [On a Percentage Basis]

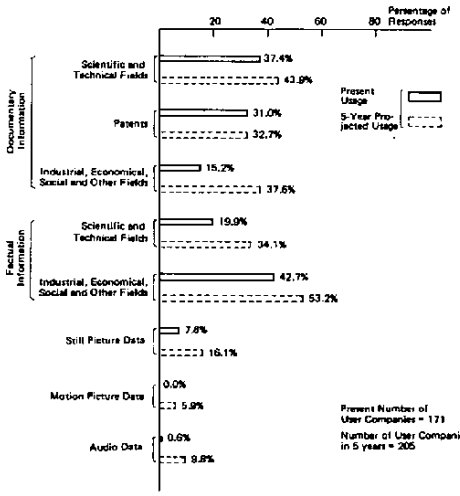
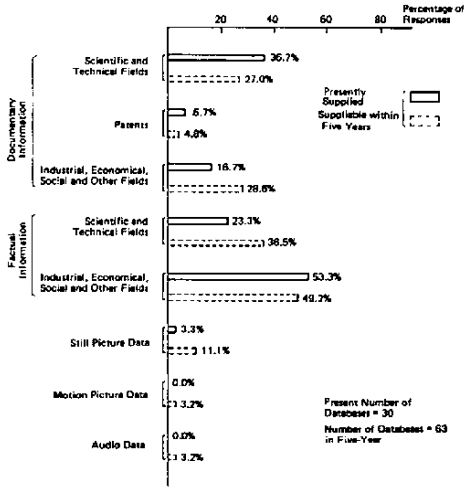


Table 4. Database Suppliability: Present and Projected (Next Five Years) [On a Percentage Basis]



Databases: Their Effectiveness and Future Expectations

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1. The Effectiveness of Databases

1.1 The Multifaceted Database

Databases can be broken down into document, non-document and fact databases depending on the type of data they contain. And if we categorize them by format, there are bibliographic, full text and numerical databases. All in all, there are quite a variety of different types of databases.

Nearly 600 different databases are currently available in the on-line mode and the majority of these are of the non-document type. Non-document databases contain numeric data for the most part and have developed along different lines from document databases composed mostly of secondary data. The supply systems as well as the users of these two types of databases also differ.

With the exception of a portion of that statistical information offered via such services as DIALOG's Predicasts Time Services, non-document databases are handled through separate organizations from those that publish secondary materials or offer information supply services. Moreover, the factual data contained in these databases are unique to the field, origin, means of collection and organization involved. As is apparent, then, it is rather difficult to try to discuss these different types of databases and the facts that comprise them collectively in any systematic fashion.

Due to the fact that these databases have originated and developed differently over time, there is no organization in existence today that has systematized the way it handles and circulates all that information. Therefore, when the information section of a user company draws up plans to utilize a database, there is no reason why it should limit itself to either a document or a fact database. If the section in charge of database utilization happens to be the information section of the technical department, then the utilization of a business databases – economic statistics and forecasts – will expand its sources of information. Utilization of this sort will also expand in-house service objectives. For users such as the inquiry or economic research sections of banks and/or securities firms where economic and numeric data are the main types of data utilized, the utilization of technical information (including newspaper

and magazine news and patent information) could prove a potent instrument in the analysis and forecasting of technological and business trends.

As a matter of fact, we have already begun to see reports from the technical information departments of manufacturing companies and economic research institutes where data is being utilized in these ways.

1.2 A Comparison of the Characteristics of Secondary Data

In the case of scientific information, the researchers who produce papers and monographs on subjects pertaining to their respective fields of interest are also the same individuals who require that type of information in the course of their research. Therefore, these papers and monographs are then presented at scientific meetings, appear as articles in scholarly journals or are turned into secondary data for circulation among the scientific community. There are two major problems with this approach. The first involves how to select only that information pertinent to one's field or current research from among the voluminous materials available. The second problem pertains to the method for circulating these papers among the scientific community in such a way that it evokes the active exchange of ideas, i.e. the problem of communication.

Scientists utilize three basic means of exchanging primary information between and among themselves. There are [1] correspondence via letters, [2] scholarly meetings and [3] scientific journals. However, the essence of learning is to develop new theories based on accumulated data. For this reason, it is essential that the scientist make use of abstracts and indexes capable of bringing together and widely disseminating large amounts of information. According to Price[1], the idea of abstracting scientific papers and publishing these in magazine form originated in 1820 when the number of primary sources of information first exceeded the 300 mark. Today, however, it has become impossible for one person to review even all the data contained in these abstracts and supplementary indexes. The next step, then, is to produce databases composed of such secondary sources of information (See Figure 1.).

Fig. 1 Origination and Number of Scientific Magazines (Journals), Secondary Data and Databases (De Price)

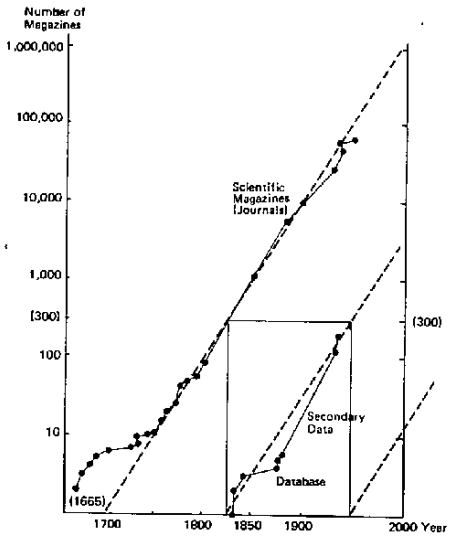

Table 1. Comparison of Retrieval Methods

Item	Retrieval Via Manuals	Batch Retrieval	On-line Retrieval
Retrieval Instruments	Secondary Data in Printed Form.	Magnetic Tapes and Computers.	Computer Terminals and Telephone Lines.
Processing Time	Simple jobs can be done quickly; complicated retrievals require considerable time.	Quick if done in-house; from 1~3 weeks if consigned to an outside firm.	Over in a matter of minutes (a few days are required to obtain the hardcopy).
Amount of Data	Amount of data is limited.	Possible to process large amounts of data.	One inquiry at a time.
Degree of Complexity	Used as an index.	Logical operations and weighted inquiries possible.	Logical operations possible (indexes also available).
Degree of Freedom	Can change search approach any time.	Don't know if you're on the right track until you see the results.	Access desired data on a trial and error bases.
Operation	Search for indexes in accordance with manuals particular construction.	An expert is needed to perform the coding and computer operations.	Carried out by selecting the search keys and knowing the file construction and commands of the system being accessed.
Selection of Fields	Contain data on all fields.	Indicates whether or not a database is maintained for a particular field.	Only the data on those fields contained in the files supplied by the system.
Adjustment of Subject Matter	Do-it-yourself method.	Based on agreement between the client and the retriever.	Can operate yourself (if it is a client/retriever situation, then agreement is necessary.)
Costs	Relatively cheap (if cost of materials included, then expenses become greater).	In-house processing is expensive; tens of thousands of yen per time when consigned to an outside firm.	Thousands of yen per inquiry for each retrieval operation.
Space Required	Space required for bookshelves can be considerable.	Not much just for tapes, but if computer equipment is included, can be considerable.	Only enough space for the computer terminal(s) and telephones if required.
Special Features	Not good for SDI and RS	Once an SDI profile has been input, output is automatic. RS is possible using the same database.	Both SDI and RS are possible (Same as at left).

SID : Selective Dissemination of Information.
RS : Retrospective Search.

Presently, the retrieval of scientific data is being carried out by means of either printed manuals or computer searches. These computer searches can be divided into batch and on-line retrieval methods. Table 1 compares these three methods, i.e. printed manuals, batch and on-line retrieval.

Database services have already entered the age of on-line retrieval. In fact, users of on-line database services are increasing so that its prospects as an industry have become quite probable indeed.

1.2.1 The Effectiveness of Secondary Sources of Data

The following points can be cited as reasons supporting the preparation of secondary sources of primary data.

(1) Information in amounts far in excess of that capable of being perused

in its primary form can be retrieved per day.
(2) Information can be retrieved from a much wider range and variety of fields than is possible with primary data.
(3) Information can be judged as to its quality and only that which is deemed worthwhile can be selected.
(4) Information can be selected from among documents in a variety of languages since the outlines of said are in either Japanese or English.
(5) New research trends in a wide range of fields can be kept abreast of.
(6) Past information can be traced and retrieved more quickly and efficiently.
(7) Secondary data sources are a means of locating core journals in any given field.

The above are the advantages of secondary sources of primary information. However, the following drawbacks can also be pointed out.
(1) Due to the fact that the preparation of secondary data adds to the process involved in producing primary sources of information, i.e. indexing and abstracting procedures, the publication of primary data is inevitably delayed.
(2) Since each secondary source of information is prepared in accordance with differing editorial policies there is the danger they will not meet with user needs or that essential documents will be excluded.
(3) There are considerable differences in the way secondary sources of information are edited and put together, meaning that they are not always easy to use.
(4) Cases where the original document can't be obtained even after being located via secondary sources are numerous.
(5) Caution must be exercised when retrieving secondary sources of numeric data since the numerals obtained are not always specific in nature.

1.2.2 The Effectiveness of Databases

Those secondary sources of data mentioned above which have been made into machine-readable databases possess the following special characteristics.
(1) Retrieval time is greatly reduced.
(2) Intricate, multiple outlines can be easily retrieved.
(3) Storage of voluminous printed matter is no longer necessary since it is possible to quickly locate required files without refering to heavy books.
(4) With the exception of huge libraries, these databases possess more and varied information than that readily available in printed form.
(5) Information can be obtained (read purchased) when needed.
(6) Although the timelag involved in the indexing and abstracting processes can't be eliminated, that in the editing and printing processes can. The time it takes to obtain needed information has also been reduced slightly.

As with most things there are disadvantages as well as advantages. The following are some of the drawbacks involved in making machine-readable databases for secondary sources of information.
(1) These databases are still very young and only the most recent information

can be retrieved (the majority of this being data stored in and after 1970).
(2) Cases of incomplete databases which do not contain abstracts or graphs, etc., are numerous, meaning that it is often impossible to judge the quality of the primary information from the secondary data.
(3) Even though the characteristics and special features of the secondary data may be known, if the items and nature of the data incorporated into the database as well as the limitations and special characteristics of that database from the standpoint of retrieval are unknown, then a complete search isn't possible.
(4) On-line retrieval requires that the user himself know how to go about locating and retrieving the information he needs, i.e., the connection procedures and commands.
(5) Due to the fact the user must pay a utilization fee in addition to the cost of the information itself, his expenses are likely to go up.

1.3 User Reports

Reports on database service utilization in Japan are still few and far between. Nevertheless, we have been able to come up with the following examples.

The Technical Information Center of the Sony Corporation conducted a survey into the effectiveness of on-line retrieval operations by in-house end users[2]. In response to queries as to the benefits to be derived from utilizing on-line retrieval methods, the most often cited advantage was the reduced amount of time required to locate materials. The report indicated that the average time saved via on-line retrieval was 6.5 days. This is a much higher figure than might be expected. If this is put in terms of financial savings, it amounts to some hundreds of million yen per year. More than half of the questionnaire used in this survey was devoted to determining future trends in on-line usage. Thus, this report also contains information concerning the types of uses to which on-line retrieval might be put in future.

There is also a report on an experiment conducted by the library section of Mitsui Mining & Smelting Co., Ltd.,[3] in which abstracts covering a number of specially selected themes were retrieved manually from "Chemical Abstracts" put out by the American Chemical Association. The results of this experiment were that it took 104 hours to manually search four year's worth of abstracts or an average of 7 hours a day for 15 days. Searching for the same materials using on-line retrieval methods, on the other hand, took only tens of minutes and cost roughly 4,000 yen. It was obvious from this experiment that on-line retrieval produced exceedingly better results than manual searches.

Sumitomo Chemical Co. provided us with another example. The people at Sumitomo conducted a similar experiment using both the manual and a magnetic tape of the same Chemical Abstracts cited above. A dozen or so researchers were utilized in this experiment. These researchers searched

the manual themselves for those abstracts pertinent to their work. As a result, they concluded that some 42.8% of the documents they had searched for were not available. Then Sumitomo called in a group of retrieval experts to search for the same materials using the magnetic tape and a computer. The results were that the experts concluded that only 2.3% of the sought after documents were not available. We understand that based on these results the Sumitomo Chemical Co. set about establishing the Sumitomo Chemical Information Center and is staffing it with information specialists.

Beginning in 1964, the U.S. National Library of Medicine (NLM) initiated a batch retrieval service utilizing tape files incorporated in MEDLARS (Medical Literature Analysis and Retrieval System). This system was the first of its kind to offer a retrospective search service utilizing a computer system open to the public. At that time, it took NLM about two weeks to process a search request, meaning that the requester received his bibliography roughly 6 weeks after submitting his request. In 1972, NLM started an on-line bibliographic retrieval system called MEDLINE which has since superseded the MEDLARS-batch demand search service.

1.4 Economic Advantages of On-line Retrieval

Just how much more economical are on-line information retrieval services than conventional information retrieval manuals? This isn't an easy question to answer.

Flynn et. al. of ICI[4] have published an article providing us with one example that proves that the cost of on-line retrieval is justified. In 1977, ICI calculated that in the period of a year it had conducted 1,851 information retrieval operations via manuals and 2,591 on-line retrieval operations. It then compared the costs involved in both types of retrieval. According to their findings, the cost of manual information retrieval averaged out to 26.7 British pounds per operation, whereas on-line retrieval operations worked out to 21.5 British pounds per operation. In order to determine cost efficiency, the cost of on-line retrieval was subtracted from that of manual retrieval and the remainder expressed as a percentage of on-line costs. The result was that the cost efficiency of on-line services was 24.1% (See Table 2.). Such details as average time required per manual retrieval operation and labor costs were also taken into consideration in this model.

Comparatively speaking, the above costs per operation hold true, but actual overall costs involved in on-line information retrieval are almost always more than with conventional manual methods.

What the ICI report points out, however, is the improvement in real terms of productivity via on-line information retrieval. It shows that the human labor required per search operation works out at 4 man-hours in the case of manual retrieval and 0.83 man-hours for on-line retrieval. With this as a

Table 2. ICI's Calculations

Number of Retrievals		Average Retrieval Time	
Using Manuals	1851	4 Hours.	
On-line	2591	50 Minutes.	
		Pre-terminal Time	20 Minutes
		Terminal Time	15 Minutes
		Post-terminal Time (Editing of output, etc.).	15 Minutes
On-line time	= 1,132 hours = 4528 inquiries.		
On-line expenses	= £68,483		
Expenses per inquiry	= £16		
		Database and circuit fees	£15
		Terminal rental fees	£1
Personnel costs: £6.67 per hour.			
		Yearly Costs: £10,000 for 200 working days	
Manual retrieval per-time costs	= £26.68		
On-line retrieval per-time costs	= £21.5		
On-line retrieval cost efficiency	= 24.1%		

basis, if we assume that the number of search operations conducted per year is 4,528, then the labor of 12.07 workers is required every year just to handle all of these searches via manual retrieval, whereas only 2.5 workers would be required to carry out the same number of searches via on-line retrieval operations. In the end, the on-line approach improves productivity by 9.57 workers per year.

This example only compares manual retrieval with on-line retrieval, but in reality it's not that simple. Actually there are secondary sources of information that come in the form of cards, as well as sorting machines and batch retrieval services, all of which are also quite useful depending on the type of problem and materials being sought. Furthermore, ICI calculated the average time required for a manual search at 4 hours. However, this was the average and not the time it took for every search using a manual. For comprehensive surveys and studies such as the ones cited above by Sony and Mitsui, it's only reasonable to assume these kind of operations will take days to complete. On the other hand, however, there are also numerous cases where a quick look at a manual-type index or databook is all it takes to solve a problem or obtain the necessary information. In these instances it would be a waste of time and money to utilize on-line retrieval methods. Thus, the task of information retrieval is extremely broad in nature, and coming up with average values, i.e. time required per operation,

Table 3. Utilization Costs To American Users

Survey Samples / Operator's Name	Bennent (1977) INFORMATION	Bennent (1977) ERIC	Rouse & Lannom (1977) ERIC
BRS	$10.24	$5.27	$7.85–11.63
Lockheed	25.82	5.43	7.55–13.64
SDC	25.91	5.84	8.06–20.47

* The cost to the users in the case of the INFORM system are slightly higher since they are based on 5 hours of utilization per month.

(Taken from the Science & Technology Agency Publication, "Mechanization of Science and Technology Information," (1981) p.74.)

is not an easy matter. In this sense, then, the figure of 4 hours as the average time necessary for manual searches has to be taken with a grain of salt.

By the same token, a number of the estimates concerning the costs required in on-line search operations were inconclusive. For example, pre-terminal time, and the time required for post-processing, editing and examination processes differs considerably according to the area of specialization and information content of the questions formulated as well as the skills of the retriever himself.

Moreover, these values will also differ according to the differences in transmission costs and the like. In America where the on-line system was developed, for example, inner city fees are quite a bit higher than they are here in Japan, but long distance transmission fees are relatively cheap. This makes comparisons rather difficult. Retrieval costs other than those incurred in transmission are easy to compare since they are all listed on the price lists of database venders. Naturally, since the most frequently used systems and databases differ, their costs will also differ according to the organization. This was brought out in reports by Bennent[5] and Rouse and Lannom[6], , the results of which are shown in Table 3.

It's probably a safe bet to assume that all those manual-type sources of information felt necessary are provided for at ICI and other western firms like it. However, at the enterprise level here in Japan, with the possible exception of secondary data in certain specialty areas, not all required data is readily available even in regular libraries. Thus, this kind of data can only be obtained via database services.

2. Effects of Database Services on Company Information Sections

2.1 What Is Meant by Information Activities?

The term "information" is used in a variety of contexts. The operation of a computer is called information

processing and the duties of a normal business office involve the processing and dissemination of information. The latter isn't simply referring to the information specialists employed at certain enterprises, but rather, applies to all the jobs in a company no matter what section an individual might belong to. To a greater or lesser degree, all work involves the generation, processing, communication and dissemination of information. All jobs can be said to be information activities. It's just that the percentage of people in the information section of a company who are directly involved in the manipulation of information is higher than that for people in other jobs.

If we carry this thought a step further, it's easy to imagine how the spread of database services will enable numerous people to make the most of those services in their own jobs. In fact, it's feared that if the duties of the information section aren't expanded to include more and different types of work, the job of the information specialist could become nominal in nature.

2.2 Expanding the Job of the Information Section

On-line retrieval services make rapid retrieval and the processing of large amounts of information possible by means of mating computer technology with telecommunications lines. If novel, new ways of utilizing these services can be devised then it should be possible to create new types of information. These new kinds of information would then form the basis for a re-evaluation of the information sections of various companies. In fact, as database service utilization has already begun to find its way into the average enterprise, the spread of jobs related to that service is effecting all aspects of company performance, much more so than originally predicted. Not a few companies have been able to turn in excellent results by making the most of on-line information processing even though it overlaps with the functions of the computer systems, research and planning sections.

The office automation (OA) boom reflects this phenomenon. The utilization of personal and microcomputers as on-line terminals has become commonplace, and not only for database services. It's become relatively easy to develop in-house information processing systems by means of time sharing systems (TSS) that enable the utilization of advanced software.

As the number of people in a company capable of operating computer terminals increases, this in turn will increase the demand for convenient, easy-to-use company information retrieval and TSS systems. That will then evoke interest in database management systems (DBMS) and a demand for easier-to-use DBMS. This holds true not only for software but also for data items. For example, it is becoming an everyday occurence for the chemical compounds management systems in operation at chemical companies to input the registry numbers registered with the chemical compounds

Table 4. Spread of Database Applications to the Chemical Field

Type of Information	Database System
1. Business Information (News, Economic /Management/ Industrial Information, Market Information, Statistics and Financial Data)	Predicast, PROMPT, etc. CIN, N.Y. Times, Needs—IR Newspaper Information et cetera.
2. Technical Information (Documentary and Patent Information, Research Reports)	JICST File, C.A. Search, CPI, NTIS, and numerous others.
3. Information on Chemical Substances (Retrieval of Entire Structures or their Parts.	CAS Online, SANSS, TSCA Inventory List, Chemname and so forth.
4. Numeric Data on Chemical Substances (Spectrum Data and Retrieval of Physical Property Values)	Toxicology Data Bank RTECS, IR–SPAN, MASS and so forth.
5. Structure of Chemical Substances (Automatic Analysis and Structural Decisions)	CHEMICS, XRAY 76
6. Automatic Measurements and Analysis (Property Measurements)	Laboratory Automation.
7. Structural Activity Correlations (Calculations, Verifications and Computations)	CHEMLAB, MLAB, Hansh. Method
8. Organic Synthesis Design (Drug Design)	

Calculations and Computations ——— Information Retrieval (File Search)

registry system of CAS (Chemical Abstracts Service) and to request graphic outputs of structural formulas.

Table 4 shows the spread of computer-related jobs in the chemical field. This table indicates that a wide range of information is being handled by computers in the chemical industry, from the utilization of economic and administrative data banks to the execution of drug designs. And the majority of this work is made possible by a terminal placed in the corner of the research lab. Furthermore, by means of making these terminals more intelligent and linking them on-line to other in-house computers, etcetera, it will be possible to develop facile information systems that meet with the company's particular needs and circumstances.

Just what will be the role of the information specialists in the face of these trends? Up to now they have been primarily concerned with the task of documentation, but from here on out these information specialists will have to devote themselves to the construction of new information systems based on their knowledge of secondary sources of data and skills in on-line retrieval.

For example, the demand for some sort of key that will enable chemical companies to link their chemical data management systems up to the chemical data items in Chemical Dictionary Files and CAS On-line will be a natural consequence of current trends. Also, as users of registry numbers increase we should see a rise in the tendency to systematically utilize external general purpose databases in conjunction with

in-house data management files.

2.3 Development of New Information Services

For the most part, those information service sections of companies called libraries or data rooms are passive information services. However, they need not remain passive services, acting simply in the role of information trustees, so to speak. By effectively utilizing database services, these in-house information sections could develop unique, autonomous service operations. Trustee-type operations aren't capable of suddenly generating information or deliberately preparing it. With active information services, on the other hand, the information section can independently make plans and carry those plans out at their own pace. Trustee operations can't be eliminated altogether, but their number of functions can be reduced by means of services that accurately anticipate the smallest needs. This kind of service would also raise the assessment of company information sections.

Database services encompass a variety of data and functions. By skillfully utilizing these, any number of active services can be devised. These could include such things as selective dissemination of information (SDI), trend and opinion studies, computational functions and the analysis of assorted information.

(a) Expansion of Specialty Fields

With the exception of a few special cases, it has been very rare for an information section that handles primarily science and technology information to make use of a business database. Although economic, administrative and trade information as well as legal and political databases have been beyond the scope of users in the technical sections of companies to date, it can be assumed that this type of data would be of use to the planning departments and top management of said companies. And this type of utilization should be encouraged. However, instances are numerous where the people in planning and top management lack a basic understanding of information per se, i.e. the time, labor and money required to produce even one small piece of information.

When we speak of "information," there are those who immediately assume we are referring to something secret, as if information were only valuable if unknown. Information does indeed have this characteristic, but more important is the joint ownership aspect of information that allows it to be circulated without reducing anyone's share of it. This relates to the public or community nature of information and database services are based on this public side of information.

The kinds of business information that are available via database services range from newspaper articles to financial data at the microeconomic level. We are not speaking here of a haphazard collection of random data by any means, but rather comprehensive, systematic

files of information that enable the user to select just about any type of data he needs.

The above has dealt with company technical information sections. However, if economic research institutes and the survey sections of banks and/or securities firms were to voluntarily utilize technical information in addition to the statistical data so basic to their work, they would undoubtedly find it to their advantage in the long run.

(b) The Application of Bibliometrics.

The data utilized in database services accumulates in large quantities over the course of a few years. If we utilize this data in combination with the computational functions of computers it becomes possible to analyze a variety of statistics. Actually, there are on-line systems already in operation which enable data to be input from the terminal, processed together with data from the database and the results output in the form of tables and graphs.

(c) Constructing Personal Files

Existing databases can be easily utilized by means of on-line terminals. But if a company wants an information service that coincides closely with its own particular needs, then it must consider using data generated in-house as well. However, users who have grown accustomed to the convenience of on-line retrieval systems employed in the conversational mode will most likely be dissatisfied with in-house information systems that still make use of outdated card systems and batch processing.

Among the on-line retrieval systems available, there are those which make it possible to register your own personal files. If conditions for usage can be amicably arranged, then end users will probably consider using such personal files. Furthermore, anyone possessing a terminal can make use of advanced DBMS via a TSS service. This has contributed to the current microcomputer boom. No matter what kind of microcomputer one might own, it can be rapidly made into an intelligent terminal by means of an acoustic coupler. The day is fast approaching when small, personal retrieval systems will be commonplace. The future of company information sections will be determined in part by how they deal with this phenomenon.

(d) Q & A Systems for Factual Data

It is said that there are currently some 40 thousand different pharmaceuticals available in Japan. Of these, approximately between 17 and 20 thousand kinds are being used in the course of medical treatment at hospitals and clinics. The propogation of the Health Insurance System has meant that the majority of these pharmaceuticals must be sold at standard prices. Not all of them are used at the same facilities, however. Rather, about 500 to 1,000 pharmaceuticals are used regularly at small- and medium-sized medical facilities, while the biggest hospitals average perhaps between 2,000 and 3,000 different medicines. However, the amount of

information available concerning each of these pharmaceutical products has become enormous, increasing in line with progress in research and advancements in medical treatment methods.

This information is multifaceted and originates either with the authorities involved, the pharmaceutical manufacturers themselves, medical documents and papers or reports published by institutions of higher learning. This diversity of information sources is a big obstacle to the doctors and pharmacists who rely on such information in the performance of their respective duties. It was this situation that prompted the realization of pharmaceutical information service systems aimed at physicians and pharmacists. One prominent such service available overseas is the BIAM (Banque d'Information Automatiseesur les Medicaments) of France. In Japan, JAPIC (Japan Pharmaceutical Information Center) and MEDIS-DC (Medical Information Systems Development Center) have jointly embarked on the development of a pharmaceutical information system.

In the chemical field, a five-year joint research project was undertaken in 1981 via a network of distributed databases containing a wide range of chemical information, everything from spectral and toxicity data to information on legal provisions. This research project involves the cooperation of the Science and Technology Agency and a variety of other government research organs. Among the latter, the Ministry of Public Welfare has consigned the task of preparing a pharmaceutical database to JAPIC, and will work together with the National Hygienic Testing Center in the preparation of a biochemical database. The Japan Chemical Industry Ecology-Toxicology Information Center will be in charge of putting together a chemical safety database. In all, seven databases and a dictionary file are currently being developed. When this project is complete, the utilization value of that system should be extremely high. The current trend of conducting studies via document bibliographic databases may at last change to the direct acquisition of data from fact databases. When that happens, company information sections will once again feel the impact.

We've been speaking here of pharmaceutical and chemical data, but there are various other practical examples that can be raised. In the dye and cosmetics industries, for instance, there is a strong need for technology that will enable the accurate reproduction of color tones. Recently, the amount of dye to be used, the dyeing temperature and the color arrangements required in the dyeing process have begun to be computed by CCM (Computer Color Matching) systems. Dye manufacturers are now making databases on the dyes they produce, placing on-line terminals in dye houses and servicing them with technological information as well. This is a good example, then, of a fact database being utilized in conjunction with computer services.

Thus we see how information services

have gone beyond the realms of R&D and technological development and are being linked directly to customer service. In line with this, the people in charge of supplying these services are being positioned throughout the country and their numbers are steadily increasing. The information needs that they are expected to fullfill are also growing more complex in nature. There are even those data services aimed at raising the educational level of the people and strengthening consumer protectionism. In other words, information services have become a necessity for the customer/consumer as well as the manufacturer or business enterprise. From data on toxicity and side affects to emergency measures and answers to legal problems, the database is sure to grow even more important in future.

3. Expectations of Database Services

3.1 User Assessment

Users generally assess database services on the following points.

a. Amount and Quality of Data Resources
   i. Abundance of database types.
   ii. Coverage of the information gathered in a field.
   iii. Reliability and accurateness of the data.
   iv. Frequency of updates and promptness of reports.
   v. Facility of retrieval keys, comprehensiveness and competence (especially concerning ability to deal with change).
   vi. Incorporation of new technologies and so forth.

b. Quality of Service
   i. Reasonable utilization fees and a fair charging system.
   ii. Complete user education and consulting capabilities.
   iii. The quality and understandability of operation manuals and instruction books.
   iv. High level classified information protection functions.
   v. Time required for supply of services.
   vi. Ease of access to primary information.
   vii. Clear-cut set of responsibilities. ties.

c. Technical Aspects of the System
   i. Reliability of the retrieval system.
   ii. Promptness of response time.
   iii. Completeness and ease of operation of the command system.
   iv. Complete guidance capabilities.
   v. System operability, including the terminals.
   vi. Flexibility of output formats.
   vii. Substantial analysis tools for numeric data.
   viii. Reliability of telecommunication lines.

The above items are likely to change according to what the individual user feels is important to him personally. There are also a number of reciprocal items contained in the above lists. For example, if emphasis is placed on speed of information delivery, then concern for retrieval (search) keys is more than

likely going to suffer a bit. Thus, in the end, any comprehensive evaluation of database services will depend on the user's individual needs and can not simply rely on the merits and demerits inherent between systems.

3.2 Construction of Data Resources

In general, the preparation of databases isn't very profitable, regardless of their various socially redeeming features. Consequently, national database construction projects are viewed as national resources.

A large percentage of the databases currently being supplied are machine-readable versions of old publications and as such can be said to be rather long-lived. The preparation of a database is a long and tedious process that involves the gathering of enormous amounts of data from every conceivable area, its assessment and organization into specified formats. If we are talking of a secondary information database, then there is also the painstaking task of indexing to consider. In all, it can take anywhere from 5 to 10 years of hard work to compile one, complete database.

Today, the influence of science and technology and industrial database services are being highly evaluated all over the world, advertising the fact that nationally-produced databases are so far behind the times.

Japan has become a likely market for foreign venders of huge databases, a fact which is having a considerable influence on the Japanese information industry. There is also talk that this situation could be dangerous from the standpoint that overreliance on foreign-supplied information might mean cut-off of said in times of emergency. With the opening of ICAS, America's three biggest on-line database venders landed in Japan. This has put the shoe on the other foot, so to speak, as far as trade friction with the U.S. is concerned. Whereas Japan is usually under the gun for perpetrating trade friction with America, in the world of information, Japan's trade balance with the U.S. is nearly 100 percent imports over exports. Even if Japan tried to play the reciprocity game here, it couldn't, because there is nothing in the way of information that Japan has to offer the United States at this time. If this situation is allowed to continue it could lead to a kind of "reverse" trade friction problem, with the U.S. criticising Japan for only using information and not disseminating any on its own. Of course, the provision of Japanese language databases domestically is also important, but Japan mustn't forget its duties as a member of the world of nations when it comes to the production and dissemination of information abroad as well.

3.3 The Ideal Database Service

Database services in Japan consist of either domestic semi-governmental or integrated distributors (a few database producers and distributors working together on a joint basis) and the representatives of America's major distributors. This makes for considerable

competition, especially between the various agencies representing the big U.S. database distributors. From the standpoint of quality service, then, the situation is rather complicated.

Whichever the case, however, database services only appeared in Japan in the past several years and can't yet be said to have established a solid business foundation for themselves here. In a free society such as Japan's, the principle of competition is hard at work in the marketplace. Businesses that just can't cut muster are doomed to early collapse. The people in charge of company information sections can't very well introduce a service into the company the supply of which is so unstable that they never know when it might suddenly end without warning. The users, too, can't afford to concern themselves only with which services are the cheapest. Rather, it is necessary that they inform the suppliers of database services as to what they consider desirable in the way of future services.

According to a survey conducted on members of the Japan On-line Information Retrieval User's Association it was determined that the items raised above (section 3.1) pretty much sum up the kinds of demands being levelled at suppliers. Among those, however, the strongest requests were for an increase in the number of years available for retrospective searches and more complete primary information access systems.

(a) Complete Databases

Concerning the perfection of databases, from the service side, it is no longer a question of technology, but rather one which deals with the problem of just how much storage capacity should be expanded. However, this is not to say that it is simply a matter of enlarging memory disks to rival the big American databases like DIALOG which supply enormous amounts of filed data. This isn't considered a good idea at all. For Japan, the problem that needs tackling now in order to perfect domestic databases is to figure out just what is meant by an efficient system in the Japanese database industry. One possible solution is networking, i.e. the promotion of a new NIST (National Information System for Science and Technology) concept.

An abundance of database capacity can be secured by means of connecting individual systems into a network. The realization of databases which offer joint utilization of different types of data (document databases which contain physics and environmental data), which link secondary information retrieval together with that of primary information retrieval and those which offer backup analysis and evaluation services will give birth to new methods of utilization which go beyond the simple problem of capacity.

Another possible solution relates to the off-line retrieval service currently being tried with the JIP/BRS system. The perfection of databases and the perfection of search and retrieval functions are, in effect, two sides of the

same coin. If retrieval functions are inadequate, for example in the case of the system where the inverted file is incomplete making it difficult to distinguish between primary and secondary searches, no matter how much the database might be expanded it will still only be half effective. In the end, this problem can also be solved by enlarging storage capacity perhaps, but for the time being a temporary expediency to the lack of storage capacity can be found in the introduction of off-line retrieval systems. This will provide the leeway for concentrating on efforts at developing a truly outstanding retrieval program.

(b) Obtaining Primary Sources of Information

The problems involved in supplying primary sources of information encompass all art and science information systems, inluding the public library.

In addition to yet unsolved problems such as the changing role of libraries, the decline of scientific magazine publications and diversification of media as well as the confusion surrounding how to deal with the recent flood of copy machines and the problems this poses for copyrights, the problems regarding how database services will affect all these are innumerable.

The number of people utilizing the services of the National Diet Library is up 30% over what it was five years ago. The ratio of these people personally requesting copies of library materials has increased 100%, while the number of individuals requesting copies of library materials by mail has gone up 130%[7]. This would seem to indicate that the library is changing from a place where one reads books, to a place where one obtains information in copy form. For the library this poses reciprocal problems such as the damage done to library books and materials as a result of so much copying and the need to meet demands to preserve its other, more basic function as a library.

From the users standpoint, it's true that he now can use databases that represent some of the most comprehensive collections of data in the world, but that still doesn't mean that all the primary sources of information and data in the world are now available in Japan. According to one explanation, it is estimated that there are roughly 60 thousand different scientific magazines being published in the world today, and out of that only a few thousand such magazines are available in Japan. In the past, this inability to obtain the vast amounts of information available from other countries didn't pose such a big problem. However, with the coming of the database and the ability to search for the types of data available, the user now knows the extent of existing information and feels handicapped by not being able to get his hands on it. Although there will be problems concerning the evaluation of primary sources of information, one solution might be the development of new information media such as networks for on-line ordering systems and electronic mail services.

(c) Points Concerning Education and Training

Let's consider a few points concerning the improvement of consulting activities such as the types of education and training systems and just who should be eligible for them.

The fact that there is a demand for consultants indicates that advertising phrases which state that a certain system can be used by "anyone" obviously don't mean the ordinary user. In fact, generally speaking, training in the use of a system, i.e. the database configuration and commands, is most often in a form only understandable to people who already possess a fairly deep knowledge of that area of specialty, computer languages and logical operations. And even in spite of that, we can still point to numerous operation manuals and instruction booklets which are hard to understand as well as to incomplete database clearing functions. However, the need for consulting and educational activities is not the same for all users. For those users who are already capable of doing their own processing there is no reason in the world why they should be burdened with the additional cost of education as well. It is for this reason that the perfection of consulting activities is so intimately tied up with the problem of fees. A dual fee system would seem the best solution, one where there would be a service charge for educational services provided, but no service charge, simply a user contract fee, when training wasn't required.

However, if retrieval fees themselves were cheaper it wouldn't be necessary to charge so much for training and education since the user could then afford to acquaint himself with the terminal and "get used to operating it" rather than "learn" how to use it.

If we advance this argument one step further, we see that the responsibility for education and training doesn't lie solely on the side of the supplier, but is also a user responsibility. In this regard, then, it is a good idea for users to form groups to study and do research on their own. The Japan On-line Retrieval User Association has established research groups that look into common problems and subcommittees for each and every area of specialization. As a result, this association is capable of carrying out "joint" research and information exchange activities concerning retrieval techniques among its own members. This is one way for users to share their experiences and learning with other individuals in the same area of specialization, and to build up mutually cooperative and beneficial relationships.

3.4 Retrieval Commands (User Language)

Finally, let's discuss two important technological aspects of database services.

There are presently a large number of information systems in existence both in Japan and throughout the world, and each of these has its own unique set of commands. In fact, the most often pointed to "special feature" of a system is its commands. It has gotten to the point where just about any set of commands will do, the more 'unique'

the better. These systems are still mutually independent and autonomous, but in future the possibilities are good that they will be connected together by networks and these networks themselves systematized to realize network systems that make retrieval of information from the various and different databases stored in the respective centers simple and practical. When this happens, commands that differ from one system to the next just won't do. Such differences are certain to prove impediments to the mutual joint processing of distributed databases. The following measures are considered effective means of solving this problem.

[1] Standardization of Commands.

[2] Leaving the commands for each system as is, but developing software capable of analysing these various commands and then converting them so as to be able to access different systems.

[3] Establishing a standard set of commands and appending it to those command systems currently in use.

It's not yet certain at all which, if any, of the above means will be employed in future Japanese network systems.

Actually, the present trend seems to be towards employing certain convenient command functions in a number of different systems. For example, systems should make use of each others strong points, something like the DIALOG and ORBIT systems do now. For users this would most certainly be a welcome development since it would enable them to perform a number of retrieval operations on different systems using the same set of commands. However, in order to achieve this, it would first be necessary to make the command functions of all systems the same. This could pose problems from the standpoint that certain users prefer to use certain systems precisely because they have different commands.

In this development and growth period for Japanese databases, it would be nice if we could take our time and realize command systems such as those used in the two big American systems mentioned above. If this can be achieved, then standardization and command conversion will have become a reality. However, a considerable amount of effort is still required on the part of Japan before this level can be reached.

There is one more problem with user languages that should be raised in closing. This involves log on procedures. Probably the most inconsistent aspect of large numbers of systems are their log on procedures. Since they are not a part of a systems design or functions, it would seem these procedures aren't taken very seriously. However, they can be a big problem to the user in terms of terminal control in particular.

User IDs and passwords allow only those users with permission to have access to a system and also serve to protect data contained in that system. For the user himself, however, problems involving IDs and passwords cover a wide range of concerns such as password and user data security, et cetera.

The problems of computer security aren't limited simply to the protection of the system itself. Rather, the security of each individual user must also be taken into consideration. The problem of utmost concern to the user is the possibility that the contents of his queries will be leaked to a third party. The development of the database service industry could well depend on its reliability in this particular area. Presently, the guarantees included in user contracts concerning this point are still pretty weak, relying instead on the fostering of a sense of trust. It would probably be better to include clauses in these contracts that explicitly prohibit the unauthorized recording of such queries. This holds especially true for contracts between parties of different nations.

Footnotes

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Results of A Worldwide Survey of Database Users/Venders

1. Respondents

The special feature of this survey is the fact that it was conducted on a worldwide basis. The opinions of 1500 users and/or venders of database services from Japan and other countries around the world were solicited. Of the 1,000 questionnaires mailed to prospective respondents in Japan, 203 valid responses were received, while 24 valid responses were returned from among the 500 questionnaires sent to users and venders in overseas countries.

The following is an analysis of the results of this survey. The table included below shows a breakdown of the respondents as to the type of database activity in which they are engaged.

* There were 12 respondents from Japan who failed to answer this first question but who did, nonetheless, respond to all the other questions in this survey. These individuals have thus been included in the total number of respondents and their opinions will be analyzed in the following tables.

2. Current Database Service Utilization

1) Document and Article Databases

When document and article databases are broken down by contents into bibliographic, abstract or original text databases, we see that utilization of Abstract databases is overwhelmingly high. This tendency seems to hold

	Japan		Overseas	
	Respondents	%	Respondents	%
Users of Database Services	126	66.0	6	25.0
Individuals Planning to Use Database Services in Future	32	16.8	3	12.5
Vendors of Database Services	11	5.7	7	29.2
Both Vendors and Users of Database Services	22	11.5	8	33.3
Total	191	100.0%	24	100.0%

true both in Japan and overseas.

As for the type of information most sought after, Scientific and technical documents proved the highest. This was the same regardless of whether it was a bibliographic, abstract or original text database, and was true in Japan as well as overseas.

When we divide the mode of utilization into three types, [i] on-line, [ii] batch and [iii] on-line/batch, the on-line mode proves to be the most often used in accessing bibliographic and abstract databases. However, when it comes to original text databases, the batch mode is the most prevalent in Japan (Overseas, on-line usage is higher for original text databases as well.).

The most numerous activity by Japanese respondents currently utilizing database services is the accessing of abstract databases for scientific and technical documents using the on-line mode, accounting for 36% of all Japanese respondents. However, the precentage of Japanese respondents who access abstract databases for scientific and technical documents using on-line/batch modes is a close second at 35%. Overseas the number one activity is also the accessing of abstract databases for scientific and technical documents via the on-line mode and on a percentage basis works out to 50% of the foreign respondents. The second highest form of utilization overseas would seem to be the on-line access of abstract newspaper article databases with 36% of all foreign respondents falling into this category.

2) Numerical Databases

There doesn't appear to be that great a difference between utilization of original data and secondary processed data numerical databases either in Japan or overseas. In Japan the highest rate of utilization of secondary processed databases is for accessing scientific and technical and property data in the on-line mode. This form of utilization is being applied by 13% of the Japanese respondents. The second most frequent form of usage is to acquire the same type of information as above, but takes advantage of the on-line and batch modes together and accounts for 7% of the Japanese users who responded to this survey.

The most sought after type of secondary processed numerical data in Japan is scientific/technical and property data followed by semi-macroeconomic and macroeconomic information. Overseas, semi-macroeconomic information ranks first, with macroeconomic and microeconomic data both coming in second place.

3) Image Databases

Image databases are only in limited use both in Japan and abroad. However, according to the results of this survey, of those image databases currently in use in Japan, the most often utilized are those containing images related to science and technology, including the field of medicine.

Table 1 Current Utilization of Database Services

1 – (1) Japan (Number of Responses: 150)

※ Figures in parentheses are the accumulated number of responses (Multi Answers)

Document & Article DB		Full Text				Abstracts				Bibliographies			
Numerical DB		Original Data				Secondary Processed Data				———			
		On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total
Document Databases	Documents (Cultural/ Social Sciences)	12	21	9	(42)	54	16	53	(123)	47	9	28	(84)
	Documents (Cultural/ Social Sciences)	3	2	1	(6)	20	—	6	(26)	20	—	3	(23)
	Newspaper Articles	8	10	1	(19)	42	3	13	(58)	25	—	5	(30)
	Law, Ordinance and Judicial Precedent	2	2	—	(4)	1	—	—	(1)	1	—	—	(1)
	Industrial Property	8	14	5	(27)	32	6	33	(71)	29	2	21	(52)
	Copyrights	—	—	—	(0)	—	—	—	(0)	—	—	—	(0)
	Others	—	—	—	(0)	2	—	-	(2)	1	-	—	(1)
	(Subtotal)	(33)	(49)	(16)	(98)	(151)	(25)	(105)	(281)	(123)	(11)	(57)	(191)
Numerical Databases	Macro Economics (World/National Economics)	9	4	4	(17)	5	1	4	(10)				
	Semimacro Economics (Industry)	9	3	5	(17)	8	2	4	(14)				
	Micro Economics (Company Finances)	10	1	2	(13)	8	2	2	(12)				
	Commodities, Stocks, Credit Markets	7	1	1	(9)	3	—	1	(4)				
	Science & Technology, Properties	9	10	8	(27)	19	3	11	(33)				
	Others	1	1	1	(3)	—	—	—	(0)				
	(Subtotal)	(45)	(20)	(21)	(86)	(43)	(8)	(22)	(73)				
Image Databases	Image — Natural	1	—	—	(1)	—	—	—	(0)				
	Business Graphics	4	—	—	(4)	2	—	—	(2)				
	Image — Science & Technology (including the medical field)	—	5	2	(7)	4	1	4	(9)				
	Others	1	—	—	(1)	—	—	—	(0)				
	(Subtotal)	(6)	(5)	(2)	(13)	(6)	(1)	(4)	(11)				
(Total)		(84)	(74)	(39)	(197)	(200)	(34)	(131)	(365)				

1 – (2) Overseas (Number of Responses: 24)

※ Figures in parentheses are the accumulated number of responses (Multi Answers)

Document & Article DB / Numerical DB		Full Text – Original Data				Abstracts – Secondary Processed Data				Bibliographies			
		On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total
Document Databases	Documents (Cultural/ Social Sciences)	1	3	2	(6)	7	1	2	(10)	3	2	3	(8)
	Documents (Cultural/ Social Sciences)	3	–	–	(3)	4	–	–	(4)	2	–	–	(2)
	Newspaper Articles	4	2	–	(6)	5	1	–	(6)	3	–	–	(3)
	Law, Ordinance and Judicial Precedent	–	1	–	(1)	2	1	–	(3)	–	1	–	(1)
	Industrial Property	1	–	–	(1)	–	–	–	(0)	–	–	–	(0)
	Copyrights	1	–	–	(1)	1	–	–	(1)	–	–	–	(0)
	Others	1	–	1	(1)	1	–	1	(2)	–	–	1	(1)
	(Subtotal)	(11)	(6)	(3)	(20)	(20)	(3)	(3)	(26)	(8)	(3)	(4)	(15)
Numerical Databases	Macro Economics (World/National Economics)	1	2	1	(4)	2	2	1	(5)				
	Semimacro Economics (Industry)	2	2	1	(5)	1	3	1	(5)				
	Micro Economics (Company Finances)	3	2	–	(5)	1	3	–	(4)				
	Commodities, Stocks, Credit Markets	2	1	–	(3)	1	1	–	(2)				
	Science & Technology, Properties	2	2	–	(4)	–	3	–	(3)				
	Others	1	–	1	(1)	–	–	1	(1)				
	(Subtotal)	(11)	(9)	(3)	(23)	(5)	(12)	(3)	(20)				
Image Databases	Image — Natural	–	–	–	(0)	–	–	–	(0)				
	Business Graphics	1	–	–	(1)	1	–	–	(1)				
	Image — Science & Technology (including the medical field)	1	–	–	(1)	–	–	–	(0)				
	Others	–	–	–	(0)	–	–	–	(0)				
	(Subtotal)	(2)	(0)	(0)	(2)	(1)	(0)	(0)	(1)				
(Total)		24	15	6	45	26	15	6	(47)				

3. Future Prospects

1) Document and Article Databases

Based on the cumulative number of responses concerning future prospects for database service utilization, it would appear that Abstract databases hold the most promise in Japan in future as well. However, if we compare actual present usage with future projected usage, we see that abstract and bibliographic database utilization can be expected to decline vis-a-vis increases in the use of original text databases. Moreover, while present usage of original text databases is mostly in the batch mode, in future we can expect to see the on-line mode utilized more frequnetly.

Even though the number of overseas respondents was quite small, it would seem that batch utilization of all three types of document and article databases, i.e. original text, abstract and bibliographic, is extremely limited.

As for the type of information that can be expected to be most sought after in future, this survey seems to indicate that scientific and technical documents will remain in the number one position in future as well, both in Japan and abroad.

2) Numerical Databases

It appears that utilization of numerical databases can be expected to increase considerably in future. By dividing the cumulative number of responses indicating numerical database usage by the actual number of respondents, we see that the current ratio is 106%. Doing the same for future usage indicates that it will apparently rise to 167% before too long. The most significant increases in utilization should be for Scientific and technical data and property data. By including figures for original data and secondary processed data we see that utilization is expected to rise as much as 1.7 times its current level.

3) Image Databases

Considered from the standpoint of growth potential, image databases are tops by far. In the case of Japan, the number of respondents who replied in the affirmative as to current and future usage of image databases was exactly the same (current users = 150; prospective users = 150). Thus, by simply comparing the total number of Japanese respondents to the total number of cumulative responses we can surmise that utilization of natural image databases will jump to 13 times its current level, while that for business graphics and scientific/technical and property databases will both rise 4.3 times.

Although the number of responses from abroad was exceedingly small, it would appear that increased image database utilization is expected in foreign countries as well.

4. Potential for Database Services Based on New Media

The definition of new media per se, as well as its various categories, are not

Table 2 Plans for Utilizing Database Services in the Future (within the next 5 years)

2 – (1) Japan (Number of Responses: 149)

※ Figures in parentheses are the accumulated number of responses (Multi Answers)

Document & ArticleDB / Numerical DB		Full Text / Original Data				Abstracts / Secondary Processed Data				Bibliographies			
		On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total
Documents Databases	Documents (Science & Technology)	14	12	28	(54)	33	7	33	(73)	24	10	25	(59)
	Documents (Cultural/ Social Sciences)	8	4	3	(15)	12	4	7	(23)	12	5	4	(21)
	Newspaper Articles	11	3	11	(25)	25	3	14	(42)	12	1	7	(20)
	Law, Ordinance and Judicial Precedent	3	1	6	(10)	4	1	4	(9)	3	—	4	(7)
	Industrial Property	8	8	12	(28)	15	7	15	(37)	13	2	7	(22)
	Copyrights	1	—	2	(3)	1	2	2	(5)	2	1	1	(4)
	Others	—	1	1	(2)	1	—	2	(3)	—	—	—	(0)
	(Subtotal)	(45)	(29)	(63)	(137)	(91)	(24)	(77)	(192)	(66)	(19)	(48)	(133)
Numerical Databases	Macro Economics (World/National Economics)	13	3	5	(21)	9	4	3	(16)				
	Seminacro Economics (Industry)	16	6	8	(30)	14	5	5	(24)				
	Micro Economics (Company Finances)	14	3	6	(23)	15	4	4	(23)				
	Commodities, Stocks, Credit Markets	5	4	1	(10)	4	1	1	(6)				
	Science & Technology, Properties	15	11	21	(47)	27	5	21	(53)				
	Others	1	1	—	(2)	—	—	—	(0)				
	(Subtotal)	(64)	(28)	(41)	(133)	(69)	(19)	(34)	(122)				
Image Databases	Image — Natural	2	—	4	6	3	1	3	(7)				
	Business Graphics	7	1	5	13	8	—	5	(13)				
	Image — Science & Technology (including the medical field)	13	2	12	27	21	1	19	(41)				
	Others	1	—	1	2	2	—	1	(3)				
	(Subtotal)	(23)	(3)	(22)	(48)	(34)	(2)	(38)	(74)				
(Total)		(132)	(60)	(126)	(318)	(194)	(45)	(149)	(388)				

2 – (2) Overseas (Number of Responses: 8)

※ Figures in parentheses are the accumulated number of responses (Multi Answers)

Document & Article DB		Full Text				Abstracts				Bibliographies			
Numerical DB		Original Data				Secondary Processed Data				———			
		On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total	On-line	Batch	On-line & Batch	Sub-total
Document Databases	Documents (Science & Technology)	1	—	5	(6)	2	—	3	(5)	2	—	4	(6)
	Documents (Cultural/ Social Sciences)	1	1	1	(3)	—	—	1	(1)	—	1	1	(2)
	Newspaper Articles	—	1	3	(4)	1	—	2	(3)	—	—	3	(3)
	Law, Ordinance and Judicial Precedent	1	—	1	(2)	1	—	—	(1)	—	—	—	(0)
	Industrial Property	—	1	—	(1)	—	—	—	(0)	—	—	—	(0)
	Copyrights	1	—	—	(1)	1	—	—	(1)	—	—	—	(0)
	Others	—	—	—	(0)	—	—	—	(0)	—	—	—	(0)
	(Subtotal)	(4)	(3)	(10)	(17)	(5)	(0)	(6)	(11)	(2)	(1)	(8)	(11)
Numerical Databases	Macro Economics (World/National Economics)	1	—	2	(3)	1	—	2	(3)				
	Semmacro Economics (Industry)	1	1	2	(4)	—	1	2	(3)				
	Micro Economics (Company Finances)	1	1	1	(3)	1	1	1	(3)				
	Commodities, Stocks, Credit Markets	1	—	—	(1)	—	—	—	(0)				
	Science & Technology, Properties	1	1	1	(3)	—	1	1	(2)				
	Others	—	—	—	(0)	—	—	—	(0)				
	(Subtotal)	(5)	(3)	(6)	(14)	(2)	(3)	(6)	(11)				
Image Databases	Image — Natural	—	—	1	(1)	—	—	1	(1)				
	Business Graphics	—	—	1	(1)	1	—	1	(2)				
	Image — Science & Technology (including the medical field)	1	—	1	(2)	1	—	1	(2)				
	Others	—	—	—	(0)	—	—	—	(0)				
	(Subtotal)	(1)	(0)	(3)	(4)	(2)	(0)	(3)	(5)				
(Total)		(10)	(6)	(19)	(35)	(9)	(3)	(15)	(27)				

quite clear yet. Nevertheless, when viewed in relation to databases and database services, the new media are being looked at as possible forms of information services for both home and business use. The survey being reported on here raised the points of i) CATV (including pay TV), ii) Subscription TV, iii) Videotex (Viewdata), iv) Teletext and v) Videodiscs as forms of new media, and attempted to look into the possibilities of establishing these as database services for use in the home and in business (on a commercial basis).

In addition, the study also delved into the possibilities for dividing these new media database services into two broad, shallow categories concerning the actual provision of information. These were a) high entertainment such as movies and live sports broadcasts, and b) stock, weather and travel information.

The study also went so far as to make time inquiries, i.e. current and near future (1982–1985) possibilities for new media database services, as well as future (1985 and beyond) possibilities.

(1) New Media Database Services

(Divergent Opinions by Japanese and Overseas Respondents Were Most Apparent Here.)

Current and Near Future Possibilities (1982–1985).

First of all, the Japanese respondents seemed to feel that the possibilities for establishing any of the five types of new media database services for home use in the near future were limited.

The total number of cumulative responses in support of the possibility of new media database services for home use in the near future added up to 379, while those indicating they would be impossible for some time to come numbered 806, or 32% to 68%, respectively. Similarly, the establishment of such database services for business use in the near future was also felt to be unlikely. Total cumulative responses favoring this possibility numbered 484 while those against reached 648. This worked out to 43% to 57% against such possibilities. Thus, it would seem that the Japanese respondents feel pretty certain that new media database services for home and business use, but more so home use, are not very likely to be established in the near future.

On the other hand, responses received from overseas would seem to indicate a completely different opinion. The fact that 64% of all the overseas respondents were from the United States where pay and subscription TV are already a reality probably accounts for the majority of the divergence here. On a percentage basis, overseas opinon seems to overwhelmingly support the possibility of all five types of new media database services for home use in the near future, with 81% of the respondents stating it was possible versus 19% who said it wasn't. Similar services for business use are also felt to be likely soon, working out to 70% in favor of the possibility versus 30% not.

The type of new media database

service felt to have the best chance of being established for home use in Japan soon is the teletext service. The percentage of cumulative Japanese responses indicating so worked out to 32%. This was followed by videodisc services with 28% of the cumulative responses.

As might be expected, overseas respondents felt that CATV (including pay TV) was most likely to be established for home use (22%). Subscription TV, videotex and teletext all averaged 21% of the cumulative overseas responses, putting them a close second behind CATV for near future home use new media database services.

The most likely types of new media database services to be established for business use in the near future according to the Japanese respondents are videotex (23%) and videodisc (21%). Overseas opinion, however, seems to favor videotex (24%) followed by CATV and teletext each with 20% of the cumulative responses. Both Japanese and overseas respondents appear to have high expectations for videotex. Moreover, compared to the other new media, Japanese respondents seem to feel the possibilities are good for videodisc database services for both home and business use, whereas the overseas respondents don't seem inclined to believe so.

Future Possibilities (1985 and beyond)

The potential for establishing new media database services for home use after 1985 were felt to be good by 67% of the Japanese respondents and 82% of the overseas respondents. Similar services for business use in the-future were also felt to be probable by both the Japanese and overseas respondents, figuring out to 65% and 67% respectively.

(2) CATV (including pay TV)

Japan

Current and near future (up to 1985) possibilities for the establishment of CATV database services for home and business use are felt to be slight in Japan. These possibilities are considered to increase considerably after 1985, though, with the general opinion being 66% to 34% in favor of the establishment of home-use CATV, and 63% to 37% in support of CATV possibilities in business.

The various types of CATV services offered are listed in a menu where A equals entertainment such as movies and sports, and B equals database information on such things as stocks, weather and the like. A and B together indicates that both types of services are offered. The possibilities for the future establishment of such a menu for home use is felt to be about the same in all instances, averaging between 32% and 34% of the Japanese respondents cumulative responses. For business use, however, the ratio of entertainment-type services is quite naturally felt to be low, while database information is considered quite likely with 42% of the cumulative responses.

If this same menu is viewed in terms of individual types of services, we see that entertainment services are felt

most likely to be established for home use in future, averaging out at 72% of the cumulative responses. Database information got the highest vote of confidence as a CATV database service for business use, earning 78% of the cumulative responses.

Overseas

Overseas opinion as to the time frame involved in the establishment of CATV services as well as that service's respective categories (menu) differed considerably from that of the Japanese respondents.

First of all, possibilities for the establishment of CATV services for both home and business use are felt to be good currently and in the near future. Thus, general opinion overseas was 85% in support of the realization of home-use CATV services and 69% in favor of the possible establishment of such services for business use in the near future. The percentage of support for CATV services in the future (after 1985) was just about the same.

Irrespective of time factors (before or after 1985) and types of use (home or business), that category of the CATV menu felt most likely to be established was the A & B type service which offers both entertainment and database information together. Moreover, 88% and 80% of overseas responses pointed to the fact that business-use database information had good possibilities of being established in the near and distant future, respectively.

(3) Subscription TV (STV)

STV is a system whereby television waves are scrambled at broadcast time, and only those subscribers to the system whose TV sets are equipped with special decoding devices can watch these programs. Perhaps because this service is unfamiliar in Japan the difference of opinion between the Japanese and overseas respondents was once again considerable.

Japan

Similar to the case of CATV services, those Japanese respondents who felt that STV services could be established in the near future for either home or business use were few. The chances for such services after 1985 were felt to be only slightly better, averaging out at 52% to 48% of the cumulative responses in favor of such possibilities.

Overseas

The number of respondents who felt the possibilities of establishing STV services in the near and distance future, irrespective of whether they be for home or business use, was considerably higher overseas. As for the STV menu, the best chances were felt to be with the A & B service offering both entertainment and database information together regardless of whether it be for home or business use.

(4) Videotex (Viewdata)

Japan

The percentage of Japanese respondents who felt possibilities for the

establishment of videotex (viewdata) were good for home use in the near future was a mere 26%. Videotex for business use was apparently felt to have better chances, earning 48% of the responses. The percentage of responses indicating the belief that videotex services could be established in the future (after 1985) improved, reaching 77% for home use and 72% for business use.

Overseas

Videotex services have already been commercialized overseas by such firms as the UK's Prestel and America's Dow Jones' News/Retrieval and Compuserve's C/S.

For this reason, a considerable divergence of opinion between Japanese and overseas respondents could be seen again here. A high 88% of overseas respondents felt that videotex (viewdata) services for home use could be established in the near future.

(5) Teletext

Japan

Teletext was the only new media database service felt capable of being established in Japan in the near future. However, it was felt so only for home use. Chances for this type of service to be established for both home and business use are felt to be even better after 1985.

Overseas

The results gained from analysis of overseas responses showed that like all the other new media database services with the single exception of videodisc, teletext is felt to have a good chance of being established.

(6) Videodisc

Japan

The percentage of Japanese respondents who felt that videodisc services could not be established in the near future was high, but the range wasn't as great as for the other new media services. For example, videodisc services for home use were believed possible by 44% of the respondents and not possible by the remaining 56%. Similarly, videodisc services for business use were felt possible by 43% of the Japanese respondents, with 57% feeling otherwise. However, the percentage of those who felt this kind of service had better chances of establishment after 1985 rose to 65%.

Overseas

As with the other new media services, the percentage of overseas respondents who felt the establishment of videodisc services to be possible both in the near and distant future and for home as well as business use was high, but not as high as for the other media services. For example, whereas the degree of belief that the other new media services could be established ranged between 82% and 88%, for both home-use and business-use videodisc, the percentage of respondents who felt it could be established in the near future didn't exceed 63%.

Comments from Respondents

The most numerous of the comments made by the respondents concerning new media services, as might be expected, related to cost factors. The spread of new media services, they insist, will depend more than anything else on their costs. The following are the principal comments received from the Japanese and overseas respondents. For the sake of space, similar remarks have been lumped together and expressed as a single comment.

Japan

- The popularity of services aimed at home use will depend largely on cost factors.
- The spread of new media services will depend on the extent to which transmission and reception costs can be lowered.
- Those services related to office automation (OA) will be introduced as business-use services rather quickly, I should think.
- Image and original text information currently stored on microfilm will probably be made into videodiscs before long.
- The possibilities for all sorts of videodisc media are extremely good.
- These services will probably be used much the same way as encyclopedias here in Japan.
- The new media should probably be used as teaching materials in schools, the home and business.
- We don't need that much information in our day to day lives!
- In order to establish these new media services commercially, it will be very important to limit the information provided to certain specific fields of specialization.
- New media services for home use that must be paid for just simply don't fit in with Japanese customs.
- I don't think the rate of utilization for these services will increase much.
- The lifestyle of the average Japanese isn't likely to change much in future. Thus, new media services won't prove very useful in the home save for the most basic applications.
- Televisions and video tape recorders are more than enough.
- The problems of standardizing regulations applying to hardware and software in the industry will have to be solved first.
- It will be necessary to study the compatability and mergability between and among these new media.

Overseas

- Technologically speaking, all the new media discussed here have already become possible. However, whether or not they can be established economically is another question.
- If the TV set used for videodiscs isn't of a high quality, the display of the text is not effective.
- Videodiscs are quite effective when used for travel films and the like. However, as a means of providing flash updates on the stock market situation or the weather, they are not much good.

Table 4 Potential for Database Services based on the New Media

4 – (1) Japan (Number of Responses: 168) (Multi Answer)

New Media		Current & Near Future Possibilities (1982 – 1985)				Future Possibilities (1985 and beyond)			
		Home Use		Business Use		Home Use		Business Use	
		Possible	Impossible	Possible	Impossible	Possible	Impossible	Possible	Impossible
CATV (including Pay-TV)	A	26	53	15	60	54	21	32	41
	B	11	63	54	32	51	27	61	17
	A & B	21	73	23	55	53	32	52	26
	Subtotal	(58)	(189)	(92)	(147)	(158)	(80)	(145)	(84)
Subscription TV	A	14	57	15	53	47	26	31	34
	B	9	61	45	34	30	37	65	13
	A & B	13	81	29	48	43	49	58	31
	Subtotal	(36)	(199)	(89)	(135)	(120)	(112)	(154)	(78)
Videotex (Viewdata)	A	16	49	19	50	54	13	32	31
	B	16	47	55	24	48	18	59	9
	A & B	26	69	37	44	70	21	62	20
	Subtotal	(58)	(165)	(111)	(118)	(172)	(52)	(153)	(60)
Teletext	A	35	35	16	48	45	17	24	33
	B	37	33	36	30	49	13	46	16
	A & B	49	49	38	46	63	22	57	31
	Subtotal	(121)	(117)	(90)	(124)	(157)	(52)	(127)	(80)
Videodisc	A	56	29	24	46	61	11	31	30
	B	14	55	41	33	34	35	45	22
	A & B	36	52	37	45	50	33	52	31
	Subtotal	(106)	(136)	(102)	(124)	(145)	(79)	(128)	(83)
Total		(379)	(806)	(484)	(648)	(752)	(375)	(707)	(385)

4 – (2) Overseas (Number of Responses: 22)

New Media		Current & Near Future Possibilities (1982 – 1985)				Future Possibilities (1985 and beyond)			
		Home Use		Business Use		Home Use		Business Use	
		Possible	Impossible	Possible	Impossible	Possible	Impossible	Possible	Impossible
CATV (including Pay-TV)	A	6	1	2	3	5	1	2	3
	B	5	1	7	1	5	2	4	1
	A & B	18	3	11	5	14	1	9	4
	Subtotal	(29)	(5)	(20)	(9)	(24)	(4)	(15)	(8)
Subscription TV	A	5	1	2	3	6	1	3	3
	B	5	1	5	2	6	2	5	2
	A & B	17	2	9	5	14	1	11	2
	Subtotal	(27)	(4)	(16)	(10)	(26)	(4)	(19)	(7)
Videotex (Viewdata)	A	6	1	3	2	5	1	4	1
	B	5	2	6	1	5	2	4	1
	A & B	17	1	14	2	14	2	13	1
	Subtotal	(28)	(4)	(23)	(5)	(24)	(5)	(21)	(3)
Teletext	A	7	2	2	4	6	1	2	3
	B	8	2	8	1	5	2	4	1
	A & B	13	2	10	3	13	2	10	3
	Subtotal	(28)	(6)	(20)	(8)	(24)	(5)	(16)	(7)
Videodisc	A	9	1	5	3	6	1	4	2
	B	2	6	6	3	5	3	5	1
	A & B	8	4	8	5	12	4	12	3
	Subtotal	(19)	(11)	(19)	(11)	(23)	(8)	(21)	(6)
Total		(131)	(30)	(98)	(43)	(121)	(26)	(92)	(31)

- Even if the profit situation doesn't change for the better in the near future, it will still be possible to establish all of the new media.
- Conversational capabilities between the user site and the database side will become very important.

5. Problems Surrounding Trans-border Data Flow (TDF)

Increases in the amounts of data flowing between and among nations brings with it a variety of problems. Discussions aimed at coming up with solutions to these problems are currently in progress in such international forums as the OECD, et cetera. These various problems were broadly divided into five categories in the questionnaire, 1) economic, 2) legal, 3) social, 4) political and 5) others. This was done in an attempt to determine just what the most pressing problem is currently as well as what kinds of problems might be expected in future.

Japan

The biggest problem in Japan today concerning TDF has to do with the lack of standardized regulations and laws, i.e. is in the legal area. This is apparent from the fact that nearly 58% of the cumulative responses from Japanese respondents dealt with problems in this category. The problems raised by the questionnaire in the legal area were divided into three basic types: 1) non-standardized regulations and laws governing telecommunications, 2) non-standardized telecommunications charges and 3) non-availability of legal protection for data. The percentage of cumulative responses for each of these problems averaged 22%, 16% and 20%, respectively.

The biggest problems in the future are considered to be social in nature, and deal with apprehensions concerning invasions of data privacy and the vulnerability of an information society. Legal and political problems rank second as far as future problems are concerned.

Percentage-wise, the current problem that is considered to become of major importance in the future is an economical one, more specifically, unemployment. This problem is apparently expected to nearly quintuple in future.

Overseas

Overseas respondents agreed with those from Japan that the biggest current problem dealing with TDF is legal in nature. The highest percentage of cumulative responses totaled 19% for non-standardized regulations and laws regarding telecommunications. The next biggest problem according to the overseas respondents was a social one, the invasion of data privacy. This category averaged 17.5% of the cumulative responses.

Comments from Respondents

Japan

- Japan must also utilize data to establish a strong economical position for itself.
- It is quite likely that TDF will bring about new forms of employment.

Table 5 Transborder Data Flow (TDF) Problems

Field	Examples of Problems	Japan (Number of Responses: 161)				Overseas (Number of Responses: 19)			
		Present		Future		Present		Future	
		Responses	(%)	Responses	(%)	Responses	(%)	Responses	(%)
Economical	Increase in economic gap due to TDF	30	7.4	46	10.9	5	6.8	9	11.5
	Appearance of unemployment problems	6	1.5	31	7.3	3	4.0	5	6.4
	Subtotal	(36)	(8.9)	(77)	(18.2)	(8)	(10.8)	(14)	(17.9)
Legal	Non-unified telecommunication regulations & laws	89	22.1	24	5.7	14	19.0	11	14.1
	Non-unified telecommunication charges	63	15.5	20	4.7	9	12.1	4	5.1
	Non-availability of legal protection for data security	80	19.9	59	14.0	12	16.2	9	11.6
	Subtotal	(232)	(57.5)	(103)	(24.4)	(35)	(47.3)	(24)	(30.8)
Social	Apprehensions re: invasion of data privacy	51	12.7	65	15.4	3	17.5	14	17.9
	Vulnerability of information society	32	7.9	64	15.2	5	6.8	9	11.6
	Subtotal	(83)	(20.6)	(129)	(30.6)	(18)	(24.3)	(23)	(29.5)
Political	Crises of national sovereignty and security	27	6.7	62	14.7	6	8.1	8	10.3
	Widening of the North-South Gap	21	5.3	40	9.5	2	2.7	5	6.4
	Subtotal	(48)	(12.0)	(102)	(24.2)	(8)	(10.8)	(13)	(16.7)
Others		4	1.0	11	2.6	5	6.8	4	5.1
Total		(403)	(100.0)	(422)	(100.0)	(74)	(100.0)	(78)	(100.0)

- International deliberations will be required in the areas of telecommunications regulations and charges.
- We must also consider the problem of too much legal protection of data.
- Legal regulations are urgent from the standpoint of codes, copyrights and intelligent terminals.
- Database service networks are down too often.
- If a balance isn't maintained between the influx and outflow of information from a country, it will lead to considerable political conflict.
- The effective utilization of foreign databases must be encouraged.
- We must be careful not to overrely on foreign databases since these services could be shut off in times of emergency.
- Priority must be given to the promotion of the database service industry.

Overseas

- The gap between the information rich countries and the information poor countries will widen at the personal, company, group, national and international levels.
- It's difficult to control data on the national level. This is because data gathered via satellite on natural resources, for example, can then be transmitted to foreign countries where the press gets hold of it and exposes it to the world.
- Developing countries are continuously evaluating the worth of information and this in turn leads to political and cultural problems.
- When a number of countries get involved in each others political machinations as a result of TDF it can be extremely troublesome for all concerned.
- There is the problem of computer illiteracy.

Japan Information Processing Development Center