CHAPTER 3

LIBRARY AUTOMATION

3.1 INTRODUCTION

Rapid development of science and technology and constant relay research in various subject fields has led to the enormous growth of literature and ultimately posed various problems for all types of libraries. After the post world war, the industrial society and scientific community have witnessed the information explosion and felt the necessity of computers in order to have access to information easily, specifically and instantly in spite of vast magnitude and wide range of information.

Automation implies a high degree of mechanization wherein routine and repetitive works or operations and processes are left to be performed by machines with little or no intervention by human beings. Automation also implies that the control over the performance of the tasks, operations and processes is automatic, i.e, without any or with minimal human intervention. The lesser the degree of human intervention, the greater the degree of automation. This does not mean that automation does away with human beings; on the contrary human interface is an essential component, only they are relieved of routine works. They get more time for tasks which require their intelligence. The term library automation refers to the processing of certain routine clerical functions in the library with assistance of computers or other mechanized semi-automatic equipments. Automation can relieve the library staff from many routines administrative or clerical functions which the machine can do easily and without errors. Automation includes mechanization of various processes and their operations as well as the machines, equipments, tools, i.e, all sorts of mechanical devices, automatic machines.
Library automation is a major undertaking which requires a positive operational justification, an examination of the pros and cons, and realization that it would in the course of time change the whole work and culture of the library. The initial impetus for the introduction of computerized service is often the desire to enhance the standard of service the library wishes to reach. Corbin (1985: 14) states 'when properly designed, installed, operated and managed, an automated library system can offer many benefits to a library, but any system will have some limitation'.

Many of the failings of library may be solved, or alleviated by the use of computer which is indispensable for library automation; things would simply be produced in milliseconds rather than minutes or hours. It is important to know what computer can or cannot do. They can count quicker than average human being; computer strings of numbers or letters may be put in ascending/descending orders; search for a particular set of characters in the data they hold; logically analyse data and retrieve information, etc.

The ability of a computer to put items in order quickly and do so in a variety of different sequences or with different access points all derived from a single record, is undoubtedly one of its most advantageous points to a librarian. All university libraries of developed countries are using computers, which have become part and parcel of the automation infrastructure works of the library for the daily routine.

3.2 NEED OF LIBRARY AUTOMATION

Enormous growth of published and near-published information in diverse fields and forms gives birth to many problems to librarians. Manual methods for bibliographic control of
information have limitations. It is impossible for any library, however big or small, to collect and catalogue all materials that are useful to its readers. Even in case of a comparatively bigger and rich library, it is difficult to have all the important materials in one library due to the volume of newly published or produced information.

Tedd (1984: 7) states two main reasons for automation of libraries. They are:

1. To provide better services at lesser or no amount of costs; and
2. To give added benefits at lesser costs.

A library needs access to collection of other libraries also. Sharing of resources needs access to each other's catalogues. Such access by manual methods is insufficient and unreliable.

Libraries are realising that the only way by which they could satisfy their client groups is by effective cooperation between libraries and by sharing of costly resources. Online library networks enable libraries to have access to each other's catalogues and also effectively share resources and cooperate with each other in collection development, lending, cataloguing, etc.

The need to conserve costly professional manpower for sophisticated technical service and readers service, it is necessitated that professional staff be relieved of clerical tasks such as filing, sorting, typing, duplicating, checking, etc. Computers are able to perform such tasks quite effectively and with little supervision. Automation enables many libraries to handle many more publications without a corresponding increase in costly professional manpower.

Increasing number of information users with increasing specialization requires much advanced methods for organizing information and sophisticated services to meet specialized needs like current awareness service, selective dissemination of information, etc. Traditional methods of cataloguing, library management and information retrieval and dissemination are not adequate.
A manual circulation system cannot handle the large volume of transaction (issue, return, reservation, etc.). Automated circulation systems have amply demonstrated speed, efficiency, and relatively error-free manner in which management and control of circulation is possible.

Matching of specialized readers' needs and current information in service has became possible, easy, and satisfying by machine readable method which was rather difficult, time-consuming, and insufficient in manual methods. There is no scope in manual method to manipulate data elements from different directions and retrieve pin-pointed, specific information for specialized readers and disseminate information instantly.

Need of introducing computers in performing library jobs is deeply felt in today's world mainly because of the following reasons:

3.2.1 Increased Workload: Libraries/information centers are always growing. Its growth is manifolds, growth of library collection along with growth in variety of functions and growth of actual users. Library collection growth is primarily because of increased number of publications, multifaceted and specific demands of users, etc. With the development of subjects in different directions, the literature embodying these knowledge have increased in various forms, like information sources, books, periodicals, pamphlets, audio-visual materials, sound recordings, etc. A library has to be concerned with such growth and should try to collect the literature output as much as possible in order to satisfy its readers. Increased number of users, i.e., students (including research scholars), faculty members, other staff also enhances the workload of a library.

A library is to provide adequate service to its users having different background and aptitudes in selective way. In this situation, it is now becoming difficult or impossible to satisfy the readers in proper perspectives by continuing the traditional methods in a library.
introducing computers in the library activities, it is possible to meet the increased workload with the constant or decreasing staff.

3.2.2 NEED OF GREATER EFFICIENCY: Computer has the ability to provide information instantly, with less staff and at less cost (of course, cost should not be the deciding factor in providing efficient service). Computer stores information more systematically which can be accessed accurately from different points as well as in combination and manipulation of different data elements taken from different directions, provided that it has used appropriate software for the purpose. Instant and systematic dissemination of information against search query are the results of computer applications in libraries. However, efficiency depends upon the accuracy of information inputted in.

3.2.3 FACILITATES IMPROVEMENT OF SERVICES: By introducing computers new services may be offered in addition to the library's existing traditional services. In addition to the improvement of existing services new services could be extended which include like providing statistical data on different aspects for decision making by the management; preparation, arrangement, re-arrangement of lists of records for providing current awareness service; preparing union lists of serials, information retrieval service specifically, sufficiently and instantly under selective dissemination of information service and so on. Corbin (1985: 15) also holds 'that automation can be seen in improved services to the users... The computers could enable the library to offer new services never before possible with a manual system'
3.2.4 CO-OPERATION AND CENTRALIZATION

Better co-operation specially in resource sharing is possible in computer based library systems. Computerized electronic online programmes can be used for making available of external data which can be exploited to greater effect.

Centralized collection of data by some intermediary agencies and their availability to users of different libraries through an online library network is a significant outcome of computerization. The ability to share records, expertise, finance and some of the burdens of planning and designing has significant impact on most house keeping operations. It has started the process of de-institutionalization of libraries and placed the resources of central database at the disposal of any one with a personal computer and this has given tremendous boost to document delivery and resource sharing in the days of constraints in finance, space and expertise. To summarize, application of computers in library operations and services would satisfy the following:

1. enhance the speed of work (time saving);
2. improve the efficiency of a given function (ease of use);
3. relieve professional manpower of jobs which are routine, repetitive or clerical;
4. require minimum space to keep maximum information (space saving) due to use of micro-forms of storage media like micro-films, micro-fiches, magnetic tapes, optical disks, electronic mail, fax, online video disks;
5. improve the cost efficiency of library operations (cost benefits);
6. expand access to information;
7. enable instant search and retrieval of information in various desired formats including full text;
8. facilitate remote access to information;
9. facilitate selective dissemination of information specifically, exhaustively and instantly;
10. assures accuracy, etc
Automating library operations has great advantages as mentioned above. An appropriate scheme, if implemented properly, would enhance the quality of library service with less cost and less manpower. As computer has become a fact in industry and commerce, the library also can not resist the irresistible invasion of computer and communication technology into library activities at present time.

3.3 FACTORS FOR LIBRARY AUTOMATION

There are different factors required to be considered in proper perspectives before changing over to library automation. A brief discussion of these factors is made below to keep abreast of the situation:

3.3.1 Cost Cost is a major factor in library automation. This includes mainly expenditure on equipments purchasing, installation, maintenance, etc. Corbin (1988) states ‘an automated system often is radically different from a manual system, so it is difficult to obtain accurate cost figures for a comparison between the two’. Installation of an automated library system is expensive and the cost of maintaining the system could be more expensive. Adequate financial resources for purchasing softwares, education and training of staff, etc. are included in the cost factor including cost price of the hardware based on the sophistication available with the system. Hardware effectiveness means speed of the hardwares in inputting and inputting function, capacity to store data, provision of attaching number of terminals at the installation time, etc. Of course, cost of hardware in selection of computer hardware should not be the only criterion as it may affect adversely. Maintenance cost necessary on recurring basis including maintenance charge of hardware equipments to be paid to company, staff payment, electricity, repairing works, etc. is also to be considered. The
initial cost for preparation of room, installation of hardware, air-condition cost for cabling, etc require comparatively a huge amount.

The Indira Gandhi Memorial Library (IGML), Hyderabad University is a fully automated university library in India. It has completed the process of automation in 4 stages in 1995, and the cost involved for the whole project is as follows (Venkataraman and other 1998 69).

**Automation Project: IGML, HU: Cost**

**Computer hardwares:**

<table>
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<tr>
<th>Phase</th>
<th>Cost</th>
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<tbody>
<tr>
<td>1st phase</td>
<td>Rs. 1,12,000/-</td>
</tr>
<tr>
<td>2nd phase</td>
<td>Rs. 32,000/-</td>
</tr>
<tr>
<td>3rd phase</td>
<td>Rs. 2,45,000/-</td>
</tr>
<tr>
<td>4th phase</td>
<td>Rs. 19,00,000/-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs. 22,89,000/-</strong></td>
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</tbody>
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The library is using LIBSYS software package and the cost of the package varies from time to time. The IGML spent for the package as follows:

**Computer Software**

<table>
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<tr>
<th>Time</th>
<th>Cost</th>
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</thead>
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<tr>
<td>1st time (During 1st and 2nd phase)</td>
<td>Rs. 60,000/-</td>
</tr>
<tr>
<td>2nd time (During 3rd phase)</td>
<td>Rs. 60,000/-</td>
</tr>
<tr>
<td>3rd time (During 4th phase)</td>
<td>Rs. 2,80,000/-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs. 4,00,000/-</strong></td>
</tr>
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This is simply an example citing costs for introducing library automation project in a university library. Due to competitive market economy, fast development of computer technology—both hardware and software, the required cost is fluctuating. Hence, the above cannot be taken as guide for the future automation project though the same would give some idea to the library management in this regard.

3.3.2 SPACE: The hardware and its related machines are to be placed in spacious place. Preference should be given to install the machines inside the library building or near to it for reduction of cabling cost and staff time. The input/output devices (i.e., terminals) are to be placed as per convenience of the library staff and users respectively.

3.3.3 HARDWARE: The capacity to store data, speed of operation are some of the aspects to be considered while selecting computer hardware. It is not advisable to buy the costly computer even if a library can afford to buy it, if other conditions are not fulfilled. Computer produced by well-established company be selected and that too should be purchased from the genuine supplier having post-sale service facilities locally.

The hardware development is very fast and the market is filled up with latest and sophisticated machines with increased storing capacity and speed at a lower cost. They may make the present installation of hardware obsolete. The producers/suppliers have the responsibility to keep their earlier productions in proper working conditions and they are expected to develop the old ones so that they can be used in the same way as the recent ones. While selecting hardware, these factors should be borne in mind. If the production of spares for the old ceases, if the supplier or producing farm refuses to provide regular service, there is no alternative but to go for a new system.
Incompatibility is another problem posed by hardware. There is nothing more frustrating in the computer world than the inability to use one machine designed for one purpose to another. Both external communication link as well as data transfer suffer due to its incompatibility with added sophistication. Now, it is possible to overcome this problem at least partially in the present computer world.

3.3.4 SOFTWARE: Suitable software package used for data processing and manipulation is a must for any automation project for various operations and services. Problems might arise if it has not been implemented, tested and documented. Different organizations have produced software packages for library operations. Careful study is necessary prior to select for adoption a package in one library under the particular circumstances. Computerized online library networks, which are based on existing telecommunication facilities is possible if a proper multi-users softwares are used in individual library automation programmes. While consideration of a software if it is multi-users or single-users along with its cost is necessary, question relating to its power and sophistication in information retrieval specifically also should be answered as well as if it is properly documented in order to create additional structural format according to circumstancial need. Besides, if there is provision of revision, a single-user aiming at becoming multi-user, etc. are also to be considered. Lastly, compatibility to transfer the files to nationally and internationally standardized programme packages also is necessary.

3.3.5 MANAGEMENT: The management (authority) is expected to be convinced of the tremendous impact of library automation upon library operations and services in order to
come forward for its introduction and appreciate its tremendous impact upon information storage and retrieval necessary for higher studies and researches.

3.3.6 Computer Experts. Computer personnel are the important group to be counted in library automation. For better performance, smooth running and upgrading service standard, regular interaction between computer experts and library staff and sometimes with library users is necessary. It is found that the training merely by INFLIBNET of the university staff is not sufficient.

3.3.7 Library Staff. It is after all human interface that makes or mars the computer environment really functioning. Accustomed with the traditional library operations and services, the library staff has to realize the need of automation and should try to adjust with the changing environment. It would affect adversely if all the automation works have been entrusted to newly recruited professionals or computer people leaving aside the existing staff. One or two persons from the existing library staff should be deputed to gather practical knowledge on library automation prior to introduction of computer in a library. Of course, new hands with clear background in computer technology are also needed. In-service training for library staff to enable them to be acquainted with the latest developments in the field is necessary for regular improvement of library service. Library personnel without computer knowledge also may be put in supervision of the computer input and thus accommodating and integrating both the groups in the system.

3.3.8 Library Users. Having been familiar with the traditional library system, users may feel uneasy in computer based library systems if all of a sudden the existing facilities
available in the library like browsing a physical collection of documents or card catalogues is withdrawn. The change over should be in a gradual process without affecting the existing facilities all of a sudden. Library environment introducing computer system should be created properly so that users would feel comfortable in using the library. Moreover, different areas like management, staff, supplier of equipments, in-service training, etc should work in close cooperation for better library service. Any system failure affects chiefly the users and precautionary measures should be taken so that users do not face such failures.

3.3.9 PLANNING AND DESIGNING: The next step is the planning and designing of library automation. Financial provision for different non-recurring and recurring expenditures are to be worked out and allocation in the budget need to be made accordingly. Discussion with the experts study of the different areas where library automation is already in operation elsewhere are necessary. On this basis, planning and designing of library automation have to be carried out.

3.4 AREAS FOR APPLICATION OF LIBRARY AUTOMATION

During the recent years in India, there has been a growing tendency to introduce computer in various fields of library operations and services in order to meet the growing challenge of the volume and the flow of literature, although in developed countries computer has already become a basic equipment in library operations. Application of computer in libraries can successfully be made in the following group of activities:

1. Those concerned with house keeping operations, and
2. Those directed towards information retrieval

With the co-operative schemes and international networks, house keeping routines and information retrieval systems have an increasing amount of common
Housekeeping operations include Acquisition, Serial Control, Circulation Cataloguing including OPAC (Online Public Access Catalogue) with MARC (Machine Readable Catalogue), etc. while Information Storage and Retrieval activities include Abstracting and Indexing, Current Awareness Services (CAS), Selective Dissemination of Information (SDI) service, Online database service, Resource sharing, etc. Besides these two main groups, computers can also be applied for processing of library management activities like ordering and bill passing, keeping and processing of office works, issue of reminders when not received a periodical, sending of complete volume of periodicals to binders, preparation of list of holdings, etc.

3.4.1 ACQUISITION. Acquisition is a good area to start computerization not only because it is the first of these operations but also it frees the professional librarians from clerical operations in order to use their professional skills in readers' service. It is admitted that all manual systems are not breaking down as inefficient in their use. For example, the order card written by the librarian becomes the order record until cataloguing process is completed. The computer types orders from this record. For avoiding unwanted duplication of orders, larger the number of bibliographic access points, the better it is. This unit card is used for computerization of acquisition system. It automatically updates the file of information on order outstanding, financial report, stores bibliographic information for later use and gathers statistics. Massive reports regarding progress of working of acquisition section can be produced with the help of computer in a minimum time.

3.4.2 SERIAL CONTROL. Books are received, paid for, classified and catalogued bound if necessary and here (except the circulation) the matter normally ends. Serials on the
other hand, continue to be subscribed and received, they are to be ordered and paid individually in advance, their catalogues must include additional information such as the frequency, library's holdings and if bound or not. If the information is in machine form it can be printed easily in readable format and also in multiple copies for use display and consultation at various levels. So, the application of computer with proper software package for serial control helps in placing orders, entering the bills for payment, checking payment records, checking issue claims, knowing binding position and such other information instantly and easily.

3.4.3 CIRCULATION: Circulation is one of the key functions in the university library. It involves enough time of both the staff and users either to issue or return of books as manual method. Circulation system is to perform the following functions:

1. Information about the availability of any particular book/journal in the library

2. Information about the borrower's particulars (such as borrower's name, number, address, category, etc.)

3. Information about the particulars of materials borrowed (such as Call No., Author's name, Title, etc.).

4. Information about the loan itself of individual documents (such as due date, date of issue).

5. Information on the location of the requisitioned items- either on loan or elsewhere than at shelf (e.g. at the binding or reserved or being re-catalogued or in storage).

6. Identification of items on loan to a particular borrower or class of borrowers (such as off campus).

7. Printing recall notices for items on long term loan

8. Renewal of loans

9. Notification by the library staff of overdue items and printing of overdue notices

10. Notification by the library staff on default borrowers
11. Calculation of fines, printing of fine notices and recording of receipt of fines.


13. Information about requisition for reservation of particular book or books.

With the application of computer, the above listed functions can be completed promptly, accurately and efficiently and so time of staff as well as users may be saved with satisfaction of the service. The advantage of computer is that it makes the file handling accurate and very simple.

3.4.4 CATALOGUING: Automation of cataloguing is perhaps the most important area in a computer-based library system. Computer system is to facilitate change and improve cataloguing techniques, retrieval processes and services.

The main functions performed by computer system in catalogue are:

1. Creation of worksheets for inputting of data elements for description of documents as per any cataloguing system or with necessary modifications, or being compatible with any international input format like CCF or MARC-2, etc.

2. Promotion of system operation by typist or cataloguers by displaying possible input tags, noting misspelling and illogical combination of data and leading operators from one step to another.

3. Maintenance of name and subject authority file, i.e., list of selected subject headings and also selected terms representing single concepts.

4. Production of catalogue, cross reference cards.

5. Provision for editing data for corrections and revisions.

6. Arrangement of entries in various filing sequence as per need.

* 7. Selective listing of catalogue record by specified criteria such as subject, geographical area covered, etc.

8. Creation of display format according to the accepted cataloguing system.

9. Creation of retrieval strategy for retrieval of documents according to different approaches; etc.
Matching readers’ requirements and information contained in documents

Identifying the new additions from the catalogue

At the initial stage of converting manual catalogues to automated catalogues, much time is to be devoted to input the catalogue entries as well as it needs huge expenditure. Once the computerized catalogue (at present mostly OPACs) is in operation, it becomes very useful tool in information retrieval system in a library.

(i) Machine readable catalogues: MARC (Machine Readable Catalogue) is one of the major developments and advantages in the field of automated cataloguing. Under the MARC programme initiated by Library of Congress, the subscription libraries receive tapes containing cataloguing information of new arrivals in regular basis and are also supplied with Computer Programme to be used locally. Thus all subscribing libraries can cut down their own input costs considerably. Detail discussions have been made in the next chapter of the work.

3.4.5 INFORMATION STORAGE AND RETRIEVAL: In recent years, the exponential growth of information has become more and more multi-faceted and multi-disciplinary and complex in many ways, it has been found that only powerful programme software packages with a powerful computer hardware system could help in retrieval of specific and sufficient information, instantly and accurately. For this, there has been a growing tendency to introduce automation in the field of information storage and retrieval system which is more than mere cataloguing system. It has been often discussed the possibility of developing fully mechanized information system which could store large masses of data either bibliographical references or abstracts or full text on mechanically readable storage media and which would furnish tailor made responses to large number of users in the form of answers to questions.
submitted with the aid of input keyword devices from many remote locations. The information content of a document is traced and reconstructed into a user-based format capable of being retrieved easily through the computers. The various available storage media such as magnetic tapes, magnetic disc, optical CD-ROMs, etc. are being used extensively for storage of information.

Information retrieval is the process of recovering information bearing symbols from the storage place in response to requests from users. Information retrieval is a part of complex communication system existing between authors of the information bearing documents and their readers. In the act of retrieving accurate information from the database, computer facilitates search and selection of documents with much higher speed. CAS and SDI services can also be provided with the help of computers.

(i) Bibliographic information retrieval handling. The commendable development in the field of computer technology have influenced to a large extent the method of handling the vast amount of bibliographic information of documents. The advent of electronic computer has certainly provided a new dimension for bibliographic information storage, processing, retrieval and dissemination. There are many online bibliographic databases covering different fields. These machine readable databases can be utilized to provide both CAS and retrospective literature searches.

3.4.6 INTER LIBRARY LOAN: Inter library loan service is offered by almost all the university libraries in India. They find it difficult to provide this service as the latest information about availability of a particular document in other libraries is not readily available. When libraries are automated and linked by an online network, they will be able to
get access to other library databases/catalogues (OPACs) through the network and it becomes easy for the libraries to know the availability of the documents in respective libraries. It is also easy to search and send online requests to other libraries, if possible, through electronic mail (E-Mail). Automation makes it possible to introduce interlibrary loan and to reduce the time lag in supplying the documents and solve to some extent the financial constraint and space constraint. In the days of present networking world, when internet based on different on-line networking system has already arrived, sharing of information between information centers is becoming easy, cheaper and very fast.

3.5 CONCLUSION

Automation provides improved services and offer other added benefits. Computers are used for various reasons, such as economy, efficiency, accuracy, speed improvement of services, efficient management, cooperation, resources sharing, centralization, etc. The years to come are likely to present continued problems and challenges in library automation. Libraries should be made assertive and aggressive and make automation work to fit in their needs, rather than modify those needs to fit automation.

There is no reason to assume the computers to be an all purpose remedy in library. It is important to know what computers can and cannot do. Automation creates some complex situation like inviting physical hazards to the personnel engaged in computer works. Computer virus, system failure at certain points are some other problems that the automation environment are facing. Library automation may be healthy despite the different problems but could be much more so if all these difficulties are brought to open discussion. Keeping in view the objectives/thrust of the study, the work has to be concentrated first on the present.
Discussion of automated cataloguing covering different aspects related to it and the experience on the use of OPAC in three university libraries of U.K. in the form of users’ interface and experience gathered in creation of the machine readable N.E. Database in the Department of Library and Information Science, Gauhati University have been made in the following chapter.