CHAPTER – IV

DIGITAL LIBRARY INITIATIVES: INDIAN PERSPECTIVE
WITH SPECIAL REFERENCE TO KARNATAKA

4.0 Introduction

Digital library and its initiatives are making breakthrough in the present modern information technology era in consonant with advances in ICT. The LIS profession has been observing drastic changes in the every aspect of library issues, which can be noted by the many professional experts and end users of libraries, so in this context the country like India also marked many digital library initiatives which are initiated in the country. In fact the perception of digital libraries in India began in the mid 1990s with the spread of information technology, the internet and the support of the Central Government. In 1996, this concept was recognized during the Conference on Digital Libraries organized by the Society of Information Science (SIS) at Bangalore. Though a few libraries have made attempts earlier in this direction, the digital library initiative in India is still at nascent stage (Sree Kumar, 2006)\(^1\). Despite this and some awareness among the LIS professionals, the digital library initiatives in India compare with other countries is very much behind in terms of activity, involvement, initiatives and success, so there is a need to inspire the professionals involve in to digital library activities and research.

Most of the Digital library initiatives were mainly restrained to particular uses such as subscribing to e-journals, scanning documents and installing them on the intranet. But there is every need for rapid change in this scenario of libraries in India to use ICT's which are confined so far to the prestigious National institutes such as the
Indian Institutes of Technology (IIT), Indian Institutes of Management (IIM), Indian Institute of Science (IIS) Research Institutes under the control of NISSAT and some special libraries. Some government agencies and institutions, as well as in the public sector are also engaged in digitization of their libraries in a limited way. However, it is evident from the initiatives taken so far in this direction that the great potential of ICTs for developing digital libraries has not yet been fully utilized in Indian libraries (Varatharajan, 2007)\textsuperscript{2}.

4.1 Digital Library Initiatives: Indian Perspective

In India few digital library initiations and digital library projects have been undertaken and some are completed and few are still ongoing. Majority of digital library initiatives and projects initiated by research institutes and research organizations are funded by the central and state governments and some started collaboratively by national institutes and other organizations. Digital library initiatives in India were started basically for preservation of the art, culture and heritage of the country (Madalli, 2003)\textsuperscript{3}.

The application of IT in libraries in India started on a very modest scale. During the past decade or so several Indian libraries have initiated activities to create, acquire, and provide access to electronic resources. On the other hand Singh (2002)\textsuperscript{4} has highlighted that the whole world is converting into a ‘Global Electronic Village’ as the traditional constraints of time and space are disappearing. Digitization is one of such initiatives that changed the entire concept of the ways in which scholars, students, and the general population find and use scholarly information and its dissemination.
Rao (2005)\textsuperscript{5} mentioned that growing emphasis on technology, libraries have undergone major structural change in terms of their collection, organization and services. The traditional concept of a library is becoming obsolete with the emergence of new ‘digital’ means of storing and disseminating information over the Internet. Compared to the physical organization of documents, there is more emphasis on technology - computer hardware, software, storage formats, network connectivity, etc. Arora (2001)\textsuperscript{6} emphasizes the digital library is in the process of evolution as it climbs along the technological ladder. Urs (2008)\textsuperscript{7} state that latest trends in DL which has adopted technologies (i.e. open source or commercial or mixed) which gives insight to re-use of the knowledge. This enables to save the time of the users & library staff within the local infrastructure. Prasad (2007)\textsuperscript{8} rightly pointed out that the areas of digital libraries grew in parallel with the web technologies, it can thus be concluded that further advances in the area of digital libraries would rest upon further technological developments as well as conceptual foundation.

Digital Library Initiatives are the pedals for the constructing global typical digital libraries as supreme residence of knowledge, which are capable to deal with the multifaceted subjects situated by the technology. In India, Open Digital Library (ODL) initiatives are picking up. Basically digital library is a collection of information that is both electronic (born digital) as well as digitized and it gives us powers we never had with traditional libraries. India has recognized the power of digital libraries and lots of initiatives are on the move for developing state-of-art digital libraries (Sreekumar & Sreejaya, 2009)\textsuperscript{9}.

The Universities and research institutes in India are playing a leading role in transforming the country into a modern informative, industrialized and
technologically advanced country. The green revolution and tremendous progress in dairy development have made India a major food producing country. Its development of space technology, the production and launching of indigenous satellites, and the development of peaceful nuclear energy have brought it into the forefront of technologically advanced nations to which a large number of developing countries look for training and guidance. Similarly Indian universities and institutes of higher learning support the needs and aspirations of Indian student community and scholars. The libraries of those institutions correspondingly play a vital role in acquiring and disseminating information for academic and research activities. Digital libraries are a way of making educational and research data and information available to faculty, researchers, students, and others at the institutions and worldwide (Varatharajan & Chandrashekara, 2007)\textsuperscript{10}.

The emergence of digital technology and computer networking has provided means whereby information can be stored, retrieved, disseminated, and duplicated in a very fast manner. Digital libraries have made considerable advances, both in technology and its applications. The digital library initiatives at international level are many, but in developing counties like India they are still in a nascent stage. But with the initiative like Million Book Project, initiated by Carnegie Mellon University, the culture of digital library has also made a beginning in India (Bansode & Pujar, 2008)\textsuperscript{11}.

The globalization of information is taking place and territorial boundaries are becoming meaningless due to multinational and transnational companies. Digitization is one such initiative that changed the entire concept of the ways in which scholars, students, and the general population find and use scholarly information. Digitization
refers to the process of transforming a piece of information such as a book, picture or video into bits. He also highlights the organization's willingness to undertake projects of digitization and well placed approaches to ICT issues to capture funding from external and internal sources for developing and sustaining the digitization projects. Procurement of facilities for the project should be in earnest to support the immediate take off of these digitization projects in India, also National IT policy shows the commitment of the Government of India to provide information to users in digital form and now it is the responsibility of the library and information professionals to develop and sustain functional hybrid and digital library (Paul & Jain, 2008)\textsuperscript{12}.

The development of digital libraries and repositories have been in “fits and starts”, the fact remains that India also is in “syne” with the global trend and a number of digital libraries and repositories have been developed in recent years. Though no exact statistical data exists on the number of digital libraries available globally or in specific countries, there have been a few reports. With regard to India, going by the number of published journal articles and reports in conference proceedings, it can be easily concluded that the number of digital libraries and repositories in India is growing fast (Rekha & Mahesh, 2008)\textsuperscript{13}.

The author discusses on digital library initiatives in India, the initiatives of the government of India and state governments towards digital library activities, and the policy of the Government of India towards digital library development. The contemporary initiatives, such as the INDEST Consortium, are profiled. The challenges facing digital libraries, the problems being encountered while developing digital libraries, the problems of the digital divide facing the country are revealed to the core to know the state of concrete risks (Partha. 2004)\textsuperscript{14}. 
KalaNidhi known as national information system and databank, it consists of a reference library of print collections, a large microfilm /microfiche library, a collection of slides, and photographs covering many disciplines related to Greater India, South Asia, Southeast Asia, and West Asia. A cultural archives consisting of rare collections, a conservation laboratory, and a multimedia unit also form part of the organization. The basic mission of KalaNidhi is to support the research of the different divisions of the center as well as researchers and scholars from other academic institutions. Author also describes the Indian cultural heritage resources at the IGNCA and provides some details about the digitization initiatives underway (Gaur, 2011).  

Digitization has become the buzz word in the modern Library and Information Science/ Service, Objectives of digitization, author highlighted the issues related with digitization, India’s initiatives, Government of India’s projects, schemes presently available to libraries and individuals for preservation / conservation of rare and old books, documents and other such materials of cultural heritage. Details of born digital documents and databases which are Open Source Resources [OSR] for industrial researchers in plantation crops industry are argued for the sake of information (Arora, 2002).  

The authors trace the history and developments in Open Archives Initiatives including open access journals, e-print archives and Institutional repositories. The setting up of NAL’s Institutional Repository using OSS GNU Eprints, document types with statistical analysis, country wise statistics of full text download, levels of accessibility and technologies used in building the Institutional Repository have been discussed at length (Poornima, Biradar & Goudar, 2006).
The situation in India regarding DLs has found its roots mainly in the libraries of Universities, Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), Indian Institute of Science (IISc), NGOs and R & D organizations. Some government agencies, as well as public-sector institutions, are also engaged in this activity. But the initiatives taken by the Government of India in this direction indicate that the potential of ICTs for developing DLs has not been fully realized. While one government agency is providing support for one particular aspect, the other is focusing elsewhere, without any coordinated effort by a nodal agency (Jain & Babbar, 2006)\textsuperscript{18}.

Digital libraries evolved out of the outgrowth of traditional libraries with the transition from card catalogs became computerized and replaced them with Online Public Access Catalogue (OPAC). The advent of the Internet in the mid 1990s, OPACs were connected to the Internet and Library patrons could use WWW as gateways to OPAC thus the Web-OPAC merged which were very basic, limited digital libraries. Modern digital libraries typically add full text content, such as papers or books downloadable in formats like PDF, and also all audio-visual and multimedia content formats (Jeevan, 2004)\textsuperscript{19}. Whether or not the full content of resources is present in DLs, some representation of the resources are present upon which are layered rich services, which attain some of the ends mentioned above.

In the developed nations the electronic libraries initiated around 1970’s, however in India it has been started at middle of 1990’s by means of high modern information technology and the encouragement by the Govt. of India. The advent of World Wide Web (WWW) actually worked as supportive enzyme for electronic
library initiatives. The essential scope of electronic library initiatives in India was to protect and conserve the art, culture and heritage of the India (Bhattacharya, 2004)²⁰.  

Munshi (2003)²¹ state that today libraries are at a transition phase where twin processes of paper-based environment and changing information-seeking patterns in the electronic/digital environment go hand-in-hand. Hence, all components of the information chain are in a state of flux. The application of information technology (IT) in India started on a very modest scale. During the past decade or so several Indian libraries have initiated activities to create, acquire, and provide access to electronic resources. On the other hand Singh (2002)²² was highlighted that the whole world is converting into a ‘Global Electronic Village’ as the traditional constraints of time and space are disappearing. The globalization of information is taking place and territorial boundaries are becoming meaningless due to multinational and transnational companies. Digitization is one of such initiatives that changed the entire concept of the ways in which scholars, students, and the general population find and use scholarly information and its dissemination.

In India the digital library initiatives was started at The Indian Institute of Science (IISc), Carnegie Mellon University (CMU), the International Institute of Information Technology, Hyderabad (IIITH), along with this several additional educational, spiritual, and administration organizations in India. Around twenty centers called “Content Creation Centers”, had come forward and become associates in the project Digital Library of India (DLI). The DLI look to conserve the art, architecture, and Indian heritage which are there in published books, manuscripts, art, and music. Every initiative center carried out their unique resource collections. This electronic library was a huge dais for research in communication language. This DLI
has become principal for many initiatives and motivates others to put efforts global level to make information and knowledge free. The project has initially to scan around 10,000 manuscripts started at CMU that was linked up at IISc, IIIT-H, and other organizations (Chandrashekar & Varadarajan, 2007)\(^\text{23}\).

The very first Digital Library of India particularly for science, technology and engineering along with the Council of Scientific and Industrial Research (CSIR), e-databases, e-Journals Consortium and e-portals really boost the vision of electronic library in India and also they made significant mark in the creation of digital library of India. Though the digital library initiatives and repositories at worldwide started bit early i.e., around the beginning of modern 21\(^\text{st}\) era, many initiations have been marked at global level with that motivation, where as in India only very considerable institutions have initiated investigation and development works but up to the beginning of the year 2001 there was no digital libraries as marked in the country (Kalra, 2001)\(^\text{24}\). They also reported the hard work dedication towards the initiation and computerization along with the barriers to be overcome in the development of digital libraries. They also noted that there was short of guide and principles, and additional connected handicaps, finally they conclude with few well trained professionals can definitely able to build digital sources and digital services with users perspective. Bhattacharya (2004)\(^\text{25}\) and Jain et al. (2006)\(^\text{26}\) have done many studies on initiation of electronic library and its services in India.

The main focus of this study is digital library initiatives in Research Institutes and Research & Development Organizations. It is summarily viewed that very DL initiatives in the Research Institutions and Organizations and many of them are with
own effort and some are with collaboration, the chapter overviews the Digital Library initiatives in India and a perspective view with special reference to Karnataka state.

### 4.2 Digital Library Initiatives in India under Different Category

The developing country like India is promoting digital libraries and its application to make use of the plentiful electronic and computerized resources. It is not same when it comes to the matter of developed countries. There are plenty of organizations in India that are badly in need of IT human resource for supporting the heritage, culture and resources which are available in different format and sustaining the digital library infrastructure. Several organizations still do not have even basic infrastructure. Few have some notable but they are yet to be developed (Rekha & Mahesh, 2008)\(^\text{27}\).

The professional people in India have intended to overcome the storage barriers and clarity of service to the users by adopting new technologies in terms DPI resolution and they randomly set the resolution while implementing initiatives of digital libraries. The perception towards digital library initiatives has been transitioning now days, as more number of people attracted towards the profession and interested to initiate digital libraries in their own manner which are documented by the researchers(Poornima, Biradar & Goudar, 2006)\(^\text{28}\).

The categorization of DL initiatives in India may be listed as follows:

- Digitization of Art and Culture
- DL Initiatives at Academic Institutions of National Importance
- DL Initiatives at National Level Institutions
- DL Initiatives at R&D Level Organizations
- DL Initiatives at the Government Level
- DL Initiatives at Financial Institutions

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DL Initiatives at NGOs
DL Initiatives by the Media
DL Initiatives at the Private Level
DL Initiatives within Society Level Organizations
DL Initiatives at the University Level

4.2.1 Digitization of Art and Culture

Digital library of art masterpieces HP Labs, Hewlett Packard’s research arm that examines innovative and unusual uses of technology, has announced a pilot project with the Centre for Development of Advanced Computing (CDAC) to digitize part of the art collection in the National Gallery of Modern Art (NGMA). The company will use its imaging products, including the high-end Sonar camera, to convert about 200 paintings of Amrita Sher-Gill and Rabindranath Tagore into digital form. The library of digital paintings will be stored by CDAC on its computers in the Bangalore office. NGMA plans to put up images of the paintings on the Net, from which customers may order full-sized prints (Borgman, 2000)\textsuperscript{29}. The museum will make reproductions on demand on HP Design jet printers and sell them.

The Indira Gandhi National Centre for the Arts (IGNCA) has taken up multimedia projects for the digitization of traditional artwork and artifacts that will be made available on the Web in due course of time. The digitization of “GeetGovinda,” an important classic of Indian literature, is one of their successful ventures. Some other examples of digitization from IGNCA are MuraiDevadasi, Muktesvara, and Rock Art Manossarovar.

‘Down memory lane’ is a project of the National Library, Kolkata for digitization of rare and brittle documents onto compact disks. Presently it covers 25,000 pages showing 6601 documents and is archived on 548 CDs.
4.2.2 Initiatives at Academic Institutions of National Importance

Initiatives at the Indian Institutes of Technology (IITs) (Madalli, 2003)\(^1\).

a) IIT Delhi

The commitment to digital library initiatives and the emphasis upon Web-based digitized collections at the Central Library, IIT Delhi commenced in 1998 with the installation of a fibre optics-based campus LAN connected to a 2 Mbps VSNL radio link enabling faster Internet access for the academic community of the Institute. The availability of the high-speed Internet connection has led to the launching of a number of sponsored and unsponsored projects for developing network-based digitized collections at the Central Library, IIT Delhi.

The following are some of the initiatives being undertaken at the Central Library of IIT Delhi: Digitized collection consisting of bibliographic records. LibSys/WebOPAC.

Accesses to bibliographic databases developed in-house are;

- Database of serials on subscription at IITD (850 current & 700 discontinued)
- Database of the textbook collection available in the Central Library (4000 records).
- Database of the book bank collection in the Central Library (1000 records)
- Database of Ph.D. theses submitted to IITD.
- Web-based access to the Materials Science Collection from CSA.
- Online interactive courseware in Information Technology (IT).
- In-house newsletter: New Services and Facilities
- CD-ROM based search services through a CD NET System.
• Web sites for specialized collections.
• Research articles in ERL linked to full text through Silver Linker.
• Online access to journals subscriptions in print.
• Home page and subject gateways for Web resources.

b) IIT Madras

The major digital initiatives taken by IIT Madras are:

➤ creation of the IT infrastructure for library and information activities
➤ establishment of an electronic resource center
➤ design and development of a website for the Central Library
➤ implementation of total bar-coding
➤ digitization of membership records including photos
➤ establishment of CD-ROM networking under LAN
➤ construction of a digital library working group
➤ subscription to CD-ROM bibliographical databases
➤ subscription to Science Direct
➤ subscription to the ACM digital library package
➤ creation of a CD-publishing facility for Ph.D. theses
➤ providing online access to e-journals, e-Books, e-reference sources, latest additions, journals of the month, and library publications; and
➤ Providing various Web-based services to the users.

c) IIT Bombay

Since 1999, IIT Bombay has started the online submission of Electronic Theses and Dissertations (ETD) with full text of Ph.D. theses and M.Tech dissertations. The library also subscribes to e-journals.
A number of online course wares have been developed. Digitization of old volumes of journals at IIT Delhi is just one example of projects supported by the government. Recently all seven IITs, IISC Bangalore, all regional engineering colleges of India, and IIMs have entered into the INDEST (Indian National Digital Library in Science & Technology) consortium, an initiative from the Ministry of HRD.

d) IIMs

All of the Indian Institutes of Management (IIMs) do subscribe to e-journals and other digital information products such as CD-ROMs. They have established a CD-NET system for access to the CDs on their LANs or campus intranets. The IIM Kozikode library has established a library portal. This is a Web-based library portal launched as a one-stop information shop for the IIMK community on the institute LAN. The portal is a single window on the vast treasure of information resources and services of the library and information center of the Institute.

4.3 Initiatives at National Level Institutions

a) The National Institute of Advanced Studies (NIAS)

Bangalore has shown that it is possible to produce digital archives. They have created a Web OPAC for access by their staff. The various papers, lectures, reports, and other materials available in their library for purchase are listed on the Web. The bibliographical details of publications by the staff are also available on the Web. This institution has already started the digitization of paintings and Microfilming of Indian Publication Project (MIPP). The NIAS has already started work on rare manuscript preservation projects for both microfilm and microfiche. Through this project,
different materials, including paper and palm leaf, can be preserved in an excellent manner (Urs, 2008)\textsuperscript{31}.

b) Parliament Library

A digital library has been set up in the computer center to cater to the needs of Members of Parliament and officers and staff of LokSabha Secretariat. A large number of databases of information generated within the Parliament which caters to the instant reference needs of members, officers and research and reference personnel were initially developed by the computer center. The data stored and available now in PARLIS databases for online retrieval relates to:

(i) Selected Parliamentary Questions (only indexes): LokSabha and RajyaSabha, from 1985. Data for questions and the text of answers with a search facility are available for LokSabha from February 24, 2000 onwards on a Touch Screen Information Kiosks Server and on the “Parliament of India” home page for access via Internet. Data for questions and the text of answers with a search facility are available for RajyaSabha from 1997 onwards on a Touch Screen Information Kiosks Server and on the “Parliament of India” home page for access via Internet.

(ii) Parliamentary Proceedings, from 1985 to 1993 (only indexes) and since winter session, 1993 (full texts). Data for parliamentary proceedings with a search facility is available for LokSabha from July 9, 1999 onwards on a Touch Screen Information Kiosks Server and on the “Parliament of India” home page for access via Internet. Data for Parliamentary proceedings with a search facility is available for RajyaSabha from November 30, 1999 onwards on a Touch Screen Information Kiosks Server.

(iii) Government and Private Members’ Bill from 1985. Data for legislative business with a search facility is available for LokSabha from 1991
onwards on a Touch Screen Information Kiosks Server and on the “Parliament of India” home page for access via Internet. Data for legislative business is available for RajyaSabha from the 186th Session onwards on a Touch Screen Information Kiosks Server and on the “Parliament of India” home page for access via Internet.

(iv) Directions, Decisions and Observations from the Chair, from 1952.

(v) Council of Ministers, by ministry and name, from 1947.

(vi) Current Awareness Service (Parliamentary Documentation), from January 1989. The references from 1998 onwards are available with a search facility on a Touch Screen Information Kiosks Server and on a “Parliament of India” home page for access via Internet.

(vii) Serials control, from 1989.

(viii) Library catalogue, from 1989. The catalogue can be accessed from Touch Screen Information Kiosks.


4.3.1 Initiatives at R&D Level Organizations

The Traditional Knowledge Digital Library (TKDL), a collaborative effort between the National Institute of Science Communication and Information Resources (NISCAIR) and the Indian System of Medicine and Homoeopathy (ISM&H) of the Ministry of Health and Family Welfare, was launched on March 27, 2002 (Prasad, 2005)33. TKDL proposes to document traditional knowledge about plants and the ways and means to treat diseases with traditional medicine. The first phase of the project covers Ayurveda and will eventually encompass Unani, Siddha, Naturopathy, Homeopathy and Folklore. The information from the Slokas is codified according to International Patent Classification (IPC). The Unicode files are then converted into a
database in different languages. A team of 35 Ayurveda experts, two patent examiners, five IT experts and NISCOM scientists and technical officers are working on the project (Joshi, 2006)\textsuperscript{34}.

Electronic resources at the NISCAIR took steps to establish a large CD-ROM based full-text electronic library for document delivery. The full-text CD-ROM products subscribed by the INSDOC include ADONIS, Business Periodicals OnDisc and General Periodicals OnDisc. In addition, the INSDOC also has several indigenously developed online bibliographic databases.

a) **National Aerospace Laboratory (NAL)**

National Aerospace Laboratory offers huge collection of resources related to aerospace technology, apart from acquiring digital information sources, including a good number of bibliographic and full-text databases on CD-ROM such as Aerospace Database, NTIS, AIAA Papers, and SAE Reports, the Information Centre on Aerospace Technology (ICAST) creates digital content for the following: journal tables of contents, newspaper clippings, the OPAC of the NAL Library, a Union Catalogue of current journals, and NAL Technical Reports. The Centre also maintains the portal “AeroInfo”.

**4.3.2 Initiatives at the Government Level**

Both the Central Government and the State Governments have taken considerable initiatives towards the development of digital libraries. The “Support of Government of India towards Digital Library Initiatives Policy Issues: The Long-Term National IT Policy” (National Task Force on IT and Software Development, 2003) shows us the commitment of the Government of India to provide information to users in digital form. The responsibility of envisioning, developing, and sustaining
functional hybrid and virtual library and information systems and services rests on the LIS profession (Suleman, 2001)\textsuperscript{35}.

Indian National Digital Library in Science and Technology (INDEST) Consortium is an initiative undertaken by the Department of Secondary and Higher Education of the Ministry of Human Resource Development in 2002. The Ministry has set up a “Consortia-Based Subscription to Electronic Resources for Technical Education System in India” based on the recommendations of the expert group appointed by the ministry. The INDEST Consortium is a “Shared subscription” or “consortia-based subscription” to electronic resources through consortia of libraries is a feasible strategy to increase access to electronic resources across institutions at a lower cost. The consortia-based subscription can be successfully deployed to meet pressures such as diminishing budgets, increased user demand, and the rising cost of journals (Mischo, 2004)\textsuperscript{36}.

a) **Samdhan Kendras**

In order to turn food producers/consumers into information producers/consumers, the Indian government is making efforts for the establishment of “SamadhanKendras” (SKF Rural Support Centers) and “SoochanaGumtis” (SGF Information Kiosks) in the list of industries eligible for loans under various programs (Paul & Jain, 2008)\textsuperscript{37}. Digital libraries are being used for the public grievances redresses systems of the state governments through SG facilitation counters in government offices. The following are examples of other recent government DL initiatives:

(i) Financial incentives for creation of software, applications, databases and websites in the more common Hindi language. All associated hardware/software should have multilingual capabilities.
(ii) Promotion of information technology education among the workforce in both public and private sectors, as well as among the future workforce (the student population).

(iii) Provision of priority information.

4.3.3 Initiatives from the State Governments

a) Gyandoot

Gyandoot (meaning “messenger of knowledge”) is a new intranet-based DL in the Dhar district of the state of Madhya Pradesh connecting rural public cyber cafes. A corresponding website is an extension of the Gyandoot intranet, providing global access via a portal (http://www.gyandoot.net). The pilot project was launched on November 29, 1999, and it was officially commissioned on January 1, 2000. This DL project is an initiative by the government of Madhya Pradesh (Tariq & Puja, 2007)\textsuperscript{38}.

b) E-Seva

The Andhra Pradesh government has been connected with a statewide grid that handles voice, data and video communication. From a mere 4800 transactions a month in August 2001 to a whopping 750,000 transactions a month in February 2003, e-seva, the Andhra Pradesh government’s Government to Citizen (G2C) utilities service project, has come of age. Despite initial poor response from citizens, e-seva has overcome all hurdles, netting a huge collection of close to Rs. 2000 million from a meager collection of Rs. 430,000 in August 2001. A project that started with less than 10 services in 2001, the new E-seva offers nearly 43 services, ranging from payment of utility bills to issuing certificates, permits, and licenses, and from reservation of buses to B2C services. E-seva, which has been serving citizens in the twin cities of Hyderabad and Secunderabad, is set to spread its wings to all 23 districts before the end of this year. e-seva offers any service to any counter at any place in the twin cities
and is set to go online to enable the citizens to pay their bills from their homes. The services offered would also be networked with private and public sector banks and ATMs (The Financial Express, 2003)\textsuperscript{39}.

4.3.4 Initiatives at Financial Institutions

a) ICICI Knowledge Park

This organization has built up an electronic platform for fast and reliable access to information as well as for strengthening industry and academic collaboration. To provide better information service to research and development sectors, ICICI Knowledge Park has set up a unique facility the Virtual Information Centre (VIC). VIC links to the digital resources of its members. It also facilitates widespread library and literature search facilities. A Web interface for virtual meetings, discussions and sharing of ideas is planned. VIC provides seamless access to a number of external databases. The website hosts a number of databases developed by VIC that are of interest to the S&T community (ICICI Knowledge Park, 2003)\textsuperscript{40}.

4.3.5 Initiatives at NGO’s

a) MS Swaminathan Research Foundation (MSSRF)

This group has specialized multimedia databases in diverse areas. For example, FRIS (Farmers’ Rights Information Service) is a digital multi-media database documenting the contribution of tribal and rural families in the conservation of agricultural biodiversity for the purpose of securing benefits for natural and global conservation gene funds.
4.3.6 Initiatives by the media

a) Media Group

The Times of India (TOI), Anandabazar Group, and Hindu Group have all created their own digital archives of clippings and articles for retrospective searches, historical research, facilitating the writing of features, and so forth. All the leading national newspapers and regional language newspapers have digitized their archive collections (Nanay, 1999)41.

4.3.7 Initiatives at the private level

a) Atul & Jogi Pvt. Ltd.

Premier Picture Library in India has more than 95% of organization’s pictures are self-developed. The library covers almost all possible subject pictures. They are involved with digital imaging and transfer on the pre-press levels. These images are scanned at the low resolution of 75 dpi. The company provides images to the clients through e-mail, zip disk or CD-ROM.

4.3.8 Initiatives within Society Level Organizations

a) Mobile Digital Library (Dware Dware GyanSampada)

This is a product from C-DAC-ERDC Noida. The mission of the project is an Internet-enabled mobile digital library brought to common citizens with the purpose of spreading literacy. C-DAC Noida (Department of IT, MCIT) contributed to bringing digitized books to the doorsteps of common citizens. It makes use of a mobile van with a satellite connection for connectivity to the Internet. The van is fitted with a printer, scorer, cutter and binding machine for providing bound books to the end user. Different places, such as schools in villages and other remote areas, will be covered under this programme to promote literacy and demonstrate the use of
technology for the masses. The schedule of visits of the mobile digital library is made available on their website. Books formatted for book printing may be selected from the website by language, author and title. There are about 350 books in Hindi and English which will be available for download through this website. The site is bilingual (English and Hindi) (Products from CDAC- ERDC Noida, 2003).

4.3.9 Initiatives at the University Level

a) Indira Gandhi Memorial Library, University of Hyderabad

This is the first fully automated library in India, it was the first to begin a digital library program. Since 2002 the library has digitized around 250,000 pages, primarily theses and dissertations, as well as 300 books in English and Indian languages. The library has access to about 170,000 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 (Griffin, 1998)42.

The university had identified and started the digitization process for its thesis/dissertation collection. This was a joint effort of UOH, Sun Microsystems and the VTLS software company. is developing a digital library for the university. Locuz, Sun and VTLS have come together to put up the digital library for the university by using VTLS applications and Oracle as the database platform. The other initiatives for the project are as follows:

- Digitization of the entire physical medium.
- Cataloging and indexing the content.
Creating standards for digital library development.

Setting up delivery protocols and appropriate resources.

Representing content.

The first phase of implementation is putting the content online for the users within the university and eventually making it available over the Internet. The university would make the necessary provisions by using high bandwidth connectivity to the Internet and then implementing the necessary security to ensure protected access.

An electronic educational resource of the Indira Gandhi National Open University at Delhi (IGNOU) has successfully launched a number of Web-based online coursewares in information technology under their distance education programme.

4.3.10 Digital Library Networks

Digital library networking is a cooperative venture of all participating libraries that transmit information through short and long-distance lines from one library to another. INFLIBNET, NICNET, SIRNET, ERNET, DELNET, MALIBNET, and CALIBNET are some of the national and metropolitan digital library networks (Dalbello, 2005).43

a) INFLIBNET (Information and Library Network)

INFLIBNET, as a national level library network, engages in the development of national union databases and has already hosted an online database of Indian theses. This database provides bibliographic details of around 137,000 Ph.D. doctoral dissertations awarded by all Indian universities. It can be accessed via Internet from
the website http://www.inflibnet.ac.in. This development was initiated in 1994 and covers all subject areas with data contributed by about 200 universities and institutions from all over India. This online database has provisions for searching using the following access points: title, researcher, guide(s), department, university, place, year of award, and subject(s). Free text and boolean searches are also available.

b) DELNET (Development Library Network)

DELNET is another good example of digital library initiatives in India. DELNET has been actively engaged in the compilation of various union catalogues of the resources available in member libraries. It has already created the Union Catalogue of Books, the Union List of Current Periodicals, the Union Catalogue of Periodicals, the CD-ROM Database, the Database of Indian Specialists, the Database of Periodical Articles, the Union List of Video Recordings, the Urdu Manuscripts Database, the Database of Theses and Dissertations, the DEVINSA Database, sample databases of language publications using GIST technology, and several other databases. The data is being updated in each of these databases. All the DELNET databases have been resident on DELSIS, in-house software developed on BASIS Plus, an RDBMS, and a UNION holding database of books available in participating libraries that is easily traceable from the web page of DELNET. These databases can be searched online by participating libraries.

4.3.11 Electronic Theses and Dissertation Project of INFLIBNET Centre

INLIBNET hosts a bibliographic database 200,000 dissertations from about two hundred Indian universities going back to 1905. 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.

4.4 Major Digital library Initiatives in India

Apart from the above referred initiatives, there are some important digital library initiatives and projects are identified under topic of research and they are as follows (Paul & Jain, 2008)\textsuperscript{44}.

4.4.1 Digital Library of India

The Indian Institute of Science (IISc), Carnegie Mellon University (CMU), the International Institute of Information Technology, Hyderabad (IIITH), and many other academic, religious, and government organizations in India, a total of more than twenty "Content Creation Centres", has become partners in the Digital Library of India (DLI). 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 DLI is a leader in worldwide efforts to make knowledge free. A pilot project to scan some 10,000 books was initiated at CMU and then followed up at IISc, IIIT-H, and other organizations. All the processes involved have been perfected. 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 289,000 books have been scanned, of which nearly 170,000 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, and more than 149,000 books (43 million pages) are available on the DLI web site at the International Institute of Information Technology. 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 Indian Institute of Science. The Ministry of Communication and Information Technology (MCIT) is funding the project at various DLI partner centers. The National Science Foundation (USA) is providing funding for scanners and software research and development through Carnegie Mellon University. His Excellency Dr. APJ Abdul Kalam, the then President of India, 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 centers of the DLI.

4.4.2 National Mission for Manuscript Digitization

India has one of the oldest and largest collections of manuscripts in the world. These are in different languages and scripts, and written on materials such as birch bark, palm leaf, cloth, paper, etc. They are in libraries, museums, monasteries, and in the collections of individuals. A significant portion is not archaically preserved. Experts estimate that most palm leaf manuscripts will perish due to wear and tear over the next 50 to 100 years. The National Mission for Manuscripts has taken a significant step. The Department of Culture, and Ministry of Tourism and Culture, Government of India, launched the National Mission for Manuscripts in February 2003. The objectives of the mission are to facilitate conservation and preservation of manuscripts through training, awareness, and financial support, to document,
catalogue, and promote access to Indian manuscripts and to encourage scholarship and research. In addition, the Central Secretariat Library (CSL), in the Department of Culture, has undertaken the massive task of digitizing government document resources. Expected benefits are the creation of a National Directory of Custodial Institutions and Individuals and Subject Directories; a National Manuscript Library to provide central access; raising awareness of the rich intellectual heritage of India; providing policy inputs to conserve, preserve, digitized, improve access, and save manuscripts for posterity; creating interest among scholars and institutions to for training in traditional Indian languages and subjects; and improving accessibility to all the stakeholders (Fernandez, 2009).  

4.4.3 Traditional Knowledge Digital Library (TKDL)  

TKDL is a collaborative project of the National Institute of Science Communication and Information Resources (NISCAIR), the Council of Scientific and Industrial Research, the Ministry of Science & Technology and Department of AYUSH, and the Ministry of Health and Family Welfare, which this is being implemented at NISCAIR. An interdisciplinary team of Traditional Medicine (Ayurveda, Unani, Siddha & Yoga) experts, patent examiners, IT experts, scientists, and technical officers are involved in the creation of TKDL for Indian Systems of Medicine. The project documents the public domain traditional knowledge related to Ayurveda, Unani, and Siddha, in five international languages: English, German, French, Japanese, and Spanish. Traditional Knowledge Resource Classification (TKRC), an innovative structured classification system for systematic arrangement, dissemination, and retrieval has been developed for about 10,500 subgroups of a single International Patent Classification (IPC), i.e. AK61K35/78 for medicinal plants. TKDL is India's effort to protect its traditional medicine from foreign
pharmaceutical companies who might try to copyright such medicine. TDKL will serve not merely as a source of protection for intellectual property but also as a means by which its researchers can further study and document the scientific underpinnings of the medicines and remedies in the collection (Sreekumar, 2009)\(^{47}\).

### 4.4.4 Digital Library Initiative at 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 function 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 digitization. So far, 6,600 books in Indian and English languages have been scanned, with a total of over 25,000,000 pages (Rekha & Mahesh, 2008)\(^{48}\).

### 4.4.5 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 collections, and initiates research in labour history. The collection includes documents from different organizations and from labour movements, as well as personal accounts and memories of labour leaders and
workers. The archive uses Greenstone, an open-source digital library system, to integrate text, audio, and video.

4.4.6 Khuda Baksh Oriental Public Library

This library has a rich collection of manuscripts in Persian, Arabic, Urdu and other languages. The descriptive catalogue is available in a 30-volume set which appeared in 1923 and was reprinted in the 1970s. Print catalogues were converted to machine-readable form by NICNET, which has undertaken the digitization project. Some 400 thousand pages are now available. Documents are accessible as JPEG files. There is no retrieval mechanism for the text, since documents are treated as collection of image files. The catalogue is not searchable using a metadata scheme or any descriptors.

4.4.7 ETD and Institutional Repository

Theses and dissertations are the bedrock of graduate higher education. Thesis and dissertation guided by experts in a field and frequently funded by highly competitive scholarships and grants. Theses and dissertations are useful sources of secondary information, particularly in the humanities, where texts are important and ideas stay current longer. Most of these works languish in college and university libraries and archives. Electronically publishing of theses and dissertations brings this valuable material more prominence. An Institutional Repository (IR) is a digital archive of the intellectual output of a university. Theses and dissertations are one basic category of material for an IR.

4.4.8 National Chemical Laboratory

National Chemical Laboratory (NCL) is an interdisciplinary research centre focusing on polymer science, organic chemistry, catalysis, materials chemistry,
chemical engineering, biochemical sciences, and process development. It partners with industry, and some 400 graduate students are pursuing doctoral degrees. About 50 Ph.D. degrees are awarded each year. The institute has the second largest number of papers in chemical sciences, files the largest number of patents, both in India (60) and abroad (60) and produces the largest number of Ph.Ds in chemical sciences in India. The repository uses DSpace. There are currently 500 theses, project reports, and journal articles available.

4.4.9 National Institute of Oceanography

The digital repository of the National Institute of Oceanography collects and preserves institutional publications (journal articles, conference proceedings, technical reports, theses, dissertations, etc). Some of the completed and ongoing projects are.

- Marine boundary layer characteristics during a cyclonic storm over the Bay of Bengal
- Variation of wave directional spread parameters along the Indian coast
- Study of Goa and its environment from space: A report on coastal sand dune ecosystems of Goa: Significance, uses and anthropogenic impacts
- The coastal regulation zone of Goa: Oceanographic, environmental and societal perspectives
- Marine pollution detection through biomarkers in marine bivalves. These repositories use DSpace.

4.4.10 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.

4.4.11 National Institute of Technology, Calicut

"Nalanda" 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. Nalanda is accessible from anywhere on campus. The repository contains theses and dissertations, course materials, articles, and annual reports.

4.4.12 National Institute of Technology, Rourkela

Formerly known as Regional Engineering College (REC), this is one of the premier institutions for technical education in the country. NIT is a joint undertaking of Government of India and Government of Orissa. This Institutional Repository uses DSpace. At present around 343 documents are available in the repository.

4.5 Digital Library Initiatives in Karnataka

Historically, the first original preliminary effort of digital library initiatives in Karnataka was spearheaded by the Indian Institute of Science (IISc), Carnegie Mellon University (CMU), the International Institute of Information Technology, Hyderabad (IIITH), and many other academic, religious, and government organizations in India, a total of more than twenty "Content Creation Centers," have become partners in the Digital Library of India (DLI). 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 DLI is a leader in worldwide efforts to make knowledge free. A pilot project to scan some 10,000 books was initiated at CMU and then followed up at IISc, IIIT-H, and other organizations. All the processes involved have been perfected. 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 289,000 books have been scanned, of which nearly 170,000 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, and more than 149,000 books (43 million pages) are available on the DLI web site at the International Institute of Information Technology. The link to other partner sites is also provided through a commonly accessible website. Followed by few research institutes and R & D organizations started digital library initiatives and projects, and they are as follows (Poornima, Biradar & Goudar, 2006)49.

4.5.1 C-DAC Digital Library of Art Masterpieces

The Centre for Advanced Computing has developed this digital library. This is the first initiative of its kind in Asia and it will digitize 200 rare paintings of Rabindranath Tagore and Amrita Shergill from the National Gallery of Modern Arts (NGMA). The infrastructure to host this digital library is located at the C-DAC Bangalore. C-DAC and HP launched the joint initiative “When Art Meets
Technology” for digital preservation, restoration, and dissemination of art from the NGMA at Bangalore (Kataria, 2007) on February 4, 2003.

4.5.2 Indian Institute of Astrophysics

The Indian Institute of Astrophysics has its origins 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 (Tyler, 1998).

4.5.3 Raman Research Institute

The Raman Research Institute Digital Repository allows the Institute community to deposit pre-prints, 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.

4.5.4 Vidyanidhi Project

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 institutions, and other stakeholders. Vidyanidhi began as a pilot project in 2000 with governmental support, 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 (Matha & Sarah, 2004)\textsuperscript{52}.

4.5.5 Indian Institute of Science, 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 (Rao, 2005)\textsuperscript{53}.

4.5.6 Librarians Digital Library, DRTC, Bangalore

This LDL has been developed by Documentation Research & Training Centre (DRTC), and contains full-text of papers/articles related to Indian librarianship. Presently, it contains full-text papers submitted in DRTC seminars, papers submitted by LIS professionals, and theses/dissertations of students.

4.6 Summary

It can be observed from the above discussed issues that digital library initiatives in India are still at a nascent stage of development, with the initiation of the Internet and World Wide Web, digital library development in India encounters new challenges. In India began with the goal of preservation of art, culture and heritage of the country. The digital environment in the Indian context is a new concept that became a reality through projects funded by the government, the examples of initiatives given in this chapter reflects a cross section of the DL initiatives in India. The policies framed by the government shows the commitment of the government of India to providing information to users in digital form, and that the responsibility of
envisioning, developing and sustaining functional hybrid and virtual library and information systems and services rests on the library and information professions. The successful implementation of the INDEST Consortia in IITs, RECs and IIMs shows the progress of Indian digital library initiatives. The CSIR e-journals consortia also show the benefits of DL initiatives. From the examples of DL initiatives in India and research institutes and R & D organizations of Karnataka, it can be said that there are a few projects that can develop into examples for others to follow and there is negotiable growth in the digital libraries and its services which are offered to user community.
REFERENCES


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