CHAPTER -II

Methodology and Objectives of the Study.
The present Study offers intervention of MIS (*Management Information System*) to the *conventional Library Management*.

Libraries, as centers of learning are experiencing unprecedented rates of change, both from internal and external environment. The new library environment incorporates a changing user population, technology enhancements, transformation of the scholarly communication system, digital information, new approaches to management and a renewed commitment to planning and assessment throughout the organization. However, Librarians as information managers have been slow to keep pace with this change.

According to Lakos (2006), academic libraries are confronting the issues of organisational viability and relevance and are fast adapting to the new reality of the web. Since 1995, when Netscape enabled real access to the *Internet*, academic libraries are no longer the main owners of the information gateway. The web has changed every aspect of life. The most visible change has occurred in the size, rate of change and speed of information availability and delivery.

The breakthrough combination of internet with the libraries as academic warehouses has brought us to the age of *information explosion*. The intervention of e-resources to libraries has manifold the reach of conventional academic resources. It is estimated that the amount of information in the world doubles every 20 months. The amount
of information being published is increasing exponentially. For instance let us take the example of "Chemical abstracts." During 1995, 5,62,955 Papers and 3,620 Books were abstracted which were published in total 1,55,910 pages. But, during 2007, it increased to 8,16,778 Papers and 4,526 Books abstracts published in total 3,91,079 pages.

As we live in an information environment dominated increasingly by the Internet, we have to understand that it is primarily a communication environment. All organizations and businesses are busy in rediscovering and reinventing themselves and adapting themselves around the potentials and the pitfalls of the Internet.

The Internet opens tremendous and until now inconceivable possibilities and it enables the creation of communities of interest. Librarians have to realize that they are in the information business rather than in the library business. They have to adjust, re-evaluate their core services, and change their perspective and purpose. Libraries have to rediscover and re-imagine themselves in order to stay relevant or fade. In order to change successfully, libraries have to change their systems, processes, but mainly their organizational cultures.

To do this, they have to measure – they have to know why, what, how and for whom. In this environment, libraries need to be nimble, innovative, responsive, pro-active and willing to change. To be able to deliver on
these challenges, libraries have to be able to measure their outcomes effectively and systematically and to make decisions based on data, assessment and customer feedback.

Libraries have to transform themselves into organizations that support the values of quality and quality management (Brophy & Couling, 1996). This also means that libraries should build organizations that support learning. (Senge, 1994) Libraries that focus on customer needs increase their ability to provide quality service to their customers. By concentrating on their ability to learn and create solutions, the learning organization “is continually enhancing its capacity to create its future.” (Senge, 1990)

When so much of information is being published, we need some system to help us in managing such a huge pile. Here comes the role of information management, and subsequently, management information systems in libraries to facilitate efficient and effective use of library resources.

Living in an age of such information explosion, Management Information Systems (MIS) have emerged as a solution to this capacity expansion requirement of Academic Libraries. According to McClure (1990), Management information systems are tools designed to improve management decisions. The MIS’s function is to provide library Staff and Readers with data, information, analysis and tools that enhance the
effectiveness and efficiency of library services and assist in the decision-making process.

The objectives of an MIS are to assist staff with the daily decision-making process, to maintain better accountability and control of resources, to monitor budget allocations, to improve overall library effectiveness by focusing on outcomes to generate internal and external reports to improve long-term planning and to facilitate performance measures activities. Further, the MIS intervention offers utility to Readers too by means of a wider bibliographic database through e-resources.

However, like all development tools, the development of Management Information Systems too carries certain inherent barriers. There were several reasons why many of the libraries find it difficult to implement the Management Information Systems. The criteria of an ideal Management Information System are that they must be inexpensive to operate, that they must strengthen and consolidate not overrule the existing conventional Library Management Services, and that the development of staff competence is a major prerequisite.

MIS is the need of hour; a necessity for all libraries with a large customer base. Delivering quality service in a period of scarce resources and constant technological change means that libraries need
organizational cultures that support lifelong learning, system thinking, innovation and community building.

Librarians will have to focus to adapt to even faster changing technological environments, maintain healthy scepticism of technology, maintain a high degree of curiosity, develop and maintain customer focus, develop and maintain good relations with readers, work co-operatively with neighbouring counterparts for resource sharing. Maintain the desire to work constructive cooperation.

It was thus decided to have a nutshell objective for the proposed MIS based Library for being an effective library through:

(1) Providing convenience and justice to its readers.

(2) Attract non-readers to become readers.

The present study is therefore an attempt to propose collaborative partnership with neighboring university libraries of Chhattisgarh in order to make better use of common resources and to improve services to Readers. The Study offers a software as the tool to enable such collaborative working. However offering any tool to facilitate Library operations shall be incomplete until it bears a strong Customer focus.

It was also decided to conduct a survey of readers (Teachers and Students) on Library Automation and Library Effectiveness at all University
Libraries of Chattisgarh namely Pandit Ravishankar Shukla University, Guru Ghasidas University, Indira Gandhi Krishi Vishwavidyalaya, Indira Kala Sangeet Vishwavidyalaya, Hidayatullah National Law University, Chhattisgarh Swami Vivekanand Technical University, Pandit Sundarlal Sharma (Open) University and, Kushabhau Thakre Patrakarita Avam Jansanchar Vishwavidyalaya.

Automation is a state of replacing the human performance of activities with mechanical or electronic processes. Library Automation is a process of adding electronic resources to its bibliographic resources and replacing its human performances with electronic processes.

Library automation started in late 70s in few special libraries and has now reached most of the university libraries. Owing to various problems of budget & infrastructure, It is yet to take off in college libraries in India. Library Automation provides two major areas of Conventional Library Management System vis a vis Decision Support & Transaction Support. Intervention of Library Automation has benefits for both Library Staff and Readers, starting from Procurement, to access Cataloguing, to Circulation and, Library maintenance. Another area that Library Automation facilitates is availability to a larger Bibliographic Database through a Collaborated Inter-Library System of neighbouring libraries and above all the access to e-resources takes all local libraries to a global platform.
The library catalogue or index to the collection forms the base for most of the library activities such as acquisition, reference, bibliographic service, inter-library loan etc. The users (readers) of library card catalogue will appreciate how fast the retrieval is, search and printing in automated environment. If the same system is available in network environment, users can have simultaneous access to the same database. From the library staff point of view the cumbersome job of printing the cards and their subsequent filing gets eliminated. Also, it conserves space and saves stationary.

The second level automation shall handle all the house keeping operations of the library such as acquisition, circulation and serial control thus creating a network within the library or becoming part of the existing network of the institution. Networking of computers within an organization helps the users to browse the cataloguing system from any of the workstation/ terminal.

Other technology which libraries can make use of is the e-mail system. This not only reduces the recurring expenditure but also be effective and fast. Sending reminders for returns of issued resources by e-mail has proved to be very cost-effective. In addition to this, sharing of resources among libraries becomes easy.

Another technology which has revolutionized the information world is the development of internet. Some publishers have started giving
content pages of journals and libraries having subscription to such journals can also have abstract and full text of the articles. Many academic and research institutes have given free access to their working papers.

However, mere Automation of Libraries may prove to be of little help unless supported with the right behaviours within any Library, i.e. that behaviour of staff that assists the Library in achieving its goals and objectives (Ahmed, Lim and Zairi, 1999). Library Staff needs to reflect a positive image that encourages an environment of continuous improvement ethos that further provides for better Performance, Improved Staff Support & Competence and higher Reader Satisfaction. All these together provide for greater Library Effectiveness. Therefore, as the first problem of the present study was to be assessed whether the Automation of any Library affects the Effectiveness of its services or not?

Effectiveness is a state of accomplishment of a predefined purpose or producing the intended or expected result. 'Library Effectiveness' is a continuous process of facilitating its readers with desired bibliographic and web graphic resources at lowest cost & time. An effective library organization will deliver more quality services per staff through identification of the information needs of readers, relate client needs to available resources, providing access to those resources, and facilitate the productive and proficient use of those resources.
Any thing that provides Convenience and Justice to all Stakeholders concerned can be called effective. An Effective Library can therefore be the one whose staffs have adequate Skill and Support to provide for greater service to its stakeholders through the Performance of Library Operations. **Based on all above discussion it was thus hypothesised that “Libraries with higher automation level will show more effectiveness than libraries with lower level of automation”.**

As (Victor and Cullen, 1988) found that there is a variance in the perceptions within an organization by position, tenure and work group memberships, it was thus felt necessary to examine whether perceptions of readers change with the change in their status as Teachers or Students. The second problem in the study hence enquires that: whether Readers as Teachers or Students have different perceptions about Automation and Effectiveness of their Libraries?

Perception is the process of attaining awareness or understanding of sensory information. The access to privileged services of Libraries, compounded with the advantage of higher analytical abilities due to their formal education makes a certain difference in the perceptions of both Reader categories.

Teachers are expected to have more realistic and **logical perceptions.** Moreover the Teachers are **strategic partners** of Library
administration in decision making process of the procurement and acquisition functions for building Library resources. The teachers are therefore partly insiders and are most likely to rate the Library Performance better compared to Students who are mere customers and have no direct influence on decision making other than through the feedback mechanism operated by Library administration for making their services better and customer centric. Although, how often do Library administrators hear to students complaints that their services are inappropriate? However, evaluating performance is an integral part of the Library Management, it is therefore expected that such feedback mechanism does exists.

At the University of Texas-Pan American (1991-92), a survey was conducted for all swimming classes at the start and end of each semester. Both students and instructors were asked to rate their students' swimming ability. Survey data revealed a significant difference (at the .01 level) between instructors' and students' perception of swimming ability at both beginning and end of semester. Students perceived their skills being better than the instructors' ratings at both instances.

According to Montiel (2001) in University of Arizona Teacher’s and librarian’s collaboration has become an important strategy for 21st century school libraries. The strategy recommended in
professional guidelines as a way to improve student’s academic achievement involves jointly planned and implemented instruction that improves teaching and learning. While considerable information about teacher and librarian collaboration exists in the library and information science literature providing librarians a clear understanding of the potential outcomes and gains to students from teacher and librarian collaboration (i.e., making connections, better understanding of subject content), it is unclear that teachers fully recognize this as a goal of teacher and librarian collaboration.

This qualitative study examined perceptions of teachers and librarians from two school districts as to the outcomes and gains to students from teacher and librarian collaboration. Findings indicate that teachers and librarians largely perceive traditional outcomes from teacher and librarian collaboration, such as providing resources and developing skills, yet few teachers see their collaborative endeavors with librarians as including jointly planned and implemented instruction with the potential for improving teaching and learning.

Based on the above discussion, it may be hypothesized that, Teachers will perceive higher library effectiveness compared to Students.

METHODOLOGY & OBJECTIVES
SUBJECTS

The present study collected responses of 240 readers including Teachers and Students of eight university libraries of Chhattisgarh namely Pandit Ravishankar Shukla University (PRSU), Guru Ghasidas University (GGU), Indira Gandhi Krishi Vishwavidyalaya (IGKV), Indira Kala Sangeet Vishwavidyalaya (IKSV), Hidayatullah National Law University (HNLU), Chhattisgarh Swami Vivekanand Technical University (CSVTU), Pandit Sundar Lal Sharma (Open) University (PSOU) and finally Kushabhau Thakre Patrakarita Avam Jansanchar Vishwavidyalaya (KBTU).

The respondents were asked about their perceptions on Automation Level and resulting Effectiveness of their University Library. Table 2.1 below exhibits the sample distribution of the present study.

Table 2.1

RESEARCH DESIGN
(3 x 2 x 8 Factorial Design)

DETAILS OF THE SAMPLE USED IN THE PRESENT STUDY. FIGURES IN EACH CELL INDICATE THE NUMBER OF SUBJECTS USED

<table>
<thead>
<tr>
<th>Readers</th>
<th>Teachers</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automation Level</td>
<td>PRS U</td>
<td>GGU U</td>
</tr>
<tr>
<td>High</td>
<td>5 5 5 5 5 5 5 5</td>
<td>5 5 5 5 5 5 5 5</td>
</tr>
<tr>
<td>Moderate</td>
<td>5 5 5 5 5 5 5 5</td>
<td>5 5 5 5 5 5 5 5</td>
</tr>
<tr>
<td>Low</td>
<td>5 5 5 5 5 5 5 5</td>
<td>5 5 5 5 5 5 5 5</td>
</tr>
</tbody>
</table>
The present research was conducted by using the three-way ANOVA (analysis of variance) technique as exhibited in the aforesaid figure 2.1 with the 3 x 2 x 8 factorial design revealing the three independent variables as three levels of Library Automation as high, moderate and low; two types of Readers as Teachers and Students; and eight University Libraries as PRSU, GGU, IGKV, IKSVM, HNLU, CSVTU, PSOU and KBTV. Library Effectiveness was the sole dependent variable of this study.

The combined effect of these three independent variables i.e. effect of various levels of ‘Library Automation’ in all eight ‘University Libraries’ on both ‘Types of Readers’ (Teachers and Students)] were studied for the resulting ‘Library Effectiveness’.

**TOOLS**

Two scales ‘LAS’ (Library Automation Scale) and ‘LES’ (Library Effectiveness Scale) were used in the present study. Library Automation was defined as “the state of replacing the human performance of activities with mechanical or electronic processes”. It referred to a process of adding electronic resources to the bibliographic resources of libraries and replacing human performances of library operations with the electronic supported processes.
The first scale ‘LAS’ carried fifteen items measuring the four factors as “Commitment, Infrastructure, Services and, Staff Training”. As shown in table 2.2, the Commitment factor covered dimensions of Budgetary Allocations, Access to External Funds, and Promptness of Services to the Readers. The infrastructure factor encompassed connectivity to the internet and server, energy efficiency, photocopy facility, print facility and, resource adequacy in terms of sufficient availability of terminals for all readers. The Services factor covered availability of e-catalogues and e-resources for bibliographic data, integration with neighboring libraries for resource sharing and, e-transactions for effective and time saving circulation. The final factor of staff training measured the dimensions of technical & behavioral trainings to library staff for effective adoption of technology and minimizing the resistance to change & development.

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>Budget Allocation</td>
</tr>
<tr>
<td></td>
<td>External Funds</td>
</tr>
<tr>
<td></td>
<td>Services</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Connectivity</td>
</tr>
<tr>
<td></td>
<td>Energy Efficiency</td>
</tr>
<tr>
<td></td>
<td>Photocopy</td>
</tr>
<tr>
<td></td>
<td>Print</td>
</tr>
<tr>
<td></td>
<td>Resource Adequacy</td>
</tr>
<tr>
<td>Services</td>
<td>E-catalog</td>
</tr>
<tr>
<td></td>
<td>E-resource</td>
</tr>
<tr>
<td></td>
<td>Integration</td>
</tr>
<tr>
<td></td>
<td>Transactions</td>
</tr>
<tr>
<td>Staff Training</td>
<td>Training</td>
</tr>
</tbody>
</table>
Respondents were asked to describe their perception on Level of Automation in their Library on a five point Liker-type scale with response categories ranging from Strongly Agree (5), Agree (4), Cant’ Say (3), Disagree (2) to Strongly Disagree (1).

The second scale, ‘Library Effectiveness Scale’ (LES) was specifically constructed for the present study. Library Effectiveness was defined as “a state of accomplishment of the predefined purpose or producing the intended or expected result”. Library Effectiveness is a continuous process of facilitating the readers with desired bibliographic and webographic resources at lowest cost & time.

In the present study, Library Effectiveness is measured through factors of Library Performance, Reader’s Satisfaction, and Staff’s Competence. ‘LES’ carried fifty five items measuring the aforesaid three factors. As shown in table 2.3 ahead, the library performance factor covered dimensions of library objectives, library services, and adequate working hours. The reader’s satisfaction factor measured accessibility to services, library environment, provisions of feedback mechanism, infrastructural facilities, library maintenance, efforts for reader’s training and awareness of using the library resources, services adequacy and variety ranging from conventional bibliographic resources to e-resources, saving reader’s time in transactions and circulation formalities. While the factor of staff’s competence was tested on their support and skills required for their profession of library management.
The respondents were asked to describe their perceptions about their Organization’s Effectiveness state on a 5-point Liker-type scale ranging from Strongly Agree, Agree, Cant’ Say, Disagree to Strongly Disagree.

For the making of the scales, initially about 50-items were prepared for the various dimensions of Library Automation and about 150-items were prepared for the dimensions of Library Effectiveness. After a series of Content Validity tests by experts of the relevant field, followed by a Pilot test on 50 respondents, Item-analysis using 2-tailed Independent T-test, Factor Analysis using the Principle Component Method provided the 15-item scale for Library Automation and a 55-item scale for Library Effectiveness.

### FACTORS & DIMENSIONS

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Objectives</td>
</tr>
<tr>
<td></td>
<td>Services</td>
</tr>
<tr>
<td></td>
<td>Working Hours</td>
</tr>
<tr>
<td>Reader’s Satisfaction</td>
<td>Accessibility</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
</tr>
<tr>
<td></td>
<td>Feedback</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td>Reader’s Training &amp; Awareness</td>
</tr>
<tr>
<td></td>
<td>Services &amp; Variety</td>
</tr>
<tr>
<td></td>
<td>Transaction time</td>
</tr>
<tr>
<td>Staff Competence</td>
<td>Staff Skills</td>
</tr>
<tr>
<td></td>
<td>Staff Support</td>
</tr>
</tbody>
</table>

**Table 2.3**

LIBRARY EFFECTIVENESS FACTORS
METHODOLOGY

The present study intended to investigate about Library Effectiveness by maintaining higher Automation Level in the University Libraries of Chhattisgarh. Using appropriate statistical tables, common reference of F-ratio was applied to test the significance of differences for verification of various hypotheses. On prima-facie the assumptions for applying F-test i.e. normalcy and homogeneity of data were tested.

The study further used a three-dimensional (3x2x8) ANOVA technique at SPSS to analyze the data. Three Levels of Library Automation were identified as low, moderate and high respectively. For the dimension of Readers, responses from Teachers and students were recorded separately. Eight university libraries were assigned codes on basis on their initials as PRSU for Pandit Ravishankar Shukla University, GGU for Guru Ghasidas University, IGKV for Indira Gandhi Krishi Vishwavidyalaya, IKS for Indira Kala Sangeet Vishwavidyalaya, HNLU for Hidayatullah National Law University, CSVTU for Chhattisgarh Swami Vivekanand Technical University, PSOU for Pandit Sundarlal Sharma (Open) University and finally KBTV for Kushabha Thakre Patrakarita Avam Jansanchar Vishwavidyalaya.

For the further analysis the three main effects of the three independent variables as scores of the eight University libraries at three levels of Library Automation, at two types of Readers as Teachers and Students were studied on Library Effectiveness. Useful and important information was
derived as joint effects of any two and more variables. The greatest advantage of ANOVA (analysis of variance) technique is that it provides an opportunity to examine the interaction between two or more variables at a time.

It is possible for a treatment to affect one group differentially than it does to another. Also it is possible for the effect of one treatment to depend on the specific circumstances under which it is administered. When the effect of one treatment depends on a second treatment, an interaction is obtained. Here, in the three-way analysis of variance, we get three such first-order interactions between any two factors, and one second-order interaction among all the three factors.

The three first-order interactions that the present study undertook were the interactions between (1) Level of Library Automation and Type of Readers; (2) Level of Automation and eight University Libraries; and (3) Type of Readers and eight University Libraries. Also the second-order interaction giving the combined effect of all the three independent variables (Level of Automation, Type of Readers and, eight University Libraries with the dependent variable, Library Effectiveness was studied.

PROCEDURE

Once the two scales were constructed, a total of 240 Readers (Teachers and Students) from all eight University Libraries of Chhattisgarh
were asked to respond on the given scales. The collection of responses was then followed by scoring and compilation of data. Finally the SPSS software was used for application of statistical tools and tables for the purpose of data analysis.

LIBRARY EFFECTIVENESS TOOLS

The survey results, as a strong feedback mechanism, work as a basis for decisions and actions to improve library effectiveness. However, two limitations of such study are, that perceptions of readers over library effectiveness do not actually confirm of library being actually effective or not. And that an action plan has to be any how formulated and implemented to implement the results of such study, mere feedback never makes a library effective or ineffective.

The present study therefore offers software as a tool that fulfills all requirements of an effective library as addressed under all dimensions of the LAS and LES. Through the use of integrated database, the proposed MIS based software provides solution to all limitations of the conventional library management systems. The integrated database comprises Membership Data, Bibliographic Data, Circulation Data and the Maintenance Data.
For the Bibliographic data, 13 resource types were identified as Books, Serials, Theses, Textual Data, Reports, Meetings, Special Edition, News Papers, Patents, Standards, Annual Reviews, Irregular Serials, and Monographic Serials. The software provides for (1) adding any bibliographic resource through purchases or interlibrary loan, (2) deleting any resource by way of withdrawal, or loss and (3) editing the particulars of a bibliographic resource details. For the convenience of readers, the retrieval of bibliographic data is possible through (1) Access Point search, (2) Free Text search and, (3) Boolean search. Ten access points were defined for the retrieval purpose as Title, Author, Publisher, Year, Subject, Language, ISSN / ISBN, Accession Number, Series / Note Search, and Class Number.

For the Membership data, members are classified in two categories: Institutional Members and Individual Members, the Individual Members are further sub divided in two categories as Direct Members and Indirect Members. The Institutional Members can be the Colleges affiliated to the University, University Teaching Departments, Neighboring Universities and others. The Direct-Individual-Members can be undergraduates, post graduates, Research Scholars, University Teaching Staff, University Non-teaching Staff, College Teaching Staff, College Non-Teaching Staff. The Indirect-Individual-Members are the VIP’s and the special privileged members as entitled on directions of the Vice-Chancellor of the University. 15 different records are maintained for each member as Membership No.,
Library No. (all member libraries be given a unique identity no.), Title, Name, Father's Name, Date of Birth, Department / College / University, Subject, Category / Designation, Entitlement, Gender, Address, Phone Number, E-mail and Photograph.

Entitlements for all members can be defined in the type and number of bibliographic resources to be issued at a time and for the duration for which it can be issued. For the members of neighboring libraries, following separate rules are to be framed:

Rule 1: Entitlements as per home library.
Rule 2: Check Photo Identity Card before Issue.
Rule 3: Name of Issuer who checked Photo Id Card.
Rule 4: No Dues to be issued on check of return records to all member libraries.
Rule 5: All member libraries can receive book returns on behalf of other member libraries however fine shall be collected for postage and difference of days between book return by individual and received by original owner library i.e. other library that receives book return on behalf of library (owner of book) is also liable to pay for delays.
Rule 6: All fines are payable by individual members including for the Rule-5.
Rule 7: No library can reissue books of other library.
For the Circulation function, the Issue, Re-Issue and Return of all bibliographic resources are enabled with a cross reference of the integrated database having predefined Bibliographic and Membership records. On any request for Issue, Re-Issue and return of Bibliographic resources, the software would automatically provide the status of entitlements including conditions of exhaust i.e. when member has already availed issue facilities to his maximum entitlement and no further issuing is permissible. Similarly for all permissible transactions, the durations and due date of return shall automatically be generated on calculation of the individuals’ entitlements. Unlike the conventional system, the software automatically generates the list of pending returns for reminders, or the entire transaction history record of one or more members for any given time, day or period. Provisions of automatically calculating the fines are also featured in the proposed software.

The proposed MIS based software also features the Library Maintenance assistance through records and automatically generated reminders as per predefined schedules of physical verification, Shelf Rectification, Dusting and Preservation of Bibliographic resources. Finally the software shall also generate following reports as and when required to facilitate routine and policy decisions of library administration.
1. MEMBER’S LIST for one or all categories (Subject / Gender / Status (UG, PG, Teacher UTD, Teacher - College, Non Teacher, Research Scholar, and VIP).

2. READERS visited the library on any date or between any two dates. Customized results for Subject, Gender, and Status can also be generated.

3. ITEM TRANSACTION HISTORY on any date or between any two dates.

4. ITEMS ISSUED on any date or between any two dates.

5. ITEMS RETURNED on any date or between any two dates.

6. OVER-DUE LIST on any date or between any two dates.

7. RETURN ALARMS / REMINDERS on daily or monthly basis.

8. MAINTENANCE ALARMS as per predefined schedules.

9. FINE CALCULATION for delayed returns or lost or damage to item.

10. RESOURCE AVAILABILITY to search books or any resource with this library or other neighboring library. Also information will be
generated for the selected items about whether the selected items are available or issued and if issued when are they due (date) for return.

11. CIRCULATION PERFORMANCE through measuring the request - delivery time gap.

12. MOST FREQUENTLY USED ITEMS (Single / Multiple) on any date or between any two dates.

13. MOST FREQUENTLY USER (Single / Multiple) on any date or between any two dates.

14. HIGHEST FINE PAYER (Single / Multiple) on any date or between any two dates.

15. MEMBER TRANSACTION DATA (Single / Multiple) on any date or between any two dates.

16. DEPARTMENT TRANSACTION DATA (Single / Multiple) on any date or between any two dates.

17. COLLEGE TRANSACTION DATA (Single / Multiple) on any date or between any two dates.
18. UNIVERSITY TRNSACTIONS DATA (Single / Multiple) on any date or between any two dates.

19. DAMAGE ASSESSMENT on any date or between any two dates.

20. LOST ASSESSMENT on any date or between any two dates.

21. WITHDRAWL RECORD on any date or between any two dates.

22. BEST USER on any date or between any two dates. Basis for such evaluation shall be Maximum Transaction (Weightage-60%) and Minimum Fine (Weightage - 40%).

23. LIBRARY WORTH in terms of cost of assets on any date or between any two dates.

With the installation of proposed software, no doubt, library effectiveness shall improve. However, continuous improvement still remains the key. The proposed study therefore provides with the “Library Audit Checklist”, as shown in table 2.4, which makes library performance measurable. Believing in the fact that; ‘What we cannot measure, we cannot improve’ the proposed checklist shall prove handy for librarians to measure and continuously improve effectiveness of their library.
Effective Planning is the major prerequisite to effective execution. Budgets for libraries are to be utilised in most effective manner. The

**METHODOLOGY & OBJECTIVES**

| (1) | Budgetary Allocation | a) Automation | i) Academic
| | | | ii) Circulation
| | | | iii) Vigilance
| | b) Bibliographic Resource | i) Acquisition (Print & Electronic)
| | | ii) Maintenance
| | c) Infrastructure | i) Furniture, Fittings & Fixtures
| | | ii) Lighting & Ventilation
| | | iii) Building Expansion,
| | | iv) Repairs & Maintenance
| (2) | Cost Effectiveness | a) Operational Cost
| | | b) Cost Benefit Ratio (use)
| (3) | Income Substitution | a) Self Financing
| | | b) External Funds (Grants & Aids)
| (4) | Staff
| (5) | Training | a) Staff
| | | b) Readers
| | | c) Awareness (Display Of Rules)
| (6) | Services | a) Reader Satisfaction – Accessibility
| | | b) Reader Satisfaction - Response Time
| (7) | Overall Equipment Effectiveness (OEE) | a) Availability Index
| | | b) Performance Index
| | | c) Quality Index
| (8) | Readership & Circulation
| (9) | Maintenance
| (10) | Continuous Improvement | a) Feedback & Suggestion Mechanism
| | | b) Replicating Best Practices

Table 2.4
present checklist offers three areas for **budgetary allocation**. It is interesting to note that the proposed priorities and proportions change with the age of library. While an established library should prioritise its fund allocation with Automation, then bibliographic resource and then infrastructural needs. On the other hand, the relatively new libraries should give priorities to infrastructure followed by acquisition of bibliographic resources, and then to automation.

The second criteria in the checklist are of cost. There has always been a concern with cost control in libraries. Yet throughout most of the history of library development, libraries have approached the problem of cost analysis in a most elementary and timid manner. The reluctance to analyze costs can in part be attributed to lack of training. Also, library staff and the readers are not cost conscious due to the low level of library expenditures. Not until recently, when the level of expenditure rose sharply, did anyone demonstrate real concern about unit costs and cost control. While cost figures alone should not be used to evaluate a library, they are useful in determining the efficiency of library operations. One can compute a unit cost figure by assessing maintenance cost, overheads with respect to the total value of resource available. A high cost may not reflect a "good" performance.

Cost – benefit Ratio is another way the library may prove worth of its services to the academic community. Frankly, there is no calculation and
worth that can be associated to learning facilitation. However, the number of days a book or any other bibliographic resource was used and issued in the given period or was it lying idle at the shelf waiting for the readers can be a parameter to test its cost-benefit ratio.

The third criterion for effective library performance is the solution to the difficulty of library administrator to justify, on the basis of performance, budget requests for additional funds. This is extremely difficult; however, if income substitution is possible through increasing the self financing and obtaining external grants and aids based on performance and commitment shown, it could be the beginning of a new era for all service oriented non-profit organizations like academic libraries.

For the fourth criteria of Staffing; many articles have been published on the number of staff required and the qualifications, special training, or skills needed to perform certain services adequately. It is generally recognized that an arbitrary number of staff members cannot be set but must depend on the kind and scope of service provided, the content of the collection, and the size of the organization served. The ALA College Library Standards prescribe a minimum number of professional librarians with additional hiring determined by size of population served, type of library organization, size and character of the collection, prevailing community interests, number of hours the library is open, and the physical layout of the building.
In 1964 the Special Libraries Association suggested a ratio of 2-3 non-professionals to every professional library staff member. However, very little thorough research has been conducted on the number and kind of personnel needed to perform a particular library service, nor on the type of skills and knowledge that lead to better performance. Decisions are still being based on educated guesses and not on empirical studies. One must simultaneously consider both the personnel requirements and the costs of performing various services when evaluating performance. The most reliable of the sources available, the present study believes in the staffing formula as brought up by Ranganathan (1962), as exhibited in the Table 2.5 below.

![Table 2.5](image-url)

<table>
<thead>
<tr>
<th>Section</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book Section</td>
<td>One person for every 6000 volumes added in a year.</td>
</tr>
<tr>
<td>Periodical-Publication Section</td>
<td>One person for every 1000 periodicals currently subscribed.</td>
</tr>
<tr>
<td>Classification &amp; Cataloguing Section</td>
<td>One person for every 2000 volumes added in a year.</td>
</tr>
<tr>
<td>Maintenance Section</td>
<td>One person for every 2000 volumes added in a year and one person for every 50000 volumes in the library.</td>
</tr>
<tr>
<td>Publicity Section</td>
<td>Minimum one artist.</td>
</tr>
<tr>
<td>Administrative Section</td>
<td>Minimum one accountant, typist and correspondence clerk.</td>
</tr>
<tr>
<td>Reference Section</td>
<td>One person for every 50 readers using the library in a day of the year.</td>
</tr>
<tr>
<td>Circulation Section</td>
<td>One person for every 1500 hours for which one wicket-gate of the library has to be kept open in a year.</td>
</tr>
<tr>
<td>Supervisory Section</td>
<td>One librarian and one deputy librarian.</td>
</tr>
</tbody>
</table>
In addition to the above, effective libraries do require a book binder, gateman, property counter attendant and, Xerox machine operator. Things have changed since Dr S.R. Ranganathan derived this breakthrough formula. Today, as we propose library automation and MIS in libraries, there is a need for data entry operator and a system administrator too. It is rest in the hands of library administration to decide upon for supplying these staffing needs through the in-house facilitation or to outsource the same.

For the fifth criteria of Training, adequate training for skill, knowledge and attitude for staff is must. Not only the staffs are aware of library functions, they must align well to the changing automation needs. Further the fear of loss of employment, on account of automation may fail the staff support to readers. Right attitude training for understanding their role in library and to know the impact of their work for library objectives is a must. Adequate trainings address such requirements. In addition, awareness to readers of the library rules, new offerings and to utilise the MIS based library and move ahead with the automations is necessary. Libraries must then focus on training and development of not just staff but readers too. Number of Mandays of trainings provided, therefore works as a basis to the evaluation of training effectiveness in libraries.

Services of the library and the reader satisfaction with them form the sixth criteria of library effectiveness. Reader’s satisfaction with accessibility
to the existing services and materials, and the time required (response time) to fulfil reader needs determining reader satisfaction.

Accessibility to the library and its contents is without a doubt one of the most difficult criterion concepts to measure. Accessibility measures are essentially ratios of services to users. The rating can be improved by increasing duration of services; the time for which library facilities are available to reader throughout the year is its accessibility time. Libraries must be open to maximum possible time and days in the calendar. All closed time adds negative value to the cost – benefit ratio.

Response time is another measure of library performance in a relatively recent development to make library performance measurable. It is possible to measure response time in a number of ways by varying the stopping and starting points and employing either real, elapsed, or some "average" time for different situations. As with the other criteria it is also possible to use this measure for different purposes, e.g., to measure the time required to secure a copy of a specific document, or, to measure the time required to secure a specific piece of information or have a given service performed. Circulation can be the key area for measuring response time. Response time is based on one of the major rule of library as enunciated by Ranganathan (1962) i.e. ‘Save the Time of Reader’.
The Automation (computerisation) enabling e-resources have become inevitable in MIS based libraries. Measuring the effectiveness of library automation is therefore the seventh criteria in our checklist of library effectiveness. OEE (overall equipment effectiveness) accepted as a world wide standard of performance of automation processes. OEE is a result of availability, performance and, quality. It accounts for ratio of Fully Productive Time to Planned Production Time and can be calculated as:

$$\text{OEE} = \text{Availability Index} \times \text{Performance Index} \times \text{Quality Index}$$

Availability reveals the total downtime of internet enabled computers against the colander time.

$$\text{Availability} = \frac{\text{Operating Time}}{\text{Planned Production Time}}$$

Performance is the ratio of Net Operating Time to Operating Time, and Accounts for ideal time. It can be calculated as:

$$\text{Performance} = \frac{\text{Ideal Cycle Time}}{\text{Operating Time}}$$

Quality is the ratio of Fully Productive Time to Net Operating Time and accounts for speed of connectivity. The highest complaints from e-readers are of the poor speed of internet. Quality index is calculated as:

$$\text{Quality} = \frac{\text{Operating speed}}{\text{Capacity Speed}}$$

The eighth indicator accounts for readership and circulation. Readership is simple proportion of population to the readers entering the library for any given day or period. Improvement on this figure shall fulfil our objective of attracting non-readers to become readers. Circulation accounts for the number of documents circulated in a day or period. As the number of items circulated or the number of borrowers increased, the
level of performance will be assumed to rise. Recently, attempts have been made to predict through circulation figures the amount of use a library will receive. These newer approaches represent an improvement in measurement techniques and should provide a better basis for evaluating and improving library services. Some attempts have been made to determine the relevance of the collection to user needs by gathering data on the actual use of the collection. This in turn is considered a measure of the library's performance capability. Another approach to partially evaluating the collection and the library on the basis of use is to analyze reference questions asked, whether answered or unanswered. Such an approach will clearly define the active user's needs and can be a partial guide for collection development.

The ninth criteria of Maintenance, as suggested by the name itself, accounts for maintenance of print resources. Table 2.6 enumerates the expected standard for such maintenance schedules.

<table>
<thead>
<tr>
<th>Table 2.6</th>
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| **A)** SHELF RECTIFICATION  
1 Books < 5000 - Quarterly  
2 Books > 5000 < 20000 - Half Yearly  
3 Books > 20000 - Annually  
**B)** PHYSICAL VERIFICATION  
1 Books < 5000 - Quarterly  
2 Books > 5000 < 20000 - Half Yearly  
3 Books > 20000 -Bi-Annually  
**C)** DUSTING - Daily  
**D)** PRESERVATION - Quarterly  
1 Fungal  
2 Silver Fish  
3 Ants  
4 Rats  
5 Termites  

METHODOLOGY & OBJECTIVES
The tenth and final criteria, Continuous Improvement makes effectiveness self sustaining through installation of a feedback mechanism that brings forward the expectations of readers, fulfilling which shall keep the libraries always on the track of continuous improvement. Also expected from the libraries is identification and replication of best practices of library sciences and have a global approach towards improvement.

It is expected that the compliance to the three tools shall prove helpful for libraries of the present study to be effective.

**ETHICS IN STUDY**

All respondents covered under the study were treated with care, sensitivity and respect and were assured of anonymity. They were also assured of keeping their responses to be strictly confidential. These promises as made were kept with integrity.