CHAPTER-6

FINDINGS, CONCLUSION AND SUGGESTIONS

6.1 Introduction

The study was conducted to find the current trends in information communication technology applications in the central libraries of Indian Institutes of Technology. This chapter explains the findings of the study with reference to objectives of the study with testing of hypothesis, conclusions and suggestions that can be drawn from the analysis and interpretation of data. It also presents a real picture of the central libraries of Indian Institutes of Technology. This chapter concludes with suggestions and recommendations on the basis of users’ feedback for further research in the context of central libraries of IITs. The following findings are purely based on data which collected through questionnaire and observations from the librarian/library in-charge of Indian Institutes of Technology.

6.2 Summary of the findings from the questionnaires of librarian

This study finds several findings and these are summarised as under various headings:

6.2.1 General Findings

Distribution of Questionnaire

100% responses have been received from In-charge of the central library or Librarians or Deputy Librarian or Assistant Librarian or Senior Library Information Assistant of New and Old Indian Institutes of Technology. (Table 5.1.1)

Designation of Respondents

In old Indian Institutes of Technology, 3 (42.86%) respondents are Librarians (L), one (14.28%) is Deputy Librarian (DL) and 3 (42.86%) are Assistant Librarians (AL) while in new Indian Institutes of Technology, 1 (11.11%) respondent is Librarian (L),
5 (55.56%) respondents are Deputy Librarian (DL), 1 (11.11%) respondent is Assistant Librarian (AL) and 2 (22.22%) respondents are Senior Library Information Assistant (SLIA). (Table 5.1.2)

**Gender wise Respondents**

In old Indian Institutes of Technology, all respondents are male and in new Indian Institutes of Technology (IITs), 8 (88.88%) respondents are male while one is female. It means that the all the respondents (Librarians or Deputy Librarian or Assistant Librarian or Senior Library Information Assistant.) of central libraries of IITs are male except one from new IITs that is from IIT Indore. (Table 5.1.3)

**Age wise Respondents**

In old IITs, 5 (71.43%) respondents are more than 40 years old, while in new IITs, 4 (44.44%) respondents are more than 40 years old, 3(33.33%) respondents are 36-40 years old and 1(11.11%) respondent is 31-35 years old and 1 respondent is 26-31 years old. (Table 5.1.4)

**Educational Qualification of Respondents**

4 (57.14%) respondents of old IITs are PhD. and 1 (14.28%) respondent is post graduate. In new IITs, 5 (55.55%) respondents are PhD, 3 (33.33%) are post graduate and 1 (11.11%) respondent is M.Phil. The respondents of old Indian Institutes of Technology are more experienced than new Indian Institutes of Technology. (Table 5.1.5)

**Professional Experience of Respondents**

In old IITs, 4 (57.14%) respondents have 16-25 years’ experience while 2 (28.57%) have more than 25 years’ experience. In new IITs, 3 (33.33%) respondents have 16-25 years’ experience while 3 (33.33%) have 11-15 years’ experience and 2 (22.22%) respondents have 6-10 years’ experience. (Table 5.1.6)
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Sitting Capacity for the Users in the Libraries
In old IITs, IIT Kanpur has the highest (2000) number of chairs are available for sitting in the library followed by IIT Kharagpur (1500), IIT Delhi (800), IIT Madras (550), IIT Bombay and IIT Roorkee (500), IIT Guwahati (301).

In new IITs, IIT BHU is providing 200 chairs for sitting followed by IIT Ropar (130), IIT Patna, IIT Gandhinagar, IIT Bhubaneswar and IIT Indore (100), IIT Jodhpur (60), IIT Mnadi and IIT Hyderabad (50). (Table 5.1.7)

Registered Users of the Library
In old IITs, IIT Bombay has the maximum (16791) number of registered students followed by IIT Kharagpur and IIT Madras (12000), IIT Delhi (10000), IIT Roorkee (8000), IIT Guwahati (7892) and IIT Kanpur (6000).

In new IITs, IIT BHU has the highest (6000) number of students followed by IIT Hyderabad (2000), IIT Gandhinagar (1400), IIT Indore (1340), IIT Patna and IIT Bhubaneswar (1000), IIT Jodhpur (900), IIT Mandi (850) and in IIT Ropar, there is 600 registered students only. (Table 5.1.8)

6.2.2 Findings on objectives of the study
Objective 1: To identify best practices based on Information Communication Technology Applications in the central libraries of old and new IITs in India.

ICT based best practices
In old IITs, all the central libraries are using email alerts, 4 (57.14%) are using e-referencing, 3 (42.86%) are using instant messaging and only 2 (58.27%) libraries are using SMS services.

In new IITs, all the Central libraries are using email alerts, 4 (44.44%) are using e-referencing, 3 (33.33%) are using online SMS and instant messaging and only 2 (22.22%) libraries are using SMS services. (Table 5.1.11)
Listservs for Collection Development

In old IITs, only IIT Delhi uses the Listservs for the collection development while IIT Kharagpur and IIT Roorkee don’t use it.

In new IITs, IIT Gandhinagar, IIT Bhubaneswar and IIT Roopar use the Listserve for the collection development while six IITs (IIT Patna, IIT Hyderabad, IIT Jodhpur, IIT Indore, IIT Mandi and IIT BHU) don’t use it. (Table 5.1.12)

Automation in the Library and Automated Modules of Acquisition System

All the central libraries of Indian Institutes of Technology are automated. (Table 5.1.13)

In old IITs, all the libraries (IIT Kharagpur, IIT Bombay, IIT Madras, IIT Kanpur, IIT Delhi, IIT Guwahati and IIT Roorkee) are using processing, ordering and receiving of acquisition module while 6 (85.71%) central libraries of old IITs (IIT Kharagpur, IIT Bombay, IIT Kanpur, IIT Delhi and IIT Roorkee) are using recommendation and only 2 (28.57%) libraries (IIT Bombay and IIT Kanpur) are using other type of things like book exhibitions and Sending pamphlets to vendors.

In new IITs, 5 (55.55%) Central Libraries (IIT Gandhinagar, IIT Bhubaneshwar, IIT Ropar, IIT Jodhpur and IIT Mandi) are using recommendations while 4 (44.44%) central libraries (IIT Gandhinagar, IIT Bhubaneshwar, IIT Jodhpur and IIT Mandi) use processing, ordering and receiving of acquisition section. And only IIT Ropar uses the processing of acquisition section. (Table 5.1.13.1)

Automated Modules of Circulation System

In old IITs, all (100%) the libraries (IIT Kharagpur, IIT Bombay, IIT Madras, IIT Kanpur, IIT Delhi, IIT Guwahati and IIT Roorkee) are using Issue Return, Fine Collection, Membership Procedure and Overdue Notice of circulation section whereas
6 (85.71%) central libraries of IITs (IIT Kharagpur, IIT Bombay, IIT Madras, IIT Kanpur, IIT Delhi, IIT Guwahati and IIT Roorkee) are using reservation for the users.

In new IITs, all (100%) the Central Libraries (IIT Kharagpur, IIT Bombay, IIT Madras, IIT Kanpur, IIT Delhi, IIT Guwahati and IIT Roorkee) are using issue and return, overdue notice service while 8 (88.89%) central libraries are using fine collection, 7 (77.78%) are using reservation service and only 4 (44.44%) central libraries are using membership procedure service. (Table 5.1.13.2)

**Automated Modules of Cataloguing System**

In old IITs, 6 (85.71%) central libraries do data entry through books, 3 (42.86%) central libraries do through accession register whereas 2 (28.57%) do direct recommendation, direct through forms and data entry through cards.

In new IITs, 8 (88.89%) central libraries do data entry through books while 5 (55.55%) do through accession register, 2 (22.22%) do direct recommendation and 1 (11.11%) do direct through forms and data entry through cards. (Table 5.1.13.3)

**Automated Modules of Web OPAC System**

In old IITs, it is found that 6 (85.71%) central libraries do edit profile using OPAC, 3 (42.86) do Book Recommendation and 2 (28.57%) do Bulletin Board and suggestions.

In new IITs, 6 (66.67%) central libraries do edit profile and suggestions using OPAC while 5 (55.55%) central libraries use Book Recommendation and 2 (28.57%) Bulletin Board. (Table 5.1.13.4)

**Automated Modules of Serial Control System**

In old IITs, 6 (85.71%) use receiving service, 5 (71.43%) use processing, receiving request, indexing service, 4 (57.14%) central libraries do ordering and only 2 (28.57%) do abstracting service with the help of serial control module.
In new IITs, 5 (55.55%) central libraries use processing service, 4 (44.44%) libraries do indexing and receiving service, 2 (22.22%) libraries use ordering service while only 1 (11.11%) receiving request service. (Table 5.1.13.5)

Technology used by the Library

In old IITs, 6 (85.71%) librarians use barcode technology in their libraries while 5 (71.43%) use RFID technology, 4 (57.14%) respondents use smart cards, 2 (28.57) use cloud computing and only 1 (14.28%) that is IIT Guwahati is using QR code technology in the library.

In new IITs, 8 (88.89%) librarians are using barcode technology while 6 (66.67%) librarians are using smartcards, 3 (33.33%) libraries are using RFID technology and QR Code technology and merely 2 (22.22%) libraries are using cloud computing. (Table 5.1.17)

Mobile based Application

In old IITs, only 1 (14.28%) that is IIT Guwahati is using mobile based library service for the library users while in new IITs, 3 (33.33) central libraries are using mobile based library services. IIT Gandhinagar is using Beta Version mobile based library service while IIT Jodhpur is using NGL Carbon. (Table 5.1.18)

Need of Technical Training to manage ICT Applications

In old IITs, 3 (42.86%) librarians say that there is need of technical training to manage ICT applications while in new IITs, 6 (66.67%) librarians say that there is need of technical training to manage ICT applications. (Table 5.1.19)

Security System in the Library

In old IITs, 6 (85.71%) libraries are using CCTV while 4 (57.14%) libraries use RFID, 3 (42.86%) use smart cards and 2 (28.57%) use biometrics. IIT Bombay is using 3M System CCTV.
In new IITs, 8 (88.89%) libraries use CCTV while 5 (55.55%) libraries are using smart cards and 4 (44.44%) libraries that are IIT Patna, IIT Bhubaneswar, IIT Ropar and IIT Mandi are using RFID. (Table 5.1.23)

**Use of antivirus in the Library**

In old IITs, IIT Guwahati is using McAfee and MS Essential antivirus in the Library while IIT Madras is using Kaspersky, IIT kharagpur is using eTrust and IIT Kanpur librarian said that it is managed by computer center, IIT Delhi is using in-house antivirus.

In new IITs, IIT Gandhnagar, IIT Mandi and IIT BHU are using Quickheel antivirus in the library while IIT Ropar and IIT Indore are using McAfee, IIT Patna is using Symantec antivirus in the library to protect their systems. IIT Ropar is also using Kaspersky antivirus. IIT Hyderabad, IIT Bhubaneswar and IIT Jodhpur did not give response of this. (Table 5.1.24)

**Browser in the Library**

In old IITs, 7 (100%) libraries are using Google Chrome while 6 (85.71%) libraries are using Mozilla Firefox and 4 (57.14%) are using Internet Explorer.

In new IITs, 9 (100%) central libraries are using Google Chrome while 6 (66.67%) libraries are using Mozilla Firefox and 3 (33.33%) use Internet Explorer. (Table 5.1.25)

**Network System Software in the Library**

In old IITs, 5 (71.43%) libraries of old IITs are using LINUX while only 1 (14.28%) library is using windows NT. IIT Kanpur librarian did not give response of it.

In new IITs, 8 (88.89%) libraries are using LINUX while only 6 (66.67%) libraries are using Windows NT. No one library is using UNIX operating system. (Table 5.1.26)
Library Network

In old IITs, 7 (100%) libraries are using Local Area Network while IIT Delhi is also using Metropolitan Area Network, IIT Kanpur and IIT Delhi are also utilising Wide Area Network.

In new IITs, 6 (66.67%) central libraries that are IIT Patna, IIT Hyderabad, IIT Gandhinagar, IIT Bhubaneswar, IIT Ropar and IIT Jodhpur are using Local Area Network. The librarian of IIT Indore, IIT Mandi and IIT BHU did not give response of this. (Table 5.1.27)

Internet Connectivity in the Library

In old IITs, 5 (71.43%) libraries are using Broad Band while 5 (71.43%) libraries are using Wi-Fi and only IIT Kharagpur is using Li-Fi Internet connectivity that is NKN Connectivity.

In new IITs, 6 (66.67%) libraries are using Broad Band while 7 (77.78%) libraries are using Wi-Fi and no one library is using Li-Fi Internet connectivity. (Table 5.1.28)

Objective 2: To find out the use of emerging ICT applications in development of library collection, activities and services.

Library Collection

Print Books

In old IITs, highest 275000 number of books are provided by IIT Kanpur, 263864 books are provided by IIT Kharagpur, 257208 books are provided by IIT Madras, 233304 number of books are provided by IIT Bombay, 200000 number of books are provided by IIT Delhi and IIT Roorkee while lowest 125396 print books are provided by IIT Guwahati.
In new IITs, highest 114275 number of books are provided by IIT BHU followed by IIT Indore 29000, IIT Gandhinagar 25000, IIT Bhubaneswar and IIT Hyderabad 16000, IIT Mandi 15900, IIT Jodhpur 15000, IIT Ropar 14500 and lowest (14421) books prints are provided by IIT Patna. (Figure 5.1.9.1)

E-books

In old IITs, highest 100000 E-books are provided by IIT Kharagpur, followed by IIT Roorkee 35000, IIT Kanpur 16000, IIT Madras 6117, lowest 5120 E-books are provided by IIT Bombay while IIT Delhi and IIT Guwahati did not respond to it. In new IITs, highest 50000 E-books are provided by IIT BHU followed by IIT Mandi 11400, IIT Bhubaneswar 2000, IIT Indore 728, IIT Ropar 500, IIT Jodhpur 50. Lowest 1 in IIT Gandhinagar and IIT Patna and IIT Hyderabad did not respond to it. (Figure 5.1.9.2)

CD-ROM

In old IITs, highest 5801 CD-ROM are provided by IIT Guwahati followed by IIT Kanpur 2000, IIT Bombay 1370, IIT Madras 356 and IIT Roorkee, IIT Delhi and IIT Kharagpur did not respond to it. In new IITs, highest 1477 CD-ROM are provided by IIT Gandhinagar followed by IIT Ropar 750, IIT Jodhpur 500 and IIT Hyderabad, IIT Patna, IIT Bhubaneswar, IIT Indore, IIT Mnadi and IITBHU did not respond to it. (Figure 5.1.9.3)

Print Periodicals

Highest number of print periodicals are provided by IIT Bombay followed by IIT Roorkee 91, IIT Guwahati 90, IIT Kharagpur 80, and IIT Madras 30 and IIT Delhi and IIT Kanpur did not give response to it. In new IITs highest 132 print periodicals are provided by IIT Gandhinagar 132 followed by IITBHU 35, IIT Bhubaneswar 26,
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IIT Ropar 15, IIT Mnadi 5, IIT Indore 3, while IIT Patna IIT Hyderabad, IIT Jodhpur did not give response to it. (Figure 5.1.9.4)

Electronic Periodicals

In old IITs, IIT Kharagpur has 25262 electronic periodicals followed by IIT Guwahati 24100, IIT Bombay 20029, and IIT Madras 704 whereas IIT Delhi and IIT Kanpur did not respond to it. In new IITs, highest 14000 electronic periodicals are provided by IITBHU followed by IIT Bhubaneswar 8500, IIT Ropar 7000, IIT Indore 6000, IIT Mnadi 237 and lowest 36 are provided by IIT Hyderabad. IIT Patna, IIT Gandhinagar, IIT Jodhpur did not respond to it. (Figure 5.1.9.5)

Bound Volumes

IIT Kanpur has highest, 28000 bound volumes followed by IIT Kharagpur 132916, IIT Bombay 119265, IIT Madras 113919, IIT Delhi 100000, IIT Roorkee 60000 and lowest no. of bound volumes are provided by IIT Guwahati i.e 35505. In new IITs highest 17738 bound volumes are provided by IITBHU, followed by IIT Hyderabad 2284, IIT Jodhpur 100, and lowest bound volume has been provided by IIT Mnadi i.e 28 and IIT Patna, IIT Bhubaneswar, IIT Ropar, IIT Indore and IIT Gandhinagar did not respond to it. (Figure 5.1.9.6)

Theses/Dissertations

IIT Bombay has highest 37154 theses/dissertation followed by IIT Kanpur 17000, IIT Roorkee 15000, IIT Madras 6689, IIT Delhi 6000, IIT Kharagpur 5697 and lowest 1510 in IIT Guwahati. In new IITs IITBHU has highest 269 theses/dissertation followed by IIT Indore 218, IIT Patna 200, IIT Gandhinagar 187, and lowest 50 IIT Ropar. IIT Hyderabad, IIT Bhubaneswar, IIT Jodhpur, IIT Mandi did not respond to it. (Figure 5.1.9.7)
Standards/Patents
In old IITs, IIT Bombay has the highest 67835 Standards/ Patents in the Central Library followed by IIT Kanpur 3000, IIT Madras 1199, IIT Guwahati 524, IIT Roorkee 5 and IIT Kharagpur and IIT Delhi, did not give response of it. In new IITs, IITBHU has the highest 80000 Standards/ Patents followed by IIT Gandhinagar 1707, IIT Indore 405, IIT Hyderabad 4 while IIT Patna, IIT Bhubaneswar, IIT Ropar, IIT Jodhpur, IIT Mandi did not give response of it. (Figure 5.1.9.8)

Full Text Databases
Highest no. of full text databases are provided by IIT Kharagpur 58, IIT Delhi 50, IIT Madras 10 and IIT Kharagpur, IIT Roorkee and IIT Guwahati did not give response of it. In new IITs, highest 50 full text databases available in the central library of IIT Gandhinagar followed by IIT Bhubaneswar 46, IIT Jodhpur 32, IIT Indore 17, IIT Mandi 15, IITBHU 13, while responses were not given by IIT Ropar and IIT Hyderabad. (Figure 5.1.9.9)

Bibliographic Databases
In old IITs, highest 14 biblographic database are provided by IIT Madras followed by IIT Delhi 8, IIT Bombay 7, IIT Kharagpur 3, while IIT Guwahati, IIT Roorkee, IIT Kanpur did not give response of it. In new IITs, highest 10 bibliographic databases are provided by IIT Gandhinagar followed by IIT Bhubaneswar, IIT Mandi, IIT Jodhpur provided 4 and 3 bibliographic database are provided by IIT Ropar, IIT Patna, IIT Hyderabad, IITBHU did not give response of it. (Figure 5.1.9.10)

Library Personnel
In old IITs four are the librarians, seven are the deputy librarians, twenty one are the assistant librarians, nine are the Junior Library Information Officer, twenty are the Senior Library Information Officer, Seven are the Junior Library Information Officer,
twenty three are the Senior library Information Assistant, fourteen are the Assistant Library Information Officer, forty six are the Graduate Trainees and seventeen are the other library staff.

While in New IITs, only one is the librarian, 5 are the deputy librarians and assistant librarians, no one is the Junior Library Information Officer, ten are the Senior Library Information Officer, one is the Library Information Officer, Eight are the Senior Library Information Assistant, two are the Assistant Library Information Officer, twenty one are the Graduate Trainees and nine are the other library staff. (Table 5.1.10)

Services offered by the Library

In old IITs, 7 (100%) central libraries offer lending services, reference service, CAS, reprographic service, web OPAC, user education, ILL, alerting service, online database search, CD-ROM database service and Document Delivery Service while 6 (85.71%) Digital library service, I R Service, Ask librarian and only 5 (71.43%) central libraries of old IITs offer remote access to e resources.

In new IITs, 9 (100%) central libraries offer web OPAC, online database search, CD-ROM database service, digital library service, I R Service and remote access to e resources while 8 (88.89%) libraries provide reference service, CAS, user education and alerting service, 7 (77.78%) libraries offer reprographic service, ILL and CAS, 6 (66.67%) provide lending service and only 5 (55.55%) libraries offer ask librarian service. (Table 5.1.14)

Current Awareness Services

In old IITs, 7 (100%) libraries offer monthly book addition and new arrivals service to their users while 6 (85.71%) libraries provide email alert service, 3 (42.86%) provide
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SMS alerting service and 2 (28.57%) libraries provide Bulletin Board Service and Newspaper clipping.

In new IITs, 9 (100%) libraries provide email alert service while 8 (88.89%) libraries offer new arrivals service, 7 (77.77%) offer Newspaper clipping service to their users, 6 (66.67%) libraries offer monthly book addition, 4 (44.44%) libraries provide bulletin board service and 3 (33.33%) provide SMS alerting service. (Table 5.1.15)

Add-on Services

In old IITs, 7 (100%) libraries provide Library Web-blog Portal 6 (85.71%) offer Wi-Fi Services and 5 (71.43%) offer Mobile based Services to their users. In old IITs IIT Bombay is also providing other type of add-on service that is shelf-checkout.

In new IITs, 9 (100%) central libraries offer Wi-Fi Services to their users while 7 (77.78%) libraries provide Library Web-blog Portal and 3 (33.33%) provide Mobile based Services. (Table 5.1.16)

Objective 3: To find out the infrastructure required for the implementation of ICT applications in the libraries.

Computers availability in the Library

In old IITs, IIT Kharagpur has the highest numbers of computers that is 160 followed by IIT Madras (150), IIT Bombay (70), IIT Delhi (70), IIT Roorkee (70), while in new IITs, 70 are provided by IIT Bhubaneswar, 60 by IIT BHU, 30 by IIT Jodhpur, 24 by IIT Indore, 23 by IIT Gandhinagar, 14 by IIT Mandi and lowest no. of computers are provided by IIT Hyderabad and IIT Ropar that is 10. (Figure 5.1.20.1)

Server Machines availability in the Library

In old IITs, highest (12) numbers of server machines are provided by IIT Bombay followed by IIT Roorkee (7), IIT Guwahati and IIT Kanpur (5), IIT Kharagpur (3) and
IIT Madras (2) while in new IITs, IIT Bhubaneswar (6) followed by IIT Hyderabad and IIT Gandhinagar (3) and lowest numbers of server machines are provided by IIT Patna, IIT Indore and IIT Mandi that is 1. (Figure 5.1.20.2)

**Photocopy Machines**

In old IITs, IIT Kanpur and IIT Delhi are providing 4 photocopy machines for the users followed by IIT Kharagpur that is 3, IIT Bombay, IIT Madras, IIT Guwahati, are providing 2 photocopy machines and only IIT Roorkee is providing only 1 photocopy machine for their library users. In new IITs, IIT Bhubaneswar is providing 3, IIT Hyderabad, IIT Indore and IIT BHU are providing 2 while IIT Patna, IIT Gandhinagar, IIT Ropar, IIT Jodhpur and IIT Indore are providing only 1 photocopy machine for the library users. Only IIT Mandi Central Library is not providing the photocopy machine for their users. (Figure 5.1.20.3)

**Flatbed Scanners**

In old IITs, IIT Bombay and IIT Roorkee are providing 5 flatbed scanners followed by IIT Kharagpur that is 3, IIT Madras that is 2, while IIT Kanpur, IIT Delhi, IIT Guwahati have no facility of flatbed scanner. In new IITs, IIT Patna, IIT Gandhinagar, IIT Jodhpur and IIT Mandi are providing only 1. IIT Hyderabad, IIT Bhubaneswar, IIT Ropar, IIT Indore and IIT BHU have no facility of flatbed scanner. 5.1.20.4)

**Overhead Scanners**

It is analysed that in old IITs, IIT Madras, IIT Kanpur, IIT Delhi, IIT Roorkee have 2 overhead scanners whereas IIT Kharagpur, IIT Guwahati have only 1. In the new IITs, IIT Hyderabad and IIT Indore are providing 4 overhead scanners while IIT Bhubaneswar has 3 whereas IIT Patna, IIT Gandhinagar, IIT Ropar and IIT Mandi
have only 1. Only IIT Bombay and IIT Jodhpur have not the overhead scanner. (Figure 5.1.20.5)

**Barcode Scanners**

In old IITs, IIT Kanpur has the highest (15) numbers of barcode Scanners followed by IIT Delhi (10), IIT Kharagpur and IIT Guwahati, IIT Bombay (4), IIT Madras (2) and IIT Roorkee doesn’t have barcode scanner. While in new IITs, IIT Bhubaneswar (6), IIT Gandhinagar, IIT BHU (5), IIT Hyderabad, IIT Jodhpur, IIT Indore (3), IIT Mandi (2) while IIT Ropar has only one barcode scanner. IIT Patna doesn’t have barcode scanner. (Figure 5.1.20.6)

**Handheld Scanners**

In old IITs, IIT Kanpur and IIT Delhi have the highest (10) no. of handheld scanners followed by IIT Madras, IIT Guwahati (2) while IIT Kharagpur, have only 1 handheld scanners. IIT Bombay, IIT Roorkee don’t have handheld scanners. In new IITs, IIT Bhubaneswar has the highest (5), IIT Ropar, IIT Indore have only 1 handheld scanners. IIT Patna, IIT Hyderabad, IIT Gandhinagar, IIT Jodhpur, IIT Mandi and IIT BHU don’t have handheld scanners. (Figure 5.1.20.7)

**Laser Printers**

In old IITs, IIT Bombay has the highest (14) numbers of laser printers followed by IIT Delhi (10), IIT Kharagpur (8), IIT Madras (6), IIT Roorkee (5) while IIT Kanpur has 2 laser printers. IIT Guwahati central library doesn’t have laser printers.

In new IITs, IIT BHU (10), IIT Kharagpur (8), IIT Bhubaneswar (7), IIT Gandhinagar (6), IIT Mandi (4), IIT Indore (3) while IIT Hyderabad, IIT Ropar, IIT Jodhpur have 2 laser printers. IIT Patna central library doesn’t have laser printers (Figure 5.1.20.8)
LCD/Projectors

In old IITs, IIT Kharagpur, IIT Madras, IIT Kanpur, IIT Delhi, IIT Roorkee have 2 LCD/Projector while IIT Bombay, IIT Guwahati have 1. In New IITs, IIT BHU have 2 LCD/Projector while IIT Patna, IIT Hyderabad and IIT Mandi have 1. IIT Gandhinagar, IIT Bhubaneswar, IIT Ropar, IIT Jodhpur, IIT Indore don’t have LCD/Projector in their library. (Figure 5.1.20.9)

Objective 4: To find out the usage of open and commercial software for library management.

Library Management Software

All the IITs are using library management software. (Table and Figure 5.1.22) In old IITs, 5 (71.43%) central libraries that are IIT Kharagpur, IIT Kanpur, IIT Delhi, IIT Guwahati and IIT Roorkee are using Libsys software while IIT Bombay is using Koha and Libsuit Software and IIT Madras is using VTLS.

In new IITs, 5 (55.55%) central libraries that are IIT Hyderabad, IIT Gandhinagar, IIT Bhubaneswar, IIT Mandi and IIT BHU are using Koha library management software while IIT Patna, IIT Ropar and IIT Indore are using Libsys library management software and IIT Jodhpur is using NewGenLib Library management software. (Table 5.1.21)

Digital/Institutional Repository Software

All the IITs are using digital/institutional repository software. In old IITs, all the central libraries are using DSpace digital/institutional repository software while IIT Madras is also using E-Print Archive.

In new IITs, all the central libraries are using DSpace digital/institutional repository software. (Table 5.1.22)
Objective 5: To investigate the usage of social networking sites for sharing and communicating information.

Use of Social Networking Sites

2 old central libraries of IITs are using social networking sites while in new, 4 central libraries are using Social Networking Sites. (Table 5.1.29)

2 (28.58%) old central libraries are using Facebook while only one (14.27%) is using YouTube and one (14.27) is using Blog. In new IITs, 4 (44.44%) are using Facebook, 2 (22.22%) are using YouTube, blog and 3 (33.33%) are using Twitter. (Table 5.1.30)

Purpose of Using Social Networking Sites

In old IITs, 3 (42.86%) central libraries are using for linking with library users, for promotional activities and user education programme, and 3 (42.86%) central libraries are also using for creating awareness about library collection and services while only 2 (28.57%) central library are using for getting feedback/sharing the problems to the users.

In new IITs, 4 (44.44%) central libraries are using for linking with library users, 4 (44.44%) central libraries are using for creating awareness about library collection and services whereas 2 (22.22%) are using for the promotional activities and users education programme and 3 (33.34%) for getting feedback/sharing the problems to the users. (Table 5.1.31)

Objective 6: To find out the major problems and issues in implementation of ICT in libraries.

Problems during Implementation of ICT Applications

In old IITs, Librarians (28.57%) of IIT Madras and IIT Guwahati face the problem at the time of implementation of ICT Applications while five (71.43%) old IIT
Librarians (IIT Kharagpur, IIT Bombay, IIT Kanpur, IIT Delhi and IIT Madras) say that there is no problem while implementing the ICT Applications.

In new IITs, 5 (55.55%) respondents (IIT Patna, IIT Hyderabad, IIT Gandhinagar, IIT Mandi and IIT BHU) are facing problems during Implementation of ICT Applications in the Central Libraries of Indian Institutes of Technology while four respondents say that there is no problem while implementing the ICT Applications. (Table 5.1.32)

**Different Problems during Implementation of ICT Applications**

In old IITs, one respondent says that facing problem due to scarcity/paucity of funds, two respondent say that because of increasing cost of hardware and software, non-availability of consultancy services and in selection of open vs. commercial software.

In new IITs, four respondents say that facing problems due to increasing cost of hardware and software while only one respondent say that facing problem because of scarcity/paucity of funds, non-availability of consultancy services, selection of open vs. commercial software, lack of ICT infrastructure, inadequate trained professionals, implementation of latest device and gadgets, lack of co-operation and co-ordination among staff, lack of support from higher authority and server vs. cloud computing technology. (Table 1.33)

**6.3 Summary of the findings from the questionnaires of user**

**Distribution and Receiving of Questionnaire**

The results shows that highest response rate was 100% from many old and new IITs like IIT Kanpur, IIT Delhi, IIT Guwahati, IIT Roorkee, IIT Gandhinagar, IIT Hyderabad, IIT Bhubaneswar, IIT Jodhpur and IIT (BHU). Lowest responses were received from IIT Bombay (85.00%) in old IITs and IIT Indore (70.00%) in new IITs in comparison to all. (Table 5.2.1)
Gender wise Respondents

It is found that in old IITs, 81.19% respondents are male and 18.81% respondents are female where as in new IITs, 84.24% respondents are male and only 15.76% respondents are female. (Table 5.2.2)

Designation of Respondents

In old IITs, highest (43.06%) numbers of respondents are post graduate while 36.63% of respondents are under graduate and lowest numbers of respondents are research scholars in old Indian Institutes of Technology. In new Indian Institutes of Technology, highest (42.42%) numbers of respondents are under graduate whereas 38.99% are post graduate and lowest numbers (18.59%) of respondents are research scholars. (Table 5.2.3)

Age wise Respondents

In old IITs, highest 246 (60.90%) of respondents are between 20-25 years old, 80 (19.80%) respondents are more than 26 years old and lowest 78 (19.30%) respondents are less than 20 years old whereas in new IITs, highest 281 (56.77%) respondents are 20-25 years old, 122 (24.65%) respondents are less than 20 years old and lowest 92 (18.58%) respondents are more than 26 years old. It is clear that most of the respondents are from 20-25 years age from both old and new IITs. (Table 5.2.4)

Frequency of users visit in the library

In old IITs, highest 159 (39.36%) number of users visit library daily, followed by 124 (30.69%) users visit when they need, 69 (17.08%) number of users visit library twice a week, 41 (10.15%) number of users visit weekly and lowest 11 (2.72%) number of users visit library monthly.

In new IITs, highest 196 (39.59%) number of users visit library when they need followed by 149(30.20%) number of users visit library daily, 73 (14.75%)
number of users visit library twice a week, 49 (9.90%) number of users visit weekly while lowest 28 (5.66%) number of users visit library monthly. (Table 5.2.5)

**Reasons for not visiting library frequently (daily or twice a week)**

In old IITs, highest 99 (56.25%) number of users do not visit library frequently because information is available on desktop followed by 79 (44.89%) number of users do not visit due to shortage of time, 44 (25.00%) number of users do not visit library frequently to do research work, 25 (14.20%) number of users do not visit library frequently because required information is not available in library and 11 (6.25%) number of users do not visit library frequently due to inconvenient library hours, busy on old schedule etc. For old IITs, $X^2 = 18.209, p = 0.792 \ (≤ .05 \ non-significant)$, There is no significant difference in reasons for not visiting the library frequently.

In new IITs, highest 144 (52.75%) number of users do not visit library frequently because information is available on desktop followed by 124 (45.42%) number of users do not visit due to shortage of time, 62 (22.71%) number of users do not visit library frequently to do research work, 46 (16.85%) number of users do not visit library frequently because required information is not available in library and 24 (8.70%) number of users do not visit library frequently due to inconvenient library hours, busy on old schedule etc. For new IITs, $X^2 = 64.26, p = 0.0006 \ (≤ .05 \ significant)$, There is a significant difference in reasons for not visiting library frequently. (Table 5.2.6)

**Purpose of visit to the Library**

In old IITs, highest 208 (51.49%) users visit for reading subject books followed by 154 (38.12%) for borrowing and returning books, 152 (30.71%) for consulting reference books, 146 (29.49%) visit for completing their class assignments, 119 (29.46%) for purpose of reading general books, 97 (19.59%) number of users visit
library for purpose of getting reference service, 89 (22.03) number of users visit library for purpose of reading newspapers and magazines and lowest 57 (11.51) number of users visit library for other reasons that are good ambience, for preparing competitive exam, peaceful place & better environment, AC, to study in peace, quite place to work, to do research work, to complete thesis work, to read story book, to use computers, Wi-Fi and internet. For the old IITs, \( \chi^2 = 105.126, p = 2.5e-7 \) (≤.05 significant), There is a significant difference in purpose of visit to the Library.

In new IITs, highest 273 (55.15%) numbers of users visit for reading subject books followed by 271 (54.75%) number of users visit for borrowing and returning books, 170 (34.34%) number of users visit for reading newspapers and magazines, 144(29.09%) number of users visit for reading general books, 129 (31.93%) number of users visit for completing class assignment, 61 (15.35%) number of users visit library for any other reason like good ambience, for preparing competitive exam, peaceful place & better environment, AC, to study in peace, quite place to work, to do research work, to complete thesis work, to read story book, to use computers, Wi-Fi and internet and lowest 51 (12.62%) number of users visit for getting reference service. For new IITs, \( \chi^2 = 103.867, p = 0.0001 \) (≤.05 significant), There is a significant difference in purpose of visit to the Library. (Table 5.2.7)

**Information Communication Technology based services**

In old IITs, highest 300 (74.26%) users of library are agree with the use of online library catalogue, 200 (49.50%) numbers of users use reservation of book service, 199 (49.28%) library users use online access of electronic resources, 156 (38.61%) number of users use automatic issue and return of book service, 134 (33.17%) number of users agree with the use of digital reference service, 93 (23.02%) number of users use remote access service of the library, 86 (21.29%) numbers of users use in house
digital collection service, 85 (21.04%) numbers of users use online user education service, 78 (19.31%) numbers of users use instant messaging service of library, lowest 60 (14.85%) numbers of users use library for CD-ROM access on campus network. For the old IITs, $X^2 = 92.979$, $p = 0.0007$ ($\leq .05$ significant), There is a significant difference in information communication technology based services.

In new IITs, highest 298 (60.20%) users of library agree with the use of online library catalogue, 234 (47.27%) numbers of users use reservation of book service, 206 (41.62%) number of users use automatic issue and return of book service, 182 (36.77%) library users use online access of electronic resources, 128 (25.85%) number of users use remote access service of the library, 127 (25.66%) number of users agree with the use of digital reference service, 126 (25.45%) numbers of users use instant messaging service of library, 93 (18.79%) numbers of users use online user education service, 89 (17.99%) numbers of users use library for CD-ROM access on campus network while lowest 81 (16.36%) numbers of users use in house digital collection service. For the new IITs, $X^2 = 140.334$, $p = 0.0000$ ($\leq .05$ significant), There is a significant difference in information communication technology based services. (Table 5.2.8)

**Use of Social Networking Sites in the Library**

In old IITs, only 164 (40.60%) users of IITKGP, IITB, and IITM are using social networking sites while 240 (59.40%) number of users of IITK, IITD, IITG and IITR do not use social networking sites. In new IITs 222 (44.85%) %) users of IITP, IITH, IITBBS and IITRPR are using social networking sites while 273 (55.15%) number of users of IITGN, IITJ, IITI, IIT Mandi and IITBHU do not use social networking sites. (Table 5.2.9)

In New IITs, majority 118 (71.95%) of users use Facebook followed by 98 (59.76%) number of users use YouTube for their activities, 39 (23.78%) %) number
of users use Twitter while lowest 26 (15.88%) number of users use RSS feed in the old IITs. In new IITs most 168 (75.67%) number of users use Facebook followed by 141 (63.51%) number of users use YouTube for their activities, 47 (21.17%) number of users use Twitter while lowest 43 (19.37%) number of users use RSS feed. (Table 5.2.10)

**Satisfaction with the digitized collection**

Majority 374 (92.57%) of users said that they are satisfied with the digitized collection of central libraries of old IITs while 30 (7.43%) number of users are not satisfied with the digitized collection of old IITs. In old IITs, highest 59 (98.33%) number of users of IIT Delhi are satisfied with digital collection. For the old IITs, \(X^2 = 11.38, p = 0.772 \leq 0.05\) non-significant, There is no significant difference in satisfaction with the digitized collection.

In new IITs, most 441 (89.09%) number of users said that they are satisfied with the digitized collection of central libraries while 54 (10.91%) number of users are not satisfied with the digitized collection. In IITG 58 (96.67%) number of users are satisfied with digital collection. For the new IITs, \(X^2 = 140.334, p = 0.3097 \leq 0.05\) non-significant, There is a no significant difference in satisfaction with the digitized collection. (Table 5.2.11)

**Satisfaction Level with the digitized collection**

In old IITs, highest 161 (43.05%) number of users said that digital collection is highly useful while 158 (42.25%) number of users agree with the digital collection is moderately useful where lowest 55 (14.70%) users said that digital collection is slightly useful for library users. For the old IITs, \(X^2 = 13.34, p = 0.3446 \leq 0.05\) non-significant, There is a no significant difference in opinion about the use of digital collection.
In new IITs, majority 197 (44.67%) number of users are saying that digital collection is moderately useful whereas 175 (41.72%) number of users said that digital collection is highly useful and 69 (15.65%) number of users said it is slightly useful. For the new IITs, $X^2 = 25.62, p = 0.596$ ($\leq .05$ non-significant), There is a no significant difference in opinion about the use of digital collection. (Table 5.2.12)

**Satisfaction to the Library Services**

In old IITs, almost 384 (95.05%) number of users are satisfied with the services of central libraries while 20 (4.95%) number of users are not satisfied with the servicer of libraries. For the old IITs, $X^2 = 9.02, p = 0.172$ ($\leq .05$ non-significant), There is a no significant difference in in satisfaction to the library services.

In new IITs, majority 449 (90.71%) number of users are satisfied with the services of central libraries while 46 (9.29%) number of users are not satisfied with library services. For the new IITs, $X^2 = 12.93, p = 0.114$ ($\leq .05$ non-significant), There is a no significant difference in satisfaction to the library services. (Table 5.2.13)

**Satisfaction Level about the Library Services**

In old IITs, majority 173 (45.05%) of users are satisfied with the library services, 116 (30.21%) number of users said that they were fully satisfied with library services while 95 (24.74%) number of users are partially satisfied with the services of libraries. For the old IITs, $X^2 = 32.91, p = 0.001$ ($\leq .05$ significant), There is a significant difference in opinion about the library services.

In new IITs, majority 172 (38.31%) number of users are satisfied with the library services, 139 (30.96%) number of users said that they were fully satisfied with library services while 138 (30.76%) number of users are partially satisfied with the
services of libraries. For the new IITs, $X^2 = 46.98$, $p = 0.0001$ ($\leq 0.05$ significant), There is a significant difference in opinion about the library services. (Table 5.2.14)

**Satisfaction with the relevant collection available in Library**

In old IITs, 374 (92.57%) number of users are satisfied for the availability of relevant collection in the library while 30 (7.43%) number of users said not satisfied for the availability of relevant collection in the library. For the old IITs, $X^2 = 10.98$, $p = 0.0890$ ($\leq 0.05$ non-significant), There is a no significant difference in satisfaction with the relevant collection available in library.

In old IITs, 428 (86.46%) number of users are satisfied for the availability of relevant collection in the library while 67 (13.54%) number of users are not satisfied for the availability of relevant collection in the library. For the new IITs, $X^2 = 22.02$, $p = 0.0049$ ($\leq 0.05$ significant), There is a significant difference in satisfaction with the relevant collection available in library. (Table 5.2.15)

**Satisfaction level with relevant collection available in the Library**

In old IITs, 193 (51.60%) number of users said good for the availability of relevant collection whereas 102(27.27%) number of users said relevant collection of library is very good, lowest 79 (21.12%) number of users said that relevant collection of library is excellent. For the old IITs, $X^2 = 10.21$, $p = 0.597$ ($\leq 0.05$ non-significant), There is a no significant difference in opinion with the relevant collection available in the Library.

In new IITs, 211 (49.30%) number of users said good for the availability of relevant collection whereas 121 (28.27%) number of users said relevant collection of library is very good, lowest 96 (22.43%) number of users said that relevant collection of library is excellent. For the new IITs, $X^2 = 21.56$, $p = 0.157$ ($\leq 0.05$ non-significant), There is a no significant difference in opinion with the relevant collection available in the Library. (Table 5.2.16)
Use of Available E-resources in the Library

In old IITs, majority 254 (62.87%) number of respondents were using the available E-resources in the Library while 150 (37.13%) number of respondents were not using Available E-resources in the Library. For the old IITs, $X^2 = 46.00$, $p = 2.95e-08$ (≤0.05 significant), There is a significant difference in use of available E-resources in the library.

In new IITs, majority 333 (67.27%) number of respondents were using the available E-resources in the Library while 162 (32.73%) number of respondents were not using Available E-resources in the Library. For the new IITs, $X^2 = 52.32$, $p = 1.46e-08$ (≤0.05 significant), There is a significant difference in use of available E-resources in the library. (Table 5.2.17)

Used E-resources in the Library

The In old IITs, 150 (59.06%) number of users use e-general for their study and research, 132 (51.97%) number of users use E-books, 72 (28.35%) number of users use E-database, 64 (25.18%) number of users use E-thesis for research purpose, 47 (18.50%) number of users use E-scholarly content and 3 (1.18%) number of users use E-resources for their various activities like previous year question papers, conference papers and technical reports. For the old IITs, $X^2 = 38.39$, $p = 0.1399$ (≤0.05 non-significant), There is a no significant difference in use of available E-resources in the library.

In new IITs, 202 (60.66%) number of users use e-general for their study and research, 144 (43.24%) number of users use E-books, 91 (27.33%) number of users use E-thesis for research purpose, 86 (25.83%) number of users use E-database, 67 (20.13%) number of users use E-scholarly content and 13 (3.90%) number of users use E-resources for their various activities like previous year question papers, conference papers and technical reports. For the new IITs, $X^2 = 157.33$, $p = 7.75e-16$
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(≤.05 significant), There is a significant difference in use of available E-resources in
the library. (Table 5.2.18)

Problems faced while using the e-resources of the library

In old IITs, 200 (49.50%) respondents were facing problem while using E-resources,
whereas 204 (50.50%) number of users were not facing any type of problem while
using E-resources in the library. For the old IITs, $X^2 = 12.13, p = 0.592 \ (≤.05 \ non-
significant)$, There is a no significant difference in problems faced while using the e-
resources of the library.

In the new IITs, 205 (41.41%) respondents were facing problem while using
E-resources, whereas 290 (58.59%) number of users were not facing any type of
problem while using E-resources in the library. For the new IITs, $X^2 = 12.13, p =
1.01e-05 \ (≤.05 \ significant)$, There is a significant difference in problems faced while
using the e-resources of the library. (Table 5.2.19)

Different types of Problems while using the e-resources of the Library

In old IITs, 77 (38.50%) numbers of respondents said that they face problem in
reading from desktop screen while using the e-resources of the library, 75 (37.50%)
users face problem due to unorganised information, 69 (34.50%) users face problem
due to inadequate resources, 41 (20.50%) users face problem due to poor connectivity
of internet and 3 (1.50%) users face problem due to other reasons like rush at minor
time, no discussion room Wi-Fi problem sometimes login account base facilities are
out of order. For the old IITs, $X^2 = 60.48, p = 0.0001 \ (≤.05 \ significant)$, There is a
significant difference problems faced while using the e-resources of the library.

In new IITs, 11 (55.15%) numbers of respondents said that they face problem
due to inadequate resources, , 98 (47.80%) users face problem due to poor
connectivity of internet, 76 (37.07%) users face problem due to difficulty in reading
from screen while using the e-resources of the library, 75 (36.59%) users face problem due unorganised information and 3(1.46%) users face problem due to other reasons like rush at minor time, no discussion room Wi-Fi problem sometimes login account base facilities are out of order Lack of study room. For the new IITs, $X^2 = 59.59$, $p = 0.0022 \leq .05$ significant, There is a significant difference in problems faced while using the e-resources of the library. (Table 5.2.20)

6.4 Testing of Hypotheses

The hypotheses were formulated according to the objectives of the research to answer the research problem. They were tested using tables and figures with the help of MS-Word and MS-Excel.

**H$_1$**: Old Central Libraries of IITs have state-of-art infrastructure and resources to support modern library services based on ICT.

From the tabular and graphical representation of table no. 5.1.20 and figures 5.1.20.1, 5.1.20.2, 5.1.20.3, 5.1.20.4, 5.1.20.5, 5.1.20.6, 5.1.20.7, 5.1.20.8 and 5.1.20.9 show that all old central libraries of IITs have state-of-art infrastructure and resources to support modern library services based on ICT. Hence above hypothesis is proved and accepted.

**H$_2$**: Most of Central Libraries of IITs are utilizing ICT in development and management of library collection.

From the tabular and graphical representation of table 5.1.9 and figures 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.1.9.4, 5.1.9.5, 5.1.9.6, 5.1.9.7, 5.1.9.8, 5.1.9.9 and 5.1.9.10 show that most of the central libraries of IITs are utilizing ICT in development and management of library collection. Hence this hypothesis is proved and accepted.

**H$_3$**: Some of the Central Libraries are utilizing open source software for various purpose like Institutional repositories, content management etc.
From the tabular representation of tables 5.1.21, 5.1.22 show that all the libraries are utilizing open source software for various purpose like institutional repositories, content management. Hence aforesaid hypothesis is proved and accepted.

**H4: Most of the old Central Libraries are utilizing emerging technology for the library activities and services.**

The above hypothesis has been proved and accepted in the table 5.1.17, 5.1.18, 5.1.23, 5.2.28 that most of the old central libraries are utilizing emerging technology for the library activities and services.

**6.5 Conclusion**

Indian Institutes of Technology are the national and reputed institutions in India. These institutions are playing vital role in promotion of engineering education and research. The libraries are changing their shape and size due to information technology. To cope up information need of the users, library and information centres are modernising their infrastructure, collection and services. Information technology is used as tool by the library professional for collection, organisation, process and dissemination of knowledge. To create new services and update existing services, one has to develop proper ICT based infrastructure in the libraries and information centres. They are offering state of art infrastructural and other facilities to the faculty members, research scholars and students. Each institution has their own library with modern information communication technology infrastructure to provide library resources and services. ICT has changed the traditional library infrastructure into modern infrastructure.

Information technology (IT) entered into libraries, especially academic and research libraries, during the 1960s. Libraries employed Information Technology to speed up their daily actions and reduce their functioning cost. In digital era, bulk of
reading materials are available in the electronic form which can be accessed through internet as well as intranet. Modern information communication technology infrastructure is very essential for the library functioning and services. These electronic resources can be created by two methods. One is the content created in the digital form, another the print resources can be converted in the electronic form. Electronic information resources have ample opportunities in the collection development, creation of new services and up-gradation of existing information services. For optimum utilisation of electronic resources, modern library and information centres should develop adequate ICT infrastructure.

Study explores that central library of IIT Kharagpur has the highest (160) numbers of computers followed by IIT Madras (150) and lowest (10) no. of computers are provided by IIT Hyderabad and IIT Ropar. IIT Bombay has highest (12) numbers of server machines followed by IIT Ropar (7), IIT Bhubaneswar (6), IIT Kanpur and IIT Guwahati (5) while IIT Patna, IIT Indore and IIT Mandi have lowest (1) number of server machines. Study reveals that maximum numbers of sitting capacity is provided by IIT Kanpur (2000) followed by IIT Kharagpur (1500) and minimum is provided by IIT Hyderabad (50) and IIT Mandi (50). All the central libraries of IIT provide software facilities in the library in which majority (62.50%) of central libraries of IIT are using Libsys software. Majority of librarians agreed that open source softwares are sufficient for management of the library activities and services. Survey explores that all libraries are using D-Space digital/institutional repository software and IIT Madras is also using the E-Print Archive software. Majority of libraries have CCTV followed by smart cards and RFID to protect their library. Majority of libraries are using Linux followed by Windows NT. Majority (75.00%) of libraries are using Local Area Network (LAN). IIT Bombay is providing
the highest bandwidth capacity that is 2.7 GBPS followed by central library of IIT Kharagpur, IIT Patna and Jodhpur are providing 1 GBPS. All the central libraries of IITs are providing the facility of plagiarism checking for their research scholars.

Social networking sites have attracted to the millions of users in their professional as well as personal life. These are being used by academically for the purpose of linking with one to another. They are using for the means of communication to their friends and relatives. This study provides important information on libraries of academic institution on social networking sites. The result shows that the central libraries of IITs are using Facebook, YouTube, Blog and Twitter for linking with library users, creating awareness about library collection and services for getting feedback/sharing problems to the users and they are also using for promotional activities and users education programme. Central libraries of IITs are mostly using Facebook and least used Blog and YouTube.

In present scenario, information communication technology, ICT infrastructure, digital library, library automation and networking are playing vital role in the libraries. ICT infrastructure in new IIT Libraries of India is still in different stages of development. The new Indian Institutes of Technology (IITs) are not equally developed in comparison to old Indian Institutes of Technology. Inadequate sitting capacity, lack of facility in infrastructure than old IITs should be improved and increased. Hence, there is need to change in newly established central libraries of IITs. A novel idea and suitable policy should be enclosed by the new IIT library authorities.

The study suggests that new IITs central libraries must increases the hardware as well as software facility to enable the users to maximize the usage of ICT-based resources and services and also increase the number of sitting capacity for users. The
study concludes that some central libraries of IITs need to proper ICT infrastructure for the library users to utilize the resource and services.

Through the analysis of user’s data, it is found that majority of the users of both old and new IITs visit library for reading subject books. Almost all the users are utilizing information communication technology based services like online library catalogue, online access of electronic resources, digital reference service etc. In old IITs, only 164 (40.60%) users of IITKGP, IITB and IIITM are using social networking sites while in new IITs, 222 (44.85%) %) users of IIITP, IITH, IITBBS and IITRPR are using social networking sites like Facebook, YouTube, Twitter and RSS Feed. Majority of users of old and new IITs are satisfied with the digitized collection of central libraries. In old and new IITs, most of the users are satisfied with the relevant collection available in the library. In both the IITs, majority of respondents are using the available e-resources in the library like e-journals, e-books, e-theses, e-databases etc.

**6.6 Suggestions**

In view analysis of data, findings and personal observation of librarians and users of central libraries of Indian Institutes of Technology, the following suggestions are made and suggestions are also incorporated users’ reaction.

- IITs should develop adequate sitting capacity according to the registered users in the libraries.
- IITs should develop sufficient collection for users which includes more e-journals, general books, interdisciplinary subject books, technology based books, recreational books, biographies, autobiographies, books related to entrepreneurship and novels should be available in the library in print as well as electronic format.
- It is observed through the study that in new IITs, only one librarian is working out of nine IITs, so that more library professionals should be recruited for the smooth library functioning.

- The study explored that very less IITs are using QR code technology, so that all the libraries should use QR code for the promotion of the library activities and services.

- The study suggests that mobile based services should be created by the libraries for library users.

- IIT Indore, IIT Mandi and IIT BHU should create a library network for sharing the resources and services.

- All the library may also use social networking sites for offering promotional activities, sharing information and feedback.

- IIT Libraries should provide a discussion room 24×7, so that user can discuss at any time and library should also provide sufficient space for the study.

- Library should provide high bandwidth internet connection for their users.

- Orientation programs should be organized by the librarian at regular basis on various information communication technology resources and services available for their users.

- Users of IIT libraries require remote log-in facility, remote booking, so that user can do these things from their place.

- IIT libraries should acquire books as per number of students, so that user can get books without any problem.

- Libraries should offer an email alert or SMS alert service regarding books suggested by the professors for particular subject.
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- Automatic issue and return of books should be provided through digital media to the users of IIT library. So that users don't have to stand in a big queue while issuing or returning of books.

- Most of the students are unaware about the various services provided by the library. They should be provided awareness program about the library facilities and services.

- Research oriented services may be started by the libraries to their users like self-plagiarism checking, downloading articles and books.

- IIT library should provide open and digitized collection and they should also be provided app based content access.

- Library should be user friendly, there should be a help desk for new comers because most of the new comers are not aware about the resources and services of the library and they do not know that how to find relevant documents properly.

- Resource sharing of the digital content should be permitted through subscription policies.

- A good user-friendly website should be developed which includes all the relevant information regarding the library policies, available digital resources (properly organized) would greatly help and encourage the students to utilize the resources properly.

- Library should include video lectures of faculty members in their institutional repository.

- IITs should use automatic card swipe entry for permanent students of the institute and outsiders should not be allowed.
6.7 Area of Further Research

1. Use of Open Access Resources by the of Central Libraries of Indian Institutes of Technology in India: A Study
2. Use of Radio Frequency Identification (RFID) by the of Central Libraries of Indian Institutes of Technology in India: A Study
3. Use and Impact of Cloud Computing by the of Central Libraries of old Indian Institutes of Technology in India: A Study
4. Use of Research Data Management by the Central Libraries of old Indian Institutes of Technology in India: A Study
5. Use and Impact of Library Management Software by the Central Libraries of Indian Institutes of Technology in India: A Study
6. Use and Awareness of Information Communication Technology Applications by the users of Indian Institutes of Technology in India: A Study
7. User Satisfaction towards Information Communication Technology Applications in the Central Libraries of Indian Institutes of Technology in India: A Study
8. Impact of Information Communication Technology Applications in Central Libraries of National Institutes of Technology in India: A Study
9. User Satisfaction towards Open Access Resources by the Research Scholars of Indian Institutes of Technology in India: A Study
10. User Satisfaction towards E-Resources by the Users of Central Universities of North India: A Study