

LIBRARY AUTOMATION IN THE REPUBLIC OF CHINA

The Development of a National Bibliographic Network*

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ABSTRACT

The library automation in Taiwan Area of the Republic of China has been developed for more than twenty years, but systematic planning and development has only been implemented since 1981. This paper presents a brief description of the library automation development before 1981, outlines the library system progress during the ten years after 1981, and reassures the significant roles and functions of the national bibliographic network with a view to making the national bibliographic utilities more characteristic in the future exchange and promotion of bibliographic information.

Introduction

In this present age of information it has been commonly recognized that information has become man's daily necessity. To hold information means to possess wealth. Information is originally produced in the form of data from various activities in man's daily life. The records of these activities are the data collected by libraries. They will become information after systematic arrangement by libraries and computer processing. Therefore, libraries have turned out to be headquarters of information.

In early 1961, the government of the Republic of China began to use computers to handle administrative information and organizations responsible for finance, budgets, accounting, and statistics as well as national

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defense. In order to strengthen the overall information development, the Executive Yuan organized the "Information Development Working Group" in March 1982. After careful investigations, data collection and discussions with representatives of various organizations, the Executive Yuan completed the planning for the national information system. Based on the topic principles of "policy orientation" and "integrated planning but separate operation," information is divided into six systems, namely, basic national information, general administrative information, economic development information, national security information, communication development information, and science and technology development information. There are several subsystems under these six systems. Library information system is a subsystem of the science and technology development information system with the Ministry of Education and National Science Council responsible for its coordination and development.¹

The Origin and Development of Library Automation

Computers have been used for data processing since 1960 in Taiwan but they have been remarkably applied in library operations only until recent years. Library automation development can be traced in three aspects:²

1. Experimental Period (1961-1971)

Computers were mainly used for teaching and research work during this experimental period. They were actually used for data processing only in 1965 when the Taiwan Sugar Company first used an IBM-1440 computer in handling their accounts and payrolls. Since then businesses and industries have begun to use computers for data management.

In the library scene in the same period, the Library of Congress MARC tapes were first brought into experimental use by the Library of the National Chung Shan Institute of Science for reproduction of card cataloging in western languages. Tamkang University installed an IBM 370/138 for western languages materials cataloging. These two cases were regarded as pioneers in library automation in the Republic of China.

During this period, people only knew that computers could be used for library data processing but they still did not have a very clear idea about the concept of library automation.

2. Local Library Development (1972-1981)

With the influences of the library development abroad and the impacts from the progress of computer technology, the Science and Technology Information Center of the National Science Council first initiated in 1973 the printing of the third edition of the *Union List of Scientific Serials in the Republic of China*. This was the first copy of the union catalog printed by computers in the Republic of China and marked the beginning of automated cataloging in Taiwan.

The National Chung Shan Institute of Science began in 1974 to use the Library of Congress MARC tapes for producing cataloging cards in western languages and the Institute completed the planning for its integrated library operations in 1978.

The National Taiwan Normal University set up the Chinese Educational Database in 1978. It then produced the printed form of *Educational Articles Abstracts*, No.3, in 1980 and introduced in May of the same year the ORBIT and DIALOG systems from the Universal Database Access Service (UDAS) for the university library information retrieval system.

After 1979, the library automation in Taiwan has grown and developed to a larger extent like bamboo shoots in spring. Libraries at various levels had been emphasizing computerizing their operations but the effects in automation were not satisfactory due to lack of coordination and integrated planning for the overall development.

3. National Planning and Development (1982-Present)

A Library Automation Planning Committee was organized in 1980 by the Library Association of China (LAC) and the National Central Library (NCL) to work out a plan for the national library automation development with the authorization and financial support from the Ministry of Education. The missions of the Committee are to improve the data management, raise the quality of information services, meet the requirements for the integrated development of the library automation, and cope with new trends in the foreign information and cultural exchange. In order to achieve their missions, the Committee has implemented the following tasks:

a. Formulation of National Standard Formats

To standardize the library automation process, the LAC and the NCL have jointly worked on the formulation of the following formats:

- i. Chinese MARC format
 - ii. Chinese Cataloging Rules
 - iii. Chinese Subject Headings
- b. Establishment of a National Chinese Bibliographic Database
All acquisition and book exchange data collected by the NCL should be in Chinese MARC format. At the same time, all academic libraries in the Taiwan area had then been invited to have their newly-collected data sent to NCL process as national bibliographic records and their old collections would gradually be transferred to NCL.
- c. Planning for a National Information Network
Setting up a national information network is the ultimate objective for automation and also the concrete operation for international cooperation. The network has been jointly worked out by the national academic and research libraries as well as information agencies. There will be four regional public library networks in the Taiwan area, namely, a center each in the east, south, west and north area, and two special library networks which are the scientific and agricultural information networks. The NCL has served as a national information center which is responsible for the point-to-point online operation since the beginning of this project. The NCL has also carried out in priority the following two operations and services:
 - i. Implementation of the online operation system -- by starting from the cooperative cataloging
 - ii. Special Topics Selection Retrieval Services, a SDI service.

Information Systems Establishment and Development³

1. The National Central Library Automated Information Service (NCLAIS) and the National Plan Implementation
 - a. To actively establish the National Bibliographic Database and develop the Integrated Operation System:
Since the Chinese MARC format was developed in 1981 it has been used by the NCL as the basis for establishing the national bibliographic database. Bibliographic data of all books published in the Taiwan Area and even those

Western-languages books acquired from abroad were stored in the format. The Chinese MARC Database contains data in Chinese and non-Chinese languages in forms of books, periodicals, government documents, audio-visual materials, etc., and is an integrated database established in one format. It is characterized with its multiple contents, languages and functions. The acquisitions, cataloging, circulation and reference service of NCL is a series of continuous and connected operations because the data collected in each sector may be a cornerstone or reference for those in another. For instance, the procured books input from acquisition may be used for cataloging while those bibliographic data from cataloging may be in turn useful to the circulation section. These operations of various sections will not be overlapping but will become integrated in one system.

- b. To introduce foreign languages bibliographic databases from abroad and to transfer them to the National Bibliographic Data for its accelerated development:

The LC MARC tapes were introduced to the NCL in October 1983 for conversion of the western language bibliographic database. In 1986 the Bibliofile was used by NCL through Library Cooperation in the U.S. to expedite the establishment of the western language bibliographic database. Online access to OCLC was started in April 1988. All western language bibliographic data that could not be obtained from the LC MARC tapes or Bibliofile could now be made available from foreign bibliographic database, such as OCLC, through satellite transmission and had them converted to the Chinese MARC Database.

- c. To render The National Bibliographic Database Services

- i. Computer productions

In order to promote computer operation products for the purpose of sharing the automation achievements, NCL has begun to render the following services since May 1981:

- Card catalog service;
- *Cumulation Chinese National Bibliography*, 1981 - Monthly and annual;

- *Index to Chinese Periodicals Literature*, Vol. 14, No. 5, (March - May, 1983). Quarterly and annual cumulation (in Chinese);
- *Union List of Chinese Serials*, 2nd ed, 1982, 2 vols.;
- *Index to Chinese Office Gazettes*, Vol. 1, No. 1 (January - April, 1984). Quarterly and annual cumulation;
- *ISBN Newsletter* (Chinese Forthcoming Books), No. 1 (March, 1990). Monthly.

ii. Online searching service: OPAC

The National Central Library Automated Information Service (NCLAIS) provides not only librarians with online services in the area of acquisitions, cataloging and serial control but also patrons with online searching service to acquire the bibliographic records of the NCL's database. There are more than 13 access points for retrieving the bibliographic data of books and serials such as Chinese Subject Headings, Chinese Titles, Chinese Author, Chinese Corporate Body, LC Subject Headings, Title and Author in Romanization and English, ISBN, ISSN, CODEN, Chinese Classification Number, SYSID Number (System Identification Number), boolean logic searching, etc.

iii. Chinese MARC Database on CD-ROM

To meet the domestic and international requirements of cataloging and bibliographic information retrieval, this program has been designed and formulated since July 1988 and scheduled to be implemented in January 1991. Since then, the national Chinese bibliography could be accessed by libraries at all levels with an IBM-PC or compatible equipped with an optical disc drive.

2. Science and Technology Information Center (STIC) System of the National Science Council⁴

a. System Objectives

The Science and Technology Information Center of the National Science Council of the Executive Yuan has developed various information systems since September 1982 and has reinforced the scientific research information automation retrieval service in accordance with the "science and technology information system" under the "national information system" so as to gradually establish the science and technology management information system and the automation for various operations. During this automation process, foreign information databases have been introduced into Taiwan and researches have been done on how to promote the functions of information service and render effective information service.

There are two main objectives for the development of STIC:

- i. To establish the automation system for domestic science literature in accordance with the requirements for information service by its own Information Center in order to improve the quality and efficiency of its services.
- ii. To develop the keynote science information systems through close contacts with other domestic science and technology institutions in order to explore the science and technology information networks in Taiwan or abroad.

b. System Scope and Service

In order to provide online retrieval service the STIC introduced eleven information systems from abroad including: COMPENDEX (Computerized Engineering Index), western languages science periodicals systems, computer-assisted microfiches retrieval service, western languages periodicals union acquisition system, management information system, science and technology thesaurus, science and technology management policy reference database system, science periodicals literature abstracts, dissertation abstracts, abstracts of researchers' reports on science and technology, and generalized online retrieval system (GORES).

3. Agricultural Information Management System of the Agricultural Science Information Center -- AIMS⁵
 - a. System Objectives
To set up a national agricultural science information network.
 - b. System Scope and Service
To develop by itself several subsystems in the areas of cataloging, authority control, serial control, acquisitions, etc. so as to provide online information retrieval service.
4. Tamkang Automated Library Integrated System -- TALIS⁶
 - a. System Objectives
To automate the library operations of Tamkang University in order to enhance the multiple, cooperative, internationalized and pragmatic development of the University library.
 - b. System Scope and Service
The scope of TALIS covers subsystems of cataloging, acquisitions, circulation, and serials control; its service is to provide online information retrieval to all faculties and students of the University.

Aside from the above-mentioned various systems, special systems have been developed by several institutions for their own exclusive automation requirements such as the Legislative Information System initiated by the Legislative Yuan, Historical Documents Database System established by the Academia Sinica, etc.

The Development of the National Bibliographic Information Network⁷

In the 1980s with the rise of the development of network system and bibliographic utilities, every country has started to use online operation for developing bibliographic network and working on the interlibrary cooperation program so as to make library collection and unpublished data traceable and accessible. For instance, BLAISE (British Library Automated Information Service) in Great Britain; UTLAS (University of Toronto Library Automation Systems) in Canada; OCLC (Online Computer Library Center), RLIN (Research Library Information Network), and WLN (Washington Library Network or Western Library Network, as it is renamed now) in the United States. All these bibliographic networks are to accelerate

the speed and raise the efficiency of library data processing, to save manpower and expenses in technical service offered by each library, and to facilitate resources sharing. During the past three years, the National Central Library has kept on advocating and promoting the national bibliographic information center and bibliographic information network but the progress has been very slow due to the subjective and objective factors. However, with the integrated, planned and systematic development as well as the full support of the government, the online cooperative cataloging and online retrieval can be developed in the future by converting the current off-line cooperative cataloging into online cooperative cataloging. The highlights and development procedures are as follows:

1. **Developing Academic Library Information Network**
The terminals or personal computers and online facilities provided by the NCL, Taiwan Branch Library and 15 national college and university libraries were first to have point-to-point online operation in August 1990 and, later, a regional network system of the academic libraries will be developed.
2. **Phase-in of the Public Library Information Network**
Based on the administrative channels of Taiwan Province, the public library information network should be established mainly at various county and municipal libraries of cultural centers. For actual effect the establishment should be proceeded from villages to towns, counties to cities, and finally from regions to the whole province. With the location and service scope in consideration, various public libraries in Taiwan can be categorized into four areas: East, West, South and North, and a regional network center should be set up in each area for the complete framework.
3. **Linking Technological & Special Library Information Network**
Efforts are to be made for linking the well-established Science and Technology Information Center (STIC) and the Agriculture Information System (AGRIS) within the national network in order to make the network a very useful utility with all kinds of information available.

With the advancement of computer technology in recent years and the development of microcomputers, it has been more convenient for libraries large or small to make use of computers. And owing to the cost reduction and the enhancement of functions of telecommunication network, the libraries may share through the network system those achievements of automation outside the

library circle. Therefore, in order to develop the integrated operation of the bibliographic information network and offer newer and more rapid information service, NCL must break through the bottleneck in the current operation system and strive on for the development of the following functions:

a. **Bridging the Gap Among Different Systems:**

In future years, the international or national networks system should be made accessible to libraries for bibliographic information service, cooperative cataloging, interlibrary loan, electric mail and reference service, and different systems should be made mutually communicable so that their information services and products can be available through computer networks.

As a matter-of-fact, the three large network systems in the United States--OCLC, RLIN and WLN have been made mutually accessible since 1980 through the researches and experiments of the Linked System Project of the Library of Congress.

b. **Providing Multi-functional Workstations:**

The multi-functional workstations will become librarians' or readers' terminals in the future. Actually, this trend has been adopted by the two network systems, OCLC and RLIN. OCLC's M300 workstation (modified IBM-PC) and M350 (modified WYSE-PC) have been served as terminals for online access through commercial communication systems, such as Tymnet or Telenet or CompuServe, through telephone lines and modems. Besides, they can also be regarded as general PCs and perform other programs. Such multi-functional workstations are linkable with other systems to keep the obtained data on magnetic tapes, disks or other media for storage and as input to the computer system of their own library through file transfer programs.

The establishment of library bibliographic networks is the expansion and elevation of library operations. The networks are accessible through computer terminals or personal computers. Libraries can carry out online cooperative cataloging and bibliographic retrieval, and interlibrary loan through telecommunication networks and

online operations of the bibliographic database. The diagram for the future networks is shown as follows:

Conclusion⁸

To any automation system, it must have a profound understanding, an accurate concept, an assured direction and a systematic promotion to bring about the anticipated achievements. The library automation development is no exception. To set up an effective library automation system it is necessary to have computers as tools, the support and participation of leaders, and the integrated and prospective planning guidelines regulated by related organizations of the government, in which lies the success of a developed system.

A popular saying goes like this: "The age of the 1990s is an age of knowledge production and information exchange." The agriculture and industry-intensive society has been gradually replaced by an information-oriented one. The information explosion will abruptly change the social and economic structure of Taiwan. In face of this information age people have accepted computers instead of telegrams and telephones as the more popular means for "real-time" communication and friendship promotion. How to set up an effective and widespread communication system network to meet the current requirements is really a very important task. In order to keep up with the times, independent library automation systems have been gradually converted into the information networks.

Therefore, in setting up library networks for information service systems, the following basic principles must be taken into consideration:

1. To disseminate broadly the concept and knowledge of the national library information application
2. To make detailed and overall integrated planning and work out an effective scheme for implementation in proper order
3. To explore the information required by domestic "library patrons" and promote the effective utilization of computers
4. To activate a library information development center.

It will be very ideal to have all the current information networks combined into one large-scale joint network for application nationwide if more attention can be paid to the future trends of information development, the formulation of proper policies, the concentration of manpower, the unification of funds and the promotion of research development to a larger extent.

In short, the establishment of information networks is an overall development and the library information network is only one aspect of it. The library profession must have an integrated and comprehensive to idea plan for it and gradually to carry it out so as to have it merged into an integrated information system network.

NOTES

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