CHAPTER 2

REVIEW OF LITERATURE

Literature search plays a very important role in research activities, as it forms the very step of a research pursuit. Review of related literature is very essential in a new research topic. The study of related literature implies locating, reading and evaluating reports of research as well as reports of casual observation and opinion that are related to the planned research project. In any worth while study, the researcher must have an adequate knowledge with the work that has already been done in the area of his proposed research. The investigator must have up to date information about what has been thought and done in the area of his research. The search for literature should be conducted in a systematic way to achieve optimum results. Otherwise the search leads to the wastage of labour and time and poor retrieval of relevant information. Best and Kahn (1989), emphasizing importance of review of literature, state that since effective research is based upon past knowledge, review of related literature helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation. It is a valuable guide to define problem, recognizing its significance, suggesting ways of data processing and to devise appropriate study of design and source of data. This also helps to sharpen the understanding of existing knowledge in the problem and provide a background for the research project. Hence review of related literature is an inevitable part of any research study and some of work done on automation and digitization in libraries has been done in this chapter.

The impact of technological innovations on libraries has been studied by many researchers both in developed and developing countries. Duchesne and Phillips (1971) presented their report of the survey conducted on automation activities in British University Libraries carried out in October/November 1970 by the Aslib Computer Applications Group on behalf of Aslib, Society of College, National and University libraries (SCONUL) and the National Libraries. Questionnaire responses were obtained from 61 libraries, and the survey may be regarded as having effectively complete coverage of all UK university libraries with computer applications. The broad picture presented in the report is of widespread mechanisation of the
housekeeping rather than the information retrieval type. Over 60% of libraries had one or more applications; over 60% of all applications were in the cataloguing area, as distinct from the areas of acquisition, circulation and miscellaneous applications. Five libraries planned to have a fairly comprehensive range of applications by 1972. The amount of effort going into library automation was formidable, equivalent to the effort of (very approximately) 50 full-time persons divided roughly equally between library staff and system analysts/programmers. This was the UK university library effort which raised the question of the degree of communication, cooperation and coordination between projects, and it was noted that really significant cooperation tended to take place only with central encouragement and support. It was concluded that the speed of growth of the exchange and use of machine readable bibliographic records would be proportional to the amount of support and initiative provided by central organisations such as the British Library. Later on, Lesley (1976) in a seminar paper entitled, “Some recent developments in library research in Britain” took up the catalogue study and library provision for the law students and lawyers in Britain.

Folk, Hugh (1977) in a paper, “The impact of computers on book and journal publication”, writes that the electronic publication of scientific and technical literature is technically feasible: a single machine-readable copy of a document can be computer-stored and accessed at any remote point by a user with a computer terminal. Increasing publication of scientific books and journals requires a complete, unified, rapid and inexpensive scientific information system. Changes in the production of scientific books and journals and the advent of computer-based composition are described. No serious technical problems prevent development of a computerized scientific information system. A distributed version of such a system is emerging without any plan or central direction. Its eventual effect will be the elimination of libraries and journals, and the unification of scientific literature, reversing the trend towards diverse forms of publication.

Batty, David (1977) in a research article “Technological changes in libraries” has dwelt upon the approach of Canadian libraries to communications and data processing technology is outlined by reference to representative examples in such areas as: cataloguing and acquisition; circulation systems; and serials control. Widespread development in library technology has not been helped by the country's
geographical and political structure, but there are instances of effective regional
development e.g. computer-based processing and cataloguing networks in British
Columbia, Quebec and Ontario. The National Library and the Canada Institute for
Scientific and Technical Information have sought to play a major part in library
automation and networking, through MARC services and MARC-related projects, and
in the area of information retrieval, involvement has created a number of problems.

explains the distinction between the act of cataloguing and the products which it
creates and through which it is expressed, and then concentrates on the automation of
the cataloguing process rather than providing merely a review of different systems
and products. These include computer printed catalogue cards, COM catalogues,
searching capabilities. The study covers the operation of the Ohio College Library
Center and a different automated bibliographic control system, the Washington
Library Network which incorporated the Quadra planar data structure originated by
the University of Chicago and the New York. Public Library's long-term plan for on-
line authority control, as well as the sophisticated search techniques built into the
BALLOTS system.

**Kilgour, Frederick G. (1977)** in a symposium article “Online Library and
network system” begins with a description of current activity at the Ohio College
Library Center (OCLC), prices charged for using the OCLC system and its general
design. The paper discusses the general objectives of on-line computerized library
networks, identifying two main principles: to make available the network's library
resources to individual users at individual libraries; to reduce the rate of rise of
libraries' unit costs. New concepts in on-line library networks are beginning to
emerge; the re-humanization of libraries-automation should free staff for more contact
with users.

**Ready, William and Drynan, Tom (1977)** in their edited volume, “Library
Automation: A View from Ontario” acknowledges the tremendous contribution that
computers have made to library services and gives outlines of the history of computer
applications in libraries.

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Cooke, Michael (1977) in a journal article entitled, “Future library network automation” Considers 3 main problem areas associated with present-day start networks built around a central computer facility: varying levels of bibliographic needs; lack of integration of all library processing in automated systems; existing computer network architecture bottlenecks; costs. Presents ideas on the use of distributed data and distributed computing to support a network and suggests a tiered system of bibliographic activity to optimize the benefits of cooperation.

Ross, Ryburn M. (1977) in a research paper “Cost analysis of automation in technical services” has outlined that the Automation costs must be related to the total system because they compete directly with staffing and book expenditure. Details are given of Cornell University Libraries' initial automation plans which began in 1966; detailed costs are shown in table form. As a member of the FAUL (Five Associated University Libraries) consortium, the Library uses the Ohio College Library Center (OCLC) system. Analyses processing costs, staff productivity and cost savings for acquisition and cataloguing. In determining total processing costs data were also obtained regarding computer terminal and cataloguing rates using the OCLC Cataloguing Support System. To assess past performance and project future trends a Technical Services Cost Ratio is calculated, indicating the staff salary cost per dollar spent on library materials.

Gavin, Pierre (1977) in an article for Unesco Bulletin for Libraries entitled, “Automation of cataloguing: some effects on library organization” discusses specific characteristics of automated cataloguing and problems connected with the cataloguing sequence, computerized index, output handling, and staff responsibilities. There would not be any major problem in controlling a large computerized index-organizing output if the index is well under control. Catalogue automation imposes certain organizational constraints, but provides in exchange an extremely flexible and powerful management tool.

Lemke, Darrell H (1978) in a research paper, “Library networks and the provision of management information” examines recent developments in system use statistics, statistical analyses, and research studies; concludes with a discussion of some of the issues confronting library networks as they work towards the improvement of management information services for their member libraries.
Christofferson, John G. (1979) in a journal article entitled, “Automation at the University of Georgia Libraries” discusses about the MARVEL (Managing Resources for University Libraries), a complete integrated automation system, covering all acquisitions and circulation functions for all types of material. It complements the cataloguing functions through the libraries' participation in OCLC, through SOLINET. Although the data base is not arranged in the MARC format procedures that have been developed to allow it to accept MARC input from the OCLC and LC MARC tapes. This system is user-oriented and based on a self-service concept using semi-natural language.

Emmett, Robert C. (1979) in a research article entitled, “Automation and its impact on a transportation library” describes the Northwestern University Transportation Library's experience with cataloguing before and after implementation of an automation system. The 2 systems considered were OCLC and NOTIS (Northwestern On-line Totally Integrated System); finally NOTIS was chosen. Measures costs and effects of the system and discusses implications for the creation of a publicly accessible union catalogue of major transportation libraries.

Sharma, Ravindra N. (1979) in a research article published in Herald of Library Science entitled, “Academic libraries in the United States: an overview” highlights the trends in these libraries including the struggle for faculty status of academic librarians, cooperation in organizational and management activities, emphasis on automation and use of audio-visual aids, and introduction of bibliographic education to patrons. He focuses attention on the problems of budget cuts, centralization versus decentralization, and mutilation and theft of books in these libraries.

Chopra, Hans Raj (1980) in a research article, “Automation in university libraries in India” submitted to the journal International Library Management discusses the need for the introduction of more mechanization in Indian university libraries. Describes the use of automatic revolving trays; electric typewriters; calculating machines; stylus pencils; the flex writer; photo charging machines; cutting and pressing machines; the shikanja (book clamp); and photocopiers. Notes the use of computer systems by Western university libraries, and sees the introduction of such systems in India as being a long way in the future.
Papadoperakis, Pericles (1982) in a paper, “The automation project at Library B of Thrace University describes briefly the software developed for Library B of Thrace University during 1977-79. The Machine-readable catalogue of the library is in MARC II format, and for the most part is supplied by the Selective Record Service of the British Library on subscription. A small part of the MARC cataloguing is done locally using XANMARC. Various programs have been developed to produce the catalogue cards for monographs, to create and maintain the MARC master catalogue and the short Author/Title Catalogue and to produce the alphabetic and classified lists of the Library subject heading thesaurus. A simple serials listing system has also been implemented.

Naqvi, Z. H. (1982) in a special article devoted to university libraries in Pakistan entitled, “Automation in university library discusses briefly the application of the computer to library operations and describes the slow progress of computerization in university libraries in Pakistan. Makes some suggestions for improving the situation, including the establishment of a Department of Library and Information Science at the Quad-i-Azam University, Islamabad, where computer facilities are already available.

Evans, M and Bolton, T. (1983) in their journal article, “University of York automation project: 4. inter-library loans system” Outlines the inter-library loans system of the University of York Automation Project. It discusses in details of 5 major considerations of the same.

Ashoor, Mohammed Saleh (1983) in his article, “Planning for library automation at the University of Petroleum and Minerals: A Case Study of Saudi Arabia” discusses that the computerized library systems in Saudi Arabia stemmed from a critical shortage of skilled clerical and sub-professional staff; the growing number of graduate programmes; and the growth of the Research Institute. Also describes the planning, selection and installation of the DOBIS/LIBIS system at the University.

Hartje, George N. (1984) in his research paper entitled, “An automated library system for Northeast Missouri State University” describes the 3 phases in the automation of a library system at Northeast Missouri State University: the
bibliographic database, and selection of software and hardware. It also highlights points for consideration for the benefit of those engaged in similar projects.

Moon, Brenda (1985) in her paper, “The computer in a large University Library” outlines the development of library automation in Edinburgh University Library, which operates on 20 sites with 40 service points. Automation was only possible once a local area network was introduced. It also indicates the involvement of the Edinburgh Regional Computing Centre (ERCC). The Library Automation Programme, now being implemented, comprises: Geac; interfaces with EDNET, (the ERCC network) and SCOLCAP; and retrospective conversion of the catalogues to some 2 million items.

Dobrovits, P. (1985) in an article, “Computerization and the future of ABN in the UNSW Library” argues that the University of New South Wales (NSW) Library can look back upon 14 years of development of automation. Cataloguing figures show that such automation is cost-effective and increases production. Participation in the Australian Bibliographic Network (ABN) provided the opportunity to expand library services and to automate catalogue data fully. While costs of participation in cash payments can be substantial, withdrawal from a national resource-sharing system could spell disaster for the library’s clientele.

Wheatley, Michael L. (1985) in his article, “Automation at the British Library Lending Division: present situation and future plan” describes the main automation systems at the British Library Lending Division which are based on three minicomputers. A Digital Equipment minicomputer is used for the Automated Request Transmission system; the Address Database system and a Unit Accounting system will be added to service users’ deposit accounts. The System minicomputer runs the Serials system and serials check-in and invoicing functions may be implemented. It also supports part of a system to produce a publication as well as a system for record creation of UK input to the System for Information on Grey Literature in Europe (SIGLE). The Geac minicomputer has been installed to implement the Monographs Acquisitions and Records system. The minicomputers may eventually be linked to the British Library Wide Area Network recently extended to the Lending Division.
Bhimani, Nazlin (1986) in an article, “Automation at the University of Western Ontario Libraries: a review”, says that many libraries in the Western world are automating their library functions due to the rising cost of labour and the processing time advantages which can result from automation. The University of Western Ontario (UWO) in London, Canada provides one such example. This paper examines the impact of technological changes in the University of Western Ontario Library System.

Lambert, Peter (1986) in his research article, “Periodicals automation at the University of Sussex library” describes how the serials records have been integrated into the Geac system at the University of Sussex, Library, UK. Each periodical title has a Periodicals Summary Record. He discusses on-line access, display and updating, prints and other exploitations.

Alabi, G.A. (1986) in a journal article entitled, “Library automation in Nigerian Universities” describes that the automated library systems in Nigerian universities has encountered a number of obstacles, including erratic power supplies, equipment failures and lack of trained staff.

Woods, Rollo G. (1986) in a research paper, “Library automation in British universities” summarizes the responses to a letter of enquiry sent by this Sub-committee to all British university libraries in 1984. Describes the history; current position; and future plans with respect to automation in the UK university libraries. Covers: acquisitions; cataloguing; circulation control; serials as well as staffing and networking.

Manns, Basil and Swora, Tamara (1986) in their combined article, “Books to bits: digital imaging at the Library of Congress” preceded by several preliminary efforts, the pioneering Library of Congress Optical Disk Pilot Program has been underway since 1982 when contracts were awarded to Integrated Automation, Inc., to develop a digital imaging system suitable for the transfer of text based library materials and their electronic delivery, and to Sony Corporation for an analog system. It focuses on progress to date in the digital imaging system, providing a description of data base development and a detailed technical overview of the general system configuration, input, image processing, compression and specifications of devices currently being used.
Horny, Karen L. (1987) in a journal article entitled, “Fifteen years of automation: evolution of technical services staffing” provided an unusually long-term view for analyzing the impact of computerization on library staff. Technical services staff reallocations and reductions, resulting improvements in services, and savings in salaries are discussed.

Mittler, Elmar (1987) in an article, “the University library of Heidelberg: from tradition to future” describes how the old library at the University of Heidelberg was reconstructed to cater for increased usage of the library. This involved a reallocation of space for the various departments within the old building, updating of existing facilities and automation of circulation, moving science collections to a branch library, and creating a deposit library. The benefits of the new situation are discussed along with problems encountered.

Butler, Alan (1988) in a research article, “University library automation in the Northern Territory” submitted to the journal Information Development writes that the University College of the Northern Territory (UCNT) in Australia was opened in 1987. Only 4 months were available in which to appoint library staff, order stock, take decisions on computer systems and process the first books. The choice of an in-house computer system was precipitated by the need to start ordering immediately. The system developed was written in Dataflex data base software, based on a Novell local area network (LAN), and mounted on a network of fast AT workstations powered by an 80380 file server. The system has proved to be fast, cheap and flexible. The paper discusses the advantages and disadvantages of adopting this type of system. UNCT is offering to make the system available on a gratis basis to any library in a developing country.

Pakkiri Devi (1988) in a workshop paper entitled, “Plans to computerize University of Zimbabwe library services: prospects and problems” presented at the Zimbabwe Government Library Service (GLS) workshop on the use of computers in libraries. The University of Zimbabwe (UZ) has a student population of 8,000 and its major objectives are to promote study, teaching and research. The manual system, which has served the library well in the past, has become inefficient and cumbersome and it is in this context that the prospects and problems of automation are examined.
Plans for the future such as computerization of the periodicals collection, the Medical Library Zimnet packet switching system, and the use of CD-ROM are discussed.

Li, Su (1988) in a symposium article entitled, “Library automation: the future of the university library in China” reviews library computer applications in the Chinese People's Republic and abroad. A step by step process for planning the application of computers to university libraries is described involving: unified planning; making standards; selecting equipment; designing software; setting up the data base; and setting up the computerized information retrieval network.

Lee, Hwa-Wei (1989) in a journal article, “Trends in automation in American libraries: Ohio University's experiences” describes the applications of CD-ROMs, online data bases, and other computerized information searching tools (such as the OCLC data base) at Ohio University Library. The foundation is an on-line locally integrated library system. ALICE interfaces with OCLC for on-line shared cataloguing and inter-loans and offers on-line public access catalogue, acquisitions, circulation, and periodicals control. Through microwave and telephone lines, ALICE also serves libraries at 5 regional campuses in a network mode. In addition, Ohio University Library offers a computerized information retrieval service to provide on-line access to over 400 major data bases worldwide through DIALOG, BRS, and STN. The use of facsimile transmission for electronic delivery of information between libraries is now common practice. In cooperation with the university's computing service, an extensive computer laboratory is provided in the main library facility. Selected CD-ROM based data bases of general interest have been purchased and made available to library users.

Kaul, H. K. (1990) in his journal article entitled, “Library networks in UK and Spain: the projections for India” discusses the progress of library automation in the European countries. It provides an overview of networks in the UK with special reference to the British Library's automation programme and key areas of work, the Joint Academic Network (JANET), and the CATS on-line cataloguing system, developed by the University of Cambridge. Describes other cooperative projects including the Commonwealth Agricultural Bureau International (CABI) data base highlighting their activities. It discusses bibliographic networks in Spain outlining the role of the National Library and automation in public libraries, university libraries and
special libraries. It also describes Consejo Superior Investigaciones Cientificas (CSIC) (Higher Council for Scientific Research) data bases. The paper lists broad projections stressing the need for automation programmes in Indian libraries.

Lande, Ragnhild E. (1990) in a research article, “Library automation in Norway, with special references to the medical library University of Trondheim” describes the largest automated library system in Norway is BIBSYS, which takes care of ordering, cataloguing and control of documents. The 4 universities, each with established medical libraries, participate in creating a common data base for their holdings. At the medical library of the University of Trondheim a large amount of money has been spent on international data bases and on becoming a member of the BIBSYS network as well as providing users with DIALOG's MEDLINE on CD-ROM.

Mohammed, Zakari (1991) in a research paper, “the automation of academic and special libraries in Nigeria: the state of the art” examines the state of library automation in academic and special libraries in Nigeria. Describes efforts made by different bodies and institutions in the country to automate their entire library systems. Discusses reasons why the libraries opted for automated systems, the successes achieved by some of the libraries in automating their systems, and the problems faced by the libraries that succeeded in automating some of their systems as well as those who are still in the process of doing so. The future of library automation in the country is bright.

Crawshaw, Tom (1991) in his article, “Library automation at the University of Oxford” gives a brief history of the libraries in Oxford University, followed by a review of progress towards comprehensive library automation from the early 1960s. This includes a description of the retrospective conversion of the Bodleian Pre-1920 Catalogue, the OCLC LS2000 pilot project, and the present university-wide IBM DOBIS/LIBIS system. Also describes in details the process of selecting, installing and modifying this system.

Coppola, J. F. and Yannacone, R. (1992) in their joint article entitled, “Library automation network: connectivity in a multicampus environment” describes the In - Campus-wide information systems and the local area network (LAN) based
multi-site campus wide information service installed at Pace University. Options considered in system selection included: user friendliness; functions and applications; system sophistication; extension capabilities support; and cost. Also describes both planned and unforeseen problems that arose during the project.

Keefer, Alice and Jimenez, Miguel (1992) in their book entitled, "Library automation in Spain: an overview" outlines the development of automation in the Spanish library. Spanish libraries have experienced considerable change in the past decade as a result of governmental restructuring and the general economic boom, after many years of neglect. Automation efforts, the first of which dates from the 1960s, have increased in the past 5 years coinciding with the introduction of new software packages. The pace of automation and the software solution chosen vary according to the different types of libraries. Some networking and cooperative ventures have begun recently, especially among university and research libraries. It remains to be seen if the present growth will continue after the major events of 1992 have concluded.

Agboola, A. T (1993) in an article, "Third Generation Nigerian University Libraries", studied the development of third generation Nigerian university libraries established between 1980-1984 was conducted during the latter part of the 1990/91 session. The study, which was carried out through the use of a questionnaire, personal visits, as well as informal discussions with the staff, had the objective of determining the similarities and dissimilarities in the growth of the libraries using indices such as governance, finance, stock and services, etc., as well as problems affecting their effective performance. The outcome of the study showed that there are more areas of similarities than dissimilarities in the ways they operate. Poor funding, scarcity of foreign exchange for the purchase of library materials from abroad, near absence of modern information retrieval technologies as well as theft and mutilation of materials, were found to constitute major problems to their rapid development. The recently negotiated World Bank loan for the Nigerian university sector designed to inject some US$120m for the purchase of books, journals and library equipment among others gives a ray of hope, though on a short-term basis. It is suggested that to take the university libraries out of the woods, massive injection of funds on a long-term basis is required.
Maguire, C. (1993) in a journal article, “Automation in Australian university libraries at the end of 1992” presents a survey of the Council of Australian University Librarians investigating past, present and planned automation in their university libraries. Discusses functions covered and systems used; system changes and replacements; provision of electronic access; special features of systems and experience and future automation directions most frequently mentioned by university librarians.

Bazirjian, R. (1993) in a paper, “Automation and technical services organization” presented at the American Library Association annual conference 1992 streamlined the functions, cost effectiveness and access. The integrated database unites the functions of order, receipt and cataloguing. It discusses how this has brought organizational changes since work is not structured around physical files. It also describes the reorganization of technical services at Syracuse University. Merging was precipitated by the implementation of NOTIS. Receiving and accounting sections are combined and all invoice payments made by the library interface with the university's accounting office.

Pastine, M. and Kacena, C. (1994) in their article entitled, “Library automation, networking, and other online and new technology costs in academic libraries” discusses Library finance: new needs, new models by using the costs for the library automation activities at Southern Methodist University, Texas, plus a review of the literature in automation costs and requirements, to illustrate some of the hidden as well as obvious budgetary requirements to meet the electronic library needs in small and medium sized university libraries today.

Pierce, D. M. and Theodore-Shusta, E. (1994) in their combined paper, “Automation: the bridge between technical services and government documents” included in a special issue devoted to the theme: Cataloguing government publications online. The Olson Library, North Michigan University, includes bibliographic records for US government documents in its online catalogue. Although preparing the initial profile and planning for the first computer loading of retrospective magnetic tape cataloguing records were important and time consuming projects, staffs were somewhat unprepared for the impact the project would have on traditional staff functions. As the automation project evolved, procedures once
performed in the Documents Unit were transferred to Technical Services. Presents a case history of how Olson Library staff dealt with the impact of the first tape load, restructured work patterns to accommodate future tape loads, and took advantage of the project to move forward toward a more fully automated environment. Demonstrates how a project can bring together in a single team staff who once viewed themselves as having related but separate missions.

**Blagden, J. and Ford, J. (1994)** in their paper entitled, “The electronic library: a view from academia and the computer industry” defines the virtual library and sets out aspects of this concept which are occupying the minds of those working in education and industry: how much further should they move towards the virtual library; how to implement the steps to achieve the virtual library; and determining the role, if any, of print on paper products, if and when the benefits of the virtual library are fully exploited. It discusses some of the issues that need to be addressed which include: the role of the intermediary; electronic full text document delivery; a market for information; and access versus holding. It also describes 2 projects involving Cranfield University, UK and Digital which seek to address these issues: the European Initiative in Library and Information in Aerospace; and Digital Information Access Demonstration Centre.

**Barker, P. (1994)** in a research paper, “Electronic libraries: visions of the future” discusses the basic functions of library systems and the roles that they must undertake within modern societies and the potential of new technologies and media within library systems. Identifies 4 future types of libraries: polymedia, electronic, digital and virtual; and describes each of these types of library system, identifies their distinguishing features and discusses the implications of such systems.

**Sewa Singh (1994)** in his article, “Growth and development of university libraries in India” highlights the challenges thrown to the university librarians by the technological developments in the field of information technology and the need to upgrade their skills to make university libraries efficient tools of learning, research and development.

**Mader, B. (1995)** in an article, “Library automation systems in academic libraries in Hungary” briefly reviews the development of library automation in
Hungary with particular reference to the large research libraries and university libraries. Sets out the plan for library automation in Hungary which includes: details at the organizational level; hardware supply; network developments; and the outline of a library automation strategy for Hungary.

Deeken, J. (1995) in a research paper entitled, “Automation and change in acquisitions at R. M. Cooper Library” discusses the relationship between automation and reorganization, using the experiences of the Clemson University Libraries, South Carolina, as a case study for connecting the two. Discusses library reorganization in general, and then focuses specific attention on the reasons and methods for reorganization in the acquisitions unit. Also discusses staff participation and total quality management principles, ends with 8 ioms of reorganization.

Thorin, S. E. (1995) in an article, “The National Digital Library: digitization at the Library of Congress” describes the plans and progress of the digitization programme of the Library of Congress (LC), Washington, DC, with special reference to the American Memory Project, a digitization of certain of the LC's historical collections which offers the American people a chance to explore their country's cultural and historical resources through words, images, and sound. American Memory has been tested in 44 schools and library sites around the country and a number of its collections are now on the Internet. Also considers the wider role of the LC in the creation of the National Digital Library including its archival function for files of digital data that would otherwise disappear; its role in developing new approaches to organizing, managing, and preserving digital material; the need to create procedures for the protection of intellectual property; and the need to acquire resources to convert current collections to digital formats. A number of screen illustrations of the LC's digital files are included.

Amekuedee, J. O. (1995) in a paper, “Barriers to successful university library automation in Ghana with particular reference to the Balme Library” he describe that Library automation assumed a great deal of importance in libraries in the mid 1960's and he reviews the computerization projects in the university libraries in Ghana, with a particular reference to the Balme Library of the University of Ghana. Reasons for automation, areas of application and problems associated with automation are
discussed and also highlighted the barriers militating against successful university library automation, like financial problems, attitudinal problems, lack of co-operation among university libraries, hardware and software problems and personnel problems. He has also made the recommendations for the improvement of automation at the university libraries in Ghana. These include evaluation of existing systems, properly planned automation project, financial support and co-operation among the university libraries.

Xu, Hong (1996) in a paper en titled, "The Impact of Automation on Job Requirements and Qualifications for Catalogers and Reference Librarians in Academic Libraries" he has traced the impact of automation on job requirements and qualifications of catalogers and reference librarians in academic libraries by comparing and analyzing job advertisements from 1971-1990. Four periods were identified to reflect the influence of each important library automation development on job descriptions. Chi-square tests were used to see whether there are significant differences between catalog librarians and reference librarians with regard to duties and qualifications in each period; and whether there are significant differences in professional duties and qualifications for catalog librarians and reference librarians over the periods. With the development of automation in libraries, librarians have become more similar, increasing needs for computer skills can be found in both groups and a shortage of catalogers and greater demand for reference librarians have led to more entry-level positions being posted in both groups. There still remain differences between catalogers and reference librarians in major responsibilities and knowledge or skills needed.

Rashid, Abdul (1996) in his paper entitled "Library automation: An overview" he discussed that the computer are widely exploited in library management systems. While most of the libraries in the developed world must have by now computerized library management systems and are now exploring different methods of improving access to information., computerization of housekeeping functions of libraries of most of the developing countries is just beginning to take place and in most cases signifies the first experience to automation.

Will, B. (1996) in an article, "California: Library information technologies" briefly describes selected library computerization and network projects in the state of
California: California's Info People Project; Digital Library Developments at California University at Berkeley; California Home Page and the State Library; Pacific Bell's long term commitment to libraries; State government initiatives; and the Library of California. Includes the name of a contact person, with telephone, fax and electronic mail number for each project or system

**Fresko, M. (1996)** in an article, “The impact of digital resources on British Library reading rooms” determines the impacts of digital resources on the future demand for British Library reading room seats in the library’s new building at St Pancras. It examines the effects which Internet resources and CD-ROMs may have on demand for seating space in British Library Reading Rooms. Considers use of digital media both within the library and outside; and includes all kinds of content, notably monographs and serials. The study was conducted in 1996, by means of interviews and desk research, and brings together data from the study which may be useful in future work.

**Vyas, S.D. (1997)** in an article, “Library Automation and Networking in India: Problems and Prospects” says that automation and the networking of academic libraries in India are still in their formative stages. He has also given reasons for, prerequisites of, and benefits of networking. He has also described the networking systems at the national and local levels, as are the salient features of INFLIBNET, which has been functioning since 1988. The role played by the three metropolitan networks, viz., DELNET, CALIBNET, and BONET has been discussed. According to him, the libraries of the three metropolitan cities are already reaping the benefits of networking. The constraints of networking in Indian academic libraries are explained. The conclusion of the paper is that major information library networks such as INFLIBNET should have a more realistic and time-bound programme.

**Minetto, S. (1997)** in an article, “the Genoa University Library Network” Briefly outlines the library automation system operating at Genoa University Library with particular reference to cataloguing and database networking and the hardware and software used. The database contains 250000 records and is accessible via the World Wide Web.
Olorunsola, R. (1997) in an article, “Staff training aspects of automation in a Nigerian university library” contributed to the Aslib Proceedings discusses the structure and organization of on site training of staff in the use of TINLIB software at Ilorin University Library, Nigeria. It pays particular attention to the content of the training, trainers and what the programme is out to achieve.

Awogbami, P. A. (1998) in an article, “Staff opinions on library automation planning in Nigerian university libraries” asserts that it is very necessary to involve library staff both in selecting an automated library system and in encouraging staff acceptance of the system. Describes a study which focused on 7 federally funded universities in Nigeria where agriculture is taught as a discipline but, most importantly, which had been established less than 10 years before the date of the study. This date was selected on the assumption that it was recent enough to have fallen within the years of automation in Nigeria, but distant enough to have allowed time for planning.

Schaefer, M. T. (1998) in a journal article entitled, “Internet information retrieval for libraries: four keys and sites that use them” provides illustrative examples of the methods, tools and resources that enable librarians, information specialists and end users to make the most of the World Wide Web. The 4 key factors that facilitate access are location, evaluation, organization and communication. Also outlines how a number of sites make use of these factors. The author further describes: the Internet library for Librarians, Argus Clearinghouse's Digital Librarian's Award, FEDSTATS, the University Library System, and Chinese University of Hong Kong, the WWW Virtual Library, the Finnish Virtual Library Project, and BIBNET.

Kumar, P. and Kumbar, T. S. (1998) in their article, “INFLIBNET activities: status, plans and strategies for the future” paper presented at the Fifth National Convention for Automation of Libraries in Education and Research (CALIBER-98), at Bhubaneswar, 4-5 March 1998. The Information and Library Network (INFLIBNET), a programme of the University Grants Commission, created in 1991, has the objectives to computerize university libraries, create union databases, facilitate resource sharing through networking, and provide speedy access to information at national level in India. The paper describes the activities of the INFLIBNET Centre at Ahmedabad, along with plans and strategies for the future.
Panigrahi, P. K. (1999) in an article, “Web authoring and information services in university libraries” shows how Hypertext Markup Language (HTML) can be used for Web authoring by libraries and information centres to enrich the quality of information services they provide to their users. The paper discusses Web browsers, and explains the use of the various categories of HTML tags. Provides sample pages developed for the Web page of the Central Library of Vidyasagar University, India.

Younis, A. R. (1999) in an article, “The effect of automated system structure”, describes that all university libraries in Jordan are computerized, 35.3 per cent use MINISIS, 52.9 per cent use CDS/ISIS and 11.8 per cent use customized packages. Systems are mostly utilized in technical processing, reference services, bibliographies and acquisitions. The effect of automation on technical and administrative services is evidenced by the establishment of a department for computer applications in 52.8 per cent libraries, the motives of staff and users to use the systems and their satisfaction and acceptance of this technology. He stresses the need to develop software packages, academic training and the necessity for a network linkage, both locally and internationally.

Salgar, S. L. (1999) in a workshop paper entitled, “Automation and Networking of University Libraries under [the] INFLIBNET Programme” has given a list of the lectures, presentations, and practical sessions comprising the topics discussed in the workshop. The workshop was attended by the heads of the 18 university libraries. They discussed a number of issues related with the present and future of automation in India.

Ondari-Okemwa, Ezra (1999) in a paper “Managing a library automation project: the Moi University experience” in his paper he examines the major problems associated with managing a library automation project in a developing country. The Moi University experience is representative of the type of problems that a library project manager in a developing country is likely to face. Poor infrastructure, a shortage of local technical expertise, lack of information technology and a shortage of qualified managers are some of the managerial hurdles that they should be able to cope with. Training local personnel and equipping the training institutions may partly solve some of the problems. Management and information technology skills should be
emphasised in whatever training programmes may be initiated in a bid to overcome the shortages.

Sewa Singh (1999) in his article titled, “National policy on University libraries in India.” mentioned that for overall development of university libraries, a national policy is required. A couple of attempts have been made in this regarding including the one by the association of Indian universities (AIU). He analyses and evaluates the paper on national policy on university libraries prepared by AIU. In his paper he has concluded that because of non-implementation of the national policy, university libraries could not develop to the desired extent. He has suggested that the policy may be amended according to the recent development and professional may be called upon to provide quality services in the electronic age. Dabas, K. C. and Sewa Singh (1999) in another article titled, “Application of Information Technology in University Libraries of Punjab, Haryana and Chandigarh: A Comparative Study” discuss university libraries of Punjab, Haryana and Chandigarh with an ulterior objective to establish some co-relationship between quality in libraries and level of It application. They have outlined the meaning, scope, importance and possible application of IT in different library and information environment. They have also enumerated the cause for low level of It application in Indian university libraries in comparison to their counterparts in developed countries of the world.

Lynch, Clifford (2000) in his paper titled” From Automation to transformation: Forty years of libraries and information technology in Higher education,” he examines the ways in which information technology developments have changed the academic library over the last few decades, and speculates about further changes to come.

Jayasundara, C. C. (2000) in an article, “Progress of library automation in Sri Lanka: with special reference to the university academic libraries” provides some historical background on library automation in Sri Lanka and specifically the university library automation process. Looks at reasons for the delay in the automation of university libraries and provides an overview of the current situation focusing on library networks and the development of data communication. It also offers some recommendations as to how the situation might be addressed.
Mohapatra, P. K. (2000) in a journal article entitled, “Current developments in electronic library services at the Indian Institute of Technology, Kharagpur” describes the salient features of the digital library at the Central Library, Indian Institute of Technology, Kharagpur; enlisted the infrastructure available at the Central Library: library automation; network facilities; and library hardware/software. Lists and describes the electronic library services available, including: video library services; database services (library database, commercial databases); selective dissemination of information (SDI); online periodicals access; retrospective database search services; user education programmes; and professional training courses.

Shirato, L., Cogan S. and Yee S. (2001) in their combined article entitled, “The impact of an automated storage and retrieval system on public services” discusses the automated storage and retrieval system for low use books and periodicals. Approximately a third of the library's total collection was placed into this storage system, freeing floor space for many new activities in the library. This system, linked to the library's online catalogue, could retrieve items requested by a user in less than 10 minutes. While the Automated Storage/retrieval System (AS/RS) performed well, other start up problems of a new building and public perceptions of the AS/RS made its introduction a challenge. Discusses planning, implementation, and public reaction and acceptance.

Kalra, H P. S. (2001) in his journal article entitled, “Efforts towards digitization of libraries in India: problems and prospects” visualizes electronic libraries, digital libraries, and hybrid libraries which have started, but are few in number and at early stages of development. As is true of many developing countries, library and information professionals face a sort of catch-22 dilemma in choosing between working for improved library and information services through conventional print-based resources and automated library systems on the one hand, and working toward setting up state-of-the-art electronic or digital libraries on the other. Begins by presenting an overview of librarianship and information work in India, and then looks at some of the more technologically advanced and specialized libraries and library networks being developed. Describes the Indian superstructure for library and information services, and gives a summary of some digital library initiatives currently underway.
Reza, Davarpanah (2001) in a paper, “Mohammad Level of information technology application in Iranian university libraries”, examines the level of information technology (IT) application in university libraries in Iran. As a background, an attempt was made to present current status of IT application in the libraries. In this study the whole population of 79 university libraries under the jurisdiction of two ministries: Culture and Higher Education (MCHE) and Health, Treatment and Medical Education (HTME), was surveyed. The significant difference between the level of IT application in two library groups, i.e. MCHE and HTME, and the relationship between the level of IT application and the number of computers in use and the annual expenditure on IT, have also been discussed. The paper concluded that the automation of Iranian university libraries is a continuous exercise.

Waaijers, Leo (2002) in a paper, “Stratum continuum of information: scholarly communication and the role of university libraries” has explained that as a consequence of digitization, universities have to investigate their scholarly communication process. In fact, this is a quest for values that goes beyond the issues of the day. Once found, these values operate as criteria for assessing competencies, roles and instruments. The communication process must allow for free exchange of ideas and results. In particular, knowledge created in the public domain must be openly accessible. The process must be reliable, lend credibility to authors and give support to users. The respective competencies are logistics, validation and mediation. New technologies not only support these classical aspirations, but also develop their own dynamics when it comes to broadening the communication scope. Publications can be enhanced by including audio-visuals, executable files and datasets. Linking techniques enable the creation of organically growing bodies of knowledge. Who is the fittest for this scholarly communication job? Is it universities and their libraries and university presses, or could it best remain in the hands of global publishing monopolies?

Damodhar, P. (2002) in his paper, “Developing digital university libraries in India” says University libraries have vast store of information in various forms. According to him these sources of information can be accessed through Internet from any corner of the world; but Indian University libraries are lagging behind in this direction despite the fact that they can not afford to remain isolated form the world of
information. There is a need to cat up with modern trends, which is possible only through digitization of libraries. His paper tries to analyse the present scenario of Indian University libraries and made an attempt to propose digital libraries in Indian Universities. The proposed development of Digital University libraries have been suggested in three phases; Phase I: Acquiring Materials in Digital form; Phase II.: Digitization of Thesis, Dissertations, Manuscripts and Rare Books. Phase III: digitization of books and Journals. Lastly author has suggested that INFLIBNET which has taken up automation and networking of university libraries in India should extend its programmes to digitization of university libraries.

Dabas, K. C. et al. (2003) in their article titled, “Automation Scenario in University Libraries: A study of some selected libraries” attempted to review and audit the present scenario of library automation in nine university libraries in Punjab, Haryana and Chandigarh in the background of yesteryears and expected future. Their paper points out that today complete library automation and modernization means digitization of the every bit of information contents. Their paper also highlights the meaning, need, main considerations, rationale, main components, and domain of library automation in the context of university libraries. Throws light on the availability of hardware and software in respective libraries and examines types and forms of library collection.

Gaur, Ramesh C. (2003) in his article entitled, “Rethinking the Indian Digital Divide: The Present State of Digitization in Indian Management Libraries” has analyzed the present status of digitization of Indian Management Libraries through a survey carried out in 500 management libraries in India. The issues such as library automation, development of digital libraries, and use of bar code and smart card technology have been discussed. Issues responsible for the widening of the digital divide have been identified.

Chandrakar, Rajesh (2003) in his research article, “Barriers of bibliographic database creation in Indian university libraries: the INFLIBNET experience” has discussed the present status of digitization in India. He emphasized that on the one hand the world has reached the last stages of library automation, while, on the other, the Internet has revolutionized it with different concepts such as the electronic, digital, virtual and library without walls. Now, professionals are researching knowledge
management, Internet cataloguing, copy cataloguing, metadata, Z39.50 retrieval protocol, and resource sharing in the context of inter-library loan, document delivery services, Internet services through Net etc. Unfortunately in an Indian context, libraries are still in the process of the automation and digitization of their resources. This paper discusses some of the barriers to progress in these areas in university libraries in India.

**Jagtar Singh (2003)** in his paper, “Library Consortia: A strategic response to fiscal and technological changes” attempts to map the impact of ICTs on libraries as a metaphor of our documentary heritage, and ascertain professional response to fiscal and technological changes. Particular emphasis has been laid on academic libraries and the Inflibnet initiatives.

**Satpathy, Sunil K and Swain, Chandra (2003)** in their study of critical analysis of internal and external structure of the library and states the condition of Parija Library structure the Central Library of Utkal University of Orissa before automation conclude with the remarks that in near future Parija Library will be restructured to be a hybrid library instead of a fully automated library.

**Palmer, Suzy Szasz (2004)** in her article, “National Conference for Statewide/Regional Digitization Projects” indicated that the Ohio College Library Center was willing to serve the host site. The group was in favour of such a conference. The following were suggestions for topics for the seminar: day-long leadership seminar; long-term storage of archival files; products and services for collaborative projects; preservation metadata and archiving solutions; sustainability issues, especially business models for funding and staffing, along with funding sources for generating revenues; components of other statewide virtual libraries, both in terms of sustainability and technology; architectures to pull in scattered projects for federated searching in a decentralized system; marketing communications plan.

**Bultmann, Barbara (2005)** in a research article, “A Call for a National Digitization Strategy in the United Kingdom” calls for the creation of a national digitization strategy in the United Kingdom. It summarizes the author's research into the current state of digitization in the UK with reference to present strategy, direction and funding. The application of a defined strategy is contentious and the author
considers arguments on both sides of the debate. The author argues, however, that
digitization has 'come of age' and that it is essential that integration and harmonization
of methods are considered by UK stakeholders in order to maximize future potential.
The author proceeds to suggest what future steps are necessary to achieve this goal.

**Caplan, Priscilla and Guenther, Rebecca (2005)** in their combined article,
“Practical Preservation: The PREMIS Experience” discusses the Online Computer
Library Center (OCLC) and Research Libraries Group (RLG) which established an
international working group to develop a common, implemental core set of metadata
elements for digital preservation. Most published specifications for preservation-
related metadata are either implementation specific or broadly theoretical. PREMIS
(Preservation Metadata: Implementation Strategies) was charged to define a set of
semantic units that are implementation independent, practically oriented, and likely to
be needed by most preservation repositories. The semantic units will be represented in
a data dictionary and in a METS-compatible XML scheme. In the course of this work,
the group also developed a glossary of terms and concepts, a data model, and a
typology of relationships. Existing preservation repositories were surveyed about their
architectural models and metadata practices, and some attempt was made to identify
best practices. This article outlines the history and methods of the PREMIS Working
Group and describes its deliverables. It explains major assumptions and decisions
made by the group and examines some of the more difficult issues encountered.

**Suku, J and Pillai, Mini G (2005)** in their article entitled “Perspective on
Automation of University Libraries in Kerala Status, Problems and Prospects”
discussed the present scenario of automation activities of university libraries in
Kerala. The survey findings mainly cover various aspects of library automation such
as information technology infrastructure, in-house activities, information services and
their usage, manpower development, and budget. The paper briefly describes the role
of INFLIBNET Centre in accelerating the automation activities of university libraries,
especially in the context of the recently introduced UGC-Infonet programme. The
problems encountered in this process are identified and possible suggestions are
stated.

**Younis, Abdul and Mustafa, Razeq (2005)** in their article, “Local online
information systems in Jordanian university libraries” The study is concerned with
gathering factual data on the use of local online information systems, automation, online connections, online public access catalogs (OPACs), CD-ROM-based systems in 19 Jordanian university libraries.

**Perry, Claudia A (2005)** in a paper, “Education for Digitization: How Do We Prepare?” examines the characteristics and variety of digitization training initiatives implemented worldwide, especially those in North America, and the growing development of credit-bearing courses and programs in educational institutions. The author introduces this examination with a brief discussion of the benefits and challenges associated with the development of digitized resources, as well as summarize existing resources and the current digitization infrastructure.

**Singh, S.N. (2006)** in a paper, “Digitization Initiative and University libraries in India” he discusses the various aspects of the conversion of in-house library materials into electronic format, which leads toward the creation of digital library. Also describes the digitization initiatives that have taken place in India. Objective of digitization have been correlated with the mission of university libraries.

**Bist, Rajender Singh (2006)** in his paper, “Digitization at Gandhi Smriti Library of LBSNAA: An Initiative to preserve the Rare Books” he discusses that manuscripts provide rich and authentic information. Physical condition of the manuscripts may be decayed due to many reasons such as climate, insects, acidified paper and old age. A core function of libraries is to maintain and preserve the manuscripts for the present and future generation. In this paper he has also described that the most significant development in the resent time is to digitize the fragile and rare documents for better access, storage, preservation and dissemination. Digitization is an important aspect of developing digital libraries as it opens up new avenues of access, use, research and preservation of valued information resources. **Dilroshan, Chrishantha T. L. (2006)** explain in his article titled, “Identification of problems faced by university libraries in the process of automation: with special reference to the libraries of Moratuwa and Colombo Universities” the main objective of this study was to identify the problems faced by the University of Moratuwa library and the University of Colombo library in the process of automation. In achieving this objective, the study aimed to identify the software packages used by the two libraries and available modules in them; to find out the availability of infrastructure, hardware
and financial facilities in the two libraries; to identify the progress made by two libraries in automation; to identify the attitude of the staff of the two libraries towards library automation; to identify the attitude of the university management towards library automation; to identify the solutions suggest by the two libraries to overcome the problems in automation. Survey method was used to identify the problems and interviews have been conducted with the two librarians and the departmental heads of the two libraries to collect data. Survey method was used to identify the problems and interviews have been conducted with the two librarians and the departmental heads of the two libraries to collect data. The Survey revealed that two libraries surveyed face several problems such as inadequacy of infrastructure and hardware, problems in the software, lack of trained and skilled staff and lack of funds. The study makes recommendations to overcome these problems and achieve successful automation.

**Nok, Grace (2006)** discusses in an article, “The Challenges of Computerising a University Library in Nigeria: The Case of Kashim Ibrahim Library, Ahmadu Bello University, Zaria” that Ahmadu Bello University, Zaria is one of Nigeria’s first generation universities, opening its doors in 1962. Like other universities, its functions include teaching, research, and community service. University library computerization in Nigeria has been in the pipeline since the 1970s, although concerted efforts began in the late 1990s. Lack of funds and lack of information resources have been problems for academic libraries in Africa for many years. In addition, automation of information resources and services pose new problems. These include the acquisition, selection, and cataloguing of online information resources, the construction of databases, providing information literacy education for library users, and the new skills required by, and continuing education for, librarians. However, if the library ensures sound and quality automation of services and information resources, creates new approaches to user education, pays attention to the provision of continuing education for library staff, helping them to master the new techniques required for the management of electronic and the networked information resources and services, the gains of automation are immeasurable.

**Boyd, Kate Foster and Creighton, Alma (2006)** in their article, “Building a DIGITAL LIBRARY on a Shoestring” discusses the possibility of creating a digital library under a limited budget at the University of South Carolina. The importance of
digital collections to universities and colleges is examined. The initial steps taken by
library administrators in creating digital collections are revealed which included the
creation of a team of staff members interested in creating digital collections.

Boock, Michael and Vondracek, Ruth (2006) in their article, “Organizing
for Digitization: A Survey” studies how academic libraries organized the digitization
of information sources to meet the existing demand for information innovation. A
survey was conducted on two library organizations in the U.S., the Association of
Research Libraries, which is composed of 123 research libraries and the Greater
Western Library Alliance, with 31 academic and research library members. Result of
the survey shows that of the 40 participating libraries, 95 percent are involved in
library digitization, while 84 percent special collections library departments are
involved in digitization. In assessing library digitization effort, seventy-six libraries
have created new position, while fifty percent of the respondents created new units to
deal with the digitization process.

In the recent years, because of changing needs of readers and globalization
phenomenon, there has been spurt in the articles on automation and digitization in
libraries. Bansode, (2008) highlights the digitization activities undertaken by Shivaji
University Library to preserve rare materials. The author attempts to calculate the
costs incurred in the digitization process. He has explained that digitization is the
solution for the preservation of, and access to, rare manuscripts and suggests the
complete budget required for the digitization of manuscripts and best possible
preservation and access strategy according to the local needs of the users. The paper
provides valuable insight into the development of digital libraries in India. It is useful
for setting the infrastructure required for digitization and a guideline for preservation
and access to the rare materials. Choukhande (2008) has recently conducted a study
on the information need and information seeking behaviour of the library users. Line
(2006) has reviewed the library automation programmes of last 40 years. Malhan
(2006) has drawn attention to the problems and challenges of changing management
in developing corporate culture in the Indian University libraries. Shafique and
Mahmood (2007) have focused on the professional librarian’s experiences and
opinions regarding different library software tools on the basis of survey conducted on
the libraries of Lahore. The need to shift from the print to electronic form has been
emphasized by Ferguson (2006). A number of studies have been conducted on the awareness and use of OPAC in different libraries. Kapoor and Goyal (2007) have brought out functional comparisons on web-based OPACs in Indian academic libraries. Powell (2008) has discussed on the integration of OPAC in this era of mass digitization. Ansari and Amita (2008) have conducted a case study on the awareness and use of OPAC in five Delhi libraries. Mahmood (2008) analyzed features and functions of indigenously developed web-based catalogues of academic, special and national libraries of Pakistan. The paper found that indigenous web OPACs were at an initial stage of development and only offer basic facilities to their users, but they did not offer facilities many OPACs being already offered by advanced countries. Their shortcomings included the absence of MARC format and Z39.50 protocol, which were indispensable for shared cataloguing. He also found that a very few catalogues can accommodate non-Roman scripts like Urdu and other local languages.

The importance of digitization has been repeated stressed by the experts to keep pace with the changing needs. There are a large number of studies that have been conducted in the recent past on the need of reference services in digital collections and projects (Choi 2006); and status, issues & modalities of digitization in different libraries (Koehler 2004, Lopatin 2006, Patra 2006, Rosenberg 2006, Vohra and Sharma, 2006, Yu 2006, Ballard and Donald 2007, Seadle and Greifeneder 2007, Zhang 2007, Fox 2008 Reinhart 2008). Patra (2006) has emphasized on the need to develop theme based digital libraries like one on ceramic. According to Weintraub and Wisner (2008), in September 2007, Yale University Library (YUL) and Microsoft agreed to partner in a large-scale project to digitize 100,000 books from the YUL collections—an ambitious effort that would substantially increase the library's digitized holdings, particularly in the area of its own text collections. YUL has been digitizing materials from its collections for many years, primarily in the area of visual art materials and slides, some specific textual materials, and a small number of books in need of preservation. However, YUL had yet to undertake an effort to digitize a major portion of its book collection. Weintraub and Wisner (2008) in their article have done an analysis of YUL's special needs regarding mass digitization, illustrated the workflows and in-house technical developments necessary for mass digitization, and summarized the lessons learned and future directions for large-scale digitization at YUL. Now even web-based learning technologies are available and people are
making use of these. **Reinhart (2008)** has examined changes occurring in the organization and delivery of learning at the level of higher education, and has argued that it is now possible to envision the shape and structures of the future digital university. The article found that the physical structure of the university was a consequence of the hierarchically organization of knowledge, the predominant model from the late middle ages through the industrial era. As knowledge became more extensive and complex, the old organization was proving inadequate. The organization of knowledge in several dimensions would bring a massive restructuring of institutions of higher education. The new digital university would have the web rather than disciplines and the library at its virtual center with (nearly) infinite access to the larger peripheral world. No longer holding a monopoly on information, the postmodern café university competes with commercial, for-profit institutions of learning, thus offering traditional and new adult learners immediate access and enormous learning flexibility (Reinhart 2008). In a recent study on the topic, **Yang and Miaoliang (2008)** explored the feasibility of using web-mining technology on learning object (LO) usage information to discover the correlation pattern and provided valuable recommendations on related learning resources. Reviewing published work on digital libraries in India, **Mahesh and Mittal (2008)** reveal that most articles focus on developing digital libraries and digital collections except for a few studies on copyright issues and management of digital libraries. They further claim that no studies have touched upon issues such as digital rights management, security and digital library policies. **Iwhiwhu and Eyekpegha (2009)**, on the basis of their study, are of the opinion that the libraries lack written policy on digitization, inadequate ICT infrastructures and manpower, fund, and inadequate government support. Users are not given user education/digital literacy to enable them adequately utilizing the available digitized resources and services, thus posing challenges to effective information delivery. **Byamugisha (2010)** discusses that the People have become increasingly dependent on digital information and the internet as medium for gaining and exchanging information. However, despite promising developments numerous challenges that are related to digital content and collection, interoperability, standards, knowledge organization systems, users and usability, legal, organizational and social issues, staff education, infrastructure, language barrier, and technology remain.
2.1 Relevance of the Study based on Review of Literature

From the above it can be concluded that automation of university libraries, establishment of the digital libraries and digitization are crucial for preserving and disseminating information and knowledge more effectively and efficiently in the present of information explosion. The above review also highlights that in the recent years, because of changing needs of readers and globalization phenomenon, the university and other libraries have realized that the best way to meet the user needs and to be competitive in their services there is an urgent need of automation and digitization in libraries. The studies are being conducted on the library users to assess their needs. The studies have been also conducted to assess the status of various libraries in their activities including computer hardware, software and resource sharing to achieve complete automation and digitalization of their libraries and to meet the needs of their users. It has been reported that lack of maintenance culture on the part of some library staff, inadequate space to accommodate ICT facilities, etc; constitute problems. Most of the studies done in Northwest Indian libraries have not included the State of Jammu and Kashmir. Bhattacharya (2004) traced the development of digital libraries with respect to India and concluded that India’s attempt towards digital library development has been sporadic and partial. In view of above, the present study was undertaken to review the current status of automation and digitization and the challenges they pose for the effective information delivery in some select university libraries of Northwestern India.