CHAPTER 7
### FINDINGS, SUGGESTIONS AND POINTS TO FURTHER RESEARCH

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7.1 Introduction

The final chapter presents an overall picture of the study. Till now this report has covered six chapters of the study which includes; Research design (Introduction), Review of related literature, IT strategy for research libraries (supporting chapter), Use of Information Technology in selected research libraries in Karnataka (analysis of the primary data extracted through the responded questionnaire of the Librarians), Use and perception of Information Technology by selected research library professionals in Karnataka (analysis of the primary data extracted through the responded questionnaire of the Library professionals) and Use and perception of Information Technology by selected research library users in Karnataka (analysis of the primary data extracted through the responded questionnaire of the Library users). The main objective of the study is to survey the state-of-art of use of Information Technology in research libraries and to find the perception by the professionals and users, while using Information Technology in routine activities of the library and accessing sources and services of the research library respectively. The study has started with the related review of literature and framing the needful survey questionnaires for primary data collection. Three different primary data collection instruments were administered to survey 20 research libraries, 71 full time library professionals, 650 research library users, but the researcher received complete response from 13 (65%) research library, 45 (63.58%) library professionals and 418 (64.30%) library users respectively. The computed data has been analyzed using both descriptive and inferential statistical techniques including; frequency, percentages, mean, standard deviation, co-efficient of variation cross tabulation with chi-square test, etc. The analysis of computed data revealed certain results and trends as reported in the fourth, fifth and sixth chapters. Based on the results, some findings, suggestions and conclusions are offered.

7.2 Testing of Hypotheses

The hypotheses as stated in the section 1.9 in the first chapter of the study is examined with reference to the analysis of the data gathered through three different questionnaires and tested the same. The results of the testing of the hypotheses are presented below.
7.2.1 Majority of Research Libraries does their Routine Works with Automated Library.

To test this hypothesis several questions has been asked to obtain the data regarding use of automated library to run their routine activities. The analysis of the data in the 4th chapter reflects that, all research libraries under the study have computer systems, good infrastructure facility of IT applications, majority of them also have installed library software. They are providing library services through automated library and some of them also provide through LAN. Hence the above stated hypothesis has been proved and accepted.

7.2.2 More or less All Research Libraries Use Commercial Integrated Library Automation Software Package.

As it can be seen from the table 33 of the 4th chapter that, 53.84% of the research libraries use commercially integrated library software and 30.76% of them possess in-house built library automation software. Hence the above stated hypothesis has been disproved.

7.2.3 Majority of Research Libraries Provides their Services with the Use of IT Applications.

Regarding the use of IT applications to provide library services, majority of the research libraries have good infrastructure facility of IT applications (Table 35 of the 4th chapter). They are also providing their services through automated library (92.30%) and through LAN of the library (76.92%) (Table – 25 of the 4th chapter). Hence the above stated hypothesis is proved.

7.2.4 Majority of Libraries Created Internal Database for Books & Back Volumes.

To test this hypothesis, a question has been asked to obtain the data regarding the availability of internal database for books & back volumes. Based on the analysis of the data presented in the table 48 of the 4th chapter, 84.61% of the research libraries have created in-house database for books and 76.92% of the research libraries have created in-house database for journals. Hence the above stated hypothesis has been proved.
7.2.5 All Most of all Research Libraries are Using Modern Media's of Communications in their Routine Work of Library.

The table 47 of the 4th chapter clearly indicates that all research libraries under the study are using e-mail, fax, phone & intercom. Hence the above stated hypothesis has been proved.

7.2.6 Most of Research Libraries Safeguard their Resources through Electronic Security System.

As it can be seen from the table 55 of the 4th chapter, only NIMHNS is using Electronic security system (Closed Circuit TV) to safeguard their library resources. Hence the above stated hypothesis has been disproved.

7.2.7 Majority of Research Libraries Achieved their Objective in House Keeping Operations by the Use of Information Technology Applications.

Regarding the achievement of their objective in house keeping operations by the use of IT applications, 12 research libraries have stated that they have achieved their objective in house keeping operations by the use of IT applications. (Table 61 of the 4th chapter) Supporting to this, the variable house keeping operation is rated first when compared to other variables in achieving their objectives. Hence the above stated hypothesis has been proved.

7.2.8 The Dawn of Mobilization of Library Fund can be Seen in Research Libraries.

To test this hypothesis a question had been asked to obtain the data regarding the mobilization of library fund. It is observed from the analysis of the table 57 of the 4th chapter, the research libraries are mobilizing the library fund through automation project, Digital library project, Developing the Internal database of the library, Designing the Library web site, Developing the Library automation software, Developing the Digital library software, Conducting the self financed Workshop/ training on Digital library, Conducting the self financed short term course on library automation and networking, Fee for deputing the library staff, Fee for Consultation, Fee for hiring the library staff, Nominal fee to consult the electronic library source/services and Nominal fee to borrow / avail electronic library sources/service. Hence the above stated hypothesis has been proved.
7.2.9 The Dawn of Library Consortia (for Journals & Online Database) can be Seen in Research Libraries.

It is observed from the Table 13 of the 4th chapter that, 53.84% of the research libraries are the member of the library consortia for journals and 30.76% of research libraries are the member of the library consortia for online database. Hence the hypothesis has been proved.

7.2.10 Research Library Professionals Feel Benefit of Information Technology Applications Helps to Disseminate the Information in User-Defined Format.

To test this hypothesis, the researcher has incorporated a number of benefits by the use of IT applications. As it can be seen from the table 20 of the 5th chapter, the highly rated benefit of the IT application for the library professional is “IT helps to disseminate the information in user defined format. Hence the above hypothesis has been proved.

7.2.11 Research Library Professionals Feel Use of Information Technology Applications Upgrade their Knowledge and Skills of Information Technology Applications.

The perception & experience of the library professionals of research libraries of Karnataka have been studied on the impact of using IT applications in the library. Based on the analysis of the data presented in the table 23 of the 5th chapter, the variable “upgraded the knowledge and skills of TI applications” has been top rated by the library professionals. Hence the above stated hypothesis has been proved.

7.2.12 Users are Satisfied with Computer Facility and Literature Search Services.

Various library facilities/ services were listed in the questionnaire, library users of research libraries of Karnataka have been asked to rate them according to their level of satisfaction. It is observed from the table 16, 17, 18, 19 & 20 of the 5th chapter that, computer facility and literature search service are highly rated to access the same. Hence the above stated hypothesis has been proved.

7.2.13 IT Causes Techno Stress for Library User and IT Helps to Interact with their Source Within and Outside the Library.

The perception and experience of the IT on library user of research libraries of Karnataka have been studied through the questionnaire. Based on the mean of the different variables in the table 21 of the 6th chapter, the variable “caused the techno-stress for the library user” and I can interact with my own resources within and outside
the library" are the main impact of the IT on library users. Hence the above stated hypothesis has been proved.

7.2.14 Lack of User Education Programme Act as Barrier to Use IT based Library Services.

Various barriers are listed in the questionnaire, library users of research libraries of Karnataka have been asked to choose them. It is observed from the table 22 of the 6\textsuperscript{th} chapter, majority of the library users are feel, lack of user education programme is a the barrier to access IT based library services. Supporting to this the table 60 of the 4\textsuperscript{th} chapter also rated the variable “User education programme” top as the barrier to use of IT applications in the library. Hence the above stated hypothesis has been proved.

7.2.15 Research Library Professionals and Users are Looking for Hybrid Libraries (Both Electronic & Print).

Table 25 of the 6\textsuperscript{th} chapter and the table 26 of the 5\textsuperscript{th} chapter, majority of the library professionals (73.33\%) and library users (66.74\%) are looking for hybrid libraries. Hence the above stated hypothesis has been proved.

7.3 Research Findings

7.3.1 Use of Information Technology in Selected Research Libraries in Karnataka

From the study it is observed that, all research libraries under the study were established in 20\textsuperscript{th} century. Among them, the first established research library is IISc (1909) and the new one is NCBS (1992). These research libraries have highly qualified persons like PhD in library science (11=15.49\%) PG in library science (51=71.83\%) and also diploma in computer science/applications (9=12.67\%). All the research libraries have targeted to provide the sources and services to research scholars (100\%), scientist (100\%), trainees (100\%) and administrative staff (100\%). The study points out that, all research libraries get the financial help from their parent institution (100\%) and some of them get financial assistance from central government (8=6.15\%) also. Among all research libraries, NIMHNS has good budget (Rs. 19.20 lakh) for Information Technology applications. While IIMB spares Rs. 110 lakh for books and journals for the academic year, 2003-2004.

From the study it is found that all research libraries have good collection on books, journals projects, reports in print and electronic form. But they have huge collection of books, journals, and back volumes in print form and a medium collection of journals in electronic form. The studied libraries do not prefer the parallel collection of
both print and electronic form. 53.84% of the research libraries are the members of consortia for journals followed by online databases (30.76%).

The study demonstrates that, research libraries use publisher web page (92.30%), book review on internet (69.23%) and search engines of Internet (61.53%) as sources for book selection. After acquiring new collection, research libraries display new arrivals through new arrivals rack (92.30%). Followed by, web page (76.92%) and sending e-mail (53.84%) to their users. These research libraries publish the new arrival list through web publication (61.53%), but none of them publish their new arrivals through CD format.

It is observed from the study that, majority of research libraries classify their documents according to UDC (46.15%) and DDC (30.76%). Regarding cataloguing they follow AACR-II (92.30%). The catalogue of these research libraries are also made available through OPAC (92.30%) followed by OPAC of LAN (61.53%) and Web based OPAC and card catalogue (53.84%). Only a few research libraries catalogued (23.07%), classified (15.38%) and indexed (46.15%) the web resources.

The survey oriented study witnessed that, the various services of the research libraries have provided at parent institution level (100%), Regional level (69.23%), local and National level (61.53%). A few research libraries provide services at International level (30.76%). The research libraries provide various services through manual (100%), automated library (92.30%) and Home page & LAN of the Library also (76.92%).

The study also reflects that, all the research libraries are using computers for their routine work. Among research libraries, IIMB has more computers (29). All research libraries have installed DOS and Windows as operating system followed by Windows-NT (84.61%), Linux (76.92%) and UNIX (23.07%). In addition to operating system, the research libraries have also installed MS Office (100%), Acrobat Reader, WinZip (76.92%), FTP (61.53%) and Flash (30.76%) also. To run house keeping operations of the library, the majority of the research libraries have installed commercial integrated library automation software (53.84%) and In-house digital library software (38.46%).

The study informs that, the research libraries have good infrastructure facilities like Internet (100%), Home page (92.30%), Telephone (92.30%), and Online search (84.61%). 76.92% of research libraries have LAN; photocopy machine, laser printer and barcode. The research libraries have other good infrastructure facilities also.
It is clear from the study that, 76.92% of the research libraries have automated their library from 1984 with integrated modules of the library software. Around 46.15% have partially digitized their library.

The survey also witnessed that, 61.53% have Internet server in their library and most of them access Internet through leased line (53.84%), with MS Internet explorer and Netscape navigator (69.23%) for browsing the Internet. The majority of the Internet services provided for research libraries are VSNL (46.15%). The purposes of internet connectivity are for database services (100%), list server ((100%), bulletin board service (76.92%), file transfer, e-mail, downloading software (69.23%) and others.

It is noted from the study that, all research libraries use snail mail, fax, e-mail, phone and inter-com for communication media. Regarding barcode technology, it is used for circulation (84.61%), stock verification (61.53%) and Acquisition (15.38%).

The study demonstrates that, 69.23% of research libraries use AACR-II standards to create databases, and they created database for books (84.61%), for back volumes (76.92%) and for projects (76.92%). These research libraries also use MS-SQL (61.53%) for database management system for various purposes. For information retrieval, research libraries use online databases (100%) that covers international databases also(84.61%). While a few research libraries also access MEDLINE (46.15%) for information retrieval purpose.

It can be know from the study that, to safeguard the sources of the library, many research libraries are utilizing professional security and library staff (53.84%). Only NIMHANS is using closed circuit television to safeguard the library resources and also to watch the activities of the users and staff in library.

The research libraries are also providing various training programmes for library professionals and users. The training programs provided for the library professionals are online/offline database search (84.61%), different modules of library automation software (76.92%), information retrieval system (69.23%), e-mail (69.23%) and others. Library users availing the training programme like; online/offline and internal database search (76.92%), Internet search (92.30%), OPAC/ e-OPAC (46.15%) and others.

Among 13 research libraries 61.53% research libraries are mobilizing their library fund by undertaking projects (38.46%), running short-term courses (7.69%) and through professional manpower (38.46%).
It also known from the study that, majority of research libraries have achieved their objectives on house keeping operations by the use of Information Technology, while most of the research libraries faced the barrier in user education programme in the environment of Information Technology. The majority of research libraries are planning to provide effective web based and campus LAN based services.

7.3.2 Use and Perception of Information Technology by Selected Research Library Professionals in Karnataka

Among the respondents, female category (62.22%) is dominant in returning the responded questionnaires, 68.88% of the respondents come under the age group of 36-50 years, 62.22% have PG degree in library science and most of the respondents have 11-20 years experience in the library. Most of them have gained the Information Technology knowledge through assistance of the colleagues/ friends (84.44%).

Most of respondents (73.33%) have got the experience in automated sections of their library. They have Information Technology facilities like; computer (93.33%) e-mail (93.33%), library software (91.11%), access to LAN and CD-NET (88.88%). Many of the respondents are involved in implementation of Information Technology in library such as planning level (60.86%), application level (30.43%) and execution level (100%). The respondents are also involved in providing the services through; automated library, LAN of the Library, and Web based ones.

Majority of the respondents preferred to say about the most benefit by the use of Information Technology is “helps to disseminate the information in user defined format and they also feels it is cost effective”. It is also helps to upgrade the knowledge and skills of IT. 64.44% of respondents have positive approach to digital information content, while 73.33% opines that their future library should be both electronic and print media.

7.3.3 Use and Perception of Information Technology by Selected Research Library Users in Karnataka

The characteristics of users revealed that, male (59.33%), is dominant over female in terms of number of users, 42.34% of the users fall under the age group of 20-30 years, the user community comprises scientist (27.03%), research scholars (23.35%) and they have qualification like PG degree (54.54%) and PhD degree (24.88%).

All respondents have knowledge on Information Technology, most of them have this knowledge by self-study through manuals (59.09%) followed by assistance from
colleagues and friends (57.89%). Their level of knowledge is adequate on e-mail when compared to others. 98.08% of users remarked that they are utilizing modern technology at library and next priority was commercial centers (75.83%). Out of 418 respondents, 98.32% of the users are utilizing IT based library services for their research (74.20%) and study (62.77%) and it is found from the study that the majority of users are using their library daily (52.39%).

Research libraries have good infrastructure facilities for users. 89.71% of users are accessing computer followed by photocopy machine (79.42%), 319 respondent accesses to Internet (76.31%), online database (72.72%), e-mail (69.37%), printer (60.04%) and others. Majority of the respondents are using literature search services through automated library, LAN and Home/web page of the library.

While using the library services 35.64% of users face the problem like lack of user education programme and around 24.50% remarked the non-availability of consultation services. The inadequate trained staff in Information Technology is also another barrier.

Nearly half of the respondents have positive approach to digital information content and 66.74% of the respondents feel that, their future library should be both print and electronic form (hybrid).

7.4 Suggestions

7.4.1 Suggestions for Research Libraries

Based on the findings of the survey-oriented study, the following suggestions are offered.

In view of shrinking budget, rapidly increasing and dramatically decreasing cost of Technology and explosive growth of electronic information sources, it has become not only essential but also more useful, economical and effective for research libraries to make the best use of Information Technology in routine activities of the library and its services to users.

The dawn of Information Technology eventually have an impact on each and every aspect of library and therefore librarians need to have a long term planning and well defined planning for IT implementation in order to get the more benefits and to minimize the barriers while using the Information Technology applications.
Implementation and maintenance of all Information Technology applications in the libraries require heavy investments. Therefore, the libraries should mobilize their funds by undertaking the projects, running the self-financed courses and hiring the manpower. Further some special grants should be made available from different funding agencies to implement Information Technology applications for libraries. In addition to this, research libraries need to restructure their budget policies by allocating a part of their annual budget for training their library professionals and users.

Research libraries should adopt a hybrid collection development policy in order to fulfill the demand of the users, as it is needed.

All research libraries should concentrate on procuring online databases of journals, books, patents, thesis/projects and others to save the precious time of the users.

Majority of research libraries have good infrastructure facilities to exploit new technology, while some of them need to develop multimedia work station, V-Sat, Voice in put device, video conference and others.

The research libraries should have user group mail so that, the new arrivals can be sent to all user at a time.

Research libraries should overcome the barrier and become the members for library consortia to crack down the library budget.

There should be an opportunity to involve all library professionals in implementation of Information Technology in the library. The involvement may be at the planning level, execution level or just application level. It improves their morale and motivation for successful implementation of Information Technology in library.

The process of digitizing the library should be done as early as possible and they should prefer to purchase commercial integrated digital library software, which has already been in use successfully in libraries in western countries and in some research libraries in India too.

Majority of research libraries should give stress on need-based, value added users services through automated library, campus wide LAN and also with web based services.
It was found that; majority of research libraries seems to be less accessed to various networks. So research libraries need to make rigorous efforts to access various networks like INFLIBNET, ERNET, NICNET, DELNET, I-NET, GIAS SIRNET, INDONET and others in order to provide access to a wide range of information sources and services to users.

Virtual private network is suggested for all research libraries to link the library with off campus users and professionals.

Research libraries should plan their separate network called KARLIBNET (Karnataka Research Library Network) to offer consultancy and advisory services by the way of sharing their Information Technology expertise and experiences to other research libraries in specific and other libraries in general.

For the new digital environment the existing rare and valuable documents should be digitized in a phased manner for preservation and for future use.

All research libraries should have consortia on online databases to save the fund, which can be utilized for other purposes.

Research libraries should bring CD publications for new arrivals, internal bibliographic database, Library/Institutional reports and others.

All research libraries should catalogue, classify and Index the web-resources for the effective use.

The research libraries should create in-house database for documents other than journals and books. It may be patents, standards reports and others.

All research libraries should safe guard their resources by implementing any one of the electronic security systems in addition to professional security. It may be video cameras, closed circuit television, electronic security systems, etc.

7.4.2 Suggestions for Library Professionals

Effective use of new technologies and their applications in libraries is possible only with the skilled and competent personnel. So it has become essential for libraries to have such a staff with Information Technology skills. The persons with Information Technology expertise and a vision for new and innovative services using new
technologies would be able to bring significant improvement in Information Technology implementation in libraries.

Library professionals should keep in touch with new technology utilities, so that they can convince the policy makers about the benefits of using latest technology and plan for successful implementation.

Professional involvement is required for successfully of implementation of Information Technology in library. Therefore, all levels of professionals should invariably involve in planning and execution.

Intensive training, retraining and sensitizing the professional need is to be largely increased and more time is to be allocated in order to exploit the full potential of Information Technology for the development of innovative services.

Library professionals should attend training programmes, conferences, and short-term courses to acquire knowledge in Information Technology so as to work in automated/digital libraries effectively.

Library professionals should form newsgroup/list server to have a regular touch to share ideas, experiences, and innovations and to keep abreast of new Information Technology developments.

7.4.3 Suggestions for Library Users

Research library users should get wide and varied user education programmes for maximum utilization of Information Technology based library facilities and services.

Library users should attend lectures, demonstrations and read the library guides, bulletins on current awareness program to avail the utility of Information Technology based library services.

Library users should evaluate themselves periodically, regarding how best they are using Information Technology based services and facilities.

Library users should not hesitate to demand higher authority or librarian to get the required facilities or services.
7.5 Points to Further Research

Information Technology provides enormous opportunities in a wide range of areas for various investigations. The following areas are suggested for further research in Information Technology applications.

- Mobilization of library fund through Information Technology based library services and products in research libraries of Karnataka.
- Networking of research libraries in Karnataka: A study on impact and pitfalls.
- Linking of OPAC to library resources in a digital environment: A study on problem and prospects.
- Design, development and use of bibliographic databases of research libraries in Karnataka.
- Auditing of Information Technology applications in research libraries of Karnataka.
- Manpower planning in automated/digital library environment of research libraries in Karnataka.
- Virtual Private Network: A model for sharing the resources in research libraries of Karnataka.
- Status, problems and future of the digital libraries in research libraries of Karnataka.
- Imparting the consumption skills of Information Technology applications to customers and information intermediaries for better utilization of electronic information: A study of research libraries in Karnataka.

7.6 Conclusion

The survey-oriented study concludes that, Research libraries have given due recognition and importance in terms of collection, budget, infrastructure facility, staff and users. In the Meanwhile they are using Information Technology, as a source for book selection, display of new arrivals for library publications and for database creations. These Research libraries have good infrastructure facilities to provide the services through LAN, Web based and through automated library and to continue the routine activities of the library. Majority of them have Internet servers that are used for various purposes. These Research libraries are using standards to create internal databases, which are used for information retrieval purposes. Some of research libraries mobilize the library funds by under taking projects, running short-term courses, marketing the manpower and through the sources and services. Most of the research libraries provide
training programme for their staff and users on various aspects. But most of the research libraries expect to conduct user education programme to keep the users abreast of new developments/trends, however it is currently the main barrier in use of Information Technology in libraries.

With the help of Information Technology in the library, most of research libraries achieved their objectives in house keeping operations, collection development and library services. While majority of the research libraries have a plan to improve the campus LAN and web-based services and to educate the library staff in use of Internet super highway. Regarding knowledge and skills, most of the library professionals acquire the Information Technology knowledge through assistance from colleagues/friends and have undergone training on Information Technology applications in library and they are involved in implementation of Information Technology in libraries in execution level.

Most of the library users acquire the Information Technology knowledge through self-study and assistance form colleague/friends for effective use of the same in library or outside the library. They use modern Information Technology in the library for research activities. They also avail good infrastructure facilities with library services through manual, LAN based, and web based or through automated library.

Thus this study concludes with a note on the fast and comprehensive access to all Information Technology benefits to libraries so that libraries would contribute significantly to the progress of the society and the nation.