CHAPTER III

REVIEW OF LITERATURE

3.1 INTRODUCTION

The literature review is a critical discussion and summary of statistical literature that is of 'general' and 'specialized' relevance to the particular area and topic of the research Problem. A literature review is an account of previously published material by experts and researchers in a particular area of interest. The literature review gives the author an opportunity to reference previous research publications to provide strengths and weaknesses of the research. Literature review provides an overview and a critical evaluation of a body of literature relating to a research topic or a research problem and analyzes a body of literature in order to classify it by themes or categories, rather than simply discussing individual works one after another.

The literature review provides a deeper understanding of the published research related to the topic and enables to identify research gaps in the existing literature and thereby helps to know the current research trends. A substantial amount of research has been carried out on the impact of electronic information resources and services on Libraries and its users in an academic and research environment. An attempt has been made in this chapter to review
the literature on use and its impact of electronic information resources and services from the perspective of libraries and users.

3.2 METHODOLOGY AND INFORMATION SOURCES

Information sources both primary and secondary sources were consulted for the literature review that includes

- Library and Information Science Abstracts (LISA) from 1969 to April 2013 published by Cambridge Science Abstracts,
- EBSCO’s Library, Information Science & Technology Abstracts (LISTA) online, 1970-2013,
- ERIC Database, Silver Platter (2005 – 2013),
- Sociological Abstracts (2006-2013) Published by Cambridge Science Abstracts and

Efforts have been made to identify the existing relevant literature on the research problem by scanning, browsing and reading the original documents and consulting abstracting sources. Appropriate notes were taken and wherever the original documents were not available, the relevant information has been culled out from the abstracts for the preparation of the review.
Main emphasis of the search was on the literature that dealt with information technology applications in libraries and their influence on: Library resources, Information Services and finally Library Users.

3.3 LITERATURE REVIEW

In this chapter the literature has been discussed and reviewed in the following subheadings:

3.3.1 Changing Information environment

3.3.2 Application of Information Technology in Libraries

3.3.3 Impact of E-Resources on Library and Information Centres

3.3.1 Changing Information Environment

The production, processing and distribution of information are quickly becoming major activities for many nations in the world. Giving an economical and social perspective, Jeong (1990) explains that information sector has become more predominant. He stresses that in knowledge and information society, society becomes highly sensitive to changes in the treatment to and management of information.

Seideman (1991) writes in his article “Everybody gets so much of information all day long that they lose their common sense”. Continuing further he makes a startling revelation that present society is information rich and knowledge poor society. This can be agreed, as enormous amount of data is made available today.
**Gifford (1992)** reasons that today’s libraries are under intense pressure to create a more sophisticated information environment, and at the same time they are struggling to organize and preserve paper based resources. Author envisages that benefits of rapid changes happening in the information environment need to be watched cautiously. This view is supplemented by **Ginsberg (1992)** who, in his article describes that today’s libraries have achieved a transformation from Libraries to Information Centers by developing infrastructure and abilities to provide need-based information.

**Piggott (1993)** defines that technological as well as economical changes have forced the familiar role of librarians as information intermediaries to undergo immense change to avoid being displaced by a variety of contenders.

**Ojala (1993)** mentions about core competencies for the special library managers of the future. It is necessary for them to have solid understanding of information sources, deliver information in desired format, evaluate information and anticipate needs, etc. **Clair (1993)** mentions that the changes occurring in information management process have called for an efficient benchmarking process to ensure quality control.

**Stevenson (1995)** conducted a study at Bradford University Library, UK to predict the changes that will occur by the year 2000. He suggested that the changes would be more of an evolution than a revolution. Discusses the services provided, finances, staff skills, stock and space in terms of the present and possible future.
Corrall (1995) in her article points out about the way higher education library services are viewed, planned and managed. Author highlights that the advances in technology, economic and political pressures have combined to create an environment posing unprecedented challenges and opportunities to libraries and suggests for a radical change if they have to survive and thrive in the future.

Wills and Wills (1996) in their article reported the trends of electronic publishing and its impact on information environment. The changed information environment has put forth some fundamental and, perhaps, uncomfortable questions about the training and development of librarians and information workers.

Greenaway (1997) states that libraries need to work efficiently and with innovativeness in the way services are provided to make the best possible use of resources: human, material, technical and financial. Library Services have come a long way in the electronic information environment. They are a mix of skilled & professional jobs to provide user service in libraries. Satija (1999) writes that these services have evolved themselves and adapted to changed information environment by using the available technology of the day.

To meet the challenges posed by the changing information environment, libraries need to reengineer themselves. In his case study, Liang (1999) reviews the reengineering process at a university library. The experience tells that the obstacles to the change process are not technological; they are organizational, and demand major strategic planning and tactical management.
However, it is the author’s hope that the experiences and insights identified herein will significantly improve the probability of success by creating avenues for future research and initiatives that will lead to improvements in this critical area of information services.

Evaluating the influence of Internet on information environment, Campbell (1999) explains how establishment of an International Mesh of subject gateways laid foundation for several subject gateways in Australia. Rowley (1999) in his article writes about similar influence on the information management activities. Feret and Marcinek (1999), Nisonger (1999) in their article examine the most important trends that are occurring in academic libraries and their impact on the role of academic library as a whole, with focus on the skills and characteristics of a new century librarian.

Ward (2000) draws our attention to items of interest to managers of information and library services, and students. Her review of literature on management is quite significant because it enables librarians to identify trends in library management and practice in these testing times besides indicating developments in the sector.

Wood and Walther (2000) in their article explore the future of academic libraries in this digital era. They mention about the pace of change occurring within higher education and how information will be provided in academic libraries to their vastly changing student population. Authors felt that the integration of technology in higher education has resulted in an impact on academic libraries.
Joint and Law (2000) felt that there is clearly a plurality of views about the nature of an electronic library. They explain that a truly virtual library is an electronic library created in new network space distinct from existing institutional boundaries. This will be the most fertile ground for creating the information service of tomorrow. Ashcroft and Melvor (2000) examine the dissemination process in the digital environment. Discussing about web publishing, they explain that it would be reasonable to expect the new technologies to improve the dissemination process. Research findings have become easier to publish, and now proliferate in electronic formats, particularly online. Ervin (2000) describes the process of dynamic delivery of information through Web. He feels that the data delivery has become more structured and instantaneous with web based databases.

Chisenga (2000) discusses about the impact and the changes induced by global information on libraries in Africa. Author indicates that this impact is closely linked to the status of information technology application in libraries and the state of electronic connectivity in the countries of the sub-region.

Vadakepanrayil (2001) explains the concept, types and advantages of multimedia. In his opinion multimedia CD ROMs, databases, reference tools, etc dominate market. The effectiveness of these systems depends on various factors such as software programs, information content, etc.

Ashraf (2003) mentions some of the implications put forth by the changing information environment. They are

- User Education
3.3.2 Application of Information Technology in Libraries

Information Technology is the collective term for various technologies involved in the processing and dissemination of information. Keeping in view the growth of IT on one hand and the developments in teaching, learning and research on the other, all concerned with management education today are attempting to grasp how IT could help in teaching learning process.

Sarma (1994) in his article indicates that the automation is very important to achieve resource sharing at a large scale. He explains the reasons for identifying CD ROM as most appropriate storage media: Low Cost, Easy Portable, Permanent Storage, and Transferability.

In the case study, Konnur and Rajendra (1994) explain their experiences of automation at the library of University of Pune. They say that major activities like cataloguing, acquisition, circulation and serials, etc were computerized. They also explain that the major problem faced by them was the maintenance of hardware and the inadequacy of staff in handling such automation.

Ulrich (1995) conducted a study in United States to suggest framework for IT applications in libraries. He mentions that change caused by information technologies not only affects the technical services of libraries but also shapes the library services that are being offered to the public. This study was based on structured expert interviews conducted in leading US libraries.

Malik (1996) conducted a survey to know the current status of the use of computers in libraries at Pakistan. He mentions the problems faced by librarians and information specialists in automating their libraries. Reviews internationally accepted database management systems mostly used in library housekeeping routines in Pakistan. Also introduces locally developed library packages and training facilities in library software offered by library schools and professional associations in the country, particularly the Pakistan Library Association. Rashid (1996) in his article evaluates the features of available software and hardware.

Jain (1996) conducted a three phased feasibility study about computer applications. Author suggests that through this approach, libraries can handle the entire computerization process properly. In this sage of information, the need for technology has become ever more significant. Kumbar (1996) feels that use of technology provides better means of transmission of data or
messages in all its forms. He quoted some of the technologies like Telephone, Telex, Videotext, Fax, and Email etc as the means for faster communication, which are finding increased use in libraries.

Networking, the sharing of information resources has been dramatically enhanced by telecommunications network. In his article Molholt (1996) writes that the potentials of networking are not only changing the way libraries operate, but are also opening up new possibilities for future activities.

Arnold (1996) in his book attempts to answer various questions, which are important to would-be electronic publishers. How can publishers take advantage of the Internet and exploit the new medium? Is there really a place for traditional publishers in the decentralised networked world, and what are the threats to information ownership? Such questions obviously concern publishers, but are also relevant to printers, distributors, writers, retailers, librarians, and others connected with the publishing sector. They would also be of interest to consumers of published information.

Hallonds (1997) explains in his article about the need to promote the use of Internet based information services among teaching and research staff at a university in UK. Author further explains how this project ensured that what they have done thus far has been successful and that they have had positive responses from members of University staff.

Ekpenyong (1997) observed that the University of Ibadan Library is the first largest library to automate its library services in Nigeria. It is now a focal point for library automation in the country. Highlights the span of library
automation in this library and also reflects the impact of the World Bank Book Project started in 1991 in research and teaching in the university.

Górny and Jazdon (1997) conducted a survey on the existing IT infrastructure, degree of automation and utilization of electronic resources at Polish research libraries. Their findings reveal that IT has found widespread use in most of the academic libraries. They also observed that degree of automation is also much higher. However, research organizations were found to be lagging behind in automation aspect.

The provision for web-based services was envisaged as early as 1997. Griffith (1997) said that the need of the hour is that of PC for every member of the staff, all necessary applications at the desktop and all staff connected by network. He introduced several services through Internet.

The automation of libraries is never free from problems. Ramesh (1998) describes that software incompatibility, lack of standardization, security problems, staff resistance to adapt to change, lack of management support and inadequate financial resources are some of the perennial problems.

Libraries and Information Centers all over the world have realised that they can no longer be self-sufficient in respect of their own information resources to provide for the growing needs of their users. Explaining similar situations, Jalloh (1999) writes in his article that it is more so especially after access to the Internet and the vast number of information resources available on the World Wide Web (WWW).
**Subba Rao (1999)** suggests that during the last 15 years, networking and information is at the heart of this transformation. Author highlights the networking scenario in India by listing the general communication networks. Concludes by mentioning the ambitious plans in India about the same.

**Watstein, et.al. (1999)** in their article identifies and defines some of the more commonly used terms and phrases, which have been used to describe the evolving online/electronic/virtual/digital library phenomenon. Author writes that much of the literature on digital libraries has attempted either to teach us the “facts” about this emerging phenomenon or to provide a narrative account of developments in both library and information science.

**Baker (1999)** contends that academic libraries are at crossroads, whether deciding on the pros and cons of converged services or juggling with slashed budgets. Author suggests that we should regard this situation as an exciting challenge, rather than a threat. In this article, integrated solutions are discussed and suggestions made as to how best we can balance the old with the new and a question is posed as to whether we can ever overcome the infrastructure problems posed by the Web.

**Darch (1999)** conducted a study on Information and Communication Technology (ICT) developments and their applications in South African libraries. This study reveals that the society consists of a technologically sophisticated sector, and an underdeveloped third world sector. Higher education and other libraries attempt to straddle this divide. The main
development has been the emergence of academic library consortia. Applebee, et.al. (1999) conducted a survey to examine the Internet use in Canada. As expected, most Australian academics (95 per cent) have Internet access, and make heavy use of e-mail. Another major conclusion of this research is that one-third of respondents seem in need of more training in Net use. It was a quantitative survey backed up by detailed statistical analysis of the data, which revealed that academics do not make much use of document delivery services.

Commenting on the developments in the storage media, Subba Rao (1999) outlines information access through the right mixture of technologies namely, online and CD-ROM. While mentioning the electronic databases and generations of online services, author discusses the salient features of CD-ROMs, their cost effectiveness, database services in various subjects and select databases. Discusses the establishment of CD workstations and their networking, publishing and future Optical technology.

Sreenivasulu (1999) conducted a survey to measure the role of IT applications in data transfer process. The survey revealed that IT plays an important role in electronic data transfer, electronic data interchange, and transfer of voice, text and video. This survey also indicated that the transfer and diffusion of electronic information is central to the success of any library in providing value added information services.

Computer technology in libraries has revolutionized the concept of rapid and accurate information services. Mahmood (1999) writes that in Pakistan computer technology is still new and is being successfully introduced in all
types of libraries and information centers. He also discusses specific library applications of information technology, the activities of individual libraries and automation education.

Reflecting upon the short history and fast development of electronic journals Chan (1999) writes that electronic journals have opened up exciting service opportunities like multimedia capabilities, speed of production and distribution, and accessibility for academic libraries. Disadvantages posed are technological, socio-cultural, and economic barriers. This article also delineates the positive and negative aspects of the technology, which librarians need both to be aware of and understand.

Mutula (2000) reports that libraries in the university environment in Eastern and Southern Africa are making efforts to join and participate effectively in the information revolution. This paper reviews information technology (IT) developments and illustrates what university libraries can do to meet user expectations and remain relevant.

Moorthy and Karisiddappa (2000) in their article explain the mass storage technologies for libraries and information centers. Authors feel that the increasing content in the library is now being made available in digital form. Hence there is demand for more storage space. The methods like magnetic disc, magnetic tape, cartridge tape, digital audiotape and CD, DVD are fast gaining utility in this field.

Goswami (2001) discusses the technologies relevant to the activities of the library like circulation, acquisition, serials, reference services, etc. and how
networking is bringing about new possibilities in the automation process. In the
digital age, libraries strive to provide scholarly materials in networked
environments.

Kannappanavar and Vijayakumar (2001) conducted a survey to
highlight the use of software and hardware facilities at agricultural universities
in Karnataka. They found out that sufficient software facilities are being used.
However, some teething problems like paucity of funds, inadequately trained
staff, and little encouragement from the users have all become barriers in the
applications success. Haravu (2001) in his article explains the experiences
gained at the automation process of ICRISAT. They developed an application
in-house, designed and developed databases and the generation of SDI as well
as CAS from the same.

Jeevan (2002) points out that libraries in India are progressing well on
automation aspect. With each advancing technology, the time incurred for the
user to retrieve information has shown a drastic reduction than for print
sources. Author discusses about the electronic information services and how
they are changing the interface between the user and library staff. On the
similar lines, Pandey and Chakraborty (2002) contend that it has become
imperative for libraries to absorb the benefits of IT and increase their efficiency
and contribution to the teaching learning process.

Ship (2002) discussing about the networking concepts, explains that
publishers are rapidly adapting networking technology as one of the means for
distributing their content. He says that the networked world of the future may
be both exciting and frightening. Failure to adapt to the technology can marginalize the librarianship, he says. Jeevan (2003) in his article explains the emergence of e books in library collection. He discusses major e book portals and the access mode. Author feels that the developments in networking technology have offered opportunities for libraries to expand their collection base beyond traditional books and journals.

3.3.3 Impact of Information Technology on Library and Information Centers

Cohen (1993) considers that development of in-house databases is gaining popularity now for enabling customized access to external publication or a combination of both. He explains the creation of database of citations in a narrow subject area with customized added indexing and reports that this kind of projects are complex, expensive and time consuming.

Woodward (1994) writes in detail on how electronic information and the electronic journal had an impact upon libraries and the management of their collections as well as technical and user services. The factors, which need to be assessed for the formulation of a collection management policy with regards to electronic information, are defined.

CD ROM technology has a considerable impact on resources in libraries. Like an entire 34 Volume set of Encyclopedia Britannica having more than thirty thousand pages of information is available on a single CD. Reference works, Medical databases, Government Reports and almost all disciplines are bringing out their data on CD ROMs. Supplementing this view,
Glory (1994) in his article explains how CD ROM Technology has transformed the storage media. Author further mentions various issues relating to archiving, in-house publishing, multimedia etc related to storage purpose.

Subramaniyan (1995) describes CD ROM as an ideal electronic media for storage and retrieval. He feels that CD ROM is an appropriate tool for wide distribution of large databases. CD ROM overlaps many other storage technologies and in future may vie with microform, magnetic storage media and videodisc.

Brandreth and MacKeigan (1994) say that reduced funding, global competition and technological change are forcing libraries and information centers to turn to new methods of providing services. Despite the advent of electronic journals, publishers expect print journals to remain their primary product for several more years. Library collections will continue to be largely paper-based, but clients will demand much faster document delivery services from them. Electronic scanning of documents coupled with transmission over high-speed, high-capacity networks offers a potential solution to these problems. Ability to rationalize library collections is seen as an important consequence.

Pullinger (1995) in his article writes about the high-speed networks, such as the England’s Super JANET, which have transformed the process of library collection development process. In 1993, this particular project explored the possibilities with electronic versions of journal articles from nine publishers
using four different interfaces. Briefly undertakes a study of the changing role of paper in the context of multimedia systems.

McKnight (1996) in his article suggests that the Internet and its continued growth present academic authors with desktop access. Considering the future of journal publishing and copyright in the electronic domain, author offers reasons for guarded optimism about the roles of both publishers and libraries.

In a study conducted in USA, Dalehite (1996) mentions in detail the background of the development of an electronic collection for the Florida State University System (SUS). This study reveals that, a year after its creation, the Electronic Development Committee has still not yet managed to formulate a plan for managing the SUS’s electronic collection.

Dwelling on the transition of library resources from print to digital, Ray (1996) describes how technology is rapidly changing the way information is distributed and paid for. Author expresses that the libraries face the risk that they will be cut from the loop that includes publishers and information consumers. Libraries must upgrade their technology infrastructure to maintain their strong position as collection builders and organizers, and to continue their tradition of excellence in providing access to information for their users.

Mahesh and Ghosh (1998) conducted a case study analysis on the availability and use of indigenous databases by NISSAT. This study indicated that the libraries felt such databases can be reliable and convenient resources and are willing to buy such databases. Authors also reported that the awareness

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about indigenous databases is not there resulting in less use of it by other libraries of concern.

Discussing the collection development policy, **Coutts (1998)** writes about selection criteria, effective resource discovery, and the role of metadata and electronic search tools. Changes in the physical environment of research collections are discussed, along with the current uncertainties about disposal of hard copy in favour of electronic formats. **Miller (1998)** in his article discusses the transformation happening in the filed of reference sources publishing. He feels that having reference sources like encyclopedias in digital form has many advantages over print versions. He refers to already available dictionaries and encyclopedias and reports that the world is accepting the digital format for such reference sources.

Tax research services are now available in a variety of formats including print, online, CD-ROM, and Web-based. **Harrington (1999)** emphasizes that just over a decade ago, tax researchers relied entirely on printed sources. However, present day databases have made this process very convenient.

**Sanville(1999)** conducted a library resources use study in USA. Author reports that the current practices of journal acquisition are of a print-bound world in which each library is an island of access for its own patrons. It was observed that with electronic desktop delivery of information, the increased ease of access allows far greater information use than previously possible. It was further suggested that libraries and consortia must seek to enable this
desirable outcome by adopting purchase models that provide for expanded journal access.

Grant (1999) views that the procurement processes of digital resources for automated library systems has to be examined to determine if libraries are choosing the best methods for getting the best return on their investment. The benefits of the implementation of such processes are also reviewed.

Consortia movement has influenced the collection development policies in the libraries. Dwyer(1999) at the California State University System (CSU), United States of America, conducted a study. CSU utilizes a cooperative buying program to provide a wide range of electronic resources at the lowest negotiable prices. It surveys campus needs, identifies and reviews resources, and makes recommendations for purchase. Today, libraries within all institutions of higher education are viewing serials collection development in a new light. Miller, et.al. (1999) looks at the issues revolving around these new dynamics, including distance education, electronic serials and how librarians should proceed in the near future.

Collection development in cyberspace is a complex one, considering the diverse nature of information sources. Kovacs and Elkordy(2000) in their paper provide a practical discussion of developing and implementing a collection plan for building web-based e-libraries. Discusses some guidelines and practical strategies on where and how to find, identify, evaluate and select appropriate web-based information resources.
Ashcroft (2000) conducted a study of electronic journals in academic libraries in the UK and North America. This study focused on the areas of promotion and evaluation of electronic journals. Author felt because of the convenience in access and other benefits, libraries add more and more e-journals to their portfolio. This has had an impact on overall collection development policy as well as other aspects in the library.

On collection development and consortia, Chen (2000) conducted a study in Taiwan. This study revealed that it is a tradition in libraries to offer scholarly materials for supporting research and education. More so in the digital age, it becomes both a challenging issue and an opportunity for libraries to provide electronic resources. Introduction of large number of electronic databases to its end users by applying mirroring technology is discussed.

Patra and Basak (2001) conducted a study of collection development in CSIR libraries in India. Authors reported that convergence of technologies has revolutionized the process of collection development in CSIR libraries. ICT is enabling libraries to go for CD ROM or online databases because of its conveniences. Authors feel that the librarians are now looking towards databases as a replacement for print resources.

Wilson (2001) makes a revelation about the level of use of e-books in comparison with use of E journals. He suggests that impact of e-journals has been significant. In comparison, electronic books have been little slow and have had less impact on higher education. This EBONI will look into the design and usability of e books to increase their acceptance level by the users.
The impact of IT on sources is best explained by the availability of large number of business information sources in digital form. Chikkamalliah, et.al. (2001) compiled an exhaustive list of such resources useful for management libraries.

Thappa, et.al (2002) feels that these electronic resources have become very popular because of the many advantages like:

- Fast and easy access,
- Data updated online,
- Less turn around time, etc.

Hence the number of e journals is increasing day by day. This is an indication that the user community has learnt to accept e-publications.

Hyatte and Connaway (2002) describe the rationale and background of OCLC’s acquisition of major electronic books company netLibrary. They list out many benefits of e books Like: easy access, accessible anytime anywhere, capabilities to search within a book and across a collection of books, links to other resources, including dictionaries and thesauri, no risk of loss, damage, theft, or misplacement; no physical space requirements, etc.

Garrod (2003) describes the future of e books in UK libraries. Contrary to the feeling of many that e books will replace traditional books, he says the new media will always supplement the existing one and will never replace it. E books are a logical step in the field of publishing and are going to become a major part of collection in libraries.
Ramesh (2003) in his article discusses about the management of digital collection in libraries and the issues involved. We are living in a digital world and libraries have acquired large number of digital resources for their clientele. Managing them is an important concern for librarians. Author feels that the management of digital collection is an entirely different phenomenon and librarians should work on this. This article also discusses about the criteria for preserving digital resources.

Jebraj and Deivasingamani (2003) discuss the electronic libraries and the prevailing situation in India. Efforts of major scientific libraries like IIT, TIFR towards becoming digital libraries by slowly building their collections in digital format are explained. Authors discuss about the digitization activities in these libraries, and purchase of digital content from outside like e journals, online databases etc. They also discuss how this digital content is enabling the e learning process.

Angadi and Koganuramath (2004) in their case study discuss the availability of electronic resources like e journals, ETDs and Online databases to the users. Authors feel that these digital content has facilitated fast and easy access to content with simple and powerful search and retrieval capabilities. This article also elaborates on the efforts of TISS library in becoming the finest digital repository of the world in the field of social sciences.

Blixruda and Kyrillidou (2003) writes that responding to user demand, libraries have steadily been shifting the focus of their collection development to the acquisition and licensing of electronic content, much of it via consortia. In
spite of considerable efforts, data documenting the quantity and use of these e-resources was proving to be elusive. The ARL E-Metrics work was established in 2000 to develop standard definitions for measures that libraries could use to describe their e-resources, extent of their use and the level of library expenditures.

Plutchak (2004) explains the impact of Open Access movement on library budgets and consequently on library resources. Author suggested that open archives promise to deliver superb content without having to pay for it. Further discusses several movements in this direction and says that open access will be major movement in the days to come.

3.3.2.2 Impact on Information Services

There have been a number of studies that discussed the impact of e-resources use in the universities worldwide. Shuling (2007) analyzed the use of electronic resources in Shaanxi University of Science and Technology. The sample consists of 909 respondents of all types of library users. The study found that nearly 80 percent of respondents knew little about electronic resources. Nearly half the respondents use both printed and electronic resources, followed by print periodicals.

Ray and Day (1998) on the other hand, conducted their study to determine the level of use of electronic resources and how students feel about various issues surrounding electronic resources. The findings of their study are that 91 per cent of respondents acknowledged access to a networked computer
via university, and also that more internet access is from work place than from home. The most popular electronic resources used were CD-ROM and the internet. Only 37.5 per cent of the sample population used electronic journals as an information tool. Another study by Tenopir (2003), studied the 200 recent research publications that focus on the use of electronic library resources and were published between 1995 and 2003 in the report for the council on library and information resources. The study used a variety of research methods, including observations, surveys, interviews, experiments and transaction log analysis. The findings show that both faculty and students use and like electronic resources and most readily adopt them if the sources are perceived as convenient, relevant, and time saving to their natural work flow. Print medium is still used for some reading and is part of research in almost every discipline. Rao (1997) on the other hand, has discussed the impact of CD-ROM databases, internet and digital libraries on collection development. He has reported that it is quite significant. Finally, there is lack of research on electronic resources in Bangladesh. So, this study has been attempted discuss the electronic resources and its use in one of the premier universities in the country.

Information Technology involves acquiring, storing, processing and distribution of information by electronic means. IT is now perceived as an enabler that facilitates in the information dissemination process. One of the important activities in library is transaction of reading materials: issue and
return of books, journals, etc. Computer applications have made the job easier for all concerned. Use of barcodes at the circulation counters has saved the time of staff as well as users to great extent.

Electronic News Delivery is fast catching up with the librarians. **Levinton (1990)** explains that a customized news service, delivered on a daily basis to corporate staff is a highly valued information service. She further mentions that it is possible only because of the e-mail facility.

**Howden and Dillard (1991)** conducted a survey to determine the technologies used in online library services. The survey revealed that technology is rapidly incorporated in to the information services being generated in libraries. Only 7% have reported not doing online searching for the users. This underlines the significance and influence of information technology in library services.

Discussing the influence of information technology in libraries, **Lawes (1993)** reports that attention to the quality management produces proactive library services and the vital link between the user and the information. **Friend (1993)** writes that expanding international electronic networks allow for greater ease of communication between libraries. At present this facility cannot be exploited by all libraries in the world, but access will become more essential as the range of uses for such a network grow. This opinion is also supplemented by **Wuest (1993)**: In a case study, **Klein (1994)** considers how the quest for improving the effectiveness of information services motivated the authorities to create a leading-edge campus-wide network. In this
case study author explains the master plan, which studied the existing infrastructure, managing and staffing computing enterprise, assessing strength and weaknesses and the financial investments needed.

**Clausen (1996)** conducted an empirical survey of Danish academic and business users of Internet services. In this survey, author discusses different types of quality problems associated with library services that use information available on Internet. Survey reveals that only natural intelligence will be able to cope with the enormous task of filtering and distilling usable and useful information needles from the Internet haystack.

Lots of information services are web based. **Sharma and Raina (1996)** observed that while utmost care is being taken to design databases, sufficient attention is not yet given to retrieval software which influences the quality of output.

**Robson (1996)** in his article summarizes briefly the development of online bibliographic databases from their beginnings in the early 1970s to the present. Warns that most academic journal publishers have not changed their structures and overheads and that they must now co-operate strategically with agents and libraries if they are not to be made redundant by the virtual library.

**Fisher (1997)** in his article provides an outline of the main types of published information sources generally available in libraries. Author examines first a range of potentially useful types of information available within libraries and from other channels. Further provides an account of the use of computers to search CD-ROM, online and the Internet to find information.
Ciurlizza (1997) describes the Network of Networks project in Latin America, the objective of which is to improve access by the end-user to existing information resources through an integrated approach to network support and development. Further mentions the use of electronic conferences to coordinate and discuss information services and product delivery, cooperative CD-ROM production, marketing and information management. Anticipates the future use of CD-ROM for full-text document delivery.

A project by name “café Jus” was undertaken in United Kingdom to investigate end-user reactions to electronic journals. Woodward (1997) reports about the issues explored: access to e-journals; reading habits; human factors; financial implications; and the future roles of librarians, subscription agents and publishers in the electronic environment.

The provision of current awareness to a community of customers is generally accepted as highly desirable. The service becomes even more valuable when it includes journals held within the customers’ own library. Gessesse (1997) describes a pilot programme about Internet accessed CAS conducted at the University of Alabama, USA September 1995 to May 1996. An electronically accessed table of contents service was distributed to a group of faculty members in the Department of Chemistry. Outcome of the survey at the end indicated that provision of table of contents electronically was a highly valuable library service.

Olorunsola (1997) conducted a study in Nigeria on electronic delivery of information. Author states that the use of information technologies in
libraries has had a far-reaching effect on librarians and library users. The study reveals that the provision of information can be made more effective and efficient with the use of electronic information, and examines the extent to which these sources have been used in Nigerian libraries. Identifies some problems facing the application and use of electronic information sources and offers suggestions on how to overcome them.

**Majid (1998)** writes that proper management and promotion of CD-ROM service is desirable to make it more popular and cost-effective for developing countries. This article explores the management of CD-ROM service in Malaysian academic libraries and marketing strategies used to popularize it.

Although much has been written about the impact of the Internet and the Web on libraries and librarianship, relatively little attention has been devoted to the subject of librarians as creators and even marketers of new online services. **Trehub (1999)** in his article describes two fee-based online services at the University of Illinois Library, USA. The author discusses the pros and cons of in-house content-creation and concludes that academic libraries have the raw materials and the know-how to create valuable new online services, especially reference services.

Academic librarians are faced with choosing between the formats in the face of decreasing budgets and competing institutional needs. **Harrington (1999)** first examines the changes in the format of tax services and outlines those services available to academic libraries, compares two products in this
regards. Finally, several issues are outlined that need to be considered before implementing a Web-based tax service in an academic library.

New teaching and learning methods, in particular online learning, are now reality. In this context, Darzentas (1999) discusses the methods of online information provision. He further states that libraries will increasingly be the mediators to digital as well as physical objects. Explores the question of metadata and collaborative cataloguing activities and how these might impact on the library services of the future.

Ashcroft and Langdon (1999) conducted a survey in UK and North America to determine the advantages of electronic journals. This survey investigated the benefits of and barriers to the purchase of electronic journals in university library collections. Research findings demonstrated the growth of electronic journals, and their benefits. Issues like access to electronic journals, availability, and methods of access and delivery options, promotion and evaluation were all discussed.

Discussing the growth and development of electronic journals, Chan (1999) says that electronic journals open up many exciting service opportunities for academic libraries. Some of the advantages mentioned are Multimedia Capabilities, Speed of production and distribution, and Accessibility. Disadvantages posed are technological, sociocultural, and economic barriers.

Processing of information is very much necessary in order to make it traceable. There is a growing need to organize and retrieve subject information
on the Internet. Satija (1999) explains the technical services in the electronic information environment. Author feels effective retrieval is essential for any information service.

Electronic data transfer has greatly facilitated delivery of information services. Sreenivasulu (1999) explains that electronic data transfer has helped libraries in designing and providing value added information services. As technology changes, so do methods for delivering electronic information to library users. Describes Web-based online public access catalogs (Web OPACS) and other Web-based tools as gateway methods for providing access to library collections. Bordeianu, et.al (2000) offers solutions for overcoming barriers to information, such as through the implementation of proxy servers and other authentication tools for remote users are also addressed.

SubbaRao (2000) presents briefly the impact of information technology in information management and the major activities to be considered for improving information accessibility in India. Author reports on Indian scenario and information availability with various departments/agencies for database production. Concludes that the database sector is growing very fast in spite of several factors hindering its growth.

The success of any library depends upon the adequacy of sources and the information services generated for the benefit of its users. Siddiqui (2001) conducted a survey at Jawaharlal Nehru University, Delhi to know the awareness and utility of information services. He observed that by developing
awareness bulletins, library orientations one can create a better awareness about services and increase the usage of information services.

Internet has found its use in almost all modes of life and more so at the libraries. Hence it is important that all the potential users are made aware of the major services on Internet. Raychaudhary and Pal (2001) explain the impact of Internet on information dissemination process. How the library services are being redesigned in the advent of Internet are also explained. Email, mailing lists have made the information delivery much easier and convenient job now a day, they say. Continuing further Jeevan (2001) explains about how information technology has helped librarians in achieving a value addition in management library services.

Discussing the economic conditions of India, Gautam and Singh (2002) points out that unless the resources are shared, libraries can never be able to meet the growing needs of users. They suggest that libraries through networking can significantly increase their information services and work to the satisfaction of users. They further suggest the formation of an information system for the same.

Explaining the changing contours of information services Khode and Dhar (2002) explain that IT has influenced the way library collections are developed. Accordingly, there is a change in the nature of information services generated through these electronic sources. They further discuss the advantages of information services provided by electronic library.
It is true that with each development in technology the access time for the information sources has come down drastically. Jeevan (2002) thinks that this has probably reduced the contact between the user and library staff. He said that there is a considerable fall in library attendance, which is very alarming. With information being made available to users at their desktops, the users have reduced their library visits, he contends.

Online Public Access Catalogue (OPAC) is the tool, which provides access to the Library collection. Hussain and Raza (2002) explain the features of such OPAC’s, the advantages and disadvantages. The simplicity in use and the amount of information provided has made the OPAC a popular tool among library users. Cataloguing Service is one of the important services in a library. Manual catalogues occupied lot of space in large libraries and were cumbersome for use. OPAC’s have already replaced them in most of the large libraries.

Singh (2003) examines the prospect of putting barcode to a lot of use in libraries. According to author, it ensures the increased accuracy, high speed, more timely information, lower labor cost and better services at the circulation desk. He further explains the different hardware and software required for the same. Singh (2003) in his article discusses in detail about the impact of Internet on library services. Author lists out benefits of technology in the areas of technical services, reference services and finally the sources of information.
3.4.3 Impact on Human Resources

Information technology has created a sense of urgency and has created new possibilities for the librarianship. It has forced librarians to either adapt to the new technology or perish in the process. Librarians, along with traditional and basic knowledge of librarianship are also required to be adequate at the computer applications in libraries.

Linder (1992) feels that in this new environment, librarians will have to shift their role from being a librarian to that of a corporate intelligence professional. He suggests that by developing and acquiring new skills, librarians can grow in their stature and importance in the organization.

Ojala (1993) explains the core competencies for the librarian. Author says that web based services and Internet has called for different set of qualities in librarians like solid understanding of information sources, ability to organize information and anticipate information needs, etc.

Harinarayana and Nalini (1994) examine the changes in the library environment – both intrinsic and extrinsic. They feel providing practical oriented education at the universities can face the challenges posed by IT. They further discuss some education requirements expected of an individual coming out of LIS schools in order to cope with these changing dimensions of libraries.

Lepik (1995) maintains that the growth in responsibility of librarians under the country’s changed conditions requires their high-quality professional education, flexible continuing education and professional development at all levels. Sengupta and Umarani (1996) feel that the dynamic nature of IT is
having far reaching implications in all spheres of human activity. While its impact on LIS is very significant, it also has created some confusion in the profession and has started a race between IT professionals and librarians for the supremacy.

**Rehman, et.al. (1997)** define and validate competences for entry-level professionals of academic libraries keeping in view the needs of the next five years. In this survey a scale of perceived importance of each competence was used for validation of competences. A distinct emphasis is noted for contextual, managerial, technological and service competences.

**Barden (1997)** examines the competences that will be required by the information worker of the twenty-first century. Emphasis is placed on those new technology skills, which are constitutive of the information industry of the future. Challenges the assumption that there will always be a role for the information professional. Argues that unless the profession proactively pursues added-value activities based on new technologies it will become superfluous.

**Nair (1998)** has proposed a scale to measure the attitude of librarians towards IT. He says the attitude a person holds towards a technological change determines their response to change. **Singh(1998)** feels that the impact of IT on human resource can be managed well by redesigning the curriculum of Library science courses. By giving more emphasis on practical aspects of IT and its management, the students can be trained for the job of librarianship. **Elder and Miller (1998)**, **Pollock** and **Brown (1998)** explain about similar learning and transitions in the careers of librarians.
Farley (1998) says effective management of change is a crucial issue for academic libraries in the 1990s and beyond, as change is impinging on every aspect of their work. Author examines organizational theory, changes in academic libraries, and human resource management to demonstrate the pressing need for attention to change and its effect on people. Additionally, human resource management should aim to minimize the negative impact of change by responding to the needs of staff through communication and information sharing, staff involvement, training and development, and job design. Weller (1998) also explains about similar impact on health science librarians in electronic environment.

Murthy (1999) stated that the impact of IT on staff has altered their functioning and calls for new set of traits. He says the librarians will have to develop as a provider of access to information and as integrator of information and as information intermediary.

Younis (1999) reviewed the higher education movement and the development of universities in Jordan. This study covered 20 libraries. It was observed that half of the libraries had department for computer applications to facilitate in library automation process.

Feret and Marcinek (1999) conducted an exhaustive study to know about the role of an academic library and skills of an academic librarian in the year 2005. This study was conducted between December 1998 and April 1999 involving 23 key library experts from ten countries. Outcome suggested that libraries and librarians should be able to keep pace with the ever-increasing
technological changes and should be able to adapt themselves as keepers and providers of information, regardless of the form of information.

**Lim (1999)** identifies the need to train information processors through the development of information literacy skills, and information distributors, particularly library and information professionals. In connection with the training of information professionals, author argues that the current curriculum in many library schools is no longer suitable, and stresses the need to build a curriculum that revolves around the model of the virtual library and the Internet. **Bruce and Clayton (1999)** echo similar feelings about librarians’ role.

**Lavagnino (1999)** conducted series of interviews with top librarians to find out what challenges they believe libraries are experiencing that could be assisted by technology, and how they believe libraries and information technologists should be working together on those challenges. They felt the challenge could be met by developing those skills required by the new information environment.

**Dugdale (1999)** advocates that as managers of digital information systems, librarians cannot remain mere intermediaries, though some find that digital collections present unwanted learning challenges and threats to current working practices. An electronic collection can underpin current pedagogic styles, initiate new teaching and learning practices and support lifelong learning skills through the close collaboration and interchange of professional academic and librarian roles.
Woodberry and Richardson (2000) discuss the way in which the establishment of an academic library has been managed at a new university in the 'information age'. This paper investigates the model proposed to support the vision of an electronic library in the late 1980's, and the issues associated with its implementation in an environment of emerging technologies.

Premachand and Jabali (2000) feel that no meaningful penetration of IT in libraries is possible unless our human resource becomes IT savvy. He also mentions about the level and areas of training to be provided. Performance evaluation can provide a useful tool in developing required skills and competencies in staff in order to meet the growing needs of the libraries today.

Maharana and Panda (2001) feel that it should not be done as routine work but to be taken as a serious tool for the development of staff.

Malhan (2001) discusses the evolving role of business information professionals in this emerging knowledge society. He feels the librarians face greater challenges because of availability of information in diverse formats like online, CD ROM etc. Generating information services out of these will require him to have thorough knowledge of information technology and its applications in libraries. This view is also supplemented by Gaur and Gaur(2000), Srivastava and Raina (2001) and Peacock (2001).

Automation in libraries and the subsequent developments in ICT have spread the waves of competition amongst all sectors of library and information science field. Vibhuti (2002) says that quality, reliability, efficiency and
competitiveness are the watchwords for the librarian for survival and growth. **Koina (2002)** says that librarians are the true knowledge managers.

Because of the proliferation of computer technology, librarians are feeling very insecure about their profession. Factors responsible for this are the greater competition posed by proliferation of information services, acceleration of IT use in libraries and networking. **Mahajan (2002)** feels that in order to compete successfully, librarianship must identify and assert its professional niche on the larger societal stage.

**Plutchak (2002)** explains in his article that managing information in the health care and biomedical research arenas is becoming increasingly complex and he envisages a challenging role for librarians here. He is of the opinion that the person who is involved in information management needs to be a truly hybrid person: person who has training in both fields like librarianship and computer science.

**Aina (2002)** has conducted a survey on the impact of library automation on the performance of library staff at University libraries in Nigeria. It revealed that the automation has helped staff in managing more workload with less staff and the efficiency also has increased. It has given a positive effect on the staff performance.

**Gaur (2003)** states that manpower is one of the three main components of reengineering process. He feels that the impact of the technology can be handled well if a well thought reengineering plan is in place for human
resources. It must emphasize on recruiting additional staff, training existing staff, motivating them and preparing them for the new environment.

Raschke (2003) writes that academic libraries need to change their recruiting and hiring procedures to stay competitive in today's changing environment. He feels libraries are taking too much time in deciding the kind of candidates they require and hence delay the process. This has discouraged the talented candidates to look at other avenues. Author further suggests that the manpower in libraries must gear up for this dynamic world by equipping them with the latest in this field.

3.3.2.4 Impact on Library Users

There are many developments and changes, which have taken, or are taking place in this learning environment. These have greatly affected the user community and the library will have to respond to this. In order to respond to many of the changes and developments, it will inevitably have to educate the user and become more service oriented.

Chaudhry (1993) in his article explains that the Automated systems in libraries can be used as effective tools for use studies and management information by producing continuous data about usage. This helps librarians to know how users are reacting to a particular digital service and if library can do something to improve the situation. However, this potential does not seem to have been exploited effectively.

Information has emerged as a key resource, which has got an overriding influence on all other resources. Naturally, IT, which is concerned with the
storage, processing, retrieval and transmission of information has come to stay with us. IT has been applied in libraries in a big way. **Vijaya Kumar (1994)** in his article explains the effects of IT on Indian society. Further, analyzing its effect on library and information science field, he says that professionals and users will have to work more closely to reap maximum benefits from it. Library and Information Centers of today are using more technologies at an ever-increasing rate. However, the increased complexity and the number of information sources available have made it difficult for the users to access information. To satisfy the users demand and to achieve maximum benefit from these new resources, a library must design and implement a comprehensive integrated strategy.

**McCormac (1995)** feels that it has become fashionable for a number of librarians to make extensive use of these newer technologies irrespective of the requirement. In the process the Users are being neglected. Librarians whenever shifting to these technologies must keep in mind the needs of the users and go ahead with the transformation.

**Whalley (1996)** examines the expectations of user from the journals. They are to communicate research rapidly, accurately, widely and cheaply and all of these are being achieved by e journals. This is evident from the growth in the number of electronic journals. He feels users also find it convenient to access e journals.

**Lapp (1996)** writes that the user community is somewhat confused by the influx of technological advances in library. He feels that electronic products
in libraries should be offered in combination with information services. Even in a library that offers large amounts of information in electronic form, users themselves need to do a lot of work, and this requires a level of library and information literacy. In order to address this situation he suggests the development of a user training and services programme designed to complement the electronic information products of the library and which forms an integrated information package.

It is widely assumed and frequently asserted that communication practices are being radically transformed by the introduction of electronic communication. Applebee (1997) conducted a study at University of Canberra, Australia about the frequency and type of Internet use. The principal findings revealed that academics use these services to enhance the efficiency, quality and productivity of their academic work. The results highlight specific measures that might be taken by academics, librarians, and academic institutions in order to realize the opportunities that the Internet offers.

Huntingford (1998) reviews this eLib project of United Kingdom. The aim has been to reach a better understanding of the depth and complexity of technological change and its effective management. It covered 24 higher educational institutions and questionnaires and structured interviews were used for data collection. The crucial factors needed were found out to be institutional support, access to technology, a comprehensive information strategy, and communication at and between all levels, project management and teamwork.
Stokker (1998) reviews operation of the Researchers' Centre of the Queensland University of Technology Library. This Center aims to meet the information needs of research level students and academic staff through a combination of access to electronic products, on-hand expert advice, and state-of-the-art study space in a one-stop-shop operation. It also offers value added facilities and services.

Wiseman (1998) explains about a project for implementing national access management system for electronic services. Author reports that it has had profound impact on users as they had a simplified interface and a single user name and password to remember.

As an instructional medium, the World Wide Web offers a multitude of options for educators. Simoneaux, et.al. (1999) highlights the design, implementation and use of the WWW to provide and evaluate library instruction including: a curriculum-integrated tutorial for learning online resources, critical thinking and other information literacy skills, “Ask a librarian” e-mail reference service, a multi-user object-oriented environment (MOO) for real-time course-integrated instruction and synchronous reference service.

In today’s world, lot of information is being disseminated through web. Abels (1999) asserts that library websites through which information is disseminated are to be in conformity with the established norms. This paper reports about a project to identify and implement user-based design criteria in World Wide Web sites. As an alternative to existing, largely ad hoc design
processes, the authors developed a user-based design process, gathering user input at three different times in the process.

Chikkamalliah and Fazzuludin (1999) discuss the computerization of library services at IIM Bangalore library and its impact on library users. Authors contend that effective user education programmes were implemented to assist users in availing the maximum use of these automated services.

David and Bridget (2000) in their Agora case study showed that the users of library systems have embraced the concept of the hybrid library. Agora is one of the five Hybrid Library Projects that began in January 1998, forming part of phase 3 of the eLib programme investigating issues surrounding the integration of digital and traditional library resources. It is a consortium-based project, led by the University of East Anglia. The project also works with several associate groups: libraries, service providers and systems developers.

Time is of the essence for librarians to review the pace of change occurring within higher education and how information will be provided in academic libraries to their vastly changing student population. According to Wood and Walther (2000) the integration of technology in higher education has had an impact on academic libraries in two direct ways:

- Changing material formats and the scholarly communication options;
- Changing how information is delivered, beyond the classroom experience.

Authors examine in depth the impact of format change issues, including changes in data preservation and conversion, personnel and facility issues and
Rowley (2001) reports on a research framework that monitors and maps the development of user behaviour with electronic information resources in UK higher education. The first phase was the annual survey, which sought to measure and evaluate the overall awareness, uptake, usage and usefulness of information technologies and information services in higher education in the United Kingdom. Phase two aimed at developing profiles of current and planned service provision. The basis for this survey is a web survey of resources accessed by individual.

The development of new technology has made direct access to information easier for users. However it has had a profound impact on library user as well. Vasanthi (2001) explains the necessity of library user training in order to make the user feel comfortable with the technologies that are adapted by them. She also explains the changing academic environment and its impact on user.

Knowledge is proliferating with such a rapid growth that it is becoming difficult day by day to manage it. Information is now available in libraries in so many different formats that users are baffled and find it difficult to find required information. Satpathy (2002) feels that the technology has had a great impact on users and changed their traditional approach of looking for information. Author suggests that only an effective user education programme can meet this challenge.
The proliferation of information products has made it difficult for the users to be aware of what are the latest happenings and what are the latest products available in his/her subject. Singh and Satyanarayana (2002) feel that promotion of an information product or service is an essential communication process. While authors suggest different methods of marketing, the most effective method appears to be establishing personal contact with the user.

The proliferation of digital library services has given rise to the problem of evaluating their quality and impact. Bollen and Luce (2002) in their article propose a quantitative approach to digital library evaluation that analyzes the retrieval habits of users to assess the impact of a collection of documents and to determine the structure of a given user community. It further discusses a system that they have developed to automatically generate extensive journal and document networks from an efficient and simple analysis of user retrieval sequences registered in a particular digital library’s server logs.

The move to an electronic format for journals has affected serials management practices in libraries, and some of those changes have also affected library users. Bonthron (2003) in his article examines the views of academic staff and students on the advantages and disadvantages of electronic journals, using data from two research projects. Further it examines uptake and use of a wide range of electronic information services in higher education in the United Kingdom, with emphasis on student usage.
Khode and Khode (2003) in their article describe many factors that are closely related to user satisfaction and library services. They feel that the library environment is changing because of technological developments and hence there is an increasing need to measure the user satisfaction about library services.

Veeranjaneyulu and Singh (2003) describe the impact of information technology on academic libraries. Authors feel that these computer applications have helped libraries in meeting the complex needs of library users thereby having a positive effect. Some of the teething problems information technology may pose to the academic libraries are also discussed.

Ramesh, et.al. (2004) has conducted an evaluative study on the IT services and the user requirements and satisfaction in the six university libraries in Karnataka state. General view of the library users is that IT has brought improvements in the library services. However, half of the respondents expressed that they are not satisfied with the IT infrastructure at their libraries. This could also be attributed to the depleting budgets and lack of trained manpower in libraries.

Although information in electronic format was created with the advent of the computer in the 1950s, it was not until the early 1960s that the first database – MEDLARS suitable for searching was developed. MEDLARS were the first on-demand computer-based information retrieval service, and it was developed primarily for the medical profession. In 1971, MEDLINE, the online version of MEDLARS, was the first major online dial-up database search
service. In the following year, DIALOG offered the first public online commercial database. With these first databases, there were no real acquisition decisions, as they were offered as access services to which libraries could subscribe. Actual searching of these databases produced charges that many libraries passed along to users. While the information revolution was clearly underway, it was not until after the introduction of the CD-ROM in the mid-1980s that electronic resources began to have a major impact on selection practices in libraries Meadow (1988).

Amritpal Kaur (2011) examines the impact of e-journals on university libraries in terms of resources, staffing, space, technical services and equipment. A well-structured questionnaire was designed to collect the data for the present study. A thorough survey of the literature was done to examine the findings of the earlier relevant studies. The results of the survey provide useful information regarding the impact of e-journals on subscription to e-journals, infrastructure, staff, space, technical services, photocopying, interlibrary loan, and library use and reference services. The study found to have important implications for information creators, publishers, libraries, scholars and researchers.

Sudharma Haridasan and Majid Khan (2009) focus on the impact and use of e-resources by social scientists pursuing research in the NASSDOC library. The data were collected from the entire population of social scientists at NASSDOC through a questionnaire accompanied by personal interview. This was further analyzed using statistical techniques and percentages to arrive
at qualitative and quantitative results. The major findings of the study indicate that respondents are aware of the e-resources such as e-books, e-journals, e-encyclopedias, e-theses, CD-ROM databases, e-mail, internet and the OPAC). Large numbers of research scholars and faculty members are using these e-resources for their research work. Many faculty members strongly agreed with the necessity for computer and internet literacy to access information. A majority of users were satisfied with the e-resources available at the NASSDOC library.

Patrick Mapulanga (2012) explored the impact of a fibre optic network and increased bandwidth on access to electronic resources for libraries in Malawi. The number of articles downloaded has increased from 6,075 in 2006 to 50,860 in 2011, representing a 737 per cent increase. Half-year statistics for 2012 reveal that the number of articles downloaded increased from 50,860 in 2011 to 81,633, representing a 60.5 per cent increase. The paper has practical implications on the impact of a fibre optic network and improved bandwidth on access to e-resources in libraries.

Jill Beard et.al. (2007) surveyed the impact of electronic resources on the learning and teaching community of Bournemouth University. Action research was used over a two-year period, with the results from one academic school were compared the following year with the results from two other schools the use of, and enthusiasm for, electronic resources is widespread amongst students and staff. The study demonstrates the effectiveness and value in using action research to assess service offerings.
Chetan Sharma (2009) The availability of e-resources in a university library is very common. But their proper and maximum use is a matter for discussion. The study highlights the preferences and importance of online resources among the teachers and research scholars.

Donald W. King; Carol Hansen Montgomery (2002) The study gives us the use and perspective to determine whether the migration to the electronic collection has had an effect on the number of journal readings, outcomes from reading and information-seeking and reading patterns particularly from library-provided articles; faculty still rely heavily on readings from personal subscriptions; most of the library-provided reading is from electronic articles; and readers spend much less time locating and obtaining library-provided articles when they are available electronically.

The studies conducted at Ball State University Libraries to examine the impact of electronic journals and aggregate databases which have on interlibrary loan activities. Borrowing and lending were monitored intermittently over a period of two-year to determine the number of requests that could be filled from available electronic journals or aggregate databases. Among several follow-up studies suggested is a recommendation to investigate whether there might be a correlation between recent decreases in the number of interlibrary loan borrowing and lending requests and the increasing amount of full text information researchers have available online. (Hildegund M Calvert, 2000).
**O. Gene Norman (1997)** This Study Investigates the Effects of Electronic Information Sources on Collection Development in Academic Libraries. Areas Studied Included the Materials Budget, Collection Development Policies, and Licenses; Identifying, Evaluating, Selecting, and Developing the Electronic Sources Collection; Training Subject Specialists to Use Electronic Resource Tools; Classifying Electronic Materials; and the Changes in the Role of the Collection Development librarian.

Discusses the development of regionally organised electronic library services within the NHS. **Richard Marriott (2002)** The evidence for the effectiveness of electronic library services draws attention to the interdependence of electronic and conventional library services.

**Erin T. Smith (2003)** explored the role electronic journals currently play in faculty's weekly scholarly reading habits. Survey results indicated that electronic access to journals—particularly library-funded access—is integral to research activities, with the vast majority of respondents reporting they read at least one article from an electronic source every week. **Victoria Robertson (2003)** The impact of electronic journals on the relationship between acquisitions, inter-library loans and journals departments in academic libraries. The study shows that, although electronic journals may be affecting departments in libraries, other factors may be present, e.g. budget cuts, staffing levels, etc. At present, it is still too early to judge the full impact of electronic journals on library services.
Rob McGeachin (2004) the potential changes to the information-seeking behavior of scholars and how they manage their own collection of research article “reprints.” With bibliographic databases and electronic journals provided by academic libraries now available at the science scholars‘ computer desktops, they can now locate and acquire a portion of needed research articles on their own at any time. They also, in some cases, have older paper copies scanned and delivered by libraries as image files at Web retrieval locations. Bibliographic citation management software is now in use by many scholars. Personal information management software is available and could also be used.

Janet Murray; Cindy Tschernitz (2005) the impact of greater access to electronic information, both free and fee-based, on reference enquiries. The assumption that greater internet access and use equal a decline in public and state library reference enquiries is not proven. The study concludes with a summary of trends, predictions and scenarios of usage of state and public library reference services in an increasingly electronic age.

Dianne Nelson (2001) The usage of electronic journals (e-journals) by academics and their attitudes towards them in the context of the rapid expansion of e-journals and their potential impact on scholarly communication. The findings suggest that while there is a high level of interest in, and acceptance of e-journals within the academic community, use of them is limited, their impact on the role of the library is discussed.
**Brinley Franklin; Terry Plum (2006)** MINES for Libraries is a web-based survey methodology is valid and a reliable method for assessing networked electronic resources usage. The methodology has collected usage data on the libraries’ electronic resources, including electronic journals, electronic books, databases, the online catalog, and services such as interlibrary loan. It can also integrate data on non-subscription resources such as digital collections, open access journals, pre-print and post-print servers, and institutional repositories. This web survey method is more successful in libraries that have implemented a network assessment infrastructure.

**Angela Conyers (2006)** to consider the importance of statistical measures for any study of the impact of electronic services and to describe how relevant statistics can be collected and analysed. The e-measures project has demonstrated some of the issues involved in the collection of reliable usage statistics, while the NESLi2 study has developed a framework for analysis which can be applied more widely. In this paper is of interest particularly to higher education libraries that wish to gain a more accurate picture of their use of electronic services.

**Kirill Fesenko (2006)** Collection development and library attendance changes are considered in light of growing use of electronic resources compared to resources on paper. Metadata formats for description of electronic documents and collections, logical structures of electronic resources as well as standards for metadata harvesting and sharing briefly. Changes in library
education and new responsibilities of librarians dealing with electronic resources considered. Preservation of electronic resources and their impact on students and libraries.

**J. Gretchen Smith (2007)** The effective communication of scientific and technological information is pivotal to the success of technological innovation and sustained economic growth. It clearly emerged from the study that the significant increase in the use of electronic modes and systems, while not affecting the inherent structure of the communication process, did create a far wider range of modes of communication and did have a positive influence on the ease of communication and collaboration. This was particularly manifested as far as cooperation with the international research community was concerned. It was also clear that this impact varied according to the scientists' work environment.

**Vincent Larivière et. al. (2008)** The study shows that the impact of theses as information sources has been generally declining over the last century, apart from during the period of the 'golden years' of research. There is no evidence of ETDs having a positive impact; on the contrary, since their introduction the impact of theses has actually declined more rapidly. This raises questions about the justification for ETDs and the appropriateness of writing monograph style theses as opposed to publication of a series of peer-reviewed papers as the requirement for fulfilment of graduate studies.
**Todd Spires (2008)** As computing becomes more portable, an ever-increasing number of people are dependent upon smartphones, personal digital assistants, webpads, and other wireless devices. An study of these current and future wireless technologies on electronic journal publishing. Have these technologies impacted e-journal publishing to this point? What are the expectations and strategies of journal publishers in dealing with the changing technology? What special issues do these devices present regarding licensing?

**Shin Eun-Ja (2004)** With the Growth in Electronic journals, Citation Indicators of these Journals may be Expected to change. Electronic Publishing can be Regarded as one of the Factors Affecting not only Citation Frequencies but also Citation indicators. Digital Access to Scholarly Journals Promises to Bring Changes in Citation Indicators, especially Immediacy Indexes of well-established Journals in education.

**Amer I. Kindilchie and Iman F. Samarraie (2008)** identifies trends among faculty members utilizing electronic information resources to develop their teaching, research and personal knowledge, it provides all faculty members with free access to its electronic resources. The University Library needs to undertake a review to identify other databases that may be needed, to promote the use of e-resources in teaching and learning, and to develop the search skills of faculty and students.
N. Chowdappa et.al. (2009) depicts the extent of dependency of users of educational and research on the electronic/digital media. The study clearly shows the degree of the use of digital information resources vis-à-vis the conventional print media.

Candela Ollé and Ángel Borrego (2010) The electronic accessibility of journals means that researchers now make fewer library visits. Web browsing and table of contents (TOC) e-mail alerts are replacing physical browsing, and searching is a very popular option for keeping up to date with developments. Internet search engines, especially Google and Google Scholar, are becoming important sources of information for researchers. However, they face problems in managing their personal scientific information.

Baljinder Kaur and Rama Verma (2009) The study is focused to know who these electronic information services users are, how often they use the services and the place where the information is accessed. It has been found that usage of e-journals is increasing; this is due to awareness among the users about the library e-resources and services. Owing to an easy access available at various places in the institute, users are accessing these resources at hostels and departments more as compared to the library. The users coming to library have decreased. The survey shows the awareness and use of types of information services, in this case e-journals.
Ming-Der Wu and Shih-Chuan Chen (2010) The study revealed that more use of print materials than electronic resources. Most of the documents cited were supplied by the university library. Only a small proportion of the documents were available in electronic format either from the university library or from the internet. The availability ratio of journals was higher than that of books. Students' acceptance of e-journals was higher than that of e-books. It will help researchers and librarians gain a better understanding of how to use electronic resources.

Ulrich Herb et. al. (2010) This paper aims to discuss a range of impact measures, especially usage-based metrics, and to report the results of two surveys. The first part of the article analyzes both citation-based and usage-based metrics. The second part is based on the findings of the surveys: The scientists who took part in the survey also asked for community services, assuming these might help to identify relevant scientific information more easily. Some of the other topics of interest were personalization or easy submission procedures. This paper delineates current discussions about citation-based and usage-based metrics. Based on the results of the surveys, it depicts which functionalities could enhance repositories, what features are required by scientists and information professionals, and whether usage-based services are considered valuable. These results also outline some elements of future repository research.
**Terry Plum et.al. (2010)** As libraries are developing a larger Web presence, issues regarding the utility, accessibility, and impact of the usage of their networked resources and services are gaining critical importance. This measure the impact of networked electronic services, building on MINES for Libraries in a scalable way across libraries and consortia to enhance digital library service quality and impact on learning by enabling the future allocation of resources to areas of user-identified need. This study enhances and deepens the information gained from vendor-supplied data. The developments described will make it easier for libraries to assess the usage of networked electronic resources and services.

**Martha Kyrillidou et.al. (2010)** The networked electronic resources, usage, and Web surveys. It discusses sampling plan options and articulates issues related to the mandatory and optional versions of the point-of-use Web survey protocols with an emphasis on nonresponsive bias. The study revealed to evaluate their networked electronic services in innovative ways to better serve the research, teaching, and learning needs of their users.

**R Guruprasad; et.al. (2010)** The study reviews the impact of Internet, the availability of high-speed networks which has enabled the researchers who have access to electronic journals right at their desktops and also keep track of the global R&D happenings in their respective field of specialization. Various studies conducted to illustrate how “electronic journals” are highly important to the researchers. The review paper also touches upon key aspects like:
Distinguishing researchers, their differences in knowledge diffusion, their communication behaviours, their information seeking behaviour, the importance of scientific communication for advances in research and the need for electronic information resources.

**Lil Grensing-pophal** *(2010)* Although evidence continues to suggest that students and consumers in general are not yet ready to entirely give up print as an information source, e-readers, e-technology, and e-resources are becoming increasingly common. As consumers become more familiar with the options that technology provides in terms of lower cost, personalized access to information, and accessibility anytime, anywhere, the impact on the textbook market is unavoidable.

**Carol Hansen** *(2000)* The study addresses another important organizational impact triggered by the migration to electronic journals that has heretofore received little attention in the literature: the changes in the library's operational costs associated with shifts in staffing, resources, materials, space and equipment. The sole exceptions are (1) when the electronic journal lacks an important feature of the print version and (2) when the journal is part of the browsing collection. With the year a dramatic change in staff workload is the most immediate impact on library operations, but space, equipment, and even supply needs are affected. Some of the aspects of this transformation were obvious and predictable; others were not.
Amritpal Kaur (2011) the impact of e-journals on university libraries in terms of resources, staffing, space, technical services and equipment. The study provide useful information regarding impact of e-journals on subscription to e-journals, infrastructure, staff, space, technical services, photocopying, inter-library loan, library use and reference services. On the basis of the results, some suggestions have been put forward for developing e-journals and ensuring their proper maintenance and utilization.

A.K.Razilan and Singh Diljit (2012) The conceptualisation of individual usage in Information Systems (IS) research is still undergoing debate and development. Only in the early 2000s has the approach gained attention in IS management. In attempting to bridge this gap, and the study the relationships between electronic library usage and individual impact where the usage measures were hypothesised as formative measures. It examines the relationships between the individual usage of electronic library for information provisioning and individual impact dimension in an IS Impact model. All of the three hypothesised causal paths among electronic library usage construct and individual impact tested were supported by partial least squares (PLS).

Jagdish Arora, Kruti J. Trivedi and Ajit Kembhavi (2013) studied the impact of e-resources through UGC-INFONET Digital Library Consortium on research output of member universities and found that based on three citation indices, namely Science Citation Index, Social Sciences Citation Index and Arts and Humanities Citation Index for the first 50 universities to be made part of the programme have
revealed that the number of research articles produced by these 50 universities has increased by more than 75% in past 5 years, i.e. from 2005 to 2009 in comparison to the previous block of 5 years, i.e. 2000 to 2004.

3.4 Conclusion

The studies cited in the literature review indicate that considerable work has been done on awareness and use of information technology gadgets and electronic resources including studies on impact of library resources (print and online) and services, but especially in the Indian context, indepth studies on impact of e-resources are not much, but only in the form of articles.


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