

## Library Technology Solutions for Smart Libraries: A Comparative Study of IIT Delhi and IIT Bombay Library System

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### Abstract

*Library technology refers to those technologies which are mainly used in libraries for providing smart library services to their users, perhaps keeping in view of the implications of five laws of library science as envisaged by Dr. S. R. Ranganathan. Indian Institutes of Technology (IITs) recognized as Institute of National Importance, provide higher technical education and research in India. IIT Libraries are using latest technologies to provide smart library solutions to their users. This study used survey method to collect primary data through observation technique and questionnaire tool. The study selected two IITs, i.e. IIT Delhi and IIT Bombay who got Institute of Eminence (IoE) status by the Ministry of Human Resource Development (MHRD), Government of India and secured 2nd rank and 3rd rank respectively in NIRF-2019 under engineering category. Their Library plays a pivotal role in making them at the top. The main objectives of the study were to know what kinds of library technology used by IIT Bombay and IIT Delhi Library System. The study found that both the IIT Bombay and IIT Delhi Library used library technology in different areas like library automation, library website, institutional repository, remote access, web-scale discovery system (WSDS), cloud computing and Web 2.0 applications. This study suggests appropriate measures for the improvement of existing library system of IIT Bombay and IIT Delhi. Further, it may be useful to those who are doing in-depth research in the field of library technology.*

**Keywords:** Cloud Computing, Digital Library, IIT Library, Library Automation, Library Technology, Library Website, Mobile Application, Web 2.0, WSDS

### 1. Introduction

The application of Information Communication Technology (ICT) in libraries made the technological transformation at a faster pace during the last twenty years. Academic libraries have developed and diversified their services based on advanced ICTs (Linh, 2008; Moradi et al., 2018) and uses different kinds of library technologies to provide smart library solutions to their clientele. Library technology

their users, perhaps keeping in view of the implications of five laws of library science as envisaged by Dr. S. R. Ranganathan (Sahoo, et.al, 2019). Some of the library technology solutions used by the academic libraries are (i) Integrated library management system (ILMS) for automation of all the house-keeping operations of the library, (ii) RFID system for self-check-out/check-in of books, theft detection, etc., (iii) digital library system for managing and archiving all kinds of digital contents, (iv) Library website - acts as virtual presence of its physical library, displays library related information, resources and services, (v) Web-scale discovery system (WSDS) for



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allowing users to search and retrieve all library resources in a single window search platform,(vi) Virtual library system for allowing users to access all the library resources and services outside the institute campus, (vii) cloud computing for hosting and serving library web applications,(viii) Mobile Apps for users to access all the library resources and services in their smart phones, (ix) Web 2.0 tools for online communication, collaboration and sharing information between the library and their users, (x) Indian Research Information Network System (IRINS) for institute faculty research profiling system, etc.

Academic Libraries, of which IIT Bombay and IIT Delhi library constitute a part, usually have adopted above library technologies to provide smart library solutions to different categories of their users.

## 2. Statement of the problem

Indian Institutes of Technology (IITs) recognized as Institute of National Importance, are among the premier higher educational institutions in India, which provide higher technical education and research in many different disciplines like Science, Engineering, Technology, Humanities and Social sciences, Management, etc. The Central library of IIT Delhi and IIT Bombay support the informational and scholarly needs of their students, research scholars, teachers and staff.

The use of latest web technology in personal life and libraries of advanced countries motivated the authors to examine what sorts of library technology solutions used by IIT Delhi and IIT Bombay library for making them smart libraries. Therefore, the statement of the problem is “Library Technology Solutions for Smart Libraries: A comparative

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Study of IIT Delhi and IIT Bombay Library System”. **3. Literature Review**

The authors reviewed research publications on different library technology solutions pertaining to the current field of study. Some of the reviewed articles on different library technology solutions are presented here.

### 3.1 Library Website

Academic library websites serve as libraries’ virtual presentations to the world (Liu, 2008). Gardner and Pinfield (2001) examined the library website model implemented at the University of Nottingham (UoN) using server-side scripting language “PHP” and backend database “MySQL”. Tidal (2012) in another study examined the process of designing a library website using Drupal content management system (CMS) with an aim to create a more user-centered experience. Johnston, et al. (2015) in another study examined the easiest way to handle the content of library website using CMS and found that the template-based design of library website is aesthetically appealing and responsive and accessible by any devices.

Devi and Verma (2018) evaluated the web contents and design trends of 19 IITs library websites/web pages based on 128 criteria and found that 14 (74%) IITs have a separate library website, 4 (21%) IITs have a library webpage, and 1 (5%) IIT has a dedicated library webpage. Khan and Fatima (2017) evaluated the library portals of IIT Madras and IIT Bombay as per NIRF-2017 using e-survey method and 95-item checklist and found that these library portals have presence of all features to achieve the needs of their respective users. Madhusudhan (2012) evaluated the content features of 12 IIT Library websites using mixed method approach and found that the IIT library

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websites ranked above average, based on available content features like general information, resources, and services of IIT libraries. It also found that IIT Library websites are not utilizing the full potential of “Web 2.0 or Library 2.0”. Ratha, Joshi and Naidu (2012) conducted a study on the design and structure including link analysis of 15 IIT library websites. They found significant differences such as “user support services”, “number of hyperlinks on home pages and whole websites”, “number of images with their locations”, “In-active links of web pages”, etc. **3.2 Web 2.0 Applications in Libraries**

The applications of Web 2.0 technologies in library website attract library users and make the website more dynamic and interactive. Wordofa (2014) examined the applications of Web 2.0 technologies in library websites of top 82 universities in Africa and found that about 40 (49%) libraries implemented one or more Web 2.0 technologies. Moradi, Bagher and Mirhosseini (2017) examined Web 2.0 application in academic library websites of top 100 universities of the world and found that the social networks (94.5%), mashups (94.5%), RSS (91.2%) and social tagging (82.4%) are the most widely used Web 2.0 tools while podcast (30.8%) is the least used Web 2.0 tool by these university libraries. Han and Liu (2010) in their study found that “more than two-thirds of the 38 top Chinese university libraries apply one or more kinds of Web 2.0 tools through the basic functions of their websites”. Harinarayana and Raju (2010) in their study found that RSS feeds and instant messaging (IM) are most widely applied Web 2.0 technology found each in 37 (64.91%) university library websites, whereas a wiki is the least applied Web 2.0 technology found in only one (1.75%) library website. Negi and Pant (2017) examined the use of

“web 2.0 tools” in seven old IIT libraries and found that “IIT libraries are not utilizing full potential of web 2.0 tools” and there is also “lack of awareness of these tools among library users”.

### **3.3 Integrated Library Management System (ILMS)**

Integrated Library Management System (ILMS) is one of the highly used library technology solutions in almost all academic library system in the world. ILMS is a core functional system for library that integrates all the housekeeping operations of the library in a unified interface. Some of the ILMS software used in academic libraries is Koha, Libsys, Virtua, NewGenLib, SLIM21, etc.

Akeroyd and Cox (1999) examined the broad trends in development of Integrated Library Management Systems (ILMS) and found that ILMS are integrated with more and more core functions and special features, and there has been a move towards industry standard databases, operating systems and architecture. Madhusudhan and Singh (2016) in another study examined various features and functions of ILMS (Koha, Libsys, NewGenLib and Virtua) based on specially designed checklist and found that Virtua got the highest rank followed by Koha ILMS and NewGenLib got the lowest rank. They also found that these ILMS are lagging behind in exploiting the full potential of the Web 2.0 features and needs to be addressed in their future development.

### **3.4 Radio frequency identification (RFID) Technology**

Radio frequency identification (RFID) is an automatic identification technology that uses radio waves to track items by sending data to readers. The application of RFID technology in a library can promote its operational efficiency and

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precision (Yu, 2007). Rahman and Islam (2019) in their study found that RFID is used in the university libraries to reduce staff stress, increase efficiency, track and locate items quickly, book drop support at any time, easier circulation promote self-check-in, check-out activities, etc. Hazarika and Ravikumar (2019) in another study examined the implementation of the RFID system with Koha ILMs and found that the RFID system has helped the library to provide better service to their users. They also found that the library staff shows a positive attitude towards embracing RFID technology in their library.

### 3.5 Digital Library or Institutional Repository (IR)

Digital library or IR is a library that collects, stores, and preserves contents in digital form and allows users to search and retrieve the digital contents through their computers or devices in a networking environment. It is an integrated set of services for capturing, cataloging, storing, searching, protecting, and retrieving information (WTECHyper-Librarian, 1999). The purpose of a digital library is to provide coherent organization and convenient access to typically large amounts of digital information (WTECHyper-Librarian, 1999). Some of the Digital Library software used in academic libraries is DSpace, Eprints, GSDL, etc.

### 3.6 Virtual Library

Powell (1994) defines Virtual Library as “It is a library with little or no physical presence of books, periodicals, reading space or support staff, but are that disseminate selective information directly to distribute library customers, usually electronically” (netugc.com). The concept of remote access to the content and services of

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libraries and other information resources can be termed as virtual library. Some of the virtual library technology or remote access software technology used in academic libraries is EZproxy, RemoteXS and OpenVPN. **3.7 Web-scale discovery service**

Web scale discovery system (WSDS) is “a platform that integrates all library resources in a single integrated tool with a most intuitive interface and allows users to search and retrieve information easily through a single window” (Sahoo, et.al, 2019). WSDS can index a variety of content, ranging from bibliographical records of integrated library system (ILS) to digital collections like institutional repository content, electronic thesis and dissertations, e-journal articles, and content from locally developed and hosted databases (Vaughan, 2008). Some examples of Web-scale discovery system are VuFind, Primo, EBSCO discovery service, Summon Serial solutions, etc.

### 3.8 Cloud computing

Cloud computing is “the name for the recent trend of moving software and computing resources to an online, shared-service model” (Hoy, 2012). It refers to “computing resources that exist in the cloud, external to an organization but accessible via the network” (Hoy, 2012). Ranger (2018) defines cloud computing as “the delivery of on-demand computing services — from applications to storage and processing power — typically over the internet and on a pay-as-you-go basis”. Examples include web-based e-mail, data storage, and virtualized servers.

National Institute of Standards and Technology (NIST) defines cloud computing as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers,

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storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Prince, 2011; Grance and Mell, 2011; Hoy, 2012).

### 3.9 Mobile Technology Applications

The mobile applications for information seeker have grown up tremendously with the growth of mobile technology. Libraries are adopting mobile technology to present their services and resources (Ragon, 2009). A mobile app can help to engage library’s patrons and ultimately increase library’s relevance. It is an ideal way to get patron’s attention. Mobile apps will allow libraries to connect with patrons on the move. It can provide a wide array of library services to users like view and access library account, search library catalog, give alerts on latest news, events, and notices via SMS, provide access to a variety of library resources and database, single window search facility, original document search, and QR codes for quick access of library catalog and important links.

### 3.10 Indian Research Information Network System (IRINS)

The Indian Research Information Network System (IRINS) is “a web-based Research Information Management (RIM) service developed by the Information and Library Network (INFLIBNET) Centre in collaboration with the Central University of Punjab” (IRINS, 2018). The IRINS is available as a free cloud-based software-as-service to the academic and R&D organizations in India and facilitates the faculty members and scientists to collect, curate and showcase the scholarly communication activities and provide an opportunity to create the scholarly network. The IRINS integrate the research management system such as HR system including faculty profiling

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system, course management system, grant management system, institutional repository, open and commercial citation databases, scholarly publishers, etc. It has integrated with academic identity such as ORCID ID, Scopus ID, Researcher ID, Microsoft Academic ID, Google Scholar ID for ingesting the scholarly publication from various sources. It supports data visualization and reporting on organization research activity and output. It consumes and produces key information to institute’s core research (IRINS, 2018).

## 4. Objectives of the Study

The main objectives of the study are:

- ❖ To know what kinds of library technology used by IIT Bombay and IIT Delhi library system;
  - ❖ To unearth the software technology used in IIT Bombay and IIT Delhi Library website along with available features;
  - ❖ To know the library automation technology and digital library/IR technology of IIT Bombay and IIT Delhi library system;
  - ❖ To know the areas of adoption of cloud computing by IIT Bombay and IIT Delhi library system;
  - ❖ To know different kinds of Web 2.0 Tools used by IIT Bombay and IIT Delhi library system;
  - ❖ To suggest appropriate measures for the improvement of existing library system of IIT Bombay and IIT Delhi.
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## 5. Scope and Methodology

The current study is confined to IIT Bombay and IIT Delhi Library system due to their presence in Institute of Eminence (IoE) status and NIRF-2019 Ranking. The study used survey method of research, where observation technique and questionnaire were used to collect the primary data. The study analyzed the links along with its client-side scripts through

Mozilla Firefox browser and contents of both the IIT Delhi and IIT Bombay library website, WEBOPAC, Institutional Repository, Web-scale discovery system (WSDS), Cloud computing, Mobile Apps, Web 2.0 tools, Research Information Management (RIM), etc.

## 6. Data Analysis and Interpretation

The current study collected and analyzed the relevant data with the help of Microsoft Excel and presented the same in tabular form in the following headings:

### 6.1 IIT Bombay and IIT Delhi Library System

The IIT Bombay and IIT Delhi comes under the first generation of Indian Institute of Technology (IIT) in India. Their Central Library was established along with the establishment of the institute in the year 1958 and 1961 respectively. Table 1 clearly shows an overview of IIT Bombay and IIT Delhi library system.

The Central Library of IIT Bombay under the current librarianship of Dr. Manju Naika, has 12185 registered users, 28 library staff, 478257 print documents (includes Books, Journals, Thesis and Dissertations, Bound Volumes, Magazines, Newspapers, etc.), 55303 e-resources (includes eBooks, e-Journals, e-Thesis and Dissertations, eDatabases, CD/DVDs, e-Newsletters, etc.), and

109 hardware resources (includes Computer Server, Desktop Computers, Printers, Scanners, Projectors, and Xerox machines). The Central Library uses Koha open source ILMS software for library automation, DSpace digital library software for building institutional repository collections, WordPress Content Management System (CMS) software for designing and developing library website, Summon Web-Scale Discovery System (WSDS) for single window search, EZproxy for remote access, and Omeka software for digital archives. But, the Central Library of IIT Bombay has not yet implemented Radio Frequency Identification (RFID) system and Research Information Management (RIM) system.

Similarly, the Central Library of IIT Delhi under the current librarianship of Dr. Nabi Hasan, has 9176 registered users, 32 library staff, 366748 print documents (includes Books, Journals, Thesis and Dissertations, Bound Volumes, Magazines, Newspapers, etc.), 36600 e-resources (includes eBooks, e-Journals, e-Thesis and Dissertations, eDatabases, CD/DVDs, e-Newsletters, etc.), and 139 hardware resources (includes Computer Server, Desktop Computers, Printers, Scanners, Projectors, and Xerox machines). The Central Library uses LibSyscommercial ILMS software for library automation, DSpace digital library software for building institutional repository collections, Drupal Content Management System (CMS) software for designing and developing library website, EBSCO and Knimbus Web-Scale Discovery System (WSDS) for single window search, OpenVPN for remote access, RFID system for self-check-out/check-in and theft detection, etc. The Central Library has also implemented a cloud-based Research Information Management (RIM) system, i.e. Indian Research Information Network System (IRINS) for showcasing the Institute

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research output and faculty profile to the academic and research community of the World.

**Table 1: Overview of IIT Bombay and IIT Delhi Library System**

Descriptions	IIT Bombay	IIT Delhi
Name of the Library	Central Library	Central Library
Established Year	1958	1961
URL of Library Website	<a href="https://www.library.iitb.ac.in">https://www.library.iitb.ac.in</a>	<a href="http://library.iitd.ac.in">http://library.iitd.ac.in</a>
Name of the Librarian	Dr. Manju Naika	Dr. Nabi Hasan
No. of registered users	12185	9176
No. of Library Staff	14	16
No. of Supporting Staff	14	16
Print resources	478257	366748
Electronic Resources	55303	36600
Hardware Resources	109	139
Library Management System Software	Koha	LibSys
Institutional Repository Software	DSpace	DSpace
Content Management System Software	WordPress	Drupal
Web-Scale Discovery System (WSDS)	Summon Serial Solutions	EBSCO and Knimbus
Remote Access Software	EZproxy	OpenVPN
Digital Archive Software	Omeka	-
Research Information Management (RIM)	-	IRINS
Radio Frequency Identification (RFID)	No	Yes

**Table 2: Library Technology used by IIT Bombay and IIT Delhi Library**

<b>Library Technology Solutions Used</b>	<b>IIT Bombay</b>	<b>IIT Delhi</b>
Content Management System (CMS)	Yes	Yes
Integrated Library Management System (ILMS)	Yes	Yes
Radio Frequency Identification (RFID)System	No	Yes
Digital Library Software Technology	Yes	Yes
Web-Scale Discovery System (WSDS)	Yes	Yes
Web 2.0 Technology Applications	Yes	Yes
Cloud Computing	Yes	Yes
Mobile Apps	No	Yes
Subject Guide/Research Guide	No	No
Virtual Library or Remote Access Technology	Yes	Yes
Digital ArchivesSoftware Technology	Yes	No
Research Information Management System	No	Yes

### **6.2 Library Technology used by IIT Bombay and IIT Delhi Library System**

Table 2 clearly states the different kinds of library technology used by the IIT Bombay and IIT Delhi library system. The mostly used library technology identified in the study are Content Management System (CMS), Integrated Library Management System (ILMS), Radio Frequency Identification (RFID) System, Digital Library Software Technology, Web-Scale Discovery System (WSDS), Web 2.0 Technology Applications, Cloud Computing, Mobile Apps, Subject Guide/Research Guide, Virtual Library or Remote Access Technology, Digital Archives Software Technology, and Research Information Management (RIM) System. Out of 12 library technology, the IIT Bombay Library used 8

(66.7%) library technology while the IIT Delhi Library used 10 (83.3%) library technology for providing smart library solutions to their users. It is noticed that, none of them has yet implemented subject guide or research guide for their users.



### 6.3 Software Technology used in IIT Bombay and

#### IIT Delhi Library Website

Table 3 clearly represents the software technology involved in the development of library website of IIT Bombay and IIT Delhi. It was observed that both the library websites have fully qualified domain name (FQDN) which consists of the hostname “library” and the domain name “iitb.ac.in” or “iitd.ac.in”. Further, the library

**Table 3. Software Technology in IIT Bombay and IIT Delhi Library Website**

Software Technology used	IIT Bombay	IIT Delhi
Fully Qualified Domain Name	library.iitb.ac.in	library.iitd.ac.in
CMS with version	WordPress 3.7.1	Drupal 8
Backend Database or RDBMS	MySQL	MySQL
Server-side scripting	PHP	PHP
Client-side scripting	HTML, CSS, JS	HTML, CSS, JS
Web Server	Apache	Apache
Web 2.0 Tools	Facebook, Twitter, YouTube, RSS, Blog	Google Map, Blog, YouTube, RSS

website of IIT Bombay and IIT Delhi developed with open source content management system (CMS) software WordPress and Drupal respectively. As both the library website uses server-side scripting language “PHP” and backend relational database management system (RDBMS) “MySQL” for storing contents, hence, the IIT Bombay and IIT Delhi Library website can be identified as “Dynamic Library Website”. It was also observed that Web 2.0 tools have integrated in both the library websites.

### 6.4 Features available in IIT Bombay and IIT

### Delhi Library Website

Table 4 shows the different features available in Library Website such as site navigation, site search, site map, single window search, J-Gate search, WEBOPAC link, Ask the librarian, general information, library team, library collection, library resourceslinks, library services, downloads, library photo gallery, Web 2.0 tools, and latest

was observed that almost all features listed in Table 4 are available in both the library website of IIT Bombay and IIT Delhi. IIT Bombay Library has not displayed latest research publications and library locations using Google Map in its website, whereas IIT Delhi Library have not used accordion menu type navigation.

**Table 4. IIT Bombay and IIT Delhi Library Website Features**

Features in Library Website	IIT Bombay	IIT Delhi
Header Navigation	Yes	Yes
Mega Footer Navigation	Yes	Yes
Accordion Menu Navigation	Yes	No
Vertical Menu	Yes	Yes
Tab Menu	Yes	Yes
WEBOPAC Link	Yes	Yes
Google Map for Location	No	Yes
Site Map	Yes	Yes
Site Search	Yes	Yes
Single Window Search	Yes	Yes
J-Gate Search	Yes	Yes
Ask the Librarian	Yes	Yes
General Information	Yes	Yes
Library Team	Yes	Yes
Library Collection	Yes	Yes
Library Resources	Yes	Yes
Library Services	Yes	Yes
Downloads	Yes	Yes
Library Photo Gallery	Yes	Yes
Latest Faculty publications through Scopus	No	Yes
Web 2.0 Tools	Yes	Yes

research publications provided through Scopus. It

### 6.5 Library Automation of IIT Bombay and IIT Delhi

Table 5 shows the library automation software technology of IIT Bombay and IIT Delhi. It was observed that IIT Bombay library uses open source

ILMS software “Koha” while IIT Delhi uses commercial ILMS software “LibSys” for their library automation. The WEBOPAC of both the library are found in public domain.

**Table 5: Library Automation of IIT Bombay and IIT Delhi**

Library Automation	IIT Bombay	IIT Delhi
ILMS Software	Koha 17.05	LibSys7
Software Type	Open Source	Commercial
Backend Database	MySQL	Own Database
Programming language	Perl	Java
Web Server	Apache	WildFly
WEBOPAC in internet	Yes	Yes
WEBOPAC URL	<a href="https://opac.library.iitb.ac.in/">https://opac.library.iitb.ac.in/</a>	<a href="http://libcat.iitd.ac.in:8080/opac/">http://libcat.iitd.ac.in:8080/opac/</a>

### 6.6 Institutional Repository (IR) of IIT Bombay and IIT Delhi Library

Table 6 shows the Institutional Repository (IR) of IIT Bombay and IIT Delhi. It was observed that both the libraries have developed IR using DSpace digital uses Cineca theme and archives Research library software with their own FQDN. IIT Bombay

Publications, Technical reports, Reprints, Conference proceeding papers, etc. while IIT Delhi uses Mirage theme and archives Electronic Thesis and Dissertations (ETDs), Faculty & Student Research Publications, Convocations, etc.

IR	IIT Bombay	IIT Delhi
URL	<a href="http://dspace.library.iitb.ac.in">http://dspace.library.iitb.ac.in</a>	<a href="http://eprint.iitd.ac.in">http://eprint.iitd.ac.in</a>
Fully Qualified Domain Name	dspace.library.iitb.ac.in	eprint.iitd.ac.in
Digital Library Software	DSpace6.3	DSpace6.3
Backend Database	PostgreSQL	PostgreSQL
Server-side Scripting Language	Java, JSP	Java, JSP
Client-side Scripting Language	HTML, CSS, JS	HTML, CSS, JS

Web Server	Apache Tomcat	Apache Tomcat
Theme	Cineca Theme	Mirage Mirage
Digital Contents in IR	IIT Bombay Research Publications, Technical reports, Reprints, Proceeding papers	ETDs, Faculty & Student Research Publications, Convocations

**Table 6. Institutional Repository (IR) of IIT Bombay and IIT Delhi Library**

### 6.7 Cloud Computing used by IIT Bombay and IIT Delhi Library

Table 7 shows that IIT Bombay and IIT Delhi Library adopted cloud computing based on different kind of service models. It was observed that both the libraries have used only “Software-as-a-Service” based cloud computing for providing subscribed web-based software as a service to their users.

**Table 7: Cloud Computing used by IIT Bombay and IIT Delhi Library**

Service Models	IIT Bombay	IIT Delhi
SaaS (Software as a Service)	Turnitin, Grammerly, Summon Serial Solutions, Subscribed e-journals and e-databases	IRINS, Turnitin, Grammerly, EBSCO Discovery Service, Subscribed e-journals and e-databases
PaaS (Platform as a Service)	None	None
IaaS (Infrastructure as a Service)	None	None

### 6.8 Web 2.0 Tools used by IIT Bombay and IIT Delhi Library

Table 8 acknowledges that IIT Bombay and IIT Delhi Library used Web 2.0 tools for different kind of information work.

**Table 8.: Web 2.0 Tools used by IIT Bombay and IIT Delhi Library**

Information Work	IIT Bombay	IIT Delhi
Information Acquisition	Blog and Wikis	Blog, Latest Research Publications acquired through Scopus

Information Dissemination	RSS	RSS, Google Map, Latest Research Publications (Scopus) displayed through Library Website
Information Organization	Social Tagging of Books in WEBOPAC	Social Tagging of Books in WEBOPAC
Information Sharing	Facebook, Twitter, YouTube, Ask-a-Librarian	YouTube, Ask-a-Librarian

### 7. Suggestions

Based on the present study, the following suggestions are made for both the IIT Bombay and

- ❖ The IIT Bombay Library should implement Radio Frequency Identification (RFID) technology for self-checkout/check-in of books by users, theft detection, etc. and Research Information Management (RIM) system “IRINS” for showcasing the institute’s research output along with the faculty research profile to the academic and research communities of the world.
- ❖ The IIT Bombay Library should develop and implement library mobile apps for their users because it helps them to get quick access of the library catalog, library resources and services in their palm.
- ❖ The IIT Bombay Library should display the latest faculty research publications in their library website home page because it alerts the new publications made by the faculty members of the institute.

IIT Delhi Library system to provide smart library services to their users:

- ❖ The IIT Delhi Library should implement digital photo archives technology for the long-term preservation and storage of the institute events photos including the library.
- ❖ The IIT Delhi Library should integrate more Web 2.0 tools like Facebook, Twitter, etc. because it helps in promotion and marketing of library resources and services.
- ❖ Both the IIT Bombay and IIT Delhi Library should provide subject/research guide to their users, so that they could get their right information resources at the right time without searching all the resources link available in their respective library websites.
- ❖ Apart from using SaaS model of cloud computing, both the IIT Bombay and IIT Delhi Library should use PaaS and IaaS model of cloud computing because these models lessen the burden of hosting and managing library

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web applications, software and hardware by the library staff.

## 8. Conclusion

Library technology plays a major role in providing smart library services to the library users. It ultimately saves valuable time of the user by obeying the fourth law of library science. The present study gives detailed preview of different kind of library technology used by the IIT Bombay and IIT Delhi library system. It is found that the IIT Delhi Library have adopted more library technology solutions compared to the IIT Bombay Library for providing smart library solutions to their clientele. This study suggested appropriate measures for the improvement of existing library system of IIT Bombay and IIT Delhi. Further, this study may be useful to those who are doing in-depth research in the field of library technology.

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