A Review of Digital Libraries in India

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Abstract: *In India, there have been numerous initiatives to develop digital libraries in recent years. 63 published studies on digital libraries in India have been reviewed in order to gain insight, assess, and comprehend the growth, development, and current status of digital library initiatives in India as they are reflected in scholarly journals. The research indicates that the majority of articles concentrate on the development of digital libraries and collections, with the exception of a small number of studies that address copyright issues and digital library management. Digital rights management, security, and digital library policies have not been the subject of any research.*

Keywords*: E-Resources, Open Access, National Digital Library of India*

I. INTRODUCTION

It is widely acknowledged that libraries worldwide are currently experiencing a transformation, particularly as a result of the advancements in information and communication technologies. The transition from traditional libraries to digital libraries is underway, and the new libraries that are being established are becoming more digital in nature. Consequently, there is a significant amount of global interest in this field, which has led to a plethora of research and development initiatives. In India, numerous institutions are in the process of establishing digital libraries, and numerous academicians and practitioners are conducting research on digital libraries.

In recent years, India has hosted numerous conferences on digital libraries and their diverse aspects. In addition to numerous national conferences, the International Conference of Asian Digital Libraries 2001, International Conferences on Digital Libraries 2004, and 2006 provided the essential impetus for the development and awareness of digital libraries in India. Both ICADL 2001 and ICDL 2004 were reported to have been widely attended.

Despite the fact that conference proceedings are an essential fundamental source of information, inconsequential papers are frequently included in the proceedings, as they may not undergo the peer-review process. Conversely, scholarly journals have a higher quality of papers due to their peer-reviewing mechanism. Additionally, the visibility and readership of papers published in scholarly journals are significantly greater than those of conference proceedings due to their coverage in abstracting and indexing databases.

Approximately 20 scholarly journals in the discipline of library and information science are published in India. Indian and foreign journals have published articles on digital libraries in India. In order to evaluate and comprehend the current state of digital library research and development in India, it would be beneficial to conduct a review of the literature published in Indian and foreign periodicals regarding digital libraries in India.

II. METHODOLOGY

The literature assessment was restricted to published articles that were included in the Library and Information Science Abstracts, Library, Information Science and Technology Abstracts, and Emerald Insight databases. The databases were searched for the entire period ending in June 2007. Numerous search strategies were implemented for the keywords "digital libraries," "digital library," and "India." Relevant articles were identified through the examination of the results of these searches. The references of the pertinent articles were further examined to identify articles that were not included in these databases. This led to the selection of 63 articles for this investigation.

III. RESULTS

According to the survey, the majority of articles concentrate on digitization initiatives and collection development, which leads to the creation of digital libraries and collections. Articles on copyright concerns and digital library administration are few. A number of topics have not been covered, including security, policies, and digital rights management. Below is a summary of the study's conclusions.

AN OVERVIEW

Many studies agree that India's digital library operations started in the 1990s, however this research indicated that most material was generated after 1995. One of the first studies to examine digital libraries in India, Rajashekar noted their pros and cons.

Srivastava and Saxena explore digital libraries. Sharma and Arora emphasized digital library relevance, needs, digitalization, and prospects. Digital libraries provide material, but Sadagopan warned that knowledge may be lost. Indian digital libraries and how library scientists may generate and access Indian language resources are discussed.

The DESIDOC Bulletin of Information Technology published a special edition on digital libraries in 1997 as Indian libraries and information centers adopted them. All six digital library ideas and technology pieces in this issue are by non-Indians.

Electronic libraries before digital libraries, and "digital library" today refers to both their concepts and services. Indian Institute of Technology, Kharagpur provides video library, database, SDI, online journal access, and retroactive database search. Future plans include digitalization, according to Mohapatra.

The Energy and Resources Institute's electronic library before digital libraries, according to Deb and Kar. The 1999-opened TERI electronic library gives academics several services. The TERI electronic library's advantages and resources are explored, along with physical and virtual libraries. Giri (2006) discusses how conventional libraries' concealed information impede communication and how digitization might assist.

COUNTRY INITIATIVES

Several publications have examined India's digital library ambitions in recent years. Bhattacharya (2004) found India's digital library development intermittent and incomplete. The study divides digital library efforts into eleven categories: art and culture, academic institutions, national-level institutions, R&D organizations, government, NGOs, financial institutions, media, private, society, and universities. Issues and government policy on digital library development in India and the digital divide are also explored.

In the same way, Jain and Babbar (2006) divided Indian digital library efforts into government, academic, and social groups. 15 digital library efforts in three categories were featured. The authors also say India has only made occasional attempts at digital library programs.

Museums, archives, and libraries in India preserve a wealth of traditional knowledge. Digital library technologies and tools make it easy to archive, reproduce, and share information. Rao (2005) addresses the Digital Library of Indian Heritage and Indian Art Preservation Re-search Project.

Prof. Raj Reddy of Carnegie Mellon University started the Million Books to the Web Project, a huge digital library endeavor. The Digital Library of India is India's primary contribution to this global endeavor. Balakrishnan covers Indian language technical obstacles and future prospects, including developing a 21st-century public library and PBS and All India Radio providing Web material.

Krishnamurthy (2004) describes the Digital Library Initiative – Phase I and Phase II initiatives and offers an overview of digital libraries. He discusses digital library research topics such interoperability, collection creation and administration, preservation, cataloguing and indexing, and reference services.

E-GOVERNMENT INITIATIVES

The majority of government-to-citizen programs are part of the e-governance efforts that other nations have implemented, and e-governance has received more attention in India in recent years. In their discussion of the Guyandotte Digital Library Intranet, Sharma and Yorick (2001) emphasized the opportunities and difficulties facing the

rural digital library. Initiatives by the government's digital libraries to address public issues are explored, including information kiosks that disseminate information about water tanker timetables, marriage matchmaking, and just-in-time employment. Guyandotte, an intra-net-based digital library that links rural public cybercafés in Madhya Pradesh state's Dhar district, is examined as a potential model for rural digital libraries in the future.

Public libraries

India's public library system has been a significant source of worry due to its relatively modest growth. The public library system is envisioned by Ghosh (2005) using the idea of ICT for development.

E-consortia

With numerous e-resource consortia, notably e-journal consortia, throughout the globe and more being created in India, writers exploring this topic must separate consortia for shared licensed materials from digital libraries. Fox et al. (1995), one of the first articles on digital libraries, said the term "digital libraries" has diverse meanings for different readers. Post-1995 Indian digital library literature supports this idea of writers approaching digital libraries differently.

Pandian, Jambhekar, and Karisiddappa (2002) proposed a consortial framework for designing and developing an intranet-based IIM digital system. Consortial digitization of IIM resources with electronic journal and database subscriptions is proposed in this paradigm. Another consortia approach to digital libraries, INDEST uses licensed e-resources. INDEST licenses and shares e-resources from GALILEO, Ohio LINK, VIVA, and SUNY Connect, other U.S. consortia. INDEST collects CD-ROMs, DVDs, portal sites, and scanned/digitized material.

INSTITUTIONAL REPOSITORIES

A digital library stores research papers, reports, and newspapers. Digital institutional repositories store, administer, disseminate, and preserve institution members' intellectual work. The open source movement created digital library and institutional repository software. Greenstone Digital Library and DS Speed software enhance digital library creation. Libraries pioneer open access institutional repositories.

Anuradha discussed creating an Indian Institute of Science, Bangalore repository. The IISc repository employs Greenstone Digital Library, one of 40 OAI-compliant database development tools. DS pace studied the design and development of an institutional repository at IIT Kharagpur. Doctor (2007) describes ICFAI Business School, Ahmedabad's GSDL-based summer internship project report library.

Few articles have demonstrated how digital library construction ideas like digital library software, standardized metadata, and digital collections administration may be applied to institutional repositories.

ISSUES AND POLICIES

Given that India is a late entrant to digital library production and that its pace is slow, there are clearly concerns with digital library development in India. Many studies have briefly examined the concerns, but Jeevan and Dhawan (2002) go into length. The authors examine IT integration, digital library tools and software, resource creation methods, IT training, content production, and copyright management.

Indian traditional libraries are becoming computerized, according to Kaur and Singh (2005). In wealthy nations, 60% to 70% of information is digital, while in India, just 2.5% is. An Indian National Information Policy and library professional training are needed to hasten the conversion of conventional libraries to digital libraries.

CONTENT FOR DIGITAL LIBRARIES

Digital libraries inevitably have more digital forms and sources as information sources become digital. Besides network infrastructure, IIT Delhi's central library offers digital holdings (Arora 2004). Examples include e-journals, theses, scanned books, CD-ROM databases, the library OPAC, and courseware.

Early Indian digital libraries struggled with infrastructure costs and incompetence. ICT infrastructure costs have reduced and digital library software competence, especially in open source DSpace and GSDL, has risen. The source of digital library content is highlighted in this case. This topic has little study, however Jeevan (2004) finds content

sources for emerging countries like India. Digitizing and the sorts of information digital libraries employ are covered in the article.

Sreekumar and Sunitha (2005) created a cutting-edge digital library information system by integrating and aggregating print and the various scattered digital material of the Indian Institute of Management, Kozhikode knowledge domain. For seamless academic dissemination, library automation, a library portal, a digital library, and an open access archive should aggregate and integrate content. The digital library was made using Greenstone.

Shukla (2005) promotes digital libraries over digital collections for content generation, a new IT trend. To establish synergy, the author emphasizes contextual and interpretative information around collections. The essay addresses content creation issues and provides further research.

DIGITIZATION

The digital library holds many informational things. Paper documents are transformed to electronic format to digitize older collections. Transferring texts across languages needs careful character set analysis. Unicode standardizes languages worldwide. Chandrika (2004) explores Unicode and Indian language localization technology.

Gaur's 2003 study "Rethinking the Indian Digital Divide: The present state of digitization in Indian management libraries" emphasizes library automation rather than digitization or digital libraries. The report describes library automation at Indian management institutions' libraries and briefly mentions digital library projects, which the research found disappointing. Murthy (2005) describes an experience with digitalization at the National Tuberculosis Institute in Bangalore.

DIGITAL LIBRARY SERVICES

Libraries provide services. For Web-enabled information services, Letha (2006) suggested the library portal. The Technical Information Resource Centre of the National Physical and Oceanographic Laboratory's site offers several services, including a digital library. According to Gupta et al. (2004), libraries supply digital library services via their websites.

Digital resource development at the Indian National Science Academy, New Delhi, is another case study. Libraries have bought and provided access to Internet resources, CD-ROM-based data sets, and services for standalone or networked CD-ROM environments and digitized materials due to the expanding use of digital media. The INSA library's three facilities are explained further.

At the Indian Statistical Institute, Bangalore, Krishnamurthy explores digital library services. According to the author, genuine digital libraries, not merely digital collections, need librarians to collaborate to produce open, dispersed, publicly available materials and a collaborative framework to coordinate and oversee implementation. It seems that ISI's digital library has consortia-based e-resources, OPAC, and CD-ROM databases.

ACCESS AND INFORMATION RETRIEVAL

Information retrieval systems retrieve all relevant documents in response to user queries. With restricted vocabulary control, a searcher may struggle to match query words to relevant resources. A thesaurus can retrieve concepts. Subject-specific indexing may automatically build a thesaurus for a digital library. Kumar et al. (2006) propose employing intelligent information processing experiments to improve information retrieval system efficiency. Latent semantic indexing in natural language processing aids retrieval.

Das, Dutta, and Sen (2007) examine the retrieval properties of eight Indian digital libraries to evaluate their growth. This research reveals that digital libraries' information retrieval properties varied owing to various content organization methods and digital material kinds.

Arumugam, Thangata, and Shanti (2005) discuss data mining and techniques that may mine library database user access patterns. The title suggests that association mining would reveal frequent access patterns in a digital library, however the research is really about an automated library's circulation or transaction database.

1. Technology

Digital libraries can only be established, developed, distributed, and used in India if libraries and information centers have modern ICT infrastructure. Open-source software may create a digital library. These freely available software are used for most Indian research. Special libraries in India employ ICT infrastructure better and participate in consortia and digitization programs (Gulati 2004).

Science and technology libraries in India are better positioned than other libraries for using information and communications technology since they are more budget-friendly. A study of 25 ICSSR universities found that social science libraries in India are digitizing and networking slowly (Jain 2003).

2. Copyright

Copyright law safeguards individual, collective, and societal rights. It aids copyright enforcement. Digital information is vulnerable to copyright abuse, and as digital libraries grow in number and collection, copyright implications become increasingly important, especially in developing and underdeveloped countries where software piracy is much higher than in developed countries. Rao (2003) discusses electronic copyright.

James (2005) discusses digital libraries and copyright, including digitalization and Indian copyright legislation. This essay notes that technological problems dominate digitalization while legal considerations are neglected.

3. Management of digital libraries

After creating the digital library, administration is crucial. Gupta and Singh (2006) discuss digital library management concerns and techniques, including hardware, software, collection, preservation/archiving, finance, and access. Digital library development requires forethought. Lakshmi and Suma (1998) stress digital library development planning, notably IT infrastructure and budgetary planning.

Digital library systems require audit and supervision, according to Das and Dutta (2004). The authors highlight audit and control aspects that improve digital library capabilities and effectiveness. Ravi, Chandra, and Sharma (2000) conclude with a look at digital library trends and their future utility and cost.

4. The Role of information professionals

The function of the conventional librarian must be reexamined in light of the growing number of digital libraries. One of the first publications examining this topic, specifically with regard to the rise of the "digital librarian," was written by Srinivasa (2000). In addition to discussing the abilities, skills, professional education, and training required by digital librarians, the article outlines a variety of positions for these professionals.

5. Digital divide

India is creating digital libraries intermittently. The rising interest of libraries and information centers in India suggests that digital library development is expanding, although slowly. This growth and progress must be balanced against Singh (2002)'s digital divide in India. This article highlights many digital library efforts but warns that "digital determinism" and "digital divide" must be addressed in different ways.

Prathama (2003) explores the social and economic challenges needed to bridge the digital gap between rural and urban India for sustainable development. These include a diminishing budget, expensive initial and ongoing costs, social and economic issues including illiteracy, population increase, and poor health, insufficient development program resources, and deficient infrastructure. Most of the nation has trouble accessing digital information due to these problems.

IV. CONCLUSION

Digital library development in India is biased. S&T libraries have advanced most. Even these libraries have focused on establishing digital libraries without considering education, training, copyright, administration, or advertising. Copyright laws must be updated for the digital age. Few universities provide digital library and technology workshops. Indian studies have neglected digital rights management, digital library security, content management, business and pricing model, and policy research. India lacks a pricing mechanism. With various digital library efforts announced, a study of Indian digital libraries would help assess their condition. The limited research on Indian digital library projects are mostly based on website or other public information. Surveys assist analyze the current situation and create action plans for targeted digital library development in India. Digital library utilization and user research in India are few. This topic is crucial for analyzing India's digital libraries and building user-centric ones.

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