CHAPTER – III
DIGITAL LIBRARY INITIATIVES - INTERNATIONAL PERSPECTIVE

3.0 Introduction

Digital library initiatives at international national level are discussed in this chapter. In this context it is also desired to find out what are digital library initiatives and projects undertaken, what are its importance, whether they have completed the project or not and other related information are discussed here.

3.1 Impact of ICT on Libraries

The introduction of Online Public Access Catalog (OPAC) and later web OPAC was a proven fact that ICT had been vital in the development of digital libraries. According to Law (2006)\(^1\) Information Technology (IT) had been growing at an explosive rate and the location and provision of information services had dramatically changed over the last 10 years (Chen, 2005)\(^2\). Information resources were now available online via digital libraries representing a new form of information technology in which content management, service delivery and social impact matter as much as technological advancement (Patra, 2006)\(^3\). The impact of technology had been so great that the most important element encompassing digital libraries had been the provision of global access, as Jaswal (2006)\(^4\) said library pays for access but none became owner of the content.

With ICT, data was available globally through communication networks while facilitating searches with speed (Sharma & Vishwanathan, 2001)\(^5\). Digitization and its derivatives the Internet and hypertext, propelled information access and exchange into
the era of cyberspace, the cyber library or ‘cybrary’ i.e., an electronic gateway for clients located anywhere to access information located everywhere (Kapitzke, 2001)⁶. Digital information could be represented as digital text, image, audio, video (Patra, 2006)⁷, and thus reducing the need for physical space; allowed concurrent use and provided access to materials that they do not own, presupposed the absence of human intermediaries or disintermediation, allowing better retrieval facilities, besides able to handle multilingual information resources (Chowdhury & Chowdhury, 2003)⁸. Digital library conjures up an image of a paperless, networked and ultimately limitless information heaven, bound by neither place nor time and available to all at the click of a mouse (McGuiness, 2000)⁹. However Gorman (2000)¹⁰ cautioned librarians not to be overwhelmed with digital technologies to the extent that the unique librarians' skills bibliographic control, collection development and reference work – would not apply any longer.

Digital libraries of the 21st century could be searched and their contents transmitted around the world (Crane, 2006)¹¹, comprising online services, multidisciplinary and multimedia collections, decentralized and distributed information resources, networked environment and information was available globally within seconds. One of the great boons of the web was the online availability of the treasures of the world’s libraries and museums, as exemplified by Australia’s Treasures from the World’s Great Libraries (Maxwell, 2004)¹² where collections located in 24 countries were accessible. UNESCO recognized that digital libraries were radically reforming how information was acquired and disseminated (Witten, 2005)¹³.
The library of the future was where all texts could be summoned, assembled and read not only on a computer screen, but a Personal Digital Assistant (PDA) had also enabled reading e-books through a screen (Louis, 2002)\textsuperscript{14}. Arms (2002)\textsuperscript{15} stressed that a digital library was where the information was stored in digital formats and accessible over a network. It was the outcome of digitization process (Deegan & Tanner, 2002)\textsuperscript{16}, associated with the concept of virtual reality and described as, the ultimate multimedia experience or “e-presence” (Barker, 1994)\textsuperscript{17}. Digital library was an information system that offers a coherent view of organized, selected and managed body of information (Lynch, 2003)\textsuperscript{18} and Chen (2005)\textsuperscript{19} that it was electronically accessible.

The development of digital library saw the information profession becoming more open and in a digital world should be concerned mainly with resource discovery, resource provision, and resource delivery. They would now be knowledge preserver by ensuring that digital preservation a success (Deegan & Tanner, 2002)\textsuperscript{20}, should be information architects (Veen, 2001)\textsuperscript{21} and libraries acting as gateways (Kochtanek & Hein, 1999)\textsuperscript{22}. Increasingly, information was likely to come from Servers at publishers, societies and bigger libraries (Lesk, 2004)\textsuperscript{23} and some libraries had already undertaken large scale organizational reconfigurations to meet the challenges of the digital environment (Cuesta, 2005)\textsuperscript{24}.

3.2 Digital Library: Concept, Meaning and Definition

The design of trouble-free, finger-tip access to information what we conceptualize as digital libraries today began with Memex machine and have continued to evolve with each advance in information technology. With the arrival of computers, the concept centered on large bibliographic databases, the now familiar
online retrieval and public access systems that are part of any contemporary library. When computers were connected into large networks forming the Internet, the concept evolved again, and research turned to creating libraries of digital information that could be accessed by anyone from anywhere in the world. Phrases like "virtual library", "electronic library", "library without walls" and most recently "digital library" all have been used interchangeably to describe this broad concept (ACRL, 1996) 25.

What is a digital library? There is much uncertainty surrounding this phrase, stemming from three factors. First, the library community has used several different phrases over the years to denote this concept-electronic library, virtual library, library without walls and it never was quite clear what each of these different phrases meant. "Digital library" is simply the most current and most widely accepted term and is now used almost exclusively at online, and in the literature.

A new feature addition to the confusion is that digital libraries are at the central point of many different areas of research, and what constitutes a digital library differs depending upon the research community that is describing it (Jeevan, 2004) 26 For instance.

- As of an information retrieval viewpoint, it is a large database
- Intended for people who work on hypertext technology, it is one particular application of hypertext methods
- For those working in wide-area of information delivery, it is an application of the WWW, and
- For library and information science, it is another step in the continuing automation of libraries that began over 25 years ago.
What is the effective explanation of “Virtual Library” or “Electronic Library” or "Digital Library" which create sense to librarians? At this point, one should believe that digital libraries are libraries with the identical purposes, functions, and goals as traditional libraries are, collection development and management, subject analysis, index creation, provision of access, reference work and preservation, to develop and organize collections and to help users find information. The digital resources are accumulated on the Servers located at distant places and they include e-journals, bibliographic and full text databases, e-books and so on, which may be shown in the digital collection. The users can access the resources simultaneously at a time or at different times. Many users may therefore use the digital resources available at one site at the same time without any problems over the Internet through Dial Up, Digital Subscriber Line (DSL), Lease Line or Very-small-aperture terminal (VSAT) connectivity (Noerr, 2000).27

More than once, many specialists have forwarded various definitions of digital libraries and still more continue to emerge each day. A digital library characteristically occupies less space; require less manpower to run and manage therefore it is very much cost effective.

The University of Central England defined a digital library as a system that provides a means of integrating digitized text, image, audio and video resources, delivered across a networked to authorized users wherever they were located, whenever they needed them (Dodd & Andrews, 2004)\textsuperscript{32}. The National Science, Technology, Engineering, and Mathematics, USA defined a digital library as a managed environment of multimedia materials in digital form, designed for the benefits of its user population, structured to facilitate access to its contents, and equipped with aids to navigate the global network, with users and holdings totally distributed but managed as a coherent whole (Mischo, 2004)\textsuperscript{33}. Meanwhile, the Digital Library Federation (DLF) proposed this definition: “Digital Libraries were organizations that provided the resources, including the special staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they were readily and economically available for use by a defined community” (Greenstein, 2000)\textsuperscript{34}.

According to Association of Research Libraries (ARL) ARL, the digital library was not a single entity as it requires technology to link the resources of many (technology driven) and universal access to a digital library and information services was the goal and that digital library collections were not limited to document surrogates as they extend to digital artifacts that could not be represented or distributed in printed formats (Borgman, 2000)\textsuperscript{35}. Deegan and Tanner (2002)\textsuperscript{36} on the other hand defined it as a managed collection of digital objects, created according to the principles of collection development, made available in a cohesive manner and allowed user to retrieve just as they would any other library materials.
The Joint Conference on Digital Libraries (JCDL, 2007)\textsuperscript{37} encompasses the many meanings of the term including new forms of information institutions; operational information systems with all types of digital content; new means of selecting, collecting, organizing, retrieving and distributing digital content; digital preservation and archiving; and theoretical models of information media, including document genres and electronic publishing.

Definitions that users readily understood were too broad and imprecise, and definitions with more technical precision quickly grew too obscure for common use (Seadle & Greifeneder, 2007)\textsuperscript{38}. Borgman (2000)\textsuperscript{39} believed that one reason for the confusion was that research and practice in digital libraries were being conducted concurrently at each stage of the continuum from basic research to implementation. The differences could be due to the fact that digital libraries had been defined differently by computer scientists and the information professionals (Chowdhury & Chowdhury, 2003)\textsuperscript{40}.

The term digital library was widespread in USA, and although electronic library was more often used in the United Kingdom, digital library was becoming increasingly common (Secker, 2004)\textsuperscript{41}. Despite the differences in definitions and terminologies, the extensive research and rapid developments in many parts of the world were manifestations that digital libraries were gaining wide acceptance and the importance of which could not be disputed.

3.3 Evolution of Digital Libraries: Some Landmarks

One of the early attempts towards digital library development Ohio Computer Library Center’s WorldCAT (Deegan & Tanner, 2002)\textsuperscript{42}, a Union Catalogue of more than 1 billion items (Hickey & O’Neill, 2005)\textsuperscript{43}. Others were Project Gutenberg 1971
at the University of Illinois, Perseus, a large hypertext collection of materials on the ancient Greek world (Chowdhury & Chowdhury, 2003)\textsuperscript{44} and the 1970’s full-text document databases, supported by software called STAIRS (Cathro, 1999)\textsuperscript{45}. Most of these early attempts involved the digitization of journal articles, such as the pre-digital Mercury Electronic Library project (1989-1992) at Carnegie-Melon University and OCLC (Tedd & Large, 2005)\textsuperscript{46}, The University Licensing Project (TULIP) 1993-1995 by Elsevier Science (Hickey, 2004)\textsuperscript{47}, Chemistry Online Retrieval Experiment (CORE) a project involving OCLC, Cornell University, Bellcore and the American Chemical Society. The American Abstract Service on the other hand had successfully digitized 400,000 pages from chemistry journals published by the American Chemical Society (Tedd & Large, 2005)\textsuperscript{48}.

In 1980, the initial convenient processor and end-user software were introduced. The compact disc, the CD-ROM and locally loaded databases appeared in the mid-1980s. At this stage, it was possible to store and retrieve images also. Tim Berners-Lee, the inventor of the World Wide Web, in 1990 wrote a paper proposing a global, cross-platform, distributed, interactive, hypertext information interchange system. At the same time, he proposed Hypertext Markup Language (HTML), a language that describes the structure of documents, which can be used in such a global information system (Ghosh, 2000)\textsuperscript{49}.

In 1993, the National Center for Supercomputing Applications (NCSA) introduced the ‘Mosaic’ browser to libraries. In the United States of America, the Library of Congress announced plans to create a National Digital Library, and the National Science Foundation (NSF) along with the National Aeronautics and Space Administration (NASA) and the Defense Advanced Research Projects Agency
(DARPA) announced plans to support the Digital Libraries Initiative, a research effort involving several universities collaborating in studying digital libraries (Kara, 2004).50

The important projects that led the path towards the Digital Library movement are the MU, MERCURY project; the TULIP project and ENVISION. The next generation of the DL projects emerged in the Web environment, under the Digital Library Initiatives and contributed significantly towards the developments in the area. Apart from the projects that directly took off under the DLI worth mentioning are other projects that are significant in terms of the collections, techniques and architecture (Arms, 1995).51

The NSF funded the Networked Computer Science Technical Research Library (NCSTRL) (http://www.ncstrl.org/); a digital repository of technical reports is a digital library of computer science research reports floated by the Cornell University and Xerox Corporation. The technical foundation of NCSTRL, is Dienst, a protocol and architecture for distributed digital libraries that later developed as part of the DARPA-funded Computer Science Technical Reports Project (CSTR) (Cleveland, 1998).52

The next significant technology that revolutionized DL architecture is Open Archive Initiative (OAI) that ushered in simple and distributed model for exchange of records. The Networked Digital Library of Theses and Dissertation (NDLTD) emerged in September 1996 when Virginia Tech was awarded a grant from the US Department of Education (7). NDLTD project has international members from over a dozen countries sharing electronic theses and dissertations. Eventually this will
become one of the world’s largest digital libraries, with the potential of 200,000 multilingual hypermedia works being added each year (Thornton, 2000)\textsuperscript{53}.

Further to the above projects, integrating the technologies and research base that emerged as a result of nearly two decades under the Digital library Initiative Phase I and Phase II, NSF initiated the National Science, Mathematics, Engineering and Technology (SMET) Education Digital Library (NSDL) (www.nsdl.org/) for the benefit of educators. A project of significant importance and magnitude, NSDL is projected to have a great impact in education with the objective of facilitating enhanced communication between educators and learners. The basic objective of NSDL is to catalyze and support continual improvements in the quality of Science, Mathematics, Engineering and Technology education (Madalli, 2004)\textsuperscript{54}.

3.4 Importance of Digital Libraries

Information professionals appreciated service enhancement, bigger collections, wider accessibility, reduced storage costs and more powerful retrieval capabilities (Tedd & Large, 2005)\textsuperscript{55}. It could be linked to a whole Web of other contents via the Internet (Hughes, 2004)\textsuperscript{56}, supporting distance education initiatives and benefits as equitable access, reduced barriers of distance, timeliness, shared resources and content delivery (Kranich, 1999)\textsuperscript{57}. Global resource sharing and democratization of information had been greatly enhanced, with wider user based and helped solved the problem of library limited physical space. Digital libraries helped to preserve rare and fragile objects (Lesk, 1997)\textsuperscript{58}. As an example the British Library (http://www.bl.uk/onlinegallery) that holds the only medieval manuscript of Beowulf in London put up the images for anyone to peruse (Secker, 2004)\textsuperscript{59}. 

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National Diet Library, Tokyo (http://www.ndl.go.jp/en/data/endl/html) digitized woodblock prints, scrolls it considered national treasures. National Palace Digital Museum of Taiwan’s collection was enamels from the Ming and Ch’ing dynasties, the famous Leaves of the Sung Dynasty and Buddhists scriptures (Hsueh-hua, 2006)\textsuperscript{60}. With digital library, people might cherish the value and beauty of culture more than ever (Ke & Hwang, 2000)\textsuperscript{61} and making older and rarer document available to a wider audience (Raitt, 1999)\textsuperscript{62}. The conversion of cultural contents opened up new dimension of reaching traditional and new audiences by providing access to cultural heritage in ways unimaginable a decade ago (Mulrenin & Geser, 2001)\textsuperscript{63}. With digital libraries, virtual reunification i.e. allowing dispersed collection to be accessed from a single entity was viable (Deegan & Tanner, 2002)\textsuperscript{64}. Libraries were set to metamorphose into ‘libratories’, an imaginary word to express their combined functions of library, repository and collaboratory (Waaijers, 2005)\textsuperscript{65}.

### 3.5 Types of Digital Libraries

Digital libraries can be grouped in the following ways

- Digital libraries developed in USA as part of Digital Library Initiatives (DLI-1 and DLI-2).

- Digital libraries developed in the course of Electronic Libraries (eLib) Programme in UK.

- Digital libraries built by Individual Institutions.

- Digital libraries that are part of National Libraries.

- Digital libraries that are part of universities, or by period, or by country of their origin.
3.6 Digital Libraries Initiatives: an Overview

Digital Library Initiatives (DLIs) was the result of a community-based process which began in the late 1980s (Griffin, 1998)\(^66\). The early digital library project and the Digital library initiative generated interest in the area by several projects were undertaken in different countries of the world with different approaches. In USA under the digital library initiatives importance was given to research leading to several breakthroughs in digital library architectures, models and tools. Most digital library projects in other countries defined it as an extension of traditional library collection building in the electronic form and providing services (Petrushin, 2007)\(^67\).

The formal projects of digital library under the Digital Library Initiative (DLI) Phase I (http://www.dli2.nsf.gov/dlione/), started in 1994 as a joint initiative of the National Science Foundation (NSF), Defense Advanced Research Projects Agency (DARPA), and the National Aeronautics and Space Administration (NASA), for a period of four years from 1994 to 1998. The intent in the first phase was to concentrate on the investigation and development of underlying technologies for digital libraries. The Initiative targeted research on information storage, searching and access (Madalli, 2004)\(^68\). The goals for the phase were set as developing the technologies related to:

- Capturing, categorizing and organizing information
- Searching, browsing, filtering, summarizing and visualization
- Networking protocols and standards

The major six projects undertaken in the DLI (1994-1998) are the following:

- University of California at Berkeley: Environmental Planning Library and Geographic Information Systems.
University of California at Santa Barbara: Alexandria Digital Library project; Spatially- referenced Map Information.

Carnegie Mellon University Project: Info media Digital Video Library

University of Illinois at Urbana-Champaign: Federating Repositories of Scientific Literature.

University of Michigan DL Project: Intelligent Agents for Information Location.

Stanford University Interoperation Mechanisms among Heterogeneous Services.

DLI brought focus and directions to the developments in the Digital libraries arena. Various architectures, models and practices emerged and precipitated further research in the area. The National Science Foundation (NSF) announced the Digital Libraries Initiative Phase II in February 1998. In addition to the NSF, the Library of Congress, the Defense Advanced Research Projects Agency (DARPA), the National Library of Medicine (NLM), the National Aeronautics and Space Administration (NASA) and the National Endowment for the Humanities (NEH) are sponsoring the DLI-II. If intent in the first phase was to concentrate on the investigation and development of underlying technologies, the Phase-II (1999-2004) is intended to look more at applying those technologies and others in real life library situations. Second phase aim at intensive study of the architecture and usability issues of digital libraries including the vigorous research on: a) Human centered DL architecture b) Content and Collections-based DL architecture and c) Systems centered DL architecture.
3.7. Digital Libraries Initiatives at International levels

What follows next were glimpses of some of the digital library initiatives in eight countries worldwide: Australia, Canada, China, New Zealand, Singapore, Taiwan, United Kingdom and Unites States. Australia was noted for having developed many digital library initiatives. Canada had manifested a good collaboration between libraries, archives and museums. New Zealand is well known for its Greenstone digital library software. The United Kingdom and the United States were among the pioneers, trend setter and main digital library players. Liu (2005) supported this when he said generally speaking all over the world the pioneering digital library initiatives took place in the United States. And according to Andrews and Law the projects undertaken under the auspices of the United Kingdom and the United States had a fundamental impact on the development of digital libraries we saw today.

3.7.1 AUSTRALIA

Australian libraries at the federal, state and university levels, together with commercial and research organizations were supporting diverse set of digital library projects. Over the past ten years, it had seen steady growth in research and development in digital library initiatives (Hunter, 2006). Many notable digital library initiatives had been successful, some of which were spearheaded by the National Library of Australia as early as 1996.

The National Library of Australia’s digital library initiatives were done under five strategies.

1. PANDORA (Preserving and Accessing Networked Documentary Resources of Australia) was the national role model, based on an archive management
system called PANDAS (Pandora Digital Archiving System), where the State Library of Victoria, State Library of South Australia, Library and Information Service of Western Australia and Screen Sound Australia were full partners (http://pandora.nla.gov.au).

2. Second was the digitization program.

3. Providing digital access to the library’s collection through various projects, such as Rare Maps, Digitization of Oral History Audio Recordings, Endeavor, Captain Cook’s Journal 1768-71 and Papers of Sir Edmund Barton.

4. Federated Resource Discovery where the Picture Australian project had been initiated.

5. Fifth was facilitating a greater understanding of digital library issues,

Preserving Access to Digital Information (PADI), the National Library of Australia was developing a single source of current national and international information covering all issues in relation to the preservation of digital information (http://www.nla.gov.au/padi). Australian universities had been active in digitizing efforts and four of West Australian universities;

- Edith Cowan, Murdoch, Curtin and University of Western Australia combined to establish the Indian Ocean Rim Virtual Library Project (http://www.cowan.edu.au/library/iorr/home.htm).

- Sydney University had developed the Scholarly Electronic Text and Image Service (SETIS), a digital library of humanities databases and theses (Chowdhury & Chowdhury, 2003)\(^1\).
Electronic Reserve Project was the virtual library for Monash University Library’s new branch on the Berwick campus (http://www.lib.monash.edu.au/wwwlib/).

REDD – an Electronic Document Delivery Project, developed by the University of Queensland, Queensland University of Technology and Griffith University Libraries had been used by staff and students of eight institutions (http://lib83.library.uq.oz.au/).

Seven institutions led by University of New South Wales on the other hand began collaborating in 1998/99 to accept electronic theses as part of the Australian Digital Theses Project (http://adt.caul.edu.au/), leading to a national program under the auspices of the National Library of Australia (Fox, 2004)\textsuperscript{72}. Adelaide University Electronic Texts Collection consisted of more than 700 e-texts that included classic works of literature. Australian National University E-Print Repository had over 2460 items as of May 2005. Australian e-Humanities Gateway, a collaborative effort between ARC, University of Sydney, Australian Academy of the Humanities and University of Newcastle presented the best portal for digital resources in humanities disciplines in Australia. Curtin University of Technology Institutional Repository had 260 items pertaining to research done by their staff and post graduate students. Set up in 2002, eprints@UQ was the University of Queensland digital repository, covering materials created sinMonash University ePrint Repository showcased and archives quality research output of the university staff. As of May 2005, it held 122 e-prints covering the period 1996-2004 (http://www.e-book.com.au/freebooks.htm#1)

Project Gutenberg of Australia produced e-books and made them freely available online. It was interesting to note that some of the e-books available here
might still be under copyright in the United States. One of the recent digital library project was PILIN (Persistent Identifier Linking Infrastructure), funded from 2006-2008 to strengthen Australia’s ability to use global persistent identifier infrastructure particularly in the repository domain (Nicholas, Ward & Blinco, 2009). Australian public libraries through the Council Libraries were moving ahead with Sydney’s first drive-through library, operational in September 2000, offering online reservations and drop off books (D’Costa, 2000). Cyber libraries and a 24-hour ordering system had been designed to cater for online services and many councils had started an integrated virtual library system. To monitor the country’s digital library initiatives, a website Australian Libraries Gateway: Australian Digitization Projects, containing information about its digitization initiatives (http://www.nla.gov.au/libraries/digitisation) was maintained. The latest development that related to digital books as reported in the newspaper recently was that digital books would be available for purchase over the counter at bookstores from the first half of 2010 via participating bookstores, using new technology designed for Australian publishers (The West Australian, October 19, 2009, p.14).

It could be said that Australia had been aggressive in its digital library initiatives. Collaboratively, the key player’s federal and state governments, state councils, the National Library of Australia, university libraries, commercial and research organizations had played huge roles. Free digital libraries were developed with the best strategies, supported by monitoring system, availability of financial support, developing role model and the creation of a single information center on the preservation of digital information. Many university libraries had developed repositories and persistent identifier linking infrastructure, enabling Australia to be the role model for other countries to follow suit.
3.7.2 CANADA

Canada’s early attempt towards digital library development could be traced back in 1993–1994 when a national working group developed Canadian Information Resource Sharing Strategy (CIRSS). The National Library of Canada, now known as Library and Archives Canada had worked in partnership with the Canadian community for many years to develop and implement a technical, service and policy infrastructure for resource sharing at national level, involving several task forces; The Canada Task Force on Digitization, Government Online Task Force and Digital Library Task Force (http://www.nlc-bnc.ca/cidl/cidle.html).

The Canadian Initiative on Digital Libraries (CIDL) with a membership of more than 50 Canadian libraries of all types, promoted, coordinated and facilitated the development of Canadian digital collections and services in order to optimize national interoperability and long-term access to Canadian digital library resources. Began in 2000 as of October 2005, the inventory contained 309 projects from 360 Canadian organizations. Libraries represented 49%, archives 25%, museums 9%, galleries, publishers and associations made up the balance. CIDL had worked on several projects with University of Calgary Press, mostly related to publish Canadian local histories. One of the Heritage Digitization Project, the most successful endeavors was Our Future, Our Past: the Alberta (http://www.ourfutureourpast.ca) (Tedd & Large, 2005). Canada’s central approach towards digitization was through digital production centers and had emphasized on digitizing Canada’s heritage. Early Canadian Online was now produced by Canadiana.org, partnering with Ancestry.ca brought out nearly 300 years of early Canadian historical documents online. It was also leading in the Our Root Project 2006 and intended to digitize 150,000 pages of Marcotte Directories of Quebec.
The Southern Alberta Information Resources Project (SAIR), 2003 – 2006, that was a (http://www.sadl.uleth.ca/gsdl/cgi-bin/library?a=p&p=about&c=SAIR) slip step to develop Alberta Digital Library and to preserve Alberta’s past and more importantly, its present for future generations to study and appreciate (Crewdson, 2006). The Lois Hole Campus Alberta Digital Library had won the 2008 Canadian Association of College and University Libraries Innovation Achievement Award due to its truly innovative concept that had pushed consortia activity to a new level and might in fact serve as a model of collaboration for other provinces (http://www.lheadl.ca/). OCLC Canada was working with the Manitoba Library Consortium to digitize over 122,000 pages of historically significant newspapers and atlas, books and historic maps. It began in 2004, in partnership with Canadian Heritage via the Canadian Culture Online Program to the Manitoba Library Consortium.

Canadian universities such as, The University of Alberta Libraries Personal Digital Assistant Service began in was integrating services and resources into library collections (Koufogiannakis, Ryan & Dahl, 2004). University of Waterloo Electronic Theses Project aimed to build an ETD submission and access system provided unrestricted web access to a growing number of university’s theses and dissertations. Although facing some IPR and copyright issues and problems, the databases provided open access to more than 500 ETDs (Jewell, Oldfield and Reeves, 2006). The Canadian Association of Research Libraries began an institutional repository project in 2003, representing 27 university libraries in Canada plus CISTI, the Library of Parliament and Library and Archives Canada. Based on open access, the number of working repositories had grown from 4 in 2004 to 9 in 2005 (Shearer, 2006).
The Federal Science’s eLibrary was an initiative supported by the Strategic Alliance of Federal Science and Technology Libraries to provide access to information at the desktop for 22,000 Canadian federal scientists, policy analysts and decision makers and had provided access to e-journals at their desktops (Brown, Found & McConnel, 2007). Toronto Public Library (TPL), started the Virtual Reference Librarian, made possible through the collaborative efforts of TPL and other government and public organizations. The TPL lends over 25m items and answered 8m reference questions a year (http://vrl.torontopubliclibrary.ca/vrl.portal).

The website of Library and Archive Canada: Inventory of Canadian Digital Initiatives (http://www.collectionscanada.ca/initiatives/index-e.html) gives a glimpse of all the DL initiatives that were in the pipeline. The key factors of digital library growth in Canada had been the involvement of the Canadian community, universities and the national working group-the digital library task forces, innovative consortia efforts, digital production centers, monitoring system, well organized repository projects and implementing service and policy infrastructure.

3.7.3 CHINA

China’s digital library program started off with research projects, embedded within the National High Technology Research and Development Program, launched in 1986, managed by the Ministry of Science and Technology. Some of these were Strategic Research on the Development of Chinese Digital Libraries, Research on Characteristics-based Multimedia Information Retrieval System, Knowledge Network Digital Library System Project, and Chinese Digital Library Application System (Liu, 2004).
The Chinese Pilot Digital Library project, undertaken by nine public libraries and the National Central Library, with the aim to set up multimedia repositories, provided digital information services and developed e-commerce in 1996. Completed in 2001 and became the first digital library project in China and the first to give a solution to issues in developing digital libraries in the country. The National Central Library then launched in 1998 its www-based “Remote Electronic Access / Delivery of Document Services” or READnel enabling users to retrieve information via the Internet. (http://readopac.ncl.edu.tw/eindex.html) READ comprised more than 9 systems with over 1.5 million entries and 5 million pages of text images and linked to over 22,000 articles via the internet.

In 2002 another collaborative project was proposed to the Ministry of Science and Technology. Called Project Establishment of Standard and Specifications for Digital Library Construction (ESSDLC), it was done with the National Science and Technology Library, National Central Library, China Academic Library and Information System (CALIS), and Beijing University Library, with the main goal to generate a series of national standards and specifications for the construction of digital library in China and one of these was the Chinese Metadata Standard produced in 2002 (Long & Ling, 2000).82

China had since developed many digital libraries in different fields. China National Knowledge Infrastructure launched in June 2000 consists of China Periodical Network and China Major Newspaper’s full text data bases created by Qinghua University. Tsinghua University Central Library had worked jointly with China Research Laboratory and Yingzaoxueshe, a Chinese Institute to design and developed Tsinghua University Architecture Digital Library and it was the first
internet based full function digital library system in China (http://www.lib.tsinghua.edu.cn/english/). The digital library of the Chinese National Historical Maps was a joint research project between National Central Library and Fudan University, and completed the national and regional geographical and historical information of the Qing and Ming Dynasties. (http://www.fudan.edu.cn/englishnew/library/digital.html).

China’s success of digital library research and development programs is through collaborative efforts of the national library, public and academic libraries and government ministries. The emphasis was on to build a series of national digital library standards and specifications for the construction of digital library and also for document delivery service. The strength of the digital library consortium saw the creation of a national platform to enhance digital repositories, digital library software and hardware, and training. The success of China’s digital library initiatives was manifested by the international collaboration it had with the United States through the China-US Million Book Project, with Carnegie Mellon University collaborating with a dozen of other Chinese universities.

3.7.4 NEW ZEALAND

The New Zealand Digital Library project, a research program at the Department of Computer Science, University of Waikato developed in collaboration with UNESCO, Greenstone Digital Library Software (GSDL) (Bainbridge, 2003)\(^3\). As illustrated by Witten (2005)\(^4\) GSDL was in widespread use in many countries of the world and as of 2006, there were 28 sites using it (http://www.greenstone.org). New Zealand has thus contributed tremendously to world’s digital library development through the Greenstone Digital Library software.
New Zealand digital library project had done a considerable amount of digitization works specifically to preserve the Maori culture. National Library of New Zealand had developed Papers Past web site containing 300,000 pages from the Alexander Turnbull Library, providing an insight into the social, political and economic happenings in the 19th century New Zealand (http://paperspast.natlib.govt.nz/). In June 2001, the Rangiatea Website was launched, featuring Church vestry – the oldest Maori Church that had been destroyed by fire in 1995, Te Papa Tongarewa & the Niupepa Collection (Chern, 2005)\(^8\). The website was an expression of partnership between the National Library of New Zealand and the wealth of the Maori cultural heritage (http://rangiatea.natlib.govt.nz/).

Living Heritage Project, integrated with the classroom curriculum, was done in collaboration with 20/20 Communications Trust, to encourage schools to discover, research and record a treasure in their community, so that New Zealand’s heritage was captured and preserved online (www.livingheritage.org.nz). In November 2005 the New Zealand National Library Te Puna Mātauranga o Aotearoa became the Sun Centre of Excellence for Digital Futures. This achievement made two important landmarks. Firstly, the New Zealand National Library was the first New Zealand organization to be named a Sun Centre of Excellence. Secondly, it was the first non-tertiary organization to achieve recognition in this way (Reid, 2006)\(^8\).

The New Zealand National Library collaborated with British Library in developing the Web Curator Tool for managing web archives (Paynter, 2008)\(^7\) to closely monitor the country’s digital library initiatives web site The New Zealand Register of Digitization Initiatives (RoDI), containing basic information about digitization initiatives in New Zealand and related topics (http://ndf.natlib.govt.nz/
register/register.htm). Archives New Zealand on the other hand was planning to undertake New Zealand’s Digital Continuity Action Plan, first of its kind in the world, initiated to prevent public records being lost and to ensure that today’s information would be available tomorrow (Clarke, 2009)\(^8\).

### 3.7.5 SINGAPORE

In retrospect, Singapore’s digital library development was spearheaded by the Library 2000 Committee, comprising of librarians as well as the Singapore National Computer Board, to establish Singapore as an international information hub. The plan included a detailed rework of 500 libraries and information centers that would enable access to information from anywhere, at any time, within the next 20 years (Reid, 1996)\(^9\). In 1999 i-Gateway to Educational and Media Services, (iGEMS) an Internet-based university portal was launched giving a number of digital library services to Nanyang Technological University (Chowdhury & Chowdhury, 2003)\(^9\).

Singapore–ONE Project, the initial digital library program, unveiled by the Ministry of Communications in 1997 might be considered as the ultimate attempt to connect all Singaporeans on one network. As part of the IT 2000 Master plan, the key elements among others was the building of world class National Information Infrastructure, aiming at providing a world-class library system. The concept of e-citizen and e-government became a reality. In May 2000 e-library was launched, believed to be Asia’s first fully electronic library, offered through “e-station”, a commercial online educational and an electronic edutainment center located in Suntec City, offerings an online e-book library that offers 16,000 titles through a tie-up with US-based net-library Incorporation, TiARA, the Vegas (Virtual Exhibition Gallery System) digital image databases and InfoXpress, a database on Singapore’s history
and culture (Quek, 2000)\textsuperscript{91} (Wee, 2000)\textsuperscript{92}. Subsequently in April 2002, the eLibrary Hub service was launched as part of the National Library Board’s Digital Library system, in collaboration with Shanghai Library in China that included document delivery services, a Chinese-English translation service and specialized libraries of digital sources were being developed for niche markets (Tedd & Large, 2005)\textsuperscript{93}. eLibrary Hub contained some 13,000 e-journals and online databases, 10,000 e-books and more than 700 CD-ROM and 900 video-on-demand titles. China Reserve Library was launched at the end of 2002 (Theng, 2005)\textsuperscript{94}.

Singapore’s digital initiatives success was marked by the strategic collaboration between the National Library Board, the National Computer Board, Library 2000 Committee and the Ministry of Communications. The well-developed public libraries and the presence of the National Information Technology master plan together with the library national plans, and the national information infrastructure and broadband, had resulted in Singapore being a connected island and had accelerated the concept of e-government and e-citizen and in making it as an international information hub. It successfully ventured in digital library collaboration with China.

\textbf{3.7.6 TAIWAN}

Taiwan’s early digital library initiatives could be traced back in 1997 when National Taiwan University initiated a metadata research project ROSS (http://lis.ntu.edu.tw) to study the existing metadata format in relating to databases and system framework (Chen & Chen, 2001)\textsuperscript{95}. Several projects that had been completed were related to the digitization of Taiwanese cultural heritage; establishment of domestic research digital libraries; provision of foreign research
digital libraries and integration of conventional and digital libraries. Taiwan digital library initiatives were more concerned with their rich ancient cultural heritage and among the major institutions that were digitizing their collections were the National Palace Museum, National Central Library, National Taiwan University and Academic Sinica (http://www.ndao.org.tw). For the preservation of Chinese and Taiwanese culture, the National Palace Digital Museums was known for its splendid collection of Chinese treasures and civilization such as the enamels from the Ming and Ching dynasties, the famous Album Leaves of the Sung Dynasty and Buddhist scriptures. It had gathered 400 volumes of Chinese scriptures and 154 leaves of Manchurian and Tibetan sutras since the Sung Dynasty (http://buddhism.lib.ntu.edu.tw/BLM)

The National Science Council Digital Museum was an inter-organizational program for establishing digital museums with Taiwanese and Chinese cultural content, supported by the National Science Council of the Taiwan government. The project witnessed interdisciplinary cooperation because the theme-based project necessitates that each theme project should at least consist of subject experts of the theme project’s content, computer and multimedia technologist and scientists of library and information organization.

Digital library in Taiwan said to be hybrid in nature. Services were integrated between the traditional and web-based services, encouraging patron’s resource discovery in a diversity of formats. E-Inter Library Loan in Taiwan was quite developed, in a hybrid library, inter library loan and document delivery service, played an important role (Ke & Hwang, 2000)96.

In Taiwan, the efforts of two governmental information centers – Science and Technology Information Center and the National Central Library, together with
CONCERT (Consortium on Core Electronic Resources in Taiwan) had paved the way for aggressive national digital library development. The year 2002 saw the birth of E-Taiwan Project by National Information and Communication Initiative, part of the Challenge 2008, the 6 year National Development Plan at a cost of NT$36.63 billion (Chiu, 2002)\(^{97}\) that included the National Digital Archives Program, the outputs of which were collected into Taiwan’s Digital Archives. The E-Taiwan Project was further supported by the M-Taiwan Project, an attempt to expand wireless networks, integration of mobile phone networks, setting up of optical-fiber backbones and the execution of the Integrated Beyond 3rd Generation (iB3G) Double Network Integration Plan (Chen, 2006)\(^{98}\).

Taiwan’s digital library initiative was part of the national development plan and was initially triggered by a university’s metadata project. It had since been doing many projects based on a specific digital library framework, emphasizing on its rich cultural heritage. Preferring the hybrid type, most of the projects were very much inter-organizations and collaborations between inter-disciplinary experts were fully utilized, integrating traditional and digital libraries. Two government information centers and an effective consortium effort paved the way for digital library developments together with supports from the E-Taiwan and M-Taiwan projects.

3.7.7 UNITED KINGDOM

In the United Kingdom, tough early attempts towards library automation made in the 1960’s, the digital library initiatives started in 2003 with the British Library’s strategic objective stated that by 2000 it would be a major center for the storage of and access to the digital texts (Secker, 2004)\(^{99}\). Following the Follet Report, the electronic library program eLib was set up by the Joint Information Systems
Committee (Follet, 1993)\textsuperscript{100}, focusing mainly on the higher education sector (Pinfield, 2001)\textsuperscript{101}.

In phases 1 & 2, 59 projects were funded in the areas of electronic publishing, image digitization, document delivery and access to networked resources (Rusbridge, 1998)\textsuperscript{102}. Phase 3 launched in 1997, involving 21 organizations (Secker, 2004)\textsuperscript{103} was an attempt to build model digital libraries through four main approaches i.e. hybrid libraries, large scale resource discovery, digital preservation and the development of e-library projects. However, 7 years, 70 projects, eLib program came to close, but it was a success in becoming a model upon which future e-library research and development activity could be base in the United Kingdom (Pinfield, 2004)\textsuperscript{104}.

The British Library Digital Library Program’s priorities were to provide improved access to the library’s historical holdings through services to the worldwide research community, schools, communities and the general public; the expansion of its international document supply services; the implementation of legal deposit to digital media; and to enable users to have full access to the complete range of materials in the library’s collection, digital or otherwise. In 2000, the British Library had completed a major procurement for the digital infrastructure environment; the Digital Library System comprised two main elements the Digital Storage Application and the Discovery and Retrieval Application.

UK’s digital initiatives saw the digitization of their national heritage such as the British Library’s Treasures Collection (Law, 2004)\textsuperscript{105}, the digitization of the only known copies of the earliest books printed in Scotland the Chepman and Myllar Prints, published in about 1508 (http://www.nls.uk/firstscottishbooks/) and the last letter written by Mary, Queen of Scots in 1587 (http://englishhistory.net/tudor/
maryqos-letter.html). Other attempts included the works of John Thompson, Scotland’s most important photographers; World War 1 documents from Earl Haig’s papers; and Churchill Archives Center, virtual exhibition of key documents and photographs from the Churchill papers (http://www.chu.cam.ac.uk/archives/) and the Digital Shikshapatri Project, treasures of Hinduism ever been available online. This was a joint cooperative project of the Indian Institute Library, the Refugee Studies Center at Oxford University and The Oxford Center for Vaishnav and Hindu studies (www.shikshapatri.org/). Funded by the United Kingdom’s New Opportunities Fund, it was one project in the World Cultures Consortium of Digital Projects that was seeking to make the cultural richness of a number of Diasporas communities in Britain more widely available. In 2001, the British Library Newspaper Library (www.bl.uk/collections/newspaper/) together with OCLC Preservation Resources, the Malibu Hybrid Library Project at King’s College London and Olive Software produced a prototype system for the digitization, indexing and presentation of historic newspaper. On the other hand the ASPECT Project was set up to (http://gdl.cdlr.strath.ac.uk/aspect/) create a digital archive of the ephemera, produced by candidates and political parties for the 1st Scottish parliamentary election in 1999. The National Archives (http://www.nationalarchives.gov.uk/) too had done digitization works and had brought together the collections of the Public Record Office and the Historical Manuscripts Commission to form one of the largest archival collections in the world, spanning 1000 years of the British history (Tedd & Large, 2005)\textsuperscript{106}.

British Council, UK with branches all over the world had embarked on a massive virtual library concept through The Distance Learning Zones concept in 2000, enabling trans-national distance learners in multiple locations worldwide,
enrolled in postgraduate courses to have access to e-books/e-journals anywhere, anytime. The British Council, Malaysia, with branches in Kuala Lumpur and Penang was operating its e-library, the first of its kind in the country, providing access to over 20 global databases (Louis, 2002)\(^\text{107}\) (www.britishcouncil.org.my)

British Library’s digital efforts started with automation, first with the higher education sector and were accelerated by its strategic objectives, a national official report on the need for electronic library, setting up priorities, creating a digital library model, procurement for digital library infrastructure and developing a prototype system. Together with the National Archive, digitizing programs had been enormous with an emphasis on global access, cultural heritage and promoting distance education.

3.7.8 UNITED STATES

Digital library movement in the United States began in 1989 by the Library of Congress when a consultant surveyed 101 members of the Association of Research Libraries and the 51 state library agencies, disclosing genuine needs for online collections. The United States federal government responded by spearheading Digital Library Initiatives 1 (1994-1998) and 2 (1999-2004), that dramatically changed the country’s digital library scenario. Defense Advanced Research Projects Agency (DARPA), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), National Library of Medicine (NLM), National Endowment for the Humanities (NEH) too played their roles in terms of giving digital library research grants (Miscoh, 2004)\(^\text{108}\).

The Library of Congress National Digital Library Program was launched in 1995, after a 5-year pilot project (1990-1995) of the American Memory Project,
working with the National Science Foundation, universities, foundations, publishers, museums and educational bodies. It began digitizing collections of Library of Congress archival materials that chronicle the nation’s rich cultural heritage (http://memory.loc.gov/ammem/index.html). They planned to present online 5 million items in 5 years and reached its goal of digitizing 5 million items in its bicentennial year of 2000. Even though the American Memory Project had successfully digitized 9 million historical images as at June 2007, this represented a mere fraction of more than 120 million items in its inventory.

Academic libraries too were rapidly developing their own digital libraries. California Digital Library system developed in 1997 was a result of a 3-year planning process, which culminated in the establishment of Library Planning and Action Initiative allowing the (http://www.lpai.ucop.edu/) (Chowdhury & Chowdhury, 2003)109 University of California’s nine campuses to more than 10 million unique titles representing over 15 million holdings (http://www.cdlib.org). Western Michigan University on the other hand began taking heavily into electronic serials in 1997/1998 with the purchase of e-serials management software, TDNet in 2001. The prototype was operational in summer 2002 and the site went alive in August 2002 (http://www.wmich.edu/library/articles/journals.php/).

The Virtual Library of Virginia (VIVA) (http://www.vivalib.org/) was a consortium of Virginia’s academic libraries established in 1993, funded by State Council of Higher Education of Virginia. The Indiana University Digital Library Program was a collaborative effort of the Indiana universities libraries, the office of the VC for Information Technology and the University Research Faculty with the leadership from the School of Library and Information Science. The Alabama Virtual
Library (http://www.avl.lib.al.us/) was initiated by Network of Alabama Academic Libraries, Alabama Department of Education, Alabama Department of Post-Secondary Education, Alabama Public Library Service and the Alabama Supercomputer Authority. The initial roll out of the Alabama Virtual Library was to the schools, campuses and libraries, then to all citizens. Due to its success, Alabama was chosen as the pilot program for the United States library program administered by the Bill and Belinda Gates Foundation.

Columbia University had completed a digital library project Bartleby, the content (http://www.columbia.edu/cu/lweb/digital/collections) of which was about literature based on published texts. Carnegie Melon University developed Informedia, centered upon entertainment, (http://www.informedia.cs.cmu.edu/) education, sports and training based on video, audio, images and texts. University of California at San Francisco was proud with its Red Saga Project, focusing on the subject of biomedical, based solely on published clinical journals. University of Kansas’s Vision Digital Video Library System, which was multidisciplinary, was digitization of its videos collection. University of Maryland and the Internet Archive, with funding from the National Science Foundation had developed for free the International Children’s Digital Library (www.icdlbooks.org) that would make available to children around the world, a collection of international literature Operational in June 2003, it started off with 200 titles from more than 27 cultures in more than 15 different languages.

Besides the academic libraries, other organizations with diverse background had also been active in pursuing digital library development. The Michigan Community Health Electronic Library was created as part of a plan to migrate the state’s five print health library resources to a virtual “mostly digital” library available
to health authorities across the state, working with OCLC and Gale Health and Wellness Resource Center. This project had been expanded by Clinical Digital Libraries Project and Michigan eLibrary. In Kentucky, digital library initiatives started in 1996, when the Kentucky Commission on Higher Education Institutional Efficiency and Cooperation recommended the establishment of a statewide e-library as part of the planning for Kentucky Virtual University. As at December 2000, 1432 Kentucky libraries were members of the Kentucky Virtual Library user community, representing a total user base to almost 2.6 million. Due to its success, Kentucky Virtual Library received the Multi type Library Cooperation Award as Outstanding Library program of the Southeast from the Southeastern Library network (SOLINET) in May 2001 (http://www.kyvl.org/)

United States digital library development had gone beyond the normal boundary when the National Institutes of Health, the National Library of Medicine, the Department of Health and Human Services and the National Institute on Aging developed NIHSenior Health a digital library (http://nihseniorhealth.gov), of health information sources to older people (60 plus) with a spoken word version also available (Tedd & Large, 2005)\textsuperscript{110}. The United States National Science Foundation initiated The National Science Technology, Engineering and Mathematics (STEM) Education Digital library and over 100 projects had made up this initiative, engaged in targeted research, services development and deployment in supporting varied communities with specialized collections (Arms, 2002)\textsuperscript{111}. The New York Public Library (www.nypl.org) on the other hand had digitized some of its local collections, such as the famous Lewis Wickes Hine photographs of the construction of the Empire State Building 1930 – 1931.

The Library of Congress was noted for the success in leading, creating and developing the National Digital Library Program. Other than those discussed above, it too had implemented a virtual reference service, Question Point developed together with OCLC and the library’s own version Ask a Librarian. It had also begun archiving primary source materials, the MINERVA (Mapping the Internet Electronic Resources Virtual Archive) (http://www.loc.gov/minerva) The Library of Congress had been tasked by the United States Congress to create a national program to preserve materials that had been created only in digital format. The National Digital Information Infrastructure and Preservation Program would provide the policy, standards (http://www.digitalpreservation.gov/ndiipp/) and the technical components necessary to preserve digital content.

Not only within the country, Library of Congress had also expanded its wing and collaborated with two Russian national libraries in the creation of its first major international digital library project Meeting of Frontiers in 1999. It also launched similar partnerships with other national libraries like Brazil, France, the Netherlands, Spain and Egypt has the Library Global Gateway initiative. The establishment of a National Digital Strategy Advisory Board in early 2001 and the overall strategy (LC21, 2000) would serve as guidelines in the planning process.
3.8 Some of the other Major Digital Library Initiatives Collaboration at Global Level

There are some countries which have showed interest in initiating the digital library projects with their own interest and in collaboration with some other national and international institutes and organizations. Some digital libraries projects with international collaboration are funded by the different organization around the globe. The Table below gives the list of such projects.

Table-3.1: Major Digital Library Initiatives Collaboration at Global Level

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the DL</th>
<th>Collection</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Arizona Memory Project</td>
<td>Primary Sources from Arizona libraries, archives, museums and other Cultural institutions</td>
<td><a href="http://azmemory.lib.az.us/index.php">http://azmemory.lib.az.us/index.php</a></td>
</tr>
<tr>
<td>4</td>
<td>California Digital Library</td>
<td>Digital material including more than 21,000 electronic journals, tens of thousands of electronic books, and more than 250 articles and reference databases.</td>
<td><a href="http://www.cdlib.org/">http://www.cdlib.org/</a></td>
</tr>
<tr>
<td>5</td>
<td>Collaborative Digitization</td>
<td>Content on human culture, science, and art to</td>
<td><a href="http://www.cdpheritage.org/">http://www.cdpheritage.org/</a></td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the DL (Colorado)</td>
<td>Collection</td>
<td>URL</td>
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<td></td>
<td>everyone connected online. The photographs, maps, documents, sound recordings, and objects held by the partner museums, libraries, and archives offer a rich and insightful glimpse into human culture.</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>Digital Library of Georgia</td>
<td>Gateway to Georgia's history and culture in digitized books, manuscripts, photographs, government documents, newspapers, maps, audio, video, and other resources.</td>
<td>(<a href="http://dlg.galileo.usg.edu/?Welcome">http://dlg.galileo.usg.edu/?Welcome</a>)</td>
</tr>
<tr>
<td>8.</td>
<td>Digital South Asia Library</td>
<td>Digital material for reference and research on South Asia to scholars, public officials, business leaders, and other users.</td>
<td><a href="http://dsal.uchicago.edu/">http://dsal.uchicago.edu/</a></td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the DL</td>
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<tr>
<td>11.</td>
<td>National Science Digital Library</td>
<td>Access to high quality resources and tools that support innovations in teaching and learning at all levels of science, technology, engineering, and mathematics.</td>
<td>(<a href="http://nsdl.org/">http://nsdl.org/</a>)</td>
</tr>
<tr>
<td>12.</td>
<td>The Open Video Project</td>
<td>Digitized video content for the digital video, multimedia retrieval, digital library, and other research communities.</td>
<td>(<a href="http://www.open-video.org/">http://www.open-video.org/</a>)</td>
</tr>
</tbody>
</table>
3.8.1 Some of the additional test beds that are developed at International Universities

- University of Arizona (High-Performance Digital Library Classification Systems: From Information Retrieval to Knowledge Management)
- University of California Berkeley (Re-inventing Scholarly Information Dissemination and Use)
- University of California Santa Barbara (Alexandria Digital Earth Prototype)
- Carnegie Mellon University (Million Books project)
- Columbia University (A Patient Care Digital Library: Personalized Search and Summarization over Multimedia Information)
- Harvard University (Operational Social Science Digital Data Library)
- University of South Carolina (A Software and Data Library for Experiments, Simulations, and Archiving)
- Stanford University (Stanford Digital Library Technologies Project)
- Tufts University (The Perseus Digital Library Project)
- Open Archive Initiative (Digital Library Federation, the Coalition for Networked Information, and from National Science Foundation)
- Gutenberg Project
- NCSTRL (Virginia Tech and Old Dominion University)
3.8 Summary

The brief overview manifests that digital library issues and challenges are being tackled on international, national, and local level. However, that there are many projects and programmes, which have not been mentioned as it is may not be impossible, yet not feasible to record all of them in this short span. It is well known that libraries are not only engaged in digitizing process of their collections, but the U.K Public Records Office is busy digitizing its records in a big program completed in 2001; and the National Digital Archive of Data-sets, available since March 1998, contains archived digital data from U.K. government departments and agencies.

The Digital libraries and archives facilitate worldwide access to the end user and it is a dynamic and a never-ending supply of distributed information and knowledge that is constantly available, easily updated, and convenient to use. To achieve quite a success, digital library issues are bringing together cooperative groupings of libraries with participation from and funding by public, private, and governmental bodies to discuss common standards, collaborative management, intellectual property rights, electronic publishing, and document delivery. And all this is happening on a global level.

The library and information professional are keen on creating digital libraries due to several reasons, such as, the need to preserve and conserve materials, to increase the use base by providing old, rare, classic and heavily used and scholarly resources available to a much broad-based user demands. The electronic or web publication is increasing rapidly in cases of scientific journals, conferences and patents, reports, theses and dissertations, where scholars look forwards to all materials for easy access and digitally produced materials have this characteristics. This has
implications on a library's acquisition, storage, preservation, and service policies. The names electronic, virtual, hybrid, or digital libraries, are becoming more and more prevalent, and being alternatively used and there is the increasing scope that the Internet is making their accessibility even easier and flexible.

The digital libraries and initiatives are increasing like anything at international level, they motivated others to follow and involve in the professional events. From the issues discussed above, it is clear that the digital library initiatives at global level are remarkable and they are at their motto. Some projects are initiated at their own interest and some are initiated at collaboration with other institutes and organizations sometimes international collaboration.
REFERENCES


