CHAPTER IV

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CHAPTER IV

LIBRARY AUTOMATION AND NETWORKING IN DENTAL COLLEGE LIBRARIES

4.1 HISTORICAL BACKGROUND

A process of great change has been taking place today in libraries due to the impact of information technology and application of computers in library work. We hear a lot about library automation in libraries and library automation is nothing but application of machines viz. computers to the routine library housekeeping operations such as acquisition, serial control cataloguing and circulation. Before proceeding into the depth of library automation, it is necessary to know the historical background of automation. Automation of library has passed through several of development, which can be divided into 3 phases:

4.1.1 Experimental Phase (1930-1960)
4.1.2 Local systems Phase (1960-1970)
4.1.3 Co-operative Systems Phase (1970-)

4.1.1 EXPERIMENTAL PHASE (1930-1960)

The first application of automatic data processing equipments in libraries can be traced back to 1936 when the University of Texas adapted a mechanical system for its circulation function. In the first half of the 20th century, i.e. in the early 1960s library automation began especially in the U.S.A. after the World War II. During this period, many libraries in North America and in the U.K began to experiment processing of information by using computers. Many techniques were introduced in the universities and national libraries. Several of these systems were like tabulators, sorters; punched cards were used for circulation i.e. for providing books on loan, serial control, acquisition, cataloguing etc. (Laxminarayan, 1986).
In the U.K. the Public Libraries of Camden and West Sussex and the University libraries of Newcastle and Southampton were involved in the Experimental phase. Many systems such as edge-notched cards, optical coincidence, punched cards, and early computers developed during this phase failed due to the following reasons:

1. Computer technology at that time was inadequate.
2. Librarians were not sufficiently definitive in their requirements of the computer based system.
3. Computer people thought that they knew the librarians’ requirements of the computer based system.
4. It was thought that all the individual systems in a library should be simultaneously converted to computer based. (Tedd, 1977).

4.1.2 LOCAL SYSTEMS PHASE (1960-1970)

This period applied general purpose digital computer for retrieval of information. In this era, the computers were applied offline. During this period, many librarians made use of the computer as a tool in the organization of many of the library’s procedures. Most of these systems were developed locally, either in an academic library, special library or public library. In this phase focus was mostly on acquisition, cataloguing and circulation process. During this phase, OPAC i.e. Online Public Access Catalogue was in an experimental stage in the U.S.A. During this phase, Machine Readable Catalogue i.e. MARC came into existence in year 1963 at the Library of Congress, U.S.A for providing standardization in automation. In 1967, the Ohio College Library Centre (OCLC) was set up which is an online system which marked the beginning of cooperative systems and union catalogue. In 1969, the Library of Congress started distribution of records in the new MARC II format. (Tedd, 1977).

4.1.3 COOPERATIVE SYSTEMS PHASE (1970-)

In the 1970s there has been an increase in library cooperation and resource sharing by libraries developing computer based systems. In this phase, designing of online systems and conversion of batch systems into online mode was done and also
the growth of library network and databases were seen in these Phase. Here magnetic tapes and floppy disks were used for storing information. In the 1980s there was in intensive use of online systems networks, optical disks, CD-ROMs etc. In this period, microcomputers came to be used in libraries. Late on through Internet and library networks, all processes of libraries were integrated. (Rajagopalan, 1986).

Kaul (1999) has given the growth of library automation can be better understood from the following table:

**TABLE -4.1**

**GROWTH OF LIBRARY AUTOMATION**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DEVELOPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940-1949</td>
<td>Semi-mechanical applications including edge-notched cards, optical coincidence, peek-a-boo cards.</td>
</tr>
<tr>
<td>1950-1959</td>
<td>Use of punched cards, data processing equipments, early computers and micro image searching systems.</td>
</tr>
<tr>
<td>1960-1969</td>
<td>Application of general purpose digital computers, feasibility studies of online interactive and advance micro image systems, experiments in library networking.</td>
</tr>
<tr>
<td>1970-1979</td>
<td>Design of online systems and conversion of batch systems into online mode, growth of library network and databases.</td>
</tr>
<tr>
<td>1980-1989</td>
<td>Intensive use of online systems, networks, mini and microcomputers, optical disks, CD-ROMs, FAX etc.</td>
</tr>
<tr>
<td>1990s</td>
<td>Use of internet and library networks aims towards higher levels of computer application such as recording through electronic media, artificial intelligence etc.</td>
</tr>
</tbody>
</table>

**4.1.1 LIBRARY AUTOMATION**

In India, some libraries and information centers made efforts to ‘automate’ their library routines and information services in 1960s with punch card and with a couple of second generation general computers that were available at Kanpur and Bombay. INSDOC was the leader in experimenting with computers for their application in documentation and information work in 1964. Initially they made use
of the IBM 1620 Model I that was available at IIT Kanpur. The first attempt was with work on data collected for union catalogue of scientific serial. *(Raizada, 1965).*

Haravu carried out an experiment with IBM 1620 in computerized data retrieval as part of this course in documentation and reprography, conducted by INSDOC, with the cooperation of Raizada who initiated computerization in INSDOC. The objective of his experiment was to find out the suitability of IBM 1620 computer for storage and retrieval of data. The program for this experiment was written in FORTRAN 11 D language. The programming done in this experiment may be considered under three heads: For storage of data, Retrieval of data and Presenting the data in an intelligible form. The data on the code sheets was key punched and verified. *(Haravu & Raizada, 1967).*

The next experiment carried out at INSDOC in computerization was on preparing author and subject indexes to Indian Science Abstracts. In 1969, an attempt was made to develop a complete and integrated program deck to process union catalogue for Mysore (now Karnataka) using the computer facility at Delhi School of Economics. It is said that the computer system posed certain problems for this data file, through finally the main part with indexes was produced. To overcome the problem of on-line storage limitations, the INSDOC completely redesigned the work to suit the IBM 360/44 computer at the Delhi University computer centre. *(Murty & Arora, 1974).*

Harold Borko of the system Development Corporation Santa Monica California submitted a paper on ‘Experimental Studies in Automated Document Classification’ wherein he presented his studies in the use of Factor Analysis- a mathematical technique for deriving classification categories for a set of documents. In an automated classification, the class membership is determined on the basis of the words contained in the documents and the documents can be ordered into classes on the basis of similarities or differences in vocabulary. He had investigated the application of factor analysis to these problems of document classification. He concluded that the techniques of automated document classification can be used to organize specialized document collections. *(Harold, 1966).*
Dr. H.P. Luhn had organized computerized indexes in 1950s. Computers entered and found some place in American libraries during this decade. However their use and application was very limited and restricted due to the high cost of hardware and non-availability of application software packages. During 1960s the cost of hardware was slashed down and appreciable attempts were made towards development of library application packages. This led to increased use of computers in libraries and printing industries. In April 1960 the American Chemical Society published its ‘Chemical Titles’ through computers. In this direction was seen in MARC I. In the year 1963 W.K. Gilbert prepared a report on computerization of Library of Congress. On the basis of this report of MARC I project was started in 1966, and the work of bringing out of the Library of Congress Catalog in Machine Readable Catalog (MARC) form was started and completed. Now-a-days computers have become almost essential components of library work in developing countries.

The Indian Statistical Institute, Calcutta was first in India to install a computer system in 1955, and to develop an indigenous computer in 1964. In India computers were used in library work for the first time possibly by INSDOC when they computerized the author and subject indexes of ‘Indian Science Abstract’ in 1965. In 1967 the INSDOC brought out the ‘Roster of Indian Scientific and Technical Translators’ with the help of computers. In 1978 INSDOC initiated SDI service as a NISSAT project with Chemical Abstracts and INSPEC data-bases, with the use of CAN/SDI software of IIT, Madras. In 1970s many libraries ventured in preparing computerized databases. Through the initiative and financial support of NISSAT many library networks were initiated and are operative. Notables of these networks are CALIBNET (Calcutta Library Network) and DELNET (Delhi Libraries Network), INFLIBNET (Information & Library Network) PUNENET (Pune Library Network) etc. Among other networks are notable are NICNET, INDONET, SIRNET etc. Now-a-days many institutions such as DRTC, INSDOC, DESIDOC, NISSAT etc. are engaged in imparting training for computer application in library work through regular, sponsored and adhoc courses. The price of computer hardware and software has been considerably reduced. Owing to these factors computers have become popular with Indian libraries. (Pandey, 1995).
The real boost in library automation came from the establishment of INFLIBNET. Before INFLIBNET, scattered efforts were being made in academic libraries especially in institution of special characters like IITS, IIMS etc. INFLIBNET proved a real catalyst by providing finance and laying standards. (Singh, 2003).

4.2 MEANING OF AUTOMATION

The word “automation” has been derived form Greek word “automose” means something, which has power of spontaneous motion or self-movement. The term “automation” was first introduced by D.S. Harder in 1936, who was then with General Motor Company in the U.S. He used the term automation to mean automatic handling of parts between progressive production processes.

Automation is technology of automatic working in which the handling method, the process and design of professional material are integrated. This is the effort to achieve an automatic and self-regulating chain of processes.

According to Webster’s Third New International Dictionary of English Languages, automation is, “the techniques of making an apparatus, a process or a system operate automatically”. In other words, it is the machinery that mathematically manipulates information storing, selects, presents and records input data or internally generated data. Mechanization of library house-keeping operations predominantly by computers is known as library automation. (Gove, 1986).

According to Encyclopedia of Library and Information Science, “automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation”. (Kent, 1977)

According to McGraw Hill Encyclopedia of Science and Technology
It defines automation as “a coined word having no precise generally accepted technical meaning but widely used to imply the concept, development, or use of highly automatic machinery or control systems”. (McGraw, 1982)
According to Webster’s Third new International Dictionary of English Language Automation is defined as “automatically controlled operation of an apparatus, process or system by mechanical or electronic device that takes place of human organs of observation, effort and decision”. (Gove, 1966)

According to the Oxford English Dictionary

It defines automation as “application of automatic control to any branch of industry or science by extension, the use of electronic or mechanical devices to replace human labour”. (Simpson & Weiner, 1989).

4.3 MEANING OF LIBRARY AUTOMATION

Library automation, stated in single term, is the application of computers and utilization of computer based product and services in the performance of different library operations and functions in provision of various services and production of output products.

There is a great impact of computers and information technology and its application on the libraries due to which a process of great change is taking place in libraries. Modern technology is tending to alter radically the nature of our society and affect the prevailing economic, political and social values and libraries are also in the process. Industrialized countries were the first to realize that in the context of stock of knowledge, classical approaches relating to storage, retrieval and utilization of the information were no longer adequate and effective and that the solution lay in making fullest use of new developments in electronics, computer, telecommunications and micro-recording etc.

Our country is very much behind in computer application in library operations and services. The reasons could be many; however, the situation is changing fast. Conditions are turning to be favorable and also the government is laying great emphasis on modernization, which covers libraries as well. Above all library
professionals are getting motivated and showing keenness to get trained to take up computer based work. (Harinarayana, 1991).

Library automation implies a high degree of mechanization of various routine and repetitive tasks to be performed by human beings. With the advent of automation, the human intervention is reduced to a great extent. The appearance of computer has greatly increased the library automation. In addition to computer advancement, telecommunication and audio-visual technologies gave way to new possibilities in information handling in India; the use of computers is limited to only some specialized libraries unlike the case of developed countries. Library automation includes use of computers and other semi-automatic devices like punched cards to reprography. These are semi-automatic because human intervention is greater in extent. So, when we talk of library automation, these days, it is principally the use of computers; associated peripheral media (magnetic tapes, disks, optical media, etc); computer based products and services in library work.

4.4 DEFINITION OF LIBRARY AUTOMATION

4.4.1. Library automation may be defined as the application of automatic and semiautomatic data processing machines (computers) to perform traditional library housekeeping activities such as acquisition, circulation, cataloguing and reference and serials control. Today “Library Automation” is by far the most commonly used terms to describe the mechanization of library activities using the computer. (Uddin, 2009).

4.4.2. Encyclopedia of Library and Information Sciences

“Library Automation is the use of automatic and semiautomatic data processing machines to perform such traditional library activities as acquisitions, cataloguing, and circulation. These activities are not necessarily performed in traditional ways, the activities themselves are those traditionally associated with libraries; library automation may thus be distinguished from related fields such as
information retrieval fields such as information retrieval, automatic indexing and abstracting and automatic textual analysis” (Kent, 1977).

4.5 OBJECTIVES OF LIBRARY AUTOMATION

1. To maintain bibliographical records of all the materials, in a computerized form.
2. To provide bibliographical details through a single enumerative access point of holdings of a library.
3. To reduce the repetition in the technical processes of housekeeping operations.
4. To provide access to information at a faster rate.
5. To share the resources through library networking.
6. To implement new IT processes to provide high quality information.

4.6 NEED FOR LIBRARY AUTOMATION

From the above definitions, we can say that the need of library automation has several reasons. Need of computers is present in all areas depending upon its usage. They range from acquisition control, serial control, and cataloguing and circulation control. They are also used for library manager’s evaluation of reports, statistics, etc. For the good administration of the library computers are used in all levels of work. Above all, the unique characteristics of computer made it the right choice for the library world. Computers right from the beginning are considered to aid man, in doing various operations.

4.6.1 Computers help in the following are.

1. Capacity to handle any amount of data and information.
2. Participating in network programmers and resource sharing.
3. Flexibility in information search.
4. Standardization of library procedures.
5. Speedy processing of information and its retrieval.
6. Provide better bibliographic control at local/regional/national and international level.
7. Facilitate interdisciplinary nature of research and information.
8. Economic implication of latest information technology.
9. Overcome geographical and other barriers to communication.

4.6.2 The library services, products and increase its awareness to promote the use of libraries:

1. Avoid retyping if we want to include or delete any matter, thus saving time and energy.
2. Retrieve much more precise and accurate information in less time as compared to manual search.
3. Get printed list of a specific subject within a few minutes.
4. Heavy bulk of data can be stored in the computer and thus certain problems, which arise with storing records in wooden cabinet, are avoided. (Jain, 1987).

Due to these advantages of a computer, computer became a universally accepted tool to provide assistance to man in all fields. In the field of Library Science, the need for making use of computers i.e. library automation was felt due to the following reasons:

4.6.2.1. Traditional methods for handling information are inadequate.

This age is termed as the ‘information age’ because large amount of information is being generated every moment. This information which is generated is stored and retrieved in a library which is used by the users. In the libraries, there are various methods of handling of information like providing reference service, cataloguing etc. due to the information explosion, these traditional methods of handling information have become inadequate and hence automation is necessary.
4.6.2.2. Difficult to update information due to voluminous increase and rise in degree of specialization.

Due to increase in research activities, and interdisciplinary specialization in different fields, there is the result of information explosion and due to this it becomes very difficult for the libraries and information centers to update the information. Hence library automation is necessary.

4.6.2.3. Techniques are suggested for applying the computers with its advantage of speed, vast storage capacity and accuracy in library work.

These three, viz. speed, storage and accuracy are some of the characteristics of a computer, which permits humans to rely on computers in dong certain operations.

4.6.2.4. Need for cooperation and resource sharing.

No library in this world is self-sufficient and therefore to satisfy its users’ demands, the concept of resource sharing comes into existence. In resource sharing the resources of one library are lent to another library for a stipulated period of time. So, library automation helps to promote resource sharing by saving a lot of time and effort of library staff as well as the users. (Verma, & Raj, 1997).

4.6.2.5. Operational advantages of computer are:

(Dhiman, 2003) has given the following operational advantages of computers are.

1. Offers flexibility.
2. Speed up processing.
3. Greater accuracy, efficiency, consistency and improved work control.
4. Reduce repetitive clerical work.
5. Permit bibliographic control, checking and updating.
6. Inability of users to explore unlimited literature and information of interest.
7. Wastage of lot of precious time in handling routine and repetitive library operations.
8. To introduce and provide new services revitalize the existing services by providing faster access to the resources.
9. Retrieval of information and dissemination of information in user defined format becomes easy.

4.7 ADVANTAGES OF LIBRARY AUTOMATION

Many activities of a library are routine in nature; a few are repetitive. Automation of these activities helps in managing the library's resources in a better way at the same time saving time, money and manpower. For example, once the bibliographic details like author, title, edition, publisher, price, ISBN number, etc are entered at the time of ordering, the same data can be used for accessioning, cataloguing (OPAC), and circulation. Other important factors associated with automation are speed, and accuracy. One can imagine the time saved in literature searches and in preparing bibliographies. Automation also offers freedom from doing repetitive and routine works as well as enables providing efficient services properly and more efficiently cutting down time and improving productivity. Automation also facilitates generation of a number of reports for better decision making in the effective management of the library. Availability of various statistical and other usage reports and performance reports will ensure better appreciation from library users. For example, vendor performance analysis is possible. Subject-wise or project department-wise budget can be monitored. Circulation data can provide information on titles that are in great demand so that more copies can be procured if needed. Many current awareness services like current additions, contents of books and journals, etc can also be provided to users. (Moorthy, 2004)

4.8 STEPS IN LIBRARY AUTOMATION

Since automation of a library is an important and essential step, it should be properly planned and implemented. Hence, while considering library automation a series of steps have to be undertaken as follows:
4.8. 1. FEASIBILITY STUDY OF THE SYSTEM

The aim of feasibility study is to determine if this is achievable, if the benefits outweigh the disadvantages and to examine alternative solutions. It is designed to answer these questions:

1. Is the proposed system realistic?
2. Is it necessary?
3. What other options are available?
4. Is it affordable?

The final output of the feasibility study is a report to be presented to the management. (Large, 2006).

4.8. 2. HARDWARE

When automating the library, the hardware to be procured should also be given a thought. Today, different types of hardware are available in the market and due to new kinds of hardware available in the market; the earlier ones are getting outdated soon. Also, while procuring the hardware, it should be seen whether the software which will be implemented will be compatible with the hardware procured.

4.8. 3. SOFTWARE

The term software refers to a set of computer programmes, procedures, and associated documents (flow charts, manuals, etc.) that describe the programme and how they are to be used. To be precise, software is a collection of programmes to enhance the working capabilities of the hardware. Software is a set of programmes written or developed to enable the computer to do desired operations. (Pandey, 1995).

It is one of the most important components which should be taken notice of, while automation. Today, a number of application software are available in the market manufactured by different companies of India and abroad with distinct feature and hence while selecting software.
Manjunath (2006) has given the following criteria.

3.1 Who has developed the software? Whether institution or company or an individual?
   In such a case, first preference should be given for an institution and second preference should be given for software developed by a company. Software developed by an individual should be as far as possible avoided because there will be no continuity in the software.

3.2 How many times the software has been revised since its first launch?

3.3 How many parameters are available for each module?

3.4 Whether the software has the facility to import bibliographic data available in ISO 2709 format and at the same time export data in this format.

3.5 Whether the software is user friendly and menu driven to facilitate access?

3.6 Whether training and guidance will be provided after installation?

3.7 If it will be available to operate on major operating systems and in multi-user environment.

3.8 Whether it is web interface able and supports data security through password?

3.9 Whether it can be interfaced with email system of the campus network?

3.10 How many installations it has got in the country, since when and its major clients?

3.11 Whether it can offer OPAC and different rights to different logins?

3.12 Cost of the software has also to be taken into account and compared with different software available in the market. This is important because if particular software provides good facilities but if the cost is very high, and software provides the similar facilities with slightly less cost then the later will be preferred. Therefore, comparative study of the cost factor of different software should be done before installation.

There are different types of software manufactured by different companies and institutions, each of which has distinct features.
Mahapatra & Ramesh (2004) has given the following table provides a list of different software’s packages used for automation and the name of their manufacturing companies.

**TABLE 4.2**

**NAME OF THE SOFTWARE AND MANUFACTURER**

<table>
<thead>
<tr>
<th>SR. NO</th>
<th>NAME OF THE SOFTWARE</th>
<th>MANUFACTURER</th>
<th>PLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARCHIVES</td>
<td>MIFIFAX Electronics Ltd.</td>
<td>Mumbai</td>
</tr>
<tr>
<td>2</td>
<td>CDS/ISIS</td>
<td>UNESCO</td>
<td>Paris</td>
</tr>
<tr>
<td>3</td>
<td>DELSIS</td>
<td>Libsys Corporation</td>
<td>New Delhi</td>
</tr>
<tr>
<td>4</td>
<td>GRANTHALAYA</td>
<td>NISCAIR</td>
<td>New Delhi</td>
</tr>
<tr>
<td>5</td>
<td>LIBMAN</td>
<td>Datapro Consultancy Service</td>
<td>Pune</td>
</tr>
<tr>
<td>6</td>
<td>LIBRIS</td>
<td>Frontier.I.T. Pvt. Ltd.</td>
<td>Hyderabad</td>
</tr>
<tr>
<td>7</td>
<td>LIBSUITE</td>
<td>Softaid Computer Pvt. Ltd.</td>
<td>Pune</td>
</tr>
<tr>
<td>8</td>
<td>LIBSYS</td>
<td>Libsys Corporation</td>
<td>New Delhi</td>
</tr>
<tr>
<td>9</td>
<td>MAITRAYEE</td>
<td>CMC Ltd.</td>
<td>Kolkata</td>
</tr>
<tr>
<td>10</td>
<td>NEWGENLIB</td>
<td>Kesavan Institute of Information and Knowledge Management</td>
<td>Hyderabad</td>
</tr>
<tr>
<td>11</td>
<td>MINISIS</td>
<td>International Development Research Centre</td>
<td>Canada</td>
</tr>
<tr>
<td>12</td>
<td>OASIS for DOS</td>
<td>Softlink Pvt.</td>
<td>Australia</td>
</tr>
<tr>
<td>13</td>
<td>SANJAY</td>
<td>DESIDOC</td>
<td>New Delhi</td>
</tr>
<tr>
<td>14</td>
<td>SLIM</td>
<td>ALGORYTHMS Co.</td>
<td>Pune</td>
</tr>
<tr>
<td>15</td>
<td>SOUL</td>
<td>INFLIBNET</td>
<td>Ahmedabad</td>
</tr>
<tr>
<td>16</td>
<td>TULIP</td>
<td>Tata Unisys</td>
<td>Noida</td>
</tr>
<tr>
<td>17</td>
<td>WILISYS</td>
<td>WIPRO India</td>
<td>Bangalore</td>
</tr>
</tbody>
</table>

4.8.4. **BUDGET.**

When planning for library automation and networking sufficient funds has to be provided by the institution or the funding agencies for purchasing of hardware, software, furniture etc. It should be noted that if sufficient funds are not available for
purchasing the entire software, then the library should automate only those areas, which are of utmost importance and then later on go for overall automation modules.

4.8.5. TRAINING

Manpower or personnel of the library is also an essential necessity. To provide effective and efficient services to the users, the staff should be provided training about the computers, how to work on computers, and the essential features of the software adopted and how the software is used.

4.9 IMPLEMENTING LIBRARY AUTOMATION

Library automation, which started in late 70’s in few special libraries, has now reached the university libraries. It is yet to take off in college libraries in India. Library automation refers to the use of computers in the routine and important services of a library. Automation of a library has mainly two components, viz. computerization and networking. Computerization will help a library to modernize its in-house operations while networking will allow it to access other libraries for the exchange of information.

4.10 HOUSEKEEPING OPERATIONS:

Housekeeping operations of a library include all operations such as acquisition, cataloguing, circulation and serials control.

4.10.1. ACQUISITION

Acquisition is one of the important functions of any library. The goal of the library which is to satisfy the users will depend on the acquisition system of the library i.e. the user of the library will be satisfied only if the library acquires reading materials based on the users’ demands. Acquisition also results in effective and efficient collection development of the library and hence acquisition of reading
materials is an important job and is also highly labour intensive. Therefore automation in this area is very much required.

(Kimber (1968) has given the major objectives of an automated acquisition system may be:

1. Elimination of maintenance of several manual files which consumes a lot time of the staff which intern eliminates may errors in reporting, control etc.
2. Improve accuracy in all facets of acquisition process.
3. More effective and efficient handling of claims and cancellations.
5. Eliminating of the need for manual processing of discount. Foreign exchange and other invoice data.
6. Improved ability to track orders, receipts, invoice and claims.
7. Improved binding control including maintenance of binding data records, provision of binding alerts, production of binding orders and tracking.
8. Integration of acquisition with cataloguing and serial control for more effective bibliographic holdings.
9. To provide necessary management information reports.
10. Improved services to the users through faster, timelier processing of orders and receipts.

4.10.2. CATALOGING

The library catalogue is considered as a mirror of the library because it reflects the collection of the library i.e. whether the library possesses good, bad or satisfactory collection. It is considered to be the base for most of the library activities such as acquisition, reference, inter library loan etc. In acquisition activity, the catalogue is referred to avoid duplication of reading materials. In reference and inter library loan activities, the catalogue is consulted to see reference and other documents which can be provided on loan or can be consulted to answer reference queries. Hence, the catalogue is considered as an important tool in the library. So, if automation of the catalogue is done, then it will be very much beneficial to the users and the staff wherein they can get the desired information with no time. Similarly if the catalogue
is made available in a network environment through LAN, then users can have simultaneous access to the same database. So also the library staff will appreciate the automated system since it will eliminate their job of printing the cards, filing the cards, keeping the catalogue up-to-date, etc. The automated catalogue also conserves space as compared to the large catalogue cabinet, which occupies a lot of space in the library. (Saffady, 1988).

OPAC (Online Public Access Catalogue) is one of the existing aspects of library automation. OPAC is a catalogue, which is available for searching online. Such OPAC may be searched from a terminal within the library or at a terminal elsewhere in the organization remotely via national or international telecommunication networks. Today majority of the softwares which are used for automation in libraries provide a separate module of OPAC. With the latest developments in integrated systems the OPAC is connected to the circulation system so that the used can come to know whether the document he/she is looking for is currently available in the library or on loan. OPAC also promotes resource sharing program and bibliographic search can be done by author, title, accession number, ISBN, Keywords etc. Search in OPAC is by using Boolean logic or by truncation. (Hussain & Raza, 2002).

4.10.3. CIRCULATION

The main component of a circulation control system is the transaction of documents i.e. issue and return of documents. This database contains bibliographic details of the documents which provide information on titles, authors and publishing details, which are used in notifying the users about the overdue. Circulation involves the charging and discharging of library materials, reservations, statistics, sending of reminders for the over-due material, etc.

Rao (1986) has given the following functions of an automated circulation control:

1. Provision of information on location of circulation items.
2. Identification of items on loan to a particular borrower or class of borrowers.
3. Recording of hold or personal reserves for items on loan but desired by another borrowers often with additional provision for notifying the library staff when the item is returned and printing a ‘book available notice’ for mailing to the persons who requested the item.

4. Printing recall notices for items on long term loan.

5. Renewal of loans.

6. Notification to library staff of overdue items and printing of overdue notices.

7. Notification to library staff of diligent borrowers (i.e. those with unpaid fines or overdue books) either at time of an attempted loan or at time a borrower is leaving the institution or on request forms the library.

8. Calculation of fines, printing fine notices, recording receipt of fines and sometimes printing of fine receipt.

9. Calculation and printing of statistics of various types.

10. Analysis of both summary statistics and statistics related to circulation of particular items for use in acquisition, planning of services and for other administration purpose.

11. Provision for printing due date slips, automatically generating orders for lost book or needed addition copies and printing mailing labels for remote borrowers.

### 4.10.4. SERIAL CONTROL

Serials are published at regular intervals and the publication is intended to continue indefinitely. Besides scholarly journals and popular periodicals, serials include magazines and all other periodical publications as newsletters, newspapers, annual reports, proceedings of learned bodies, monograph series etc. The term serial control usually denotes two very distinct aspects: bibliographic control and processing control. Bibliographic control of serials involve preparation and maintenance of a central master list of all serial publications which includes full title, short title, variation form earlier titles, publishers, ISSN, frequency etc. Serials processing control comprises of acquisition, claims controls, cataloguing, circulation, binding, weeding out etc. *(Vyasamoorthy, 1987).*
4.10.4 a. Problems in serials control:

Serial Management is an integral part of the library operations. It has fewer titles to handle as compared to acquisition system but must record more details for each title and hence it is one of the most complex and expensive procedures.

Gupta & Dass (1991) has given the following problems in serials control:

1. All publishers do not bring out periodicals on a particular date.
2. The frequency of publication may change.
3. There may be a change in title.
4. They are sent by post, air-lifted, air-mail or sea-mail and these systems have their own problems relating to delivery time and misplacements.
5. Foreign journals take about 10-15 weeks to reach the destination by sea-mail and air-mail is speeding but costlier.

Serial control refers to those jobs, which involve procurement and management of serials in a library.

4.10.4. b. The functions of an automated serials control system are:

1. Input the data when the library receives issues.
2. Ordering new serials and renewing the presently subscribed journals.
3. Sending reminders to follow up missing issues.
4. Accessioning of individual issues when the library receives them.
5. Cancellation of presently subscribed journals.
6. Controlling of budget spent on subscription binding etc.
7. Binding of issues when a particular volume is complete.

4.11 AUTOMATED LIBRARY SERVICES.

Information services are provided to assist people and enable them in solving their problems and decision making. Modern libraries and information providing a variety of documentation and information services to support research and
development, marketing and trade, management and all other programmes related to the development of institution.

**Mahapatra (1985)** has given the following automated services are:

1. Current awareness Service (CAS)
2. Online Search Service
3. Printed Indexes
4. Selective Dissemination of Information (SDI)
5. Inter Library Loan
6. Stock Verification
7. Reference service

### 4.11.1. CURRENT AWARENESS SERVICE (CAS)

Current Awareness Services are those services which keep the users abreast of the developments and advances taking place their fields of specialization or in areas of research in which they are engaged. This method is limited to a few, as it is not meant to generate comprehensive review of all activities in any subject area. CAS can be given in various forms such as by title, current content list, indexing and abstracting etc. In a library by making use of computers the embers can be provided CAS by sending emails, through various databases, CD-ROMs etc.

### 4.11.2. ONLINE SEARCH SERVICE

Online search is done through online terminal. The search comprises of a series of keywords together with Boolean logic. The search strategy or the search statement should be framed before logging-on. When communication is made by logging-on, data of the system will be displayed on the screen of the terminal and the user will be requested to select the required database. As search proceeds the interaction between the machine and the user goes on and the user gives a series of commands to which the computer responds.
Patwardhan (1986) has given the following advantages.

1. Search process is interactive i.e. response form the system is almost instantaneous. The results are printed at terminal within few seconds.
2. Facility to develop search strategy step by step by evaluating results at each stage.
3. Availability of large number of databases providing various types of information like bibliographical data, commercial and full text.
4. User need not have knowledge about computer programming and operational to search computer files.

4.11.3. PRINTED INDEX

In information retrieval, computers were used for preparation on in-house indexes i.e. within the library and also for production of indexes for major abstracting journals. Index consists of a series of terms arranged in alphabetical order. There are different types of computer produced indexes:

a. KWIC (Key Word In Context)

In a KWIC type index, an entry for a document is made under each keyword in the title of the document. The computer must be told how to derive the keywords, these being the words which characterize the subject.

b. KWOC (Key word Out of Context)

In this Index, the keyword remains in the title. This method greatly increases the size of the index but if there are many entries under one term, it sub-divides the entries. It is used by many special libraries for indexing reports, journals, patents etc. (Tedd, 1977).
c. PRECIS (PREserved Context Index System)

It allows the user to enter an alphabetical subject index at any one of the significant terms which together make up a compound statement and establish at that point the full context in which has chosen term has been considered by the author.

d. POPSI (Postulate Based Permuted Subject Indexing)

In this index, depends on word order and relational signs. The order of words elements in the chain is predetermined and fixed according to the seats, postulate categories or relational operators. (Sengupta, & Chatterjee, 1977).

4.11.4. SELECTIVE DISSEMINATION OF INFORMATION (SDI)

In SDI service, the information in a library is matched against the subject interests of the users; which means that the user receives only that information which is relevant to his research work. In computerized SDI service, a user profile is constructed. Simultaneously, document profile is also constructed when documents are received in the library. Both these profiles are matched by the computer and sent to the user. Feedback is received from the user. Incase the user is not satisfied then the profiles are checked and adjusted on the basis of user’s evaluation.

4.11.5. INTER LIBRARY LOAN (ILL)

This is true when number of user increases and means of communication reduce the barrier of distance, language and specialization. So Inter Library Loan is provided. Inter Library Loan in automated era can be provided by:

1. Thermal transfer printer with suitable barcode printing.
2. Barcode labels.

All the books should be bar-coded. The pre-printed self adhesive barcode labels are being pasted on all books, one on title page and another on secret page. Each member is provided with barcode and matched with the help of a laser scanner during transaction. (Yadagiri, 1999).
4.11.6. STOCK VERIFICATION

Stock verification is an important activity in any library. It is one of the most tedious jobs to be done which involves a lot of time. Traditionally, it took many months to complete stock verification for a normal collection but with the impact of information technology, this has been overcome and less time is required comparatively. By using bar-coding technology, all accession numbers can be saved in the barcode scanner memory. The most economical and fast way of entering accession number is to use a mobile bar code reader to scan accession numbers of books from bar code tags in books. This laser scanner is passed over the bar-coded books in the stack. The accession numbers of books available in the stack are recorded in the memory and the accession numbers, which are not in display, are checked if they are on loan and thereby, the number of missing books is known. It is also possible now with the proliferation of personal computer to just key in all accession numbers as and when checked to consolidate the loss in terms of missing accession numbers. (Sridhar, 1991).

4.11.7. REFERENCE SERVICE

Initially, the reference librarians depended on printed indexing and abstracting services, bibliographic sources and directories to perform literature search and answer questions of factual or bibliographical nature. But today it is seen that the important reference books like encyclopedias, directories, bibliographies, are available in the non-print format either in the form of CD-ROM or are displayed on the internet. They can be used as a database for accessing information for answering queries.

4.12 BARRIERS OF LIBRARY AUTOMATION

Library automation brings great changes in the functioning of the library and proving effective and efficient library services. But in spite of these great advantages, there are many barriers which occur at the time of implementing the automation in libraries.
Ramesh (1998) has given the following barriers faced by the library during automation.

4.12.1 Fear of adverse impact on employment.
4.12.2 Apprehension that the technology could be too expensive
4.12.3 The library staff has to undergo extensive training.
4.12.4 Lack of support from the management, may be owing to budget constraints
4.12.5 Retrospective conversion of data

4.12.1. Fear of adverse impact on employment

Let us examine each of the points. If we analyze the various jobs such as book acquisition, technical processing, circulation and reference service one can conclude that human interference is necessary at each and every step. The only area where substantial manpower can be saved is the cataloguing. The data entered at the time of ordering can be used for cataloging with some updating would eliminate multiple card preparation and subsequent filing. The manpower thus saved can be utilized in retrospective conversion and later on for analytical cataloguing or introducing new services. Therefore, there will be no adverse impact on employment.

4.12.2. Apprehension that the technology could be too expensive

There is an apprehension that the technology, both hardware and software would be expensive and unaffordable. The cost of hardware and software depends on the level of automation. From the user point of view cataloguing system is most important and also forms the base for other library activities. Keeping these two points in view UNESCO developed PC based software titled 'CDS/ISIS' and is available at a very nominal price to all the libraries in developing countries.

This software which works on a simple IBM compatible PC/XT is also available on UNIX and NOVELL platform. Recently the WINDOWS version has also been released. This software can export data in ISO 2709 format and therefore at later stage if one decides to go in for some other software, data transfer poses no problem. INFLIBNET has developed public domain library software titled 'ILMS' which is available on DOS AND UNIX platform.
4.12.3. The library staff has to undergo extensive training.

The in-house training for handling the software is usually provided by the developers and one can choose the software which can suit their budget. However, training for CDS/ISIS is available at INSDOC, INFLIBNET and DRTC. For further information on training programmes one can contact NISSAT. The training of library staff also depends on the level of automation. If one decides to go only for cataloguing a minimum training of one or two week’s duration will enable the librarians to develop a database and maintain it. With this basic training one can easily transfer the same data on a server/main machine in a network environment. The job becomes easy as most of the institutions have systems department with computer professionals maintaining the network.

4.12.4. Lack of support from the management, may be owing to budget constraints

Fourthly, lack of support from the management, may be owing to budget constraints, will be one of the barriers. Here the role of librarians becomes crucial in convincing the management that the users of libraries will also be the major beneficiaries of automation. Also, the skill and initiative play a major role in convincing the management.

4.12.5. Retrospective conversion of data

The fifth reason could be retrospective conversion of data. As mentioned earlier the manpower saved could be utilized for retrospective conversion and later on for analytical cataloguing.

4.13 NETWORKING

Networking involves the sharing of computers, peripheral hardware, software and switching all interconnected with communications channels used to establish a connection between network users. The end result is the shared use of information and
resources. The intension of the network is to distribute information to the users requiring the network services. Computers and telecommunications may be the tools used for facilitating communication among them. A network mainly consists of three components viz. transmission media, mechanism of control and interface unit to the network. The components provide a mechanism to transport information to and from remote corners. Generally any network must have transport capability, internal switching mechanism and an ultimate user. Communication from the source host to the link or destination host occur through the interaction of two machines through their interface units under a structured set of operation referred to as a protocol. (Rao, Abhiram & Muralidhar, 1997).

4.13. 1. LOCAL AREA NETWORK (LAN)

LAN networking is transmission system for linking computers over restricted geographical area like single rooms, rooms within a building or buildings on a particular site. LAN normally transmits data in digital form with typical transmission speeds upto several megabytes per second. It is a combination of cables/connectors, computers, processors and interfaces, software’s which interconnects computers and related devices. It regulates flow of information traffic among these devices. Usually the computers are within 300m of each other because they can be connected by a cable. A typical LAN connects computers located within half a mile of each other. LAN is distinguished from other type of data network in that communication is usually confined to moderate size geographical area. This network is owned by a single organization. (Mandal, Datta & Podder, 1998).

A library network structure is similar to hierarchical structure which is called the tree structure in which each segment or nodes is subdivided into two or more subordinate nodes which can be further subdivided into 2 or more additional nodes. There can be exception that in network structure a node may have a more than one parent. The trades off between the simplicity of design of hierarchical structure and storage efficiency of network structure are more commonly used with mainframe and minicomputer systems rarely with microcomputers. (Sehgal, 1998).
4.14 LIBRARY NETWORK: DEFINITION

A library network is broadly described as a group of libraries coming together with some agreement of understanding to help each other with a view to satisfying the information needs of their clientele.

UNISIST II working document defines Information network as ‘a set of inter-related information systems associated with communication facilities, which are cooperating through more or less formal agreements in order to implement information handling operations to offer better services to the users.

The National Commission on Libraries & Information Science in its National Programme Document (1975) defines a network as ‘Two or more libraries engaged in a common pattern of information exchange, through communications for some functional purpose’.

4.15 OBJECTIVES OF LIBRARY NETWORK

Potdar & Joshi (1997) has given the following main aims and objectives of a library network are:

1. To improve resources utilization and service levels to users at the individual libraries by providing automation facilities in acquisition, serial control, cataloguing, circulation, user’s services and funds accounting.
2. To enhance resource sharing by providing individual libraries access to composite databases like union catalogues, CAS and SDI.
3. To provide efficient and reliable means of resource sharing in areas such as inter library user services, document delivery services, manpower training, access to national and international databases, and communication link through publication and inter personal communication and procurement of micro documents.
4. To facilitate exchange of duplicate publication.
5. To establish referral centers to monitor and to facilitate catalogue search and maintain a central online union catalogue of books, serials, non-book materials of all the participating libraries.

6. To implement computerized operation and electronic services in the libraries for fast communication of information.

7. To evolve standards and uniform guidelines in techniques, methods, procedures, hardware and software, services and promote their adoption in actual practice by all libraries in order to facilitate pooling, sharing and exchanging resources and facilities towards optimization.

8. To coordinate with other regional, national and international networks for exchange of information and documents for the use of libraries and users.

4.16 NEED FOR NETWORKING

1. The rate of growth of information and knowledge is faster than before and it is ever increasing. Hence it has become impossible for each and every library to procure every document that is published in the library.

2. Another problem is the rising prices of publications, which has affected collection development in libraries.

3. The budget of the library is not increased and this makes it difficult for the individual library to provide services from its own collection.

4. Due to the emergence of new subjects, readers require pin-pointed information that may be available in other libraries.

4.17 CONTRIBUTIONS BY VARIOUS INTERNATIONAL NETWORKING ASSOCIATIONS AND INSTITUTIONS

A lot of efforts and contributions are made by various associations at international level UNESCO, IFLA, ARPANET and INTERNET etc.
4.17.1 UNESCO (United Nations Education, Scientific and Cultural Organization)

In promoting the development of electronic network UNESCO lays emphasis on policies and strategies to develop the most appropriate methodology to meet specific need of different communities. It has developed a software CDS/ISIS in 1986 for library automation. UNESCO provides certain standards for software to develop library automation system so that it has suitable qualities as a ‘documentary database’ system. It has developed data exchange format like Common Communication Format (CCF). (http://www.unesco.org/webworld/index.5htm accessed on 30/06/2010)

4.17.2 IFLA (International Federation of Library Association and Institutions)

The International Federation of Library Associations and Institutions (IFLA) is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession, Founded in Edinburgh, Scotland, in 1927 at an international conference; it celebrated 75th anniversary at the conference in Glasgow, Scotland in 2002. It now has 1600 members in approximately 150 countries around the world. IFLA was registered in the Netherlands in 1971. The Royal Library, the national library of the Netherlands, in The Hague, generously provides the facilities for it headquarters.

IFLA has a Information Technology section which serves to promote and advance the application of information technology to library information services in all societies through activities like standards, training, research etc. It supports updating of databases and initiating information technology workshops. It has been promoting dissemination of standards, open source software, MARC, digital preservation and metadata, promote data standards and protocols that will improve interoperability between systems and facilitate data exchange between library and other sectors of information creation. (http://www.ifla.org/en/about accessed on 30/06/2010)
4.17.3 **ARPANET** (Advanced Research Project Agency Network)

In 1971 the Advanced Research Project Agency (ARPA) created ARPA Network (ARPANET). This network was created to connect military installations and universities. Packet-switching was the technique used then. In 1983 it was divided into separate networks. The Defense Data Network (DDN) and a new ARPANET. Today ARPANET is completely phase out paving way to Internet. *(Satyanarayana, 2003).*

4.17.4 **INTERNET** (International Network)

The Internet is a world wide internet works of computer and communication networks. It connects a variety of computers with distinctive software and hardware. These computers worked to allow them to communicate by translating messages into a mutually understandable language, referred to as communication protocols such a TCP/IP, HTTP/IP etc. Internet works are multiple networks connected in such a manner that data can pass between the various networks. The internet is the only current global-scale internet work.

Now Internet connects millions of people worldwide and offer tremendous amount of information that can be shared. It allows user to transfer files between incompatible computers, send messages across the globe, and log into databases thousands of miles away. Internet provides many services such as E-mail and Telnet. INTERNET celebrated its twenty fifth anniversary in 1994. *(Satyanarayana, 2003).*

4.18 **CONTRIBUTIONS BY VARIOUS NATIONAL NETWORKING ASSOCIATIONS AND INSTITUTIONS**

A lot of efforts and contributions are made by various associations in India have contributed whereas on national level, NISSAT, INFLIBNET, INSDOC, IISC, DESIDOC, DELNET, CALIBNET, NICNET, INDONET, ERNET, VIKRAM, CSIRNET, BONET etc.
4.18.1 NISSAT (National Information System for Science and Technology)

NISSAT was launched in 1977 and since then it has been encouraging and supporting a variety of short term courses in the area of information science and technology such as application of computer in library and information centers. It has been promoting information resource sharing in science and technology through city based library and information networks with emphasis on web based information content development. It has developed and promoted CDS/ISIS based co-products like SANJAY; NISSAT has established NACIDS (National Access Centers to International Database Services) for providing online facility to access international database services. NISSAT has been organizing various training programs from time to time about how computers can be applied to library and information activities. The main function of NISSAT has been to strengthen information services through information centers to international database services, CD-ROM database facilities etc. (http://it.nissat.tripod.com/iit0102/mpdo102.htm accessed on 01/07/2010)

4.18.2 INFLIBNET (Information Library Network)

Information and Library Network (INFLIBNET) Centre is an autonomous Inter-University Centre of the University Grants Commission (UGC) of India. It is a major National Programme initiated by the UGC in 1991 with its Head Quarters at Gujarat University Campus, Ahmedabad. Initially started as a project under the IUCAA, it became an independent Inter-University Centre in 1996.

INFLIBNET is involved in modernizing university libraries in India and connecting them as well as information centers in the country through a nation-wide high speed data network using the state-of-art technologies for the optimum utilization of information. INFLIBNET is set out to be a major player in promoting scholarly communication among academicians and researchers in India.
4.18.2 a. Objectives of INFLIBNET

The primary objectives of INFLIBNET as envisaged in Memorandum of Association are:

- To promote and establish communication facilities to improve capability in information transfer and access that provide support to scholarship learning, research and academic pursuit through cooperation and involvement of agencies concerned.

- To establish INFLIBNET Information and Library Network a computer communication network for linking libraries and information centers in universities, deemed universities, colleges, UGC information centers, institutions of national importance and R & D institutions, etc. avoiding duplication of efforts.

- To promote and implement computerization of operations and services in the libraries and information centers of the country.

- To evolve standards and uniform guidelines in techniques, methods, procedures, computer hardware and software, services and promote their adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchange of information towards optimal use of resources and facilities.

- To evolve a national network interconnecting various libraries and information centers in the country and to improve capability in information handling and service.

- To provide reliable access to document collection of libraries by creating on-line union catalogue of serials, theses/ dissertations, books, monographs and non-book materials (manuscripts, audio-visuals, computer data, multimedia, etc.) in various libraries in India.
• To develop new methods and techniques for archival of valuable information available as manuscripts and information documents in difference Indian languages, in the form of digital images using high density storage media.

• To optimize information resource utilization through shared cataloguing, inter-library loan service, catalogue production, collection development and thus avoiding duplication in acquisition to the extent possible.

• To create databases of projects, institutions, specialists, etc. for providing on-line information service.

• To encourage co-operation among libraries, documentation centers and information centers in the country, so that the resources can be poled for the benefit of helping the weaker resource centers by stronger ones.

• To train and develop human resources in the field of computerized library operations and networking to establish, manage and sustain INFLIBNET.

• To facilitate academic communication amongst scientist, engineers, social scientists, academics, faculties, researchers and students through electronic mail, file transfer, computer/audio/video conferencing, etc.

• To undertake system design and studies in the field of communications, computer networking, information handling and data management.

• To establish appropriate control and monitoring system for the communication network and organize maintenance.

• To collaborate with institutions, libraries, information centers and other organizations in India and abroad in the field relevant to the objectives of the Centre.

(http://www.inflibnet.ac.in/about/objective.html accessed on 1/07/2010)
4.18.2 b. INFLIBNET activities

Cholin & Prakash (1997) has given the following INFLIBNET 7 activities are:

1. Financial Support.

INFLIBNET through UGC provides funds for the university libraries for procuring computer hardware and software. It also helps for converting the retrospective data into machine readable format. In this way, INFLIBNET provides funds for automation the university libraries and also provides special grants for establishing core facility for access to information.

2. Standards

Standards are required to ensure compatibility for interconnection of libraries and information centers to promote efficiency and effectiveness for easy transfer of information in a network. When standards are adopted, it reduces the barrier of information flow. INFLIBNET has provided standards and formats for creating databases of books, serials, theses and dissertations. Recording of bibliographic record is done on the basis of CCF (Common Communication Format) which is based of ISO-2709 format. INFLIBNET has finalized that Anglo American Cataloguing Rules- II are to be used for data entering.

3. Training

INFLIBNET has realized that trained manpower is very much essential for providing automated services and for this it has been organizing a number of training courses for the library personnel. In these training courses, the professionals are trained on the latest technology with hands on experience.
4. On-site Training

It means a team of technical staff of the INFLIBNET is sent to those libraries that have procured computers. This team provides all the necessary assistance for installation of software, database creation, e-mail, online, barcode etc.

5. Application Software

INFLIBNET developed software which can generate a catalogue card according to AACR-II format when the data is put in ISO-2709 format using CDS/ISIS. It has also developed SOUL (Software for University Library) software, which can be used for automating various housekeeping operation, and also provides OPAC (Online Public Access Catalogue) which is a great advantage in networking.

6. Union Database Creation Activities

It means INFLIBNET undertakes the activities of development and updating of union databases for different types of library materials like serials, thesis, and dissertations of different university libraries. This Union Database at INFLIBNET is made available for access off-line as well as on-line mode. The INFLIBNET database can be accessed by ERNET, I-Net GIAS and NICNET connectivity.

7. Integrated Library Management Software

INFLIBNET in collaboration with DESIDOC (Defence Scientific Information and Documentation Center) has developed an Integrated Library Management System (ILMS), which is the basic requirement for library automation and networking.

8. Annual National Conventions

INFLIBNET organizes a national convention every year to generate awareness in library automation. These conventions provide a common platform to the librarians to interact with each other, assess the progress made in computerization activities and plan for future. (Francis, 1997).
4.18.3 INSDOC (Indian National Scientific Documentation Center)

It is now known as NISCAIR (National Institute of Science Communication and Information Resources). It has access to 1500 international database on CD-ROM like LISA, current content, Indian Standards, and US Patents etc. It has computerized databases, which help in organization of data and its retrieval. In addition it has designed and developed databases for other organization. Some databases are available on CD-ROM as well as online like NUCSSI (National Union Catalogue of Scientific Serials in India), Indian Patent Database (INPAT), and Indian Science Abstracts (ISA). It has been providing training in library automation, resource sharing and database creation etc. \(\text{http://www.niscair.res.in/ accessed on 1/07/2010}\)

4.18.4 IISc (Indian Institute of Science)

Indian Institute of Science was started in 1909. It is one of the oldest and finest centers of its kind in India and has very high international standing in academic world. It provides computing facilities, catering to increasing demand of high performance computing. This facility is a symbiosis of computing network, graphics, and visualization. It consists of supercomputing environment housing computing systems with sophisticated software packages, connected by powerful high-speed network. It has online catalogue databases of books and journals which the users can access. It also comprises of digital libraries with collection like technical reports, standards, patents, theses etc. \(\text{www.iisc.ernet.in accessed on 2/07/2010}\)

4.18.5 DESIDOC (Defence Science Information Documentation Center)

DESIDOC stated functioning in 1958 as scientific information bureau. It produces library services like OPAC, CD-ROM search service, document supply service, resource sharing. It has also developed and maintained bibliographic databases like OPAC, bibliographic databases of books, reports, conference proceeding in defence, full text databases etc. It provides training in the areas of library automation, database development, online search, email, internet use, technical communication, multimedia development etc. It has developed integrated library management software called SUCHIKA. DESIDOC took initiative and started
providing email and internet access to DRDO laboratories spread over the country through VSNL line connection.

http://www.drdo.org/labs/compser/desidoc/index.5html accessed on 2/07/2010

4.18.6 DELNET (Developing Library Network)

DELNET was started at the India International Centre Library in January 1988 and was registered as a society in 1992. It was initially supported by the National Information System for Science and Technology (NISSAT), Department of Scientific and Industrial Research, Government of India. It was subsequently supported by the National Informatics Centre, Department of Information Technology, Ministry of Communications and Information Technology, Government of India and Ministry of Culture Government of India.

DELNET has been established with the prime objective of promoting resource sharing among the libraries through the development of a network of libraries. It aims to collect, store, and disseminate information besides offering computerized services to users, to coordinate efforts for suitable collection development and also to reduce unnecessary duplication wherever possible.

DELNET has been actively engaged with the compilation of various Union Catalogues of the resources available in member-libraries. It has already created the Union Catalogue of Books, Union List of Current Periodicals, Union Catalogue of Periodicals, CD-ROM Database, Database of Indian Specialists, Database of Periodical Articles, Union List of Video Recordings, Urdu Manuscripts' Database, Database of Theses and Dissertations, sample databases of language publications using GIST technology and several other databases. The data is being updated in each of these databases and is growing rapidly. All the DELNET databases have been resident on DELSIS, in-house software developed on BASIS Plus, an RDBMS, the product of Information Dimensions Inc. of USA which has been provided to DELNET courtesy National Informatics Centre, New Delhi.
4.18.6 a. The Main Objectives of DELNET are:

1. To promote sharing of resources among the libraries by developing a network of libraries by collecting, storing and disseminating information and by offering computerized services to the users.
2. To undertake scientific research in the area of Information Science and Technology, create new systems in the field, apply the results of research and publish them.
3. To offer technical guidance to the member-libraries on collecting, storing, sharing and disseminating information.
4. To coordinate efforts for suitable collection development and reduce unnecessary duplication wherever possible.
5. To establish /facilitate the establishment of referral and /or research centers, and maintain a central online union catalogue of books, serials and non-book materials of all the participating libraries.
6. To facilitate and promote delivery of documents manually or mechanically.
8. To develop databases of projects, specialists and institutions.
9. To possess and maintain electronic and mechanical equipment for speedy communication of information and delivery of electronic mail.
10. To coordinate with other regional, national and international networks and libraries for exchange of information and documents.

(http://www.delnet.nic.in/objectives.htm accessed on 2/07/2010)

4.18.7 CALIBNET (Calcutta Library Network)

CALIBNET has launched its library network program facilitating remote online access to holding data of Calcutta Libraries and other specialized databases as well which is a step towards bibliographic resource sharing amongst Calcutta Library. It has provided electronic access to globally available information. It has developed and launched multi user storage and retrieval software ‘SANJUKTA’ to support CALIBNET centralized database and to provide online access to it form remote location. A conversion software package ‘PARAPAR’ to support inters change of
bibliographic data between US MARC, UNIMARC and CCF files and also from non-standard formats to standard ones. It has been providing consultative services on Library and Information Sciences automation and also manpower development for operating and manning automated Library and Information Science environment through wide range of graded training programs and courses for individuals or groups.  

http://www.itt.nissat.tripod.com/itt9904/calibnet.htm accessed on 02/07/2010

4.18.8 NICNET (National Information Network)

NICNET is a government data network of National Informatics Centre, New Delhi. It was set up to link government departments for decision optimization. It was established in 1975. NIC established NICNET in 1977 having regional nodes at New Delhi, Pune, Bhubaneshwar and Hyderabad, 32 nodes at state and union territory levels and 700 earth stations at districts headquarters.

This network helps flow of information among all these nodes. The information flow various from agriculture, water resources, customs, media, socio-economic conditions to auditing elections etc.

4.18.9 INDONET

INDONET is a commercial computer based network commissioned by the Computer Maintenance Corporation Ltd. (CMC), with nodes at Calcutta, Bombay and Madras, which are connected to other cities like Ahmedabad, Bangalore, Delhi and Pune. The Bombay node of INDONET is connected to the international gateway of Videsh Sanchar Nigam Limited. There by facilitating entry to public data networks of other countries.

4.18.10 ERNET (Education and Research Network)

The Education and Research Network (ERNET) is a project of the Department of Electronics, Government of India. It connects a large number of teaching and research institution in the country. It has nodal centres at the five Indian Institutes of Technology (Bombay, Delhi, Kanpur, Kharagpur and Madras), Indian Institute of
Science (Bangalore) and National Centre for software Technology, Bombay and the ERNET group at New Delhi.

4.18.11 VIKRAM

It is a packet-switched public data network established by Department of Telecommunications. The initial network would consist of 8 switching nodes and 12 remote access points with its network management centre at Delhi.

4.18.12 CSIRNET (Council of Scientific and Industrial Research)

Council of Scientific and Industrial Research (CSIR) in planning to set up a computer communication network for exchange of information among its 40 research centers. It organizes online database services on subjects such as drugs, toxicology, food technology, medical plants etc. It would provide electronic mail and have access to international databases through networking.

4.18.13 BONET (Bombay Library Network)

Bombay Library Network (BONET) was inaugurated in 1992 in order to facilitate access to the resources of many libraries in and around Bombay. About 50 libraries were covered by this network. Using computer facilities provided by NCST, any member of BONET can get network access. This access covers electronic mail and on-line access to remote data-bases, both Indian and foreign. (Satyanarayana, 2003).
4.19 CONCLUSION

Automation and networking of libraries are still in their formative stages in India. Their full impact on libraries and library resources will be known in the course of time. INFLIBNET, DELNET, and other metropolitan networks are providing training facilities for computer applications. The Indian Library Association, IASLIC, and NISSAT have jointly helped academic libraries in the choice of software, hardware and in manpower training. Every year, INFLIBNET organizes a conference-CALIBER (Convention of Automation in Libraries) – to discuss issues related to the computerization of academic libraries. In the first convention of CALIBER, held at Ahmedabad in February 1994, the Chairman of INFLIBNET, Professor Yashpal, said that the Government of India should provide more funds for the speedy networking of higher education, research and libraries. According to him, the progress of INFLIBNET is far from satisfactory, and so the UGC should provide funds for hardware and software to accelerate the pace of library automation and networking. In addition, the plans prepared by the decision-making bodies should be more realistic, so that they can easily be achieved. The time frame which has been set, and the expenditure to be incurred, should be fixed keeping in view the fact that capital is scarce in the nation’s economy. If the above facts are taken into account before designing any information policy, then the policies are bound to be fruitful.
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