

# Planning for the Dissemination of Scientific and Technical Information in Information Centers in Korea: A Suggested Model

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## 〈목 차〉

I. Introduction	2. Results of the Interviews
II. Review of Selected Literature	V. Recommendations for Model Information Network
III. Methodology	VI. Conclusions
IV. Results and Discussion	
1. Results from the Questionnaires	

## I. INTRODUCTION

Research and development activities in the areas of science and technology have considerable impact on a nation's life in many ways. Since it is increasingly difficult to advance scientifically and develop technological innovation without active research and development activity in many countries, it becomes necessary for both the government and private sectors to provide considerable support for those involved in research and development. One imp-

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ortant prerequisite to the growth of science and technology is the prompt and efficient dissemination of scientific and technical information to researchers and engineers.

In the last decade, Korea has shown remarkable growth in the areas of science and technology; however, Korea at present, has no efficient system for disseminating scientific and technical information. The literature has suggested that an efficient scientific and technical information network in Korea should be created for the support of research and development in the fields of science and technology.<sup>1)</sup>

#### Statement of the Problem

An efficient information system for the utilization of national and international information is a prerequisite for the development of a country, In the case of Korea, problems and difficulties exist in the scientific and technical information system. Information centers in Korea do not have effective information system. Cooperation among special libraries does not exist, even though the libraries do not have enough resources in terms of finance, personnel, collections, to function well alone.<sup>2)</sup> From the viewpoint of Korean users, information consumers in the fields of science and technology suffer from the inadequacy of the information system, and from the lack of cooperation and coordination which hinders the availability and accessibility of scientific and technical information. According to Koh,<sup>3)</sup> scientists and engineers tend to duplicate research or delay their tasks because of the inadequate operation of the scientific and technical information system. Also,

industries tend to introduce only low level technology because of inadequate dissemination of scientific and technical information. Several pieces of research have included suggestions on ways to improve the current condition of the scientific and technical information dissemination by creating a model information system among information centers in Korea. However, the prior research such as that of Choi et al.<sup>4)</sup> and Lee<sup>5)</sup> has been based on published information and researchers' opinions and has not been based on a comprehensive investigation of the present status of the information handling in Korea.

#### *Importance of the Problem*

An information system and network for the utilization of scientific and technical knowledge is essential to the improvement of Korean research and development. Dissatisfaction with the present information network has centered around a need for investigation of the scientific and technical information activity in Korea.

#### *Purpose of the Study*

The purposes of the study were:

1. to identify the current status of scientific and technical information networks in Korea;
2. to make recommendations for a model for a scientific and technical information network for Korea.

### Importance of the Study

Such a study should provide useful information concerning the prevailing conditions of scientific and technical information networks in Korea. Further, it should help librarians and policy-makers establish efficient scientific and technical information networks suitable to the Korean situation.

### General Research Question

What is the present status of the scientific and technical information network in Korea and what changes should be made to establish a model scientific and technical information network in Korea?

### Subsidiary Research Questions

1. Does the present scientific and technical information system and network function efficiently to satisfy users's information needs?
2. To what extent does the present system cause difficulties and barriers for the dissemination of scientific and technical information?
3. What should be the function of a model information network in Korea?
4. Do information centers in Korea have sufficient capabilities to develop the present information network in terms of funding, personnel, information technology, information infrastructure, and sup-

port from the parent institutions?

5. What are the barriers to development of a model information network and how can these be overcome?

6. What steps and strategies are required to develop a model information network?

### Assumptions

1. The study assumed that information centers in the areas of science and technology were more advanced than other library types and hence support the parent institutions better than any other types of libraries in Korea, because most of the important research and new product development activities have been conducted in these institutions.

2. The study assumed a discernible difference between government-supported and industry-supported information centers.

3. The study assumed the government would be the major force for developing an effective and efficient information network.

### Limitations

The study was limited to information centers attached to government-supported or industry-supported research and development institutions in the areas of science and technology. Users in these institutions generally demand more information for their research; thus, information systems in those libraries should lead the way for those in other types of libraries.

## II. REVIEW OF SELECTED LITERATURE

Bell<sup>6)</sup> identifies a wide variety of structures that can be used in information system design and categorizes them as follows:

1. Comprehensive with national and regional centers
2. Partially comprehensive with some national and regional centers(e.g., AGRIS)
3. Competitive enterprise with access available to paying customers(e.g., DIALOG)
4. Formalized special-subject networks--comprehensive or near-comprehensive coverage within the special subject area
5. Traditional information network between colleagues in any particular subject field
6. Facilitated informal network--a gatekeeper acting as a counsellor to information inquirers.

Line<sup>7)</sup> identifies six functions of a national library and information system: "1) Collection of the nations' publications; 2) bibliographic control of the nations' publications; 3) bibliographic access to the world's literature; 4)access to documents; 5) repository and exchange of publications; and 6) information analysis and supply."

Neelameghan and Tocatljan<sup>8)</sup> identifies the following requirements at the national level that will lead to an ideal Global Network:

1. Strengthened information systems and services
2. Training in information handling procedures
3. Use of standards for information handling such as uniform

rules for recording and structuring information and references to information, including subject control tools.

4. Adequate computer and telecommunications facilities.

UNESCO has undertaken the work of information flow such as operation of NATIS(National Information System), the UNISIST program and more recently the General Information Programme (PGI).<sup>9)</sup> During the first phase of the implementation of the PGI-/UNISIST program, UNESCO has focused on "the formulation of information policies, norms, and standards for information handling and systems interconnection, and on the provision of assistance for

the development of infrastructures and information manpower.<sup>10)</sup> In its Second Medium-Term Plan for the PGI/UNISIST program, 1984-89, UNESCO's activities have placed emphasis on areas such as users' needs, operational activities, regional cooperation, and the introduction of information technology in developing countries."<sup>11)</sup>

### III. METHODOLOGY

The methodology for conducting the research consisted of analysis of literature, surveys, and interviews.

1. An extensive search of the literature was conducted to investigate similar studies performed elsewhere and to provide insight for the design of an instrument for use in surveys and interviews.

2. A survey instrument was designed to measure the present status of scientific and technical information networks and to eli-

cit expert opinions for a model scientific and technical information network from information centers in Korea. The questionnaire consisted of two parts and a total of 12 pages. The first part of the questionnaire, entitled "Survey of information center activities", aimed at developing background data on such areas as administration, collections, equipment, acquisitions, cataloging/processing, information services, cooperative/system activities and policy-makers' and users' attitudes. The second part of the questionnaire, entitled "Survey for a model information network", aimed at eliciting expert opinions, and covered areas such as functions and requirements of the information network, participation in the information network, responsibility for components of the information network and barriers to an information network. The survey instrument consisted of a combination of open-ended and closed-ended questions and Likert scales.

3. The Directory of Korea Technology Institutes(1989), published by Korea Industrial Research Institutes, was utilized for the selection of the survey population because it listed most of the research and development institutes in Korea, whether industry- or government-supported, in the areas of science and technology. Another reason this directory was used was that each entry included comprehensive background information on the institution, such as address, annual budget for 1988, the number of researchers according to the degree, major research and development activities, and organizational chart.

4. The head of each information center was contacted by the researcher by phone and informed about the research. On March



24, 1990 the survey was sent to the thirty-four information centers. The survey package included a cover letter, a survey instrument and a stamped self-addressed envelope. On April 3, 1990 a follow-up reminder phone call was made to heads of non-responding information centers. Also calls were made, when necessary, to find missing information and to clarify unclear responses. Twenty-four usable questionnaires(71%) were returned by April 7, 1990.

5. The opinion interviews for a model scientific and technical information system and network were conducted among experts in information centers in Korea. Based on the returned questionnaires, 6 experts in 2 industry- and 4 government-supported information centers were selected for opinion interviews. The major criterion for the selection of interviewees was the size of the information center and the variety of information center activities.

The data collected were tabulated into a worksheet, and the Statistical Package for Social Sciences(SPSS) at Texas Woman's University Computing Center was used to analyze the data.

#### IV. RESULTS AND DISCUSSION

##### 1. Results from the Questionnaires

Based on the data collected, the following results were obtained. It should be noted that not all percentages in the tables presented total 100% since some respondents gave more than one answer to certain questions.

Table 1 details how requests for information not available in

the Information center are handled. Twenty-three respondents answered the question. Several identified more than one mechanism, so that the percentages add up to over 100%. The majority of responding information centers either had "access to databasses" (20 responses or 87%) or made "requests of KIET" (17 responses or 73.9%) for information not available in their information centers. As already mentioned, databases seemed to be one of the major information mediums heavily used in information centers. In addition, the findings demonstrate that KIET has played a pivotal role in providing scientific, technical, and industrial information to industries as well as research and development institutes.

Of 23 respondents, ten documentation centers (43.5%) of the Research Complex had some formal interlibrary lending. Nine information centers (39.1%) supported by industry located information from the foreign branch offices of parent institutes, but 4 centers used other technological information centers within the conglomerate. It should be noted that quite a number of information centers belonging to industry-supported research and development institutes have employed the foreign branch offices as a means to get information produced outside of Korea. Eight respondents (34.8%) indicated that the British Library Document Supply Center (BLDSC) was also heavily used in making information available that was not available in Korea. In addition four respondents (17.4%) made direct requests to publishers. It is interesting to note that, although the libraries resisted cooperative activities, they were not at all reluctant to use cooperative systems in place to satisfy their information needs.

Table 1. Ways of Handling Information Requests not Available in the Information Center

Methods of Handling Requests	Number of Responses (n=23)	Percent of Responses
Access to databases	20	87
Requests to KIET	17	73.9
ILL among Research Complex	10	43.5
Requests to foreign branch offices	9	39.1
BLDSC	8	34.8
Direct requests to publishers	4	17.4
Other technological information centers within the conglomerate	4	17.4
Requests to commercial technological information centers	1	4.4
ILL among related institutions	1	4.4

Table 2 presents information on the databases being constructed by information centers. Nineteen (79.2%) of the information centers were involved in constructing databases. Of the 19, eleven(45.8%) had databases of their own holdings. Three centers (12.5%) were involved in the construction of the Union Catalog of the Research Complex. Two respondents identified their involvement in the UCAT(Union Catalogue of Scientific and Technological Periodicals), and Subject-Related Databases. Each information center has constructed some kind of database in its parent institute's subject areas such as the Standard Reference Tool database, the Maritime Technology database, the Energy-Related database and the Pure Chemical Compound Components database. One information center supported by one of the major conglomerates has

been involved in constructing a technical information databank. That databank covers databases such as technical reports of the conglomerate, electric and electronic related databases, and databases for daily information, patents, and market investigation.

As may be seen, 19 of 24 centers have constructed databases in their parent institutes' interest fields either by designing their own systems or adapting prepackaged software. The data in Table 2, overall, represents a great use of the new technologies by Korean information centers.

Table 2. Databases Construction Activities of Information Centers

Databases	Number of Responses(n=24)	Percent of Responses
Holding materials database	11	45.8
Union Catalog of Research Complex	3	12.5
UCAT	2	8.3
Subject-Related database	2	8.3
Standard Reference Tool database	1	4.2
Maritime Technology database	1	4.2
Technical Information Databank	1	4.2
Energy-Relate database	1	4.2
Pure Chemical Compound Components database	1	4.2

Table 3 provides the data on the participation of information centers in information networks. An open-ended question on the participation of information centers in national or international inf-

ormation networks revealed that twenty information centers participated in one or more types of networks. More than half of the information centers (13 responses of 60%) held membership in the KIETLINE, a national information network. Eight out of 20 centers (40%) participated in the information network of the Daeduk Research Complex. Dacom-Net, network of the Data Communication Corporation, is connected to three information centers (15%). Other national information networks, which are participated in by information centers include a nationwide online Education and Research Network(1 response or 5%), and an information network for telecommunication-related institutes (1 response or 5%). This finding seems to be inconsistent with the previous findings that none of the information centers participated in any kind of cooperative collection activities. However, most of that inconsistency is traceable to the interest in joining national information service networks such as KIETLINE rather than making strong commitments to cooperative acquisition activities.

At the international level, one information center participated in the International Nuclear Information System (INIS) within the International Atomic Energy Association (IAEA), and another in the Information Network on New and Renewable Energy Resources and Technologies for Asia and the Pacific(INNERTAP), "one of the five subregional information networks on New and Renewable Sources of Energy (NRSE) being supported by Unesco under its Global Energy Information Programme."<sup>12)</sup> Most of the Korean information centers of the study currently participated in some kind of information network on the national or international level.

Table 3. Information Networks' Participation by Information Center

Information Networks	Number of Responses(n=20)	Percent of Responses
KIETLINE	12	60
Information network in the Research Complex	8	40
Dacom-Net	3	15
Information network within the conglomerate	1	5
Information network among telecommunication-related institutes	1	5
Online Research Network	1	5
INIS within the IAEA	1	5
INNERTAP	1	5

\* Dacom-Net was established by the Data Communication Corporation of Korea in 1982 for efficient telecommunication. Through Dacom-Net, KIETLINE is also connected to foreign databanks such Dialog, BRS, SDC, JOIS, etc.

Table 4 presents the data on difficulties or barriers in operating ongoing cooperative or system activities. Respondents were asked to rank the difficulties or barriers in the degree of seriousness, ranging from "4" (very serious difficulty or barrier) to "1" (no difficulty or barrier). The most serious difficulties or barriers based on the mean can be categorized as follows:

1. A lack of standardization,
2. A lack of high level information technology,

Table 4. Difficulties/ Barriers in the Cooperative/ System Activities

Barriers	Very Serious Difficulty / Barrier		Serious Difficulty / Barrier		Neutral		No Difficulty / Barrier		$\bar{X}$	Rank
	4	3	8	7	2	2	1	1		
A lack of standardization	10	7	6	1	3.08	1				1
A lack of high level information technology	6	8	8	2	2.75	2				2
Inadequate administrative control for the system	5	8	10	1	2.71	1				*3
Inadequate funding	4	10	9	1	2.71	1				*3
A lack of support by policy makers from parent institution	4	11	7	2	2.71	2				*3
Inadequate cooperative with other national or international systems	5	7	11	1	2.67	1				4
Insufficient expertise	4	8	10	2	2.58	2				5
Inadequate coordination and cooperation of the cooperative / system activities	4	6	13	1	2.54	1				6
Insufficient resources of an individual library	4	6	12	2	2.5	2				7
A lack of interlibrary lending	5	5	10	4	2.46	4				8
Insufficient resources of participating libraries	2	7	13	2	2.38	2				9
A lack of support by librarians	2	5	11	6	2.13	6				10

\* This represents the same rank because of the same mean value.

3. Inadequate funding,
4. A lack of support by policy makers from parent institution,
5. Inadequate administrative control for the system.

The first rated serious difficulty or barrier in operating ongoing or new cooperative/system activities was "a lack of standardization," followed by "lack of information technology." This study shows further that "a lack of funding and support by policy-maker" and "inadequate administrative coordination" are both ranked third. The least significant difficulties or barriers include the following categories:

1. A lack of support by librarians,
2. Insufficient resources of participating libraries,
3. A lack of interlibrary lending.

It should be noted again the librarians were aware of the importance of cooperative activities and resource sharing networks and they supported it. It is surprising therefore that "inadequate resources of other libraries" is the second rated least significant barrier in operating the system activities, followed by "lack of interlibrary lending."

Methods used to handle difficulties or barriers in operating ongoing or new cooperative/system activities were mentioned by ten respondents. Those responses were analyzed and categorized into six items, as follows:

1. Joining the national and international information systems for acquisition of possible information,
2. Request for support by policy-makers,
3. Cooperation among information centers,



4. System improvement of an individual library,
5. Establishment of basic requirements for computerization,
6. Development of new information retrieval methods and their application.

Table 5 presents data collected on some of the functions or requirements of a model information network for Korea. The respondents were asked to scale a list of functions and requirements from "5" (highly necessary) to "1" (highly unnecessary). All of the functions and requirements were then ranked, based on the mean value, to identify those ranked as "the most highly necessary" and "the least highly necessary." Since the respondents served as experts in this field, their opinions and insights would be extremely valuable for the development of a scientific and technical information network.

All of the functions and requirements were more than "somewhat necessary", as may be seen in the range of mean value (83-3.46). As shown in Table 5, the most highly necessary functions or requirements are as follows:

1. Developing a national policy for science and technology information,
2. Constructing national materials databases,
3. Developing and updating information retrieval languages,
4. Exploring the use of information technology,
5. Promoting high library, bibliographic, and communication standards,
6. Compiling a national bibliography.

Seen as the least highly necessary functions or requirements for

Table 5. Functions and Requirements of the Information Network

Functions / Requirements	Highly Necessary	Somewhat Necessary	Neutral	Somewhat Unnecessary	Highly Unnecessary	Number of Responses (n=24)	Rank
	5	4	3	2	1		
Developing a national policy for S & T information	21	2	1	-	-	24	4.83
Constructing national materials databases	19	5	-	-	-	24	4.79
Developing and updating information retrieval languages	19	4	1	-	-	24	4.75
Exploring the use of information technology	18	5	1	-	-	24	4.71
Promoting high library, bibliographic and telecommunication standards	15	8	1	-	-	24	4.58
Compiling a national bibliography	17	4	3	-	-	24	4.58
Training and countinuing education of librarians	15	7	2	-	-	24	4.54
Developing a national level commission for the support and control of STI dissemination	16	6	1	1	1	24	4.54
SDI services	13	10	1	-	-	24	4.5
Developing Union Catalogs /Lists	16	5	2	-	1	24	4.46
Consulting international information centers for the acquisition of information not available in the country	11	12	1	-	-	24	4.42

\* The higher the mean value the more highly necessary a function/requirement.

Continued Table 5.

Functions / Requirements	Highly Necessary					Somewhat Necessary			Neutral			Somewhat Unnecessary		Highly Unnecessary		$\bar{X}$	Rank
	5	4	3	2	1	4	3	2	1	3	2	1	2	1	Number of Responses (n=24)		
Developing an interlibrary communication system	12	10	2	-	-	10	2	-	-	2	-	-	-	-	24	4.42	9
Identifying information needs	13	8	3	-	-	8	3	-	-	3	-	-	-	-	24	4.42	9
Establishing national/international information exchange	14	6	3	1	-	6	3	1	-	3	1	-	-	-	24	4.38	10
Providing information, reference and referral services	12	7	5	-	-	7	5	-	-	5	-	-	-	-	24	4.29	11
Guiding, planning and coordinating the activities of the system	8	15	1	-	-	15	1	-	-	1	-	-	-	-	24	4.29	11
Interlibrary lending	11	9	3	1	-	9	3	1	-	3	1	-	-	-	24	4.25	12
Indexing & Abstracting services	8	14	2	-	-	14	2	-	-	2	-	-	-	-	24	4.25	12
Developing coordinated acquisition for foreign literature	10	10	3	1	-	10	3	1	-	3	1	-	-	-	24	4.21	13
Document delivery services	11	7	5	1	-	7	5	1	-	5	1	-	-	-	24	4.17	14
Establishing a centralized processing center	11	9	2	1	-	9	2	1	-	2	1	-	-	-	23	4.13	15
Establishing a material conservation cooperative system	6	12	6	-	-	12	6	-	-	6	-	-	-	-	24	4.00	16
Establishing a Korean MARC center	10	7	5	1	-	7	5	1	-	5	1	-	-	-	24	4.00	16
Promoting cooperation with other national/international systems	6	15	2	-	-	15	2	-	-	2	-	-	-	-	23	4.00	16
Developing a specialized collections policy in all areas of S & T	9	8	4	2	-	8	4	2	-	4	2	-	-	-	24	3.88	17
Distributing catalog cards/MARC tape	6	13	2	1	-	13	2	1	-	2	1	-	-	-	24	3.83	18
Translation Services	4	8	8	3	-	8	8	3	-	8	3	-	-	-	24	3.46	19

a model information network are the following:

1. Translation services,
2. Distributing catalog cards or MARC tape,
3. Developing a specialized collections policy in all areas of science and technology,
4. Establishing a Korean Marc Center,
5. Establishing a centralized processing center.

It is interesting to note that experts in Korea gave low priority to information processing such as cataloging and classification, but high priority to information storage and retrieval. This probably reflects the fact that many information centers supported by industry demand highly specialized and prepackaged information: these centers concentrate more on analyzing, acquiring, processing and disseminating the knowledge in the most efficient way, usually via computer processing.

As may be seen in Table 6, eighteen (75%) of the 24 information centers plan to participate in any component of information network activities, as defined by the categories in Table 5.

Those information centers which do plan to participate in any of the system component activities were asked to state reasons. Their responses can be summarized in the following categories:

1. Lack of funding,
2. Lack of staff,
3. Small size of the information center,
4. Inadequate establishment of internal information system,
5. Lack of support from the policy-makers,

6. Pressure of internal tasks(workload),
7. Industry's specialized information needs

Table 6. Participation for a Model Information Network by Information Center

Responses	Number of Responses (n=20)	Percent of Responses
Yes	18	75
No	6	25

## 2. Results of the Interviews

The following is a summary of the problems identified in the dissemination of scientific and technical information:

1. Half of the information centers(3 out of 6) have a small staff, and their system activities are, therefore, limited to traditional information handling such as analysis, collection, processing, and retrieval(either online or manual).

2. All of the information centers represented in the interviews participated in very limited resource sharing. None of the information centers participated in any type of coordinated acquisition or cataloging activities for the following reasons:

- a. Each information center has specialized collections in accordance with its parent institute's research and development activities;
- b. Each information center has a different size budget;

- c. Several of the information centers with sufficient resources were not willing to participate in resource sharing with others because they failed to see any potential benefit from such a system;
  - d. There are different classification schemes and cataloging rules used by information centers and libraries;
  - e. There is a lack of leadership that can take charge of conducting a major function such as cooperative acquisition and cataloging.
3. There is a lack of standardization in such areas as hardware, software, treatment of processing, vocabulary and information retrieval languages.
4. Much of the most recent scientific and technical information obviously originates outside Korea, One resulting problem in collecting technical information is that of time lag.

The interviewees also made suggestions as to the most efficient means of acquiring, processing, and disseminating information, including;

1. Identification and study of the information needs of users (This may be predetermined by national economic policy);
2. Provision of budget increases for the collection of materials (Budget concerns, not technical ones serve as the most significant barrier to information acquisition);
3. Establishment of a National Science Library that can cover comprehensive materials available only at the international level;
4. Acceptance of responsibility by major bookstores for materials in areas of high-technology from outside Korea;

5. Identification of international information centers, association, societies, publishers, marketing investigation industries, and other sources in order to access comprehensive technical information;

6. Provision to users of access points by using new information technology;

7. Provision of an efficient information storage and retrieval system;

8. Computerization of information systems for the distribution of information;

9. Creation for distributors of various information channels such as NTIS, JICST, and BLDSC through the use of new information technology;

10. Provision of information from foreign databases with a translated abstract in Korea, and translation of Korean databases into English to make possible an international information exchange;

11. Qualitative improvement in the efficiency of databases produced by several Korean information centers;

12. Delegation of responsibility to a central information agency for developing databases produced in Korea creating a Korean thesaurus in several fields, instead of delegating these roles to various information entities;

13. Training of information professionals with a strong subject background in the areas of science and technology, to be involved in managing information flow, specifically in developing a Korean thesaurus in specialized areas, standardizing vocabulary, indexing and abstracting;

14. Planning by the policy-makers at the national level (National

Central Library, Library of the Assembly, Seoul National University Library) of an information network, an "electronic library," so that information can be accessible on computers;

15. Interfacing the scientific and technical information network with a national computerized Education and Research Network, one of the national networks;

16. A major role for the government in developing and updating information retrieval languages in the areas of specialized science and technology;

17. Coordination of acquisition and cataloging among specialized information centers under the coordination of a national information agency;

18. Improving the KIET's information handling activities through;

- a. KIET's acting as a service-oriented agency;
- b. KIET's location under the Ministry of Science and Technology, for the control and coordination of scientific and technical information activities, rather than under the Ministry of Commerce;
- c. Development by KIET of a variety of information sources and provision of services efficiently

## V. RECOMMENDATIONS FOR MODEL INFORMATION NETWORK

The following are the recommendations for a model for a sci-



entific and technical information network for Korea that will help to facilitate information handling.

1. Along with a national information policy, financial and legislative support from the government is highly necessary. Therefore a committee such as the National Council on Library and Information Science (NCLIS) in the U.S. should be established, in order to institute direct communication with policy makers at the national level.

2. The majority of experts suggested that the Korea Institute of Economics and Technology (KIET) should be the national information center for carrying out the major functions or requirements for dissemination of scientific and technical information in Korea. In order to accomplish this purpose, KIET should have adequate authority given by the government and resources such as staff, funding, and information sources. In addition, it should exert leadership that can take charge of conducting major functions and guiding information centers and libraries in Korea.

3. The Daeduk Research Information Management Council, albeit designed for internal purposes within the area, should serve as one of the specialized information centers in a model information network because the Council consists of several information centers belonging to government-supported research and development institutes in their interest fields respectively, and because it has carried out some kind of resource sharing activities, such as photocopy service, interlibrary lending, and construction of a union catalog since the beginning of the eighties.

4. It is a truism that information centers supported by industry

do not take responsibility for developing and improving an information network because of their proprietary nature, although they usually tend to take advantage of its service. However, as one interviewee suggested, industry also should make a contribution in the development of a national information network. Perhaps a council of specialized information centers should be established.

5. Major large university libraries that support the science and engineering schools should take part in developing a model information network. They can form resource sharing networks with information centers or libraries within that area.

6. Some kind of coordinated acquisition activities should be developed among major information centers and libraries to eliminate unnecessary duplication of materials. Currently, information centers in Korea lack a clear coordinated collections policy and regulation of their role in analysis, collection, and dissemination of scientific and technical information from scientifically-developed countries to information users in the public and private sectors. In this function, KIET should act as the central information agency because it has comprehensive technical information, especially periodicals and patents. Much useful information from societies, meetings, associations, publishers outside of Korea is produced; thus several delegated information centers belonging to research and development institutes should be responsible for acquisition, analysis, comparison, and dissemination of this information. Information centers or libraries should be involved in developing and updating a union catalog for monographs and a union list for serials, as pra-

ctice in the National Center for Science Information Systems (NACSIS) in Japan.

7. Some kind of shared cataloging activities, a basic and an indispensable element of major information networks, such as OCLC, Research Library Information Network(RLIN), and Western Library Network(WLN), should be conducted by information centers and libraries in the areas of science and technology to reduce unnecessary efforts, along with the standardization of the system. KIET and a small number of major information centers and university libraries participate in this kind of cooperative cataloging program; these information agencies will serve as nodes of an information network. In order to accomplish that purpose, there should be some kind of coordination and interface by information centers and libraries in the following areas; classification schemes; cataloging rules; software; and hardware. In addition KIET should coordinate with the National Central Library (NCL) since NCL has already developed KORMARC and distributed catalog cards or MARC tapes.

8. There should be a variety of activities related to information storage and retrieval. One possible element of such activity might include provision of information from foreign databases with translated abstracts in Korean and translation of Korean databases into English. A second possible element might be qualitative and quantitative improvement in the efficiency (retrieval effectiveness) of databases produced by several information centers. A third possible element might be the development of a Korean thesaurus in specialized areas, standardizing vocabulary, and ind-

exing and abstracting. KIET should be responsible for developing databases produced in Korea and creating a Korean thesaurus in specialized fields for national purposes, while other information centers may be involved in the construction of databases for their internal use.

9. A linking system project like that of the Library of Congress, OCLC, RLIN, and WLN in the U.S. should be planned, in order to communicate among systems such as a National Online Research and Education Network and a University Information Network. Furthermore, it is indispensable for Korean information networks to extend their linking activities with OCLC, National Center for Science Information Systems(NACSIS), and other information systems at the international level. As Avram<sup>13)</sup> pointed out, with the LSP links, it will be possible for information centers to share bibliographic data and to extend interlibrary lending. Many experts in this study recognized the most serious difficulty or barrier in operating ongoing or new cooperative/system activities in Korea as a lack of standardization; the standardization among information systems should be maintained to facilitate intersystem communication that has been adopted in Standard Network Interconnection(SNI) for LSP in the U.S., following the principles of Open Systems Interconnection.<sup>14)</sup>

10. Diverse systems in information technology and telecommunication should be explored and employed by KIET. The policy-makers at the information centers at the national level (KIET, Seoul National University library, and major information centers in the areas of science and technology) should plan an

“electronic library,” so that information users can have a variety of access points with the use of new information technology. Electronic document systems that “electronically transfer the information from paper copy to laser printers or other output devices,”<sup>15)</sup> such as that being developed by the Defense Technical Information Center(DTIC), should be more applied also by information systems in Korea.

## VI. CONCLUSION

Despite the lack of resource sharing, several of the information centers are heavily involved in interlibrary loan services, photocopy services, and construction of union catalogs/lists. Twenty information centers currently participate in one or more types of information networks on the national or international level.

The most highly necessary function or requirements for a model information network for Korea expressed by respondents were “developing a national policy for science and technology information,” “Constructing national materials databases,” and “developing and updating information retrieval languages.” Many information centers supported by industry demand highly specialized and prepackaged information; these centers concentrate more on analyzing, acquiring, processing and disseminating the knowledge in the most efficient way, usually via computer processing. Therefore, the functions or requirements associated with information storage and retrieval system should have high priority in a model

information network.

The most serious barriers to development of an information network in Korea were seen to be "Inadequate financial resources," "a lack of standardization," and "lack of legislative and government support."

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## 정보자료실에서 효율적인 과학기술정보 배포를 위한 시스템개발 연구

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### 초 록

한 국가경제성장을 위해 국·내외 정보의 이용을 위한 효율적인 정보 시스템은 필수조건이라 할 수 있다. 이 연구의 목적은 한국에서 현재의 과학기술정보망을 연구 조사하고, 나아가 효율적인 과학기술정보 유통을 위해 제언을 하였다. 과학기술분야의 연구소를 보조하는 34개의 기술정보실이 연구대상이 되었다.

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