3.1 Introduction

Many libraries, particularly university libraries, are working around the clock to provide access to the millions of papers and books that are published each year due to the exponential growth of knowledge and information. As a result, they are testing various approaches to effectively serve their customers. The only solution is effective resource sharing, which can be realized by utilizing current developments in information technologies to create a network of libraries. Considering the significant problems faced by university libraries in Madhya Pradesh, such as inadequate funding and high material costs, resource sharing and collaborative operation through networking have become indispensable. According to Jebora and Devadose (2004), the library network is widely understood to be a group of libraries that come together as one and are aware of how to support one another in order to ease their clients' informational burden. It is a collection of interconnected information systems linked to communication infrastructure that collaborate through a less formal agreement to conduct information handling activities to provide users with improved services.

It is crucial to note from the discussion above that the sharing of library resources via information and communication technology is the essential component of library networking. Therefore, it relates to the use of interconnected computers and peripherals for the purpose of resource sharing through a network. Academic libraries are those that serve the faculty, staff, and students of academic communities, colleges of education, and polytechnics. Since no library can compete globally and remain relevant in terms of resource acquisition and delivery, knowledge and services delivery through networks cannot be ignored in academic libraries. These individuals need access to library resources for their instruction, learning, recreation, research, and decision-making processes.

A large collection of knowledge and information can be found in an academic library. In this age of information globalization and multiplication, it can scarcely find adequate materials. Because of this, a library must work to not only produce knowledge and information but also manage and convey it to its audience. The information must be spread. Because knowledge cannot be considered knowledge until it is shared with those who need it.as the distribution method in one circumstance might not be acceptable in another, the librarian may use distance

learning in one circumstance, a CD-ROM in another, or an on-site expert in a third, providing the delivery is timely, relevant, and efficient. The practice of making knowledge available to those who require it at the right moment is known as knowledge delivery.

Academic libraries need create, acquire, store, and offer their contents to their customers with competence and great precision on demand if they are to stay ahead of other information providers and be able to compete in the information-driven economy of the twenty-first century. This is due to the mind-boggling expansion in the amount of literature that has been made available for usage since the turn of the 20th century. In a similar line, it's just incredible how many users are swarming to utilize these enormous resources.

3.1.1 Library Network Meaning

The introduction of superior technology in the sectors of computing and communication has upset the methods used by libraries around the world to store and distribute knowledge. The communication circuits of the computer link it to other computers or terminals to form a comprehensive information appliance. Through technology, the Network System was created. Network forms when several libraries that use computers decide to share information. During communications for a specific functional aim, more than libraries and organizations took part in a regular pattern of information exchange. A network is frequently a well-known framework that allows all possible clients to access the materials, data, and services offered by several libraries and other organizations. Libraries in different areas may agree to work together under the same conditions that they do for their own constituents. One or more of the technologies used to facilitate communication among them may be the computer and communications.

3.1.2 Library Network

Networking entails the allocation of computers, add-on the hardware, software, and switches that are linked through communications channel that connect network users. The joint use of knowledge and resources is the end result. The goal of the network is to provide users who need network services with information. Communication between them may be facilitated by the use of computers and telecommunications.

Transmission media, control mechanisms, and network interface units make up the three basic parts of a network. The parts offer a way to send and receive information from far-off places. In general, a network must have internal switching capabilities, transit capabilities, and a primary user**.**

3.1.3 Definition: Library Network

A network of libraries that have come together with the intention of assisting one another in meeting the information needs of its patrons is referred to as a library. In its National Programme Document from 1975, the National Commission on Libraries and Information Science defined a network as "More than libraries engaged in a shared model of information switch over, through communications for some useful purpose".

3.1.4 Aims of the Library Network

- To enhance the efficiency of resource use and service quality provided to patrons at each library by offering automated services in acquisition, serial control, cataloging, circulation, user services, and capital bookkeeping.
- To improve resource material sharing giving individual libraries way in to combine databases such union catalogues like CAS, and SDI.
- It is recommended to maintain a single, online union catalogue with all of the participating libraries' books, serials, and non-book materials. To overseen and facilitate catalogue searches, referral centres should be developed.
- Putting electronic services and computerized management into the libraries to facilitate quick in-sequence transfers.
- To allows publication sharing of duplicates.

3.1.5 Need of Library Network

- Information and knowledge are expanding at an ever-increasing rate that is faster than it ever has. Because of this, it is now difficult for any library to obtain every document published there.
- The increasing price of publications, which has had an effect on the expansion of library holdings, is a further problem.
- It is challenging for each records to offer services starting its own collection because budget for the library is not raised.

3.2 Contributes by Library Network Center National and International Level

3.2.1 UNESCO

The United Nations Educational, Scientific, and Cultural Organization is known by its acronym, UNESCO. It seeks to advance peace via international cooperation in culture, research, and education. The Sustainable Development Goals that UNESCO's activities assist in achieving are outlined in the 2030 Agenda, which was adopted by the UN General Assembly in 2015. Formally established in 1942, the Conference of Allied Ministers of Education (CAME) brought together the governments of the European nations battling Nazi Germany and its allies in the UK. The countries in question were searching for methods to reconstruct their educational institutions following the Second World War, even though the fight was still far from ended. This idea took off quickly and became more widely accepted. Participation was decided upon by new administrations, the American government among them.

On the recommendation of CAME, ECO/CONF, from November 1–16, 1945, the United Nations Conference for the Establishment of an Educational and Cultural Organization was held in London.. The conference began just as the conflict was coming to a close. It brought together representatives from 44 nations who made the decision to an organization that would truly represent culture of peace. They believed that the purpose of the new organization was to create "academic and ethical unity of mankind" and avert the start of anew world war.

3.2.2 IFLA

The International Federation of Library Associations (IFLA) is the voice of libraries around the world, representing profession's interests and working to enhance services everywhere. We gain from having a large and active membership, a thriving professional community, and close partnerships.

Throughout its long history, IFLA has helped libraries, librarians, and library associations around the globe. On September 30, 1927, in Edinburgh, Scotland, during the UK Library Association's Annual Meeting, IFLA was established. It was formally founded in 1929 and had fifteen members from fifteen different nations. We currently have more than 1500 Members and Affiliates from roughly 150 nations.

3.2.3 ARPANET

A worldwide network of computer and communication systems, the Internet. It links various machines with different software and hardware together. By converting communications into a language that both parties could understand, such as TCP/IP, HTTP/IP, etc., these computers operated to enable them to communicate. Multiple networks are connected so that data can move between them in order for the internet to function. The only current global-scale internet project is the internet.

3.2.4 NISSAT

Since its establishment in 1977, NISSAT has promoted and supported a range of short-range courses in information science and technology, including the use of computers in libraries and information centres. throughout city-based library and information networks, it has been supporting the sharing of information resources in science and technology with a focus on the creation of web-based information content. NISSAT established the NACIDS (National Access Centers to foreign Database Services) in an attempt to offer online access to foreign database services. It has developed and marketed co-products based on CDS and ISIS, such as SANJAY. Various training workshops on the use of computers in library and information tasks have occasionally been held by the NISSAT. Improving information services through information centers, worldwide database services, CD-ROM database facilities, etc. has been the primary objective of NISSAT.

3.2.5 INFLIBNET

An autonomous Inter-University Center (IUC) in Gandhinagar, the Information and Library Network (INFLIBNET) Center is managed by the University Grants Commission in New Delhi (Ministry of Education, Government of India). The UGC began this important national programme as a project under the IUCAA in March 1991, and in June 1996 it became a stand-alone Inter-University Centre. INFLIBNET is working to update university libraries in India with cutting-edge technology for the best possible information use. INFLIBNET aims to play a significant role in development academic and research communication in India.

3.2.5.1 Objective of INFLIBNET

- To encourage and build communication facilities that, with the collaboration and participation of the relevant agencies, improve information transmission and access capabilities and support academic pursuits such as scholarship, learning, research, and study.
- To promote and develop communication infrastructure that, with the cooperation and involvement of the relevant organisations, enhances information access and transmission capacities and supports academic endeavours like learning, research, and study.
- To encourage and put into practice common standards for automation of operation and services to the nation's libraries and information centres.
- To create standard and consistent guidelines for technique, methods, measures, computer hardware, software, services, and to encourage all libraries to use them in their daily operations in order to facilitate information sharing, pooling, and exchange for the best possible use of facilities and resources.
- To develop a national network connecting the nation's libraries and information centre and to progress information management, service capabilities;
- To establish online gateways for national and international databases, respectively, under the ownership of national and international information networks and institutes, and offering access to bibliographic information sources featuring citations, abstracts, and other supporting materials via locally generated databases of the NISSAT Sectoral Information Centers, UGC Information Centers, City Networks, and similar entities;
- To create innovative strategies for the high-density storage of digital images of important information that is now offered as manuscripts and information documents within various Indian languages.
- To optimize the use of information resources, reduce duplication of acquisition by utilizing shared cataloging, interlibrary lending service, catalogue generation, and collection development.
- To make it possible for users scattered throughout the nation, regardless of place to access information about serials, theses/dissertations, books,

monographic resources, and non-book resources by locate the sources, where available, and obtaining it through INFLIBNET and the union catalogue of documents facilities;

- To build databases of initiatives, organizations, experts, etc. to offer online information services;
- To promote collaboration across the nation's libraries, documents centres, and information centres so that resources can be shifted to retain weaker resource centres.
- The utilization of electronic mail, file transfers, CPU/audio/video conferencing, and other related tools to promote scholarly exchanges among scientists, engineers, social scientists, educators, researchers, and students.
- To develop systems and carry out research in the disciplines of data management, information management, and networking;
- To coordinate maintenance, create a powerful network control and monitoring system;
- To cooperate with universities, libraries, information centres, and other businesses domestically and internationally in fields related to the Center's goals;
- Enhance R&D, build the infrastructure and technical positions required to achieve the Centre's goals;
- To provide consulting and information services in order to earn money.

3.3 Introduction: Library Automation

The broad term used when computers and telecommunications linkages are utilised to replace human procedures in libraries is "library automation" (ICT). The automation of housekeeping activities in libraries is known as library automation, which mostly makes use of computers. "Library automation" used to refer to the mechanisation of traditional library procedures like acquisition, serial control, cataloguing, and circulation management. Today, the term "computerization" is used to refer to procedures including information management, information storage, retrieval, and information consumption as well as traditional library operations.

3.3.1 History of Library Automation

Punch cards were introduced into libraries in the 1930s, and technology for both acquisitions and circulation was implemented. This marked the beginning of library automation. The library automation advanced alongside the advancements in computer and communication technology during the 1930s and early 1940s, when World War II slowed down progress on computer systems. The following are significant events in the development of library automation. Between 1946 and 1947, John Mauchly and J. Prosper Eckert built two enormous ENIAC I (Electronic Numerical Integrator and Calculator) computers at the University of Pennsylvania. This was housed on two stories of a structure, weighed thirty tones, and featured more than 18,000 vacuum tubes. Another device, the EDVAC, was created to switch between instruction sets and quickly store two programmers.

The development of the Internet heralded a new era in library automation. Networks are increasingly being used for connections to commercial online systems, email, FTP, and telnet. When the World Wide Web was established in 1993, it was the network that included all information delivery methods and had the quickest growth rate.

Expert systems and information systems became widely available in the 1990s as a result of advances in software and hardware technology. As a result of an enhanced silicon computer chip, storage space expanded and telecommunications capacity lines became faster and more efficient. There is a proliferation of modern information distribution services as a result of enhanced information processing, storing, sending, and retrieval capabilities.

In the 1960s, the first decade when computers were commercially practical, Machine-Readable Cataloguing (MARC) was developed. MARC first made it easier to access bibliographic databases and introduced a consistent technique of organising cataloguing data for communication and storage. This innovation marked a significant turning point. As a result of important discoveries like the integrated circuit by American engineers Jack Kirby of Texas Instruments and Robert Noyce of Intel, leading to the improvement of computers, HP Luhn created a new, inexpensive indexing method known as "keyword in context" or KWIC index for articles

appearing in Chemical Abstracts in 1961. The MARC I and MARC II programs, which the Library of Congress worked on from 1965 to 1968, aimed to "tag" bibliographic entries by utilizing three-digit identifiers to indicate fields. The use of commercial systems for reference database searches (like DIALOGUE) increased along with the adoption of minicomputers and microcomputers. The technical processing functions of the library, which included reference files, a catalogue data file with online entries for each item, an in-process file with information on items in the processing stage, and MARC records from LOC, could be closely integrated thanks to BALLOTS, the system that served as the foundation for RLIN (the Research Libraries Information Network).

3.3.2 Meaning and Definition

One of the essential services needed by a wide range of companies is the library, to put it mildly. Almost no industry can function without a sufficient and thorough investigation into the particular subject. The majority of the time, libraries supply the information needed by academics, educators, students, and businesses. But occasionally it can be impossible to use actual libraries.

Services in libraries can get rather boring. They necessitate the collection, organization, and processing of vast amounts of data. Additionally, the documents must be maintained in a suitable way and state to ensure their longevity. Maintaining a record of the borrowed documents takes a lot of patience. These services might be labor- and financially-intensive. Additionally, manual services libraries around the world continue to face a severe staffing shortage. Libraries have, therefore, always demonstrated a need for automation.

The effects of library automation technology can be seen mostly at central universities, reputable universities, national institutions, and institutions created by legislation since they are well-funded and have cash for their libraries. The majority of these libraries take things a step further by implementing new information and communication technologies for Library 2.0 Services, including online comment and inquiry forms, interactive WebOPACs, and other web-based user services. The following is a list of some library software programs.

- Alice for Windows

- CDS/ISIS
- DELMARC and DELPUS
- Grandhalaya
- LibEra
- Librarian Suite
- LibSys
- Maitrayee
- PALMS and CLMS2
- Sanjay SLIM++
- SOUL
- Virtua ILS
- Suchika

3.3.3 Issues of Library Automation

Automation of libraries is urgently needed since it can deliver information to a wide range of users in a matter of seconds or minutes, giving other information suppliers a serious challenge. Automation of libraries can give knowledge consumers the required relief in the age of constant information generation. However, this procedure has its own problems and difficulties. Few industries can run entirely smoothly without computerization, which presents significant obstacles for those that do. To have a better understanding, several of the problems with library automation are also explored.

- **Lack of Proper Planning-**Effective planning is a must for a successful library automation, since it prevents time, money, and labour from being squandered on pointless tasks. This is still one of the most important problems with library automation, though. Library automation is a costly project that may need careful preparation before implementation. In general, structured planning implicates keeping in mind the budget allotted for the library, the goal and objectives that the library holds, sources of data, and identifying the areas where the library might consider essential automation. It also involves selecting the software, finding personnel who can handle the software competently, developing the hardware, maintaining the automated facilities, and coming up with new services. If a library doesn't systematically design

with the aforementioned goals in mind, library automation will unavoidably achieve those goals.

- **Lack of equipment or technology-** The lack of knowledge about the technology needed for library automation is one of the main overpowering obstacles to its implementation. This encompasses both software and hardware-related problems. The library may decide to use one of the software options on the market and automate its operations. Once software has been chosen, it is the role of the technology department to determine whether it can meet the library's objectives and aims.
- **Lack of economic resources-** Even if the library or any other institution wants to choose automation and has made plans for its implementation, one of the other significant obstacles or difficulties it can face is the lack of financial support. For some institutions and organizations, the expense of building computer systems might be highly prohibitive, if not outright unattainable. The majority of the time, it is necessary to hire the computer system and any necessary software, which is expensive in and of itself. Additionally, there is an additional cost for maintaining the programed. Additionally, it is necessary to employ experts who can manage such complicated systems. Additionally, they would require a set salary.
- **Lack of skilled or trained professionals**- When the system is automated, the issue or problem still exists—libraries are already gravely understaffed. Being proficient with the complexities of the software and hardware, addressing any issues, and assisting clients in understanding how things function all require a certain amount of fundamental knowledge and competence. The fact that only 1 or 2 professionals are often required to handle software tasks makes the task more difficult. The lack of literacy and training about the usage of automated technologies is a further extension of this issue. As a result, the shortage of people with the necessary skills for managing software packages can only be addressed by education and training.
- **Lack of skilled manpower**- The majority of library-focused programme emphasize how important it is to manage, track, and organize resources. The absence of appropriate education and training has not been adequately

reflected in these courses. In order to organize information initiatives, ascertain the level of planning, designing, framing, and implementation. The attitude of the librarians is one of the major relevant difficulties in this area. The truth is that their problem isn't that they can't understand how the programme works; rather, most of them think they don't have to and are too set in their ways to learn. They think manual library services are superior, so they don't think learning about automated software is necessary. The negative attitude of library staff members has a detrimental impact on automation in libraries.

3.3.4 Advantages of Library Automation

Several institutions and organizations have tried automating library resources. Automation of libraries offers a sizable number of benefits.

- The processing of large data volumes is made easier and more accurate by library automation.
- Compared to traditional processes, the operations can move forward more quickly. Furthermore, promptness has improved significantly.
- Performance quality is improving quickly.
- It is not fueled by manual exertion.
- It is extremely economical.
- Work duplication is easily avoidable
- Functioning is fairly simple.
- Automation of libraries increases the potential for data manipulation.

3.3.5 Difficulties of Library Automation

Automation in libraries has drawbacks despite having potential benefits for both users and library staff. The automation of libraries has certain additional drawbacks.

- The cost of automation facilities for libraries might be fairly high. There isn't much money left for the staff because the installation and upkeep of the software are using up the majority of the budget's resources. A significant drawback of library automation is the relatively low employee salary.

Additionally, these facilities already provide the services that employees are required to do or offer. The staff's employment is severely affected by this.

- When the quality of books is taken into account, the financial strain is also taken into account. Sometimes libraries are forced to keep cheap books because they cost more money in an effort to meet budgetary requirements. Thus, library automation may lead to valuable education getting comprised.
- Other regulations, such as the installation of air conditioning, may be implemented to safeguard the state of the automated systems. Automation of libraries is less attractive due to the increased costs.
- Numerous libraries that have automation facilities must close because they are unable to pay their operating costs due to excessive economic constraints.

3.3.6 Functional Areas of Library Automation

Information and communication technology is primarily used by libraries to automate routine tasks and operations. Bibliographic record can be accessed independently by many persons. Any member of the library's staff can check on the status of an order without keeping numerous records or calling in different questions.

Acquisitions, Cataloguing, Circulation, Online Public Access Catalogue, Serials Control, and Maintenance are the core housekeeping duties of library, regardless of its types or size. They operate according to established processes and procedures.

3.3.6.1 Acquisitions Module

The automated Acquisitions module's main goals are to effectively monitor and track library budgets while accelerating the library acquisitions process by automating the ordering, obtaining, and payment processes for library documents. The procurement module is completely connected with the rest of the system, and data about ordered products is kept both on-order and in bibliographic database of the library. Purchase requests be able to be written in a variety of styles.

An effectively built acquisitions module can support a variety of procurement transactions, such as the ones listed below:

- Record invoices of items
- Duplication and status checks
- Order preparation and order cancellation

- Record of delivered items and pending items
- Overdue of order checks
- Inspection and verification of items
- Maintaining accounts and statistics
- Creating analysis and reports
- Record of items ordered
- Vender selections
- Payment module
- Budget preparation

3.3.6.2 Circulation control

An information distribution system that is automated for improved library management effectiveness. Here are some instances when related concepts might be used:

- Reporting statistics of circulations in the entire library
- Issues/ returns/ reservations and other information records Registration/ cancellation/ activity of memberships
- Bar code systems in searching and enquires
- Late fee calculation and binding record

3.3.6.3 Circulation Control Module

The automated processes of integrated library systems' circulation control modules include the production, storage, and retrieval of borrower records; reservations; fines in measuring, gathering, and record-keeping; printing reports and notices; and checking out, returning, and renewing library materials. Many circulation control systems are very well developed as a result of the thirty years of experience libraries have had with computer-based circulation management.

- Keeping a database of users who have registered and recognizing their permissions according to their category, such as faculty, students (like, Ph.D., PG, or UG), and staff.
- Handling reservation
- Renewal of loaned items and books
- The library's stock verification

- Interlibrary loan transactions and book loans between libraries.
- Circulation fines of library.
- Printing of routing slips, no dues, and due slips, among others.

3.3.6.4 Cataloguing Module

The development, maintenance, and management of the library's bibliographic database are made easier by the cataloguing module, which is a key component of the application. While many cataloguing features are generally adopted throughout a large number of integrated library packages, system-specific variances may impact how conveniently some operations may be carried out. The basic application module of cataloguing facilitates the creation, maintenance, and management of the library's bibliographic database.

3.3.6.5 Serial Control Module

This module was developed to manage publications that are continuously sent to libraries, whether on a regular basis or sometimes, such as supplements or special publications, including periodicals, journals, monograph series, and other resources. Serials control system automation helps manage series quickly and more reliably. In some integrated library systems, the serial control module makes it easier to check in, route, and link acquired problems while the procurement module handles ordering and claiming of serial publications.

3.4 Conclusion

Library automation involves utilizing specific automated and semi-automatic instruments to attain the same task objectives relevant in manual libraries. Researchers have characterized it in a variety of ways. Some have concentrated on the range of services it covers, such as organization and acquisition, while others have highlighted the ease it provides. The study has also been meticulous addressed the development and history of library automation university library perspectives. The progression has underlined the continual rise and impetus gained by automated service in the library industry. Like any other industry, library automation faces a number of difficulties. To accomplish the same work objectives necessary in manual libraries, library automation needs the use of specific automated and semi-automatic technologies. Researchers have defined it in a variety of ways. Some have

concentrated on the range of services it covers, such as organization and acquisition, while others have highlighted the ease it provides. The history and growth of library automation from perspectives of both India and the West have been covered in-depth in this essay. The evolution has brought to light the momentum and continuous expansion attained by automated service in the library sector. Like any other industry, library automation faces a number of difficulties. The most significant of them include a lack of organized planning, a lack of financial and technological resources, a shortage of people with the necessary skills, issues with education and training, and unstable power supplies, particularly in developing nations. There are benefits and drawbacks to automated library services. A large variety of data, easy operating and easy modification of data, quick categorizing, registration, and organization, among other benefits, stand out as advantages. Some drawbacks include a high budget, negative impacts on employment and employee remuneration, the need for prior training and orientation, dependence on power, additional costs, and a dearth of computers.