CHAPTER 2

REVIEW OF LITERATURE

2.1 REVIEW OF LITERATURE

It is well recognized that libraries all over the world are undergoing transformation, especially owing to the development in information and communication technologies. Traditional libraries are changing to digital libraries and new libraries that are being set up are increasingly of the digital kind. As a result, there is widespread interest and consequently, a lot of research and development activities are being carried out in this area the world over. In India a number of institutes are also in the process of setting up digital libraries and many scholars and practitioners are conducting research on digital libraries. In this chapter, an attempt has been made to present the details about various research studies in Digital Libraries.

Traditional methods of collecting, storing, processing, and accessing information have undergone a massive transformation due to the growth of virtual libraries, digital libraries, online databases, and library and information networks. In India, a substantial number of libraries and information centers have initiated digital library projects including databases and e-journals, or by digitizing their own archaically-valuable collections.
2.2 DIGITAL LIBRARY PROJECTS IN INDIA

2.2.1 Digital Library of India

Digital Library of India (DLI) is an initiative of Indian Institute of Science (IISc), Carnegie Mellon University (CMU), the International Institute of Information Technology, Hyderabad (IIITH), and another 25 "Content-Creation Centers", as partners across the country. The DLI seeks to preserve Indian heritage that is contained in books, manuscripts, art, and music. Each centre brings its own unique collection. This digital library is also a test-bed for Indian language research. The vision is to preserve all the knowledge of the human race in digital form and make that content searchable, independent of language and location, and to ensure that the cultural heritage of countries like India is not lost during the transition from paper to bits and bytes, as they were lost during a former transition of cultural content from palm leaves to paper. So far, more than 2,89,000 books have been scanned, of which nearly 1,70,000 are in Indian languages. More than 84,000 books (25 million pages) are available on the DLI web site at the Indian Institute of Science (IISc), and more than 1, 49,000 books (43 million pages) are available on the DLI web site at the International Institute of Information Technology (IIIT). The link to other partner sites is also provided through a commonly accessible website.

Funding for the DLI comes from multiple sources. The Office of the Principal Scientific Advisor to the Government of India is funding the project at the IISc. The Ministry of Communication and Information Technology (MCIT) is funding the project at various DLI partner centres. The National Science Foundation (USA) is providing funding for scanners and software research and development through Carnegie Mellon University. The First Citizen of India, His Excellency Dr APJ Abdul Kalam, the former President, who himself is one of the contributors to this vision, has personally taken a keen interest in making the Rashtrapathi Bhavan one of the major centres of the DLI.

(www.serc.iisc.ernet.in)
2.2.2 National Library of India

The National Library of India is a permanent repository of all material produced in India and written by Indians, and also about India written by foreign authors, wherever published in any language. The library has a large collection of publications in English and other European languages, as well as Chinese, Japanese, Arabic, and Persian. There is also a rich collection of Sanskrit, Persian, Arabic, and Tamil manuscripts and rare books. One of the functions of the National Library is to conserve the printed heritage for future generations. The library has separate divisions for physical, chemical, reprographic, and digital conservation. Rare and brittle books and other documents are being scanned and stored on compact disc. English books and documents published before 1900 and Indian publications before 1920 are considered for digitisation. So far, 6,600 books in Indian and English languages have been scanned, with a total of over 25,000,000 pages. (www.nationallibrary.gov.in)

2.2.3 V.V. Giri National Labour Institute

The Archives of Indian Labour were created by the V.V. Giri National Labour Institute and the Association of Indian Labour Historians (AILH). The archive preserves documents, builds collection, and initiates research in labour history. The collections include documents from different organisations. Documents from labour movements are included, as well as personal accounts and memories of labour leaders and workers. The archive uses Greenstone, an open-source digital library software, to integrate text, audio, and video. (www.vvgnli.org)

2.2.4 Indian Parliament Library

This library serves members of Parliament and officers and staff of Lok Sabha Secretariat. Large databases were initially developed by the computer
centre. The data are stored and available now in PARLIS (Parliament Library Information System). [www.parliamentofindia.nic.in]

2.2.5 Indira Gandhi Memorial Library, University of Hyderabad

It is known as the first fully automated library in India, it was the first to begin a digital library programme. Since 2002 the library has digitized around 2, 50,000 pages, primarily theses and dissertations, as well as 300 books in English and Indian languages. The library has access to about 1,70,000 electronic journals. The library preserves discs that accompany printed books and journals by uploading them to the CD server, which is linked to the digital library system. The library scans printed journals from Indian publishers and maintains them in the digital library as well. The library uses the open source software Dspace for its institutional repository. Maintenance of a digital library includes content-creation, designing and updating webpages, metadata creation, uploading and linking digital content. The digital library uses MARC-21 for metadata and PDF for digital content. [www.igminet.uohyd.ernet.in]

2.2.6 Vidyanidhi Projects

Vidyanidhi (which means “treasure of knowledge” in Sanskrit) is a digital archive of dissertations, as well as a set of resources for doctoral research in India. Vidyanidhi is being developed as a national repository and a consortium for electronic dissertations, through participation and partnership with universities, academic institutes, and other stakeholders. Vidyanidhi began as a pilot project in 2000 with governmental support, as well as support from the Ford Foundation and Microsoft India. The Ford Foundation support is for focusing on Social and Human Sciences.

The Microsoft support is for the implementation of Unicode for Indian Languages. Vidyanidhi is a member of the Networked Digital Library of Theses
and Dissertations (NDLTD), and UNESCO and other efforts in this direction. UNESCO supports ETD initiatives worldwide. (www.vidyanidhi.org.in)

2.2.7 **Electronic Theses and Dissertation Project of INFLIBNET Centre**

INLIBNET hosts a bibliographic database comprising of 2,00,000 dissertations from about two hundred Indian universities. The Repository uses DSpace, which complies with the Open Archives Initiative (OAI) framework allowing publications to be easily indexed and searched by web search engines and other indexing services. (www.inflibnet.ac.in)

2.2.8 **Indian Institute of Astrophysics**

The Indian Institute of Astrophysics has its origin in the Madras Observatory, which was created in the late 18th century. Today the Institute is a national research centre for physics and astronomy. Its repository includes dissertations from researchers associated with the Institute, as well as papers from the Bulletin of the Astronomical Society India beginning with volume 1 (1973), journal articles, and conference papers. Archival materials from the 18th, 19th, and 20th centuries have recently been added. These materials are manuscripts, photographs, annual reports, instruments and their descriptions. The repository uses DSpace. (www.iiap.res.in)

2.2.9 **Raman Research Institute**

The Raman Research Institute Digital Repository allows the Institute community to deposit preprints, post-prints and other publications and organizes these publications for retrieval. It also contains the annual reports of Institute and newspaper clippings from its archives. The Repository uses DSpace. (www.rri.res.in)
2.2.10 Indian Institute of Technology, New Delhi

Digital library initiatives began in 1998 with an upgrade to a faster Internet connection. The high-speed Internet connection led to a number of digitized collections. IITs receive grants from government bodies such as AICTE (All India Council of Technical Education) and the Ministry of Human Resources Development and Management (MHRD) to develop digital libraries. Online courseware has been developed and older volumes of journals have been digitized, among other projects. More than 500 dissertations are available in the repository. The campus has facilities for submitting material to the repository. More than 25,000 pages of journals were scanned and are available on the Institute intranet. (www.iitd.ac.in)

2.2.11 Indian Institute of Technology, Kharagpur

The Central Library, IIT Kharagpur, created an electronic library in 1994, which is now called a digital library. Older documents have been digitized, and it has large number of electronic resources such as EiTech index, Compendex, IEEE / IEE journals in full text, INSPEC, Current Contents, Chemical Abstracts, Biotechnology Abstracts, Agricultural Abstracts, Library and Information Science Abstracts, ASTM standards and ABI. The institutional repository collects, preserves, and disseminates research output. At present, access is restricted to the IIT Kharagpur campus LAN only and submission of documents to this repository is also limited to the IIT Kharagpur research community. The repository uses DSpace. (www.iitkgp.ac.in)

2.2.12 Indian Institute of Science (IISc), Bangalore

The Institute uses e-Prints, an institutional repository of research output. The archive is maintained by the National Center for Science Information (NCSI) and it supports self-archiving in various file formats (pdf, Word, html, etc.). Around 5,000 articles are available. This is one of the very first initiatives
to provide online publishing facilities for research scholars and academia. Metadata used include a combination of Dublin Core, EAD and VRA to support a variety of media formats of information to download and upload. (www.iisc.ernet.in)

2.2.13 Indian Institute of Technology, Bombay

The repository has bibliographic information and abstract for dissertations beginning in 1965. The masters’ thesis database has bibliographic information and abstract from 1999 on more than 3,000 full text theses and Dissertations are available in the ETD database. The repository uses Greenstone, open source software, which complies with the Open Archives Initiative (OAI) protocol. (www.iitb.ac.in)

2.2.14 Indian Institute of Management, Kozikode

The IIM-K institutional repository uses GNU E-Prints software, which was developed at the University of Southampton. The community can archive preprints, post-prints, and other scholarly publications. Anyone can access the archive, but submission of documents is limited to the IIMK research community. At present around 200 full-text documents are available in the repository. (www.iimk.ac.in)

2.2.15 National Institute of Technology, Calicut

This project was initiated in 1999 and is one of the largest digital libraries in the country. It serves the campus with research and other academic information in science, engineering and technology. The software used was developed by the institute itself. This is accessible from anywhere on campus. The repository contains theses and dissertations, course materials, articles, and annual reports. (www.nitc.ac.in)
2.2.16 National Institute of Technology, Rourkela

Formerly known as Regional Engineering College (REC), this is one of the premier institutes for technical education in the country. NIT is a joint undertaking of Government of India and Government of Odisha. This Institutional Repository uses DSpace. At present around 343 documents are available in the repository. [www.nitrkl.ac.in](http://www.nitrkl.ac.in)

2.2.17 Librarian's Digital Library

This repository is at the Documentation Research Training Centre (DRTC), Indian Statistical Institute (ISI), Bangalore. It is aimed at librarians world-wide, and uses DSpace. It contains articles, theses and dissertations, presentations, multi-lingual documents, photographs, etc.

Among the initiatives described above, only a few government institutes have shown their interest. Out of three hundred universities in India, only two, the University of Hyderabad and the University of Mysore, have taken up digitization initiatives. The remaining institutes need funds, manpower, and guidelines from the UGC and their state governments. The vision should be an Indian information infrastructure linking education, research, government, and business. Questions of funding and governance, as well as technical issues, require the participation of state and national governments. [www.drtc.isibang.ac.in](http://www.drtc.isibang.ac.in)

2.2.18 Centre for Education and Documentation

The Centre for Education and Documentation hosts a variety of resources including books, journals and newspaper clippings on contemporary history and video documentaries on social change and development in its premises in Bangalore and Mumbai.
CED has also come up with online reference facilities such as DocPost and DocEmail, where one could selectively request photocopies or softcopies of material to be sent via post or email with subsidized charges. (www.doccentre.net)

2.2.19 IGNCA Digital Library

This digital library created in 1999 by the Indira Gandhi National Centre for the Arts (IGNCA) affords a varied documentation of resources such as digital images, audio and video recordings, animations, electronic books and so forth related Indian arts and culture. The main objective behind establishing this online tool is to encourage preservation of art and culture through digital documentation of works. (www.ignca.nic.in)

2.2.20 Information and Library Network Centre (INFLIBNET)

Developed by the UGC in collaboration with NISSAT, this digital library network is probably one of the more full-fledged steps towards digital libraries in India. Major Activities of this association include Library Automation, Database Creation, Software Development, Human Resources Development, Information Services and Networking. They have created a software SOUL that is based on a relational database management language, which is used for cataloguing, archiving as well as online public access of resources. (www.inflibnet.ac.in)

2.2.21 Digital South Asia Library

The Digital South Asia Library is a global collaborative effort to make important and rare resources available to the international community. DSAL includes resources from many disciplines as well as a variety of data types. The component parts of the project include maps, statistics, bibliographies, union lists, indexes, photographs, books and journals, as well as a reference collection
that is strong in pedagogical tools for South Asian language learning. (www.dsal.uchicago.edu)

2.3 RESEARCH STUDIES ON DIGITAL LIBRARIES

It is generally accepted that many digital library initiatives in India began in the 90s. One of the earliest articles giving an overview of digital libraries in India was by Rajashekar T.B. (1977); this lucid article discusses many advantages of digital libraries and issues involved in the creation of digital libraries.


Sadagopan S. (2000) discussed the challenges of digital libraries and highlighted the opportunities available for library research scholars for creating and assessing content in Indian languages. Mohapatra P.K. (2000) discussed future programmes which include plans for large scale digitization.

The article reaffirmed the evolutionary position of electronic library as the predecessor of digital libraries by Deb S. and Kar D.C. (2005). The phenomenon of information hidden in the traditional library set-up being a barrier to communication, and the potential of digitization as a means to overcome this phenomenon was discussed by Giri B. (2006).

In recent years there have been a number of digital library initiatives in India and there are several papers that have attempted to study these initiatives. Bhattacharya P. (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.
Similarly Jain P.K. and Babbar P. (2006) have categorized the different Indian digital library initiatives that fall under three categories viz., government-level, academic institutes and society organizations. India is rich in various kinds of traditional knowledge that is documented in various forms and available in some libraries.

Rao A.K. (2005) discusses two such digital library projects viz., Digital Library of Indian Heritage and Indian Art Preservation Research Project. Balakrishnan (2005) discusses the technological challenges with regard to the Indian languages and future directions including the possibility of creating a 21st century equivalent of the public library and that PBS and All India Radio might create Web contents.

Krishnamurthy (2005) gives an overview of digital libraries describing the Digital Library Initiatives- Phase I Digital Library Initiative- Phase II Projects. He touches upon research initiatives involved in digital libraries such as interoperability, collection development and management, preservation, cataloguing and indexing and reference services.

Padmavathi and Mahakuteshwar (2005) worked on Central Food Technological Research Institute’s (CFTRI) efforts to create a digital library of theses and dissertations. A brief on the digital library initiatives at the Indian Institute of Astrophysics, Bangalore is discussed by Vagiswari and Birdie (2003). Kalra (2001) mentions a few digital library initiatives that began in the 1990s but discusses mostly Web-based searchable databases, bulletin board, list servers and OPACS.

Efforts at The Energy and Resources Institute (TERI) to create an integrated digital library have been discussed by Deb S. (2006). The concept of hybrid digital library and the steps involved in its creation are also discussed. The hybrid digital library is a digital library that holds the Meta data for accessing
resources available in cyberspace and in the organization’s library. Deb also discussed the physical digital library for born-digital documents by TERI and explains integrated digital library that provides a single window that provides access to both born digital resources and digitized documents.

Urs and Raghavan (2001) highlighted about the project Vidyanidhi, the Indian Digital Library of Electronic theses initiative. They mentioned that Vidyanidhi is a direct consequence of government policy initiatives and is intended to demonstrate the utility of digital technologies.

Jose A. and Raina R.L. (2005) have drawn up a conceptual model of Networked Digital Libraries (NDL) for IIMs based on National Digital Library (NDL) programmes initiated in the US. Like the Networking Digital Library of Theses and Dissertations (NDLTD) and Networked Computer Science Technical Reference Library (NCSTRL).


Some interesting research has been taken up in the area of management of digital libraries. These works covered issues and strategies involved in management of digital libraries include hardware management, software management, collection management, preservation/archiving, financial management and the access system are focused by Gupta S. and Singh G. (2006).

Das A.K. and Dutta B. (2004) discussed the need for audit and control of digital library systems. They identified the elements of audit and control that enhances the capabilities and effectiveness of digital libraries.

Pandian and Karisiddappa (2002) have suggested a framework for the design and development of an intranet-based IIM digital system based on a consortia approach. This model proposes digitization of the IIM resources in a cooperative manner with subscriptions to electronic journals and databases through a consortia mode.

Yet another consortium approach to digital libraries, in this case primarily of licensed e-resources, is the INDEST consortium (Arora J. 2001, 2003) development of an institutional repository for the Indian Institute of Science (IISc), Bangalore. While there are about 40 software packages for creating OAI-compliant (Open Archives Initiative) databases, Greenstone Digital Library (GSDL) software has been chosen for developing the IISc institutional repository.

While many papers have cursorily discussed the problems, Jeevan V.K.J. and Dhawan S.M. (2002) focus on the issues in detail. The authors discuss the problems and issues related to integration of information technologies, digital library tools and software, models for resource development, IT training needs, content development and copyright management.

Kaur P. and Singh S. (2005) discuss the transformation of traditional libraries into digital libraries in the Indian context. Another paper on content for digital libraries is by Sreekumar M.G. and Sunitha T. (2005) who share the
experience of creating a state-of-the-art digital library information system by seamlessly integrating and aggregating print as well as the diverse distributed digital content of the Indian Institute of Management, Kozhikode knowledge domain.

Shukla V.N. (2005) discusses content creation as a new trend in IT and stresses the need to develop digital libraries and not digital collections. Unicode provides a standard scheme for world’s languages.

Chandrakar R. (2004) discusses Unicode and the related technologies available for localizing Indian language materials. Gaur R.C.’s paper (2003) entitled “Rethinking the Indian Digital Divide: The present state of digitization in Indian management libraries” focuses more on library automation and its facets rather than on digitization or digital libraries. The paper highlights the status of library automation in the Indian management institutes’ libraries and there is only a passing mention of digital library initiatives by these libraries; in fact, the study found these initiatives dismal. Murthy S.S. (2005), however, shares the practical experience of digitization at the National Tuberculosis Institute, Bangalore.

Libraries provide services. Letha M.M. (2006) has discussed the library portal as a tool for Web-enabled information services. Gupta R. S. K. et al. (2004) points out that the library website is by nature a vehicle for delivering digital library services. Another case study describes the building of digital resources at the Indian National Science Academy (INSA), New Delhi (Munshi U.M. 2003).

Krishnamurthy M. (2005) discusses digital library services in the Indian Statistical Institute (ISI), Bangalore. According to the author, to create true digital libraries, not just digital collections, will require librarians to work closely together to create open, distributed, publicly accessible resources, as well as to establish a collaborative structure to coordinate and guide implementation.
Das A.K., Dutta C. and Sen B.K. (2007) assess the present situation in the development of indigenous digital libraries focusing on the retrieval features of eight digital libraries in India. This study shows that information retrieval features of digital libraries vary significantly from each other due to the use of different content-organization techniques and differing types of digital content.

Arumugam G., Thangaraj M. and Shanti P. (2005) discuss the concept of data mining and certain algorithms than can mine frequent user access patterns of the library database. Though the title of the article states that it is about discovering frequent access patterns in a digital library using association mining, the study itself is not on digital libraries but pertaining to the circulation or transaction database of an automated library. The implications of copyright in the electronic environment are discussed by Rao S.S. (2003). James T.C. (2005) looks at digital libraries and copyright including various issues with respect to the different aspects of digitization and the copyright laws of India.

Finally, Ravi S., Chandra R. and Sharma R.K. (2000) look at emerging trends and the future of digital libraries in terms of their usefulness and cost effectiveness. As the number of digital libraries grows, the role of the traditional librarian needs to be re-examined in the light of this new environment.

Sreenivasulu V. (2000) authored one of the earliest papers looking at this aspect with particular reference to the emergence of the ‘digital librarian’. The paper describes an array of roles for the digital librarian and discusses the competencies, skills and professional education and training needed by the digital librarians.

Parvathamma .N (2003) discusses the social and economic issues that need to be considered to bridge the digital divide between rural and urban populations in order to ensure sustainable development of India.
These are some of the major research initiatives in digital library area in India. The literature review brings into the light that there are very few research studies pertaining to the attitudes and experiences of digital library service providers and users. It is also felt that the service providers and users constitute to be two critical stakeholders in the digital library management and hence this topic to understand issues related to management of digital libraries from the perspective of service providers and users.