DR. HARI SINGH GOUR VISHWAVIDYALAYA, SAGAR (M.P.)

"Impact of Information Technology on the Technical & Users Services of the Libraries of INSDOC and NASSDOC, New Delhi: A Comparative Study"

Investigator

Deepak Kumar Namdeo

M.Lib.I.Sc.Student.

Department of Library and Information Science

Dr.H.S.Gour Vishwavidhayalaya, Sagar (M.P.).

Supervisor

Dr. K.C. Sahoo

Professor and Head

Department of Library and Information Science

Dr.H.S.Gour Vishwavidhayalaya, Sagar (M.P.).

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Department Of Library and Information Science

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DECLARATION

I hereby declare that with the exception of guidance and suggestions provided by my supervisor, **Dr. K.C. Sahoo,** Professor and Head, Department of Library and Information Science, Sagar (M.P.), this dissertation entitled ***"Impact of Information Technology on Technical and Users Services of the Libraries of INSDOC and NASSDOC, New Delhi: A Comparative Study"*** is an outcome of my own efforts and is an original work. This has not been submitted previously to this or any other University for any degree, diploma of associateship.

Place: Sagar **Deepak Kumar Namdev**

Date: Investigator

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Date

Place:

Deepak Kumar Namdev

LIST OF ABBREVIATION

AACR-II	Anglo American Cataloguing Rulers-II
AGRIS	International Agriculture Information System
AI	Artificial Intelligence
ALA	American Library Association
APINESS	Asia Pacific Information Network in Social Sciences
ASCA	Association for Science Cooperation in Asia
BARC	Bhabha Atomic Research Centre Bombay
Biblio. Cont.	Bibliographical Control
Biblio. Sers.	Bibliographical Services
CALIBNET	Calcutta Library Network
CAS	Current Awareness Service
CCC	Classified Catalogue Code
CCF	Common Communication Format
CD NET	Compact Disk Network
CD	Compact Disk
CD-ROM	Compact Dick-Read only Memory
CDS/ISIS	Computerised Documentation System/Integrated Set of Information System
CPU	Central Processing Unit
CSIR	Council of Scientific and industrial Research
DAT	Digital Auto Tape
Databases Cre.	Databases Creation
DBMS	Databases Management System
DELNET	Developing Library Network
DESIDOC	Defense Scientific Information Documentation Centre, New Delhi
Docu. Sers.	Documentation Services
DOE	Department Of Energy
DTP	Desk Top Publishing

DVD	Digital Versatile Disc or Digital Video Disk
EDSAC	Electronic Delay Storage Automation Calculator
EDVAC	Electronic Discrete Variable Automation Computer
E-Mail	Electronic Mail
EMMS	Electronic Mail and Message System
ENIAC	Electronic Numerical Integrator and Calculator
ERNET	Education and Research Network
Fax	Facsimile
FTP	File Transfer Protocol
GUI	Graphical User Interface
i.e.	that is to say
IARI	Indian Agriculture Research Institute New Delhi
Ibid.	In same book or passage
IBM	International Business Machine
ICs	Integrated Circuits
ICSSR	Indian Council of Social Science Research, New Delhi
IIS	Indian Institute of Science, Bangalore
IIT	Indian Institute of Technology
Inf. Sers.	Information Services
INFLIBNET	Information and Library Network
INIS	International Nuclear Information System
INSDOC	Indian National Scientific Documentation Centre
ISDN	Integrated Service Digital Networks
IT	Information Technology
LAN	Local Area Network
LC-SH	Library of congress Subject Heading List
LICs	Library and Information Centres
LIS	Library and Information Services
Lit.	Literature
MALIBNET	Madras Library Network
MAN	Metropolitan Area Network

MARC	Machine Readable Cataloguing
MB	Megabyte
MEDLARS	Medial Literature Analysis and Retrieval System
MM	Multimedia
MODEMS	Modem-Demodulator
MPCs	Multimedia Personal Computers
MS-DOS	Micro Soft Disk Operating System
NASSDOC	National Social Science Documentation Centre. New Delhi
NICNET	Nation Information Network
NSL	National Science Library
OCLC	Online Computer Library Centre
Op. Cit.	In the work already quoted (Opposite Citation)
OPAC	Online Public Access Catalogue
PC DOS	Personal Computer Disk Operation
PC/AT	Personal Computer/Advanced Technology
PC/XT	Personal Computer/ Extended Technology
PCs	Personal Computers
R & D	Research and Development
Ref. Ser.	Reference Service
S & T	Science and Technology
SDI	Selective Dissemination of Information
TIFR	Tata Institute of Fundamental Research, Bombay
TV	Television
UDC	Universal Decimal Classification
UNESCO	United Nations Education Scientific and Cultural Organization
WAIS	Wide Area Information Server
WAN	Wide Area Network
WWW	World Wide Wave

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SUMMARY

The study presents comparative analysis of the impact of Information Technology on the technical and users services of the libraries of INSDOC and NASSDOC.

The analysis is made with respect to IT infrastructure and its facilities, application of IT and its impact on the different library services.

NSL has larger infrastructure of IT as compared to NASSDOC libarary. NASSDOC library uses LIBSYS software for handling library services whereas NSL is useing GRANTHALAYA library software.

NSL has good LAN, E-mail, On-line search etc. as compared to NASSDOC library. INSDOC has a wider Networking System than NASSDOC library.

The analysis shows that the NSL has the largest (53.5%) IT qualified staff whereas, NASSDOC library has (30%) IT qualified staff members. NSL has the highest budget provision of Rs.2 crores for the year 1999-2000. The budget distribution shows that 50 Per cent of budget for reading material (20 per cent for print and 30 per cent for non print) and 30 per cent budget for infrastructure IT. On the contrary, NASSDOC library allocates 40 per cent for IT infrastructure and 45 per cent for reading material (1.5 % for print and 30% for non print) out of one crore.

NSL is using UDC for shelf arrangement of documents and CCF for cataloguing, whereas NASSDOC library classifies the documents with DDC and AACR-II for cataloguing. NSL provides 73.4 per cent services through computers, 13.3 per cent services are semi-mechanical whereas NASSDOC library provides 53 per cent services with the aid of computers, 20 per cent services are manual and 20.6 per cent services are both through manual and mechanical.

A large user group (90.9%) of NASSDOC library are aware about IT and use it. On the contrary, all the users of NSL are aware and use IT. 62.5 per cent services of NSL are improved to great extent with the help of IT equipments, whereas only 37.5 per cent services are improved to great extent in NASSDOC library.

CHAPTER 1

INTRODUCTION

1.1. Prelude

Currently we are passing through an era of rapid technological and socio-economical changes. Furthermore, the aura of such changes makes us believe that we are living in an information society. The technological revolution during the last five decades has made tremendous impact on the way, how information is processed, stored, retrieved and disseminated. Believe it or not, admit it or not, the growth and development of Information Technology (IT) are one of the most significant achievements of the present century. Access to IT is limited- few people have seen these, even fewer used these, and fewest yet understood these. The IT by now is recognized all over the world as an instrument of progress. IT is being considered as one of the current key factor in shaping the present societies and to formulate policies for future. IT is transforming the way of research in the field of science & technology and in social sciences too.

Developments in computer-based information systems and services, innovations in communication technology and networking have paved the way for the distribution of information, from the producer of information to the consumer of information in a very fast and effective way. Minimizing the cost of information at the generation, storing and supply levels. The impact of IT, which is not very relevant to the traditional library and information services. IT play an important role in the design of information systems, in the process of communication, in the information seeking behaviour and information use of the library users, on the nature of job of the present library professionals and ultimately on the entire society at large. Information is the basic ingredient that contributes significantly for the continuous growth of research and development (R&D) activities. India being a developing country, much of its development, particularly in Science & Technology depends upon the availability, accessibility and dissemination of right information to the right users at right time, pinpointedly, expeditiously and exhaustively (Garg, 2000).

The scientists as well as the social scientists do work under many constraints. They are confronted with an environment where R&D activities are connected with actual conditions, which is of global interest. These are again bound by the limits of the specific time requirements, risk of costly duplication, fear of fast technological obsolescence, high degree of uncertainty with more technological gap between what is actually available and what is to be made available in view of rapid information revolution. Under such

circumstances the extent of timely supply of relevant information from all possible sources to the concerned users is the most important factor. User is a crucial factor for keeping the touch with latest wave front of knowledge with limited resources but unlimited challenges. The user, therefore, must be supported with the latest effective and efficient information with the help of modern IT to cope with their real information needs.

1.2. Information Technology

IT is generic tern used to denote all activities connected with computer based processing, storage and transfer of information. The IT involves computers, electronic media, satellite telecommunication and reprography (Prasher, 1990). However, all the three aim at information communication, primarily, to a specialist. When the emphasis shifts from macro documents to micro documents; from retrospective information to nascent information; and from a general user to a specialist, library science assumes the character of information science having a technological base (Rajan and Satyanarayana, 1983). The primary purpose is to save the time of user in having access to the information, most appropriate to his need (Peltu, 1982). UNESCO defines IT as "the scientific, technological and engineering disciplines and the management techniques used in information handling and processing; their application; computers and their interaction and men and machines; and associated social, economic and cultural matters" (Varalakshmi, 1992). According to (Gopinath, 1985) the term IT represents an ensemble of technologies. These technologies are the computers ability to store and process information, the communication technology which represents transmitting information to location where it may be needed. IT is a catchall term used to describe products and services created by rapid changes in computer in communication technologies and their fusion together. IT is the new science of collecting, processing, storing and transmitting electronically the information, which is the life-blood of complex industrial societies and it is growing in importance. In other words IT is "a mosaic of technologies, products and techniques have combined to provide new electronics dimensions to information management. This mosaic is known as IT" (Smith and Campball, 1982). The benefits of computers can only be realized through modern communication networks, which of course can only be build with the help of computers. They are totally inter-dependent and in fact, we may say, that the two have become almost inseparable in the present ever-growing information society. Computers and communication are playing a key role in the growth of knowledge and information, which in turn are largely responsible for the development of the nation, communities and societies (Shukla, 1990). The roles of communication systems are as essential to IT as

computers. The information technologies have revolutionized or in facts completely transformed the concept of a library. Library no longer is a storehouse of information. The optimum utilization of the library resources could only be achieved by integrating library databases in a network connecting all the constituent units of the organization (Ahuja, 1992).

1.3. Application of IT to Information Handling

Computerization of house keeping operations in the library is known as library automation. The success of library networking depends only on the extent of automation of each participating library. Unfortunately, very little attention is given to automation as compared to how seriously we think about library. The purpose of automating the operations is to bring efficiency into the system and to prepare the libraries to opt for and avail IT products. It has now become an essential tool in libraries. It is mainly used for information retrieval and networking of libraries whereas its use in library housekeeping operations is minimum (Bashir, Khan and Wain, 1996). The role of IT in library an information field is outlined under the following heads:

1. Access to remote and large databases,
2. New media of publishing,
3. Availability of tailored software,
4. Resources sharing and networking, and
5. Provision for browsing.

1.4. Need for Information Technology

Information recorded is static unless, it is used. The use of information makes it kinetic and generates more knowledge. Thus, science and technology rests firmly on foundation laid by the information generated in the past, effectiveness of future and efficiency of present information transfer. Further, the need for technology arises partly due to the concept of multimedia. The conventional printed book is taking up other form such as microfilm, microform, sound record, and computer tapes, Which require special equipment for their processing and partly to meet the requirement of fast and accurate information and its transfer, over long distances. A book is now available simultaneously, on floppy diskette, CD-ROM magnetic tape; etc. Paperless information centers are fast emerging with advancement of technology. The benefits like fast and easy access to information, lesser storage space offered by electronics and optical media have attracted

the attention of library management (Saknure, 2001). IT can be profitably applied to library services in view of following advantage and necessities.

1. Information Explosion.
2. Rise in the cost of prints media.
3. Change in the profile of library users (viz. competition, political, legal and physical aspects).
4. Space problems.
5. Change in the mode of services i.e. form collection based services to information bared services.

1.5. Advantages of Use of Information Technology in the Libraries

Some of the advantages of using IT in libraries are follows:

1. Ability for generation of new services,
2. Accommodation of increased workload,
3. Facilitating co-operation,
4. Achievement of greater efficiency.

Besides this, the problem information explosion can be solved only by the application of IT and network in libraries (Gautam; Shrivastava and Shrivastava, 2001).

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1.6. Problems in switching over to Information Technology

Libraries and information centres are trying to adopt IT for their operation, but they are being affected by a number of external forces like political, economical, social, technological. The major handicaps, which the developing countries like India are facing while implementing IT in libraries, are:

1. **Financial:** Financial crisis occurs either due to the provision of inadequate funds o due to diversion of funds allocated to library for other purposes.
2. **Manpower:** Manpower crisis occurs because of lack of or non-availability of qualified professionals and due to delay in appointment of information manager/chief librarian or lack of dedicated and committed information professionals (Gautam; Shrivastava and Shrivastava, 2001).

1.7. Statement of the Problem

In view of the above facts and as the present situation demands, the problem selected for study is ***"Impact of Information Technology on the Technical and Users Services of the Libraries of INSDOC and***

NASSDOC, New Delhi: A Comparative Study". The problem involves a systematic study of the resources and services of the libraries of INSDOC and NASSDOC and also the impact of IT on the technical and users services of there libraries. The need and expectations of the users, different services being provided by the libraries the impact of computerisation on those services and the management in particular from the interesting aspect of the present research problem and it is hoped that this investigation would be rewarding from many angles.

1.8. Definition of the Terms and the Concepts

This being a social science oriented research, many terms and concepts do not have precise definitions. Yet an attempt is made in this section to present the meaning, scope and operational definitions of certain important terms and concept used in this study.

1.8.1. Information Technology

IT is the collective term for the various technologies involved in the storage, processing, and transmission of information. They include computing, telecommunications and microelectronics (Webster's, 1992).

1.8.2. Technical Services

All the activities and processes concerned with obtaining, organizing and processes library material for use, i.e. acquisition, classification, cataloguing, etc.

1.8.3. Users Services

All the library services, which are provide data, information and documents to the user at the right time on demands or in anticipation , like reference services, documentation services circulation etc.

1.9. Objectives of the Study

The study aims at identifying the impact of IT on the technical and users services. The detailed objected of the study are as follows:

1. To view the two specials libraries under study with regard to their organization and working.
2. To find out the levels of application of IT in the libraries under study.
3. To identify the problems encountered in day to day working in an IT environment.
4. To suggests solutions for the problems encountered.
5. To examines the influence and effectiveness of IT on the day to day functioning of the libraries under study.

1.10. Scope and Limitation of the Study

Application of latest tools and techniques of IT has been used mostly in the special libraries in India. Keeping this tact in mind, an attempt has been made in the present survey to study two important documentation centres of India, one in the field of sciences, i.e. INSDOC and the other in social science, i.e. NASSDOC. Though these are other documentation centres and special libraries of national repute in the country, those have not been included under this survey because of the paucity of funds and time. Attempts have been made in the present survey to critically examine all such aspects, which are necessary to assess the impact of IT on the special libraries of India. Through this comparative study, we can assess the amount of impact of IT in the field of science and social science too.

The present study is confined to INSDOC and NASSDOC only. The study is limited to the impact of IT in library services only. Attempt is being made to make a comparative study of software packages that are being used by the libraries. Cost benefit ratio is not counted, i.e. the cost of the application of IT to the cost of the Services are left.

1.11. Review of Related Literature

Kaul (1975) traces the origin of the word automation and mentions its use and abuse in the libraries in relation to the information generated at an accelerated speed through out the world. He says that the information storage and retrieval in one of the fundamental aspect of automation. He points out that library automation has become an essential factor in increasing efficiency, accuracy and quickness. **Kaushik (1975)** out lines the working of different type of computers and their applications in the field of research, business and industry. He discusses the computer application in library operations. Computer proves to be an excellent device to expedite the process of decision making. However, it cannot replace human intelligence. **Raizada (1976)** traces the history of computer based information services and products in India and states the present status. INSDOC took the leadership in experimenting with computers for their application in documentation and information work. Existing trends in use of computer in information work in the advanced countries are discussed. He makes the presentation of alternatives developing computer-based information services in India. There is a necessity of setting up of a batch mode information networks, which would enhance these services and products in India. **Rao (1979)** Describes the role of the present day technologies like computers, telecommunications, including satellite communication, etc. To handle the over growing mass of information and data and to more it from one

points to another. He discusses their impact on information handling. He gives detail of databases, which can be utilized to provide current awareness service and retrospective literature search. More than 200 computerised databases were available till 1979. He discusses about the long distance on-line real-time information retrieval networks. **Janak and Sachdeva (1979)** state that the computerised information services offer greater possibilities for developing services having tremendous flexibility, wider accessibility and a high degree of sophistication. They suggest that INSDOC & ICSSR should provided computer-based information services to the scientists, engineers and social scientists engaged in research. **Krishan Kumar (1980)** gives reasons for using computers in libraries, mentioning the areas for computer application. The enlisted areas are accounting, periodical registration, circulation control, book ordering and acquisition, catalogue and bibliographies, resource sharing, information management and retrieval, stock verification. Issues conserving computer application in Indian situation are stated and reasons for slow adoption are given. He pleads for greater involvement of libraries in the application of IT. **Sales-Ponyes (1980)** points out that the use of computers in the libraries has a considerable effect on their working. Librarians can exploit the capabilities of computer in housekeeping activities in India. He also stresses the need for developing an understanding of the standard computers, their software and hardware. The batch mode, on-line or interactive, and remote job entry for the processing of information by computer have also been explained. **Sewa Singh (1981)** traces history of computer and its application to libraries. A brief account of computerisation of Indian libraries is given, starting with the installation of computer at the IIT, Delhi and TIFR, Bombay. The use of computers at INSDOC for the compilation of union catalogue of scientific periodicals as also for providing computerised SDI services are mentioned. Before the installation of computer in library systems he concludes that feasibility studies and surveys should be conducted to know the environment as also the economic and social possibilities. **Rajan and Satyanarayan (1983)** present an overview of the technologies of computer, communication and media that constitute together as IT. The Indian information problem is seen in the context of postindustrial society and the problem and possibilities of using information as a national resource are focussed. They suggest a national information policy to be in true with the other national policies to evolve a total information system/network that would meet the varied demands for information. **Kashyap (1985)** discusses the effect the technology on information handling in libraries and information centres. He gives an overview of the emerging technology and point out the area appropriate for application of Artificial Intelligence (AI). Some of the recent efforts made to develop knowledge-based expert system for on-line searching are mentioned. One of the frequently occurring forms of intelligent human behaviour is the sorting and classification of

data, or knowledge units is central to the development of intelligent machines or knowledge-based expert system. **Gopinath (1985)** has discusses the developments in IT are delineated. Impact of these technologies in various aspects of information storage and retrieval system are analysed. The total picture of IT and conducive use in information dissemination are also presented. **Kasiviswanadham (1986)** discusses the need for automation in libraries. Traces the areas where automation is feasible in libraries. Discusses various operational details of SDI service at the INSDOC Regional Centre, Madras, using CAN/SDI software package. Suggests modern techniques and methods necessary for libraries attached to R&D organisations. Suggests for the immediate introduction of automation in libraries in view of information explosion. The importance of on-line processing in emphasised. **Honny (1987)** analyses the impact of automation on staffing. Technical services, staff reallocations and reductions, the resulting improvements in services, and the savings in the salaries are the problems, which are discussed. Over the span of fifteen years of computer-supported operations, the Northwestern University has been able to make moderate reductions in the size of the staff of technical services. At the same time, more material has been processed and the library has provided high-quality bibliographic services. The conclusion is that the combination of monetary savings and enhanced services has made automation as the most effective asset for the Northwestern University library. **Martin (1989)** describes that some current trends will intensity major changes in the way that libraries operate and the way the society uses information technologies during the previous century. He discusses how IT is likely to proceed in the year 2000. He explains library technology and its more from the back room to provide different services. He discusses some of the current trends in using IT, which change the shape of present library set up. These current trends are: ***a.***More focus on user needs, the users accessing electronic information differently, ***b.***An increasing tendency of information users to bypass the library, ***c.*** The obsolescence of first and second generation systems, ***d.*** A contention between optical products and online access, and Focus in the United States on formulation of major information policies. **Natrajan and Kaliyaperumal (1989)** deal with the application of new technologies, explaining the use of computers, telecommunication, and satellite technology along with E-mail and telefacsimile for document provision and supply. He makes a few recommendations for organising speedily document delivery service. In order to improve the speed of document delivery, information of new information technologies have been strongly advocated. **Sharma (1989)** describes the computer, its growth, functions and objectives. He gives some tips for the selection and procurement of hardware and software for library automation. The areas where computer-based operations are possible, are: acquisition, classification, cataloguing, serial control, circulation control, stocktaking, and information

retrieval services. Usefulness of the software package MINISIS (of IDRC, Canada) designed to run on HP series of computers is brought out. It combines database creations and information retrieval in the packages. **Prasher (1990)** explains the concept of IT and its importance. Deals with recent developments in the realm of computer and communication technology. Presents a status report on computer application in India in general and in university libraries in particular. Concludes that computerisation is no panacea for all the ills afflicting the libraries in India. **Anand and Sen (1991)** describe the INSDOC, has been offering two-year training courses in specialised aspects of information science since 1964. The course contents have been under revision approximately every five years on an average. The present paper retraces the development of the courses content in respect of computer application in LIS activities. It also reviews INSDOC's programmes of short-term courses on computer application between 1987 and 1991. **Singh (1991)** discusses the various faces of IT that are emerging. Identifies their impact on library and its services. Discusses the strategies that are to be followed for adopting IT in phased manner. **Varalakshmi (1992)** refer to the changes in information activities and growth of IT. States the major technological development. Presents a comprehensive introduction in the latest developments of IT and their impact on the activities and services of library information systems. According to **Cochrane (1992),** IT includes computers, electro-optics, micrographics and reprographics, telecommunication technology and integrated applications. Use of IT is growing even in libraries of developing countries to provide reference, referral and other services, and automating library operations. In developing countries where labour is relatively cheaper and imported technology can be expensive, those in authority should take a positive attitude to IT. Ranganathan's Five law of library science can serve as useful guidelines and criteria for assessing IT's value in library & information services. **Relan and Kakar (1993)** describe the CD-ROM systems, databases and CD NET networking systems available at DESIDOC. Advantages and disadvantages of on-line and CD databases are compared. Problems faced in acquisition, installation of various databases and retrieval software problems of major CD databases producers are also discussed. **Gopinath (1994)** describes the use of CD-ROM technology for storage of reading materials. He lists out the information sources those are available in CD-ROM. CD-ROM as a medium of information storage and retrieval is also discussed. Its architecture is described, and its advantages particularly in publishing and library and information system are delineated. **Nair (1994)** describes the use of computer technology in various library activities, i.e. library management, acquisition system, stock records, classification system, cataloguing system, circulation system, serial management and reference service. He points out the areas of those library activities, advantages of computerisation, cost-effectiveness and transcending limitations. All these

factors are based on college library survey. **Reddy (1994)** explains the information explosion and various aspect of IT, i.e. computer, electronic publishing, CD-ROM, DRAW (Direct Read after write), Laser video disc, database, fax satellites, cable system, cellular Radio, teletypes, video text, hypertext and LAN and WAN Networks. **Raju and Jamuna (1995)** have discussed computer virus, there types and origins, how they spread, and what damage they do. Enumerates the precautions to be taken to protect computer system in the present day in library or information centres. **Ahmed and Munshi (1995-96)** describe the typical PC components including processing, output, and storage components. Attempts to identity some of the essential and specific features of PCs and the factors which need to be considered while buying IBM PCs and PC compatibles for library and information management. **Singh and Shaukeen (1996)** describe the concept of multimedia. Explains the revolutionary changes taking place in multimedia. Mentions the elements, application and trends in this field. Concludes that the growth of multimedia technology has given a new dimension to human life. **Bashir, Khan and Wani (1996)** describe the role and importance of IT in libraries and in information centre. Use of various IT products, in the libraries have been explained. **Misra (1996)** point out a closer looks on documentation activities in the field of social science in India. NASSDOC being a national documentation centre emerges as a center point for all documentation activities carried out in the field of social science in India. This centre not only coordinates documentation activities in India but also plays a vital role in networking by cooperating with APINESS at international level. Need for establishing a national information system for social science in India is also realized. **Maheswarappa and Hosamani (1996)** studies the awareness and usefulness of information services provided by NASSDOC, New Delhi India among the social scientists working at different Post Graduate Departments of Karnatak University, Dharwad. Concludes that there is a need for uses education programme to create awareness and to promote the use of information services of NASSDOC among Indian social scientists. **Dominic (1997)** discusses the emerging world of networked digital information and its likely impact on entertainment industry involving change in personal habits networking providing increased intellectual access and participation. Evaluates impact on intellectual property and interactive environment. Focuses on US National Digital Library and other project at various universities and the library of congress and the international issue of building a global information infrastructure. **Surija and Namasivayam (1997)** has an empirical study aiming at analysing the pattern of development of the IT sector across the countries of the world, and assessment of its impact on their socio-economic development. Examines the various in the selection and performance of the IT factors in the twenty-one sample countries. Computers the ranking order of these countries based on the IT availability's. To identify

the IT status of the sample countries, and to measure the equity in the adoption and application of IT parameters between these countries. **Gupta (1997)** has describes the library automation is an activity to convert exiting library services tools and practices to electronic based media. He focuses the various fields and activities, practices that could be automated to ensure better performance with higher speed and cost effectiveness. Prerequisites for implementing automation activities in a library and linking with a group of local/distant library/information systems have been discussed. Electronic systems presently available in the field of library and information systems are described. **Dhiman (1997)** points out computer and its various application in different fields of library and information centers have been discussed. Besides problems that hinder the way automation in Indian have also been highlighted. **Ramesh (1998)** states that in order to provide efficient library service to the enlightened readers of the present day world. It is essential that the technical services of a library should be well organised with proper demarcation by making use of recent application for fast and quick service to the readers. The services like acquisition, classification, cataloguing, reprography, circulation and binding are common in almost all the libraries. Discusses the traditional methods of management of technical services employed prior to automation. Notices the tremendous changes in the infrastructure of library technical services due to the advent of IT. Emphasises the technical problem that has arisen in making them most effective and useful in university libraries in the light of IT. **Sambasivan (1998)** mentions the sweeping changes brought about by information and communication technologies. Discusses the phenomena of computer networking, emergence of Internet, list or mail server, application of e-mail, www sites, Hypermedia links and other revolutionary innovations and technologies and their impact on library and information centres. **Usha and Malham (1998)** explains the IT has provided the means for compact storage, quick retrieval and speedy access to information. Development countries have the resources and the technology to quickly adopt and absorb new methods of information heading in their work cultures. On the other hand, developing countries face several problems. They highlight some of the common problems of adoption and absorption of technology in developing countries with special reference to India. While focussing on the issues and concerns regarding implementation of IT on a relatively moderate scale, it focuses on the strengths of India's knowledge base. They bring out the areas of concern on which India has to focus in order to exploit its strengths and overcome its weakness. **Akthar (1998)** describes library automation as a process that has brought and will continue to bring profound changes to the library world in term of both technology and involvement of people. This article deals the wide spectrum of the use of computers for which automation in libraries is appropriate and needful. **Jeevan (1999)** discusses the central library at I.I.T., Kharagpur is exploring

computer and allied technological advance for better organisation of information source and fruitful delivery of information service. An electronic library for accessing electronic database is also setup to offer information on their sources that are not present in the library. He is also mention made about the computer system available computerised operation, electronic database subscribed and research projects undertaken so for in the library. **Yadagiri (1999)** has discussed briefly the application of IT in creation of databases, housekeeping services such as, circulation desk, OPAC…etc; and introduction of latest IT infrastructure Viz., Bar-coding technology, Digital Graphic Printer, Multimedia systems, CD-ROMs, Audio-visual media…etc in the Regional Engineering college library Wavangal. **Raju (1999)** states the development of public libraries and the impact of electronic revaluation. Discuss the evolution of IT, computer-based Message Electronic Systems application of IT in libraries and impact of communication technologies. Describes social mission of public libraries, need of common men and their expectations from public libraries. **Sridhar (2000)** explain the purpose of modernization of library services using IT. Indicate the unlimited potential of IT in modernizing library services. Identifier prerequisites for modernizing library services and a wide gap between what has been said to be possible and feasible in the application of IT on services if Indian libraries on one hand achievements in application of IT in modernizing library services on the other. Explorer various reason for such a gap vis a vis way of bridging the gap and overcoming the implementation and operational difficulties. Examines and present the impact (potential) of IT on library services under six broad categories of services and concludes lack of wide spread, significant, innovative and optimum application of IT in library and information services.

1.12. Hypotheses

The following hypotheses are made for the study of impact of IT on the technical and users services of the libraries of INSDOC and NASSDOC.

- Day by day, more and more literature is procured in paperless form.
- There is remarkable improvement in the quantity and quality of the library services.
- The efficiency of the library staff has increased.
- IT has reduced the manpower need and space requirement of the modern
- library than that of tradition library system.
- The use of the libraries has increased.

1.13. Methodology

This study is designed, developed and carried out to examine the impact of IT on the various library services of two national documentation centres namely Indian National Scientific Documentation Centre (INSDOC) and National Social Science Documentation Centre (NASSDOC). Few other complementary methods of investigation such as personal interview and data collection tools like annual reports and diary are used with the intention of gaining greater insight and more clear and complete picture of the impact of IT on the library services of the libraries of INSDOC and NASSDOC. These techniques are also as to enable checking of data for its validity, reliability and consistency. There are several data collection alternatives available to the survey research, i.e., personal interview, interview schedules, personal observation and questionnaire. To conduct the present study, the questionnaire method was chosen. Questionnaire and interviews represent the most common methods of data collection in social sciences research.

A questionnaire is a structure schedule of questions which is either self-completed by respondent or completed by an interviewer who reads out the questions and records the response. The latter is technically called an interview schedule, but can be regarded as a form of questionnaire. Similar principles are involved in designing a questionnaire for self-completion or by an interviewer, although there will be slight differences in the formal (Satish, 1994).

1.13.1. Preparation of Questionnaire

Before starting construction of a questionnaire, the librarians of INSDOC and NASSDOC libraries were consulted in this matter. The services given by the libraries were noted along with IT infrastructure of library. A few sets of standard questionnaire were referred and lists of some suitable questions pertaining to the present situation were prepared. It was verified by my supervisor and was put before the librarians of INSDOC and NASSDOC libraries in order to be confirmed whether any particular question does not fit to their present conditions. Necessary modifications were made according to their suggestions.

1.13.2. Pretesting of Questionnaire

The draft questionnaire was also circulated among three information officers/scientists and five users of the libraries. On the basis of the returns and final consultation with the supervisor, the questionnaire was revised and finalised. The items in the questionnaires were arranged according to the objectives and hypotheses of the study. For the present study, two questionnaires were prepared one for the librarians and other for the users of the libraries. At last, the questionnaires were printed with computer.

Questionnaire (appendix 1) prepared for the librarians contains 40 questions and is divided to in five parts, i.e., A, B, C, D And E.

PART A: Institutional Profile,
PART B: Infrastructure and Usage of Computers,
PART C: Library Services,
PART D: Nature of Application of Information Technology.
PART E: Impact of Information Technology.

Users questionnaire (Appendix II) is divided to in three parts, i.e., A, B, and C and containing 16 questions.

PART A: General Information,
PART B: Library Services,
PART C: Impact of Information Technology.

1.13.3. Collection of Data

The investigator visited both the libraries and documentation centres. Due to lack of time, it was not possible to meet each individual user for the distribution of questionnaires. The library authority was interested to have a survey of the library. So the questionnaires were distributes to section-in-charge and users of libraries with a authority letter forwarding by the Director of each documentation centre. Some users, when contacted personally, expressed their inability to fill up due to shortage of time, some replied that they hardly use the library, so no use to fill up the questionnaire. In some cases the investigator filled up the questionnaire himself in the way of personal interview from some users and section-in-charge who were too busy to fill up by themselves.

1.13.4. Administration of Questionnaire

The size and analysis of the sample is indicated in the following table:

S. No.	Category of the persons	Questionnaire Administered		Number of Responded		Total
		NSL	NASSDOC Library	NSL	NASSDOC Library	
1.	Information officer & Section-in-charge	2	2	2 (100%)	2 (100%)	4 (100%)
2.	User	30	30	25 (83.3%)	22 (73.3%)	47 (78.6%)

Table 1.13.4 shows the response of the information officer/section-in-charge and user of the libraries of the documentation centres. Response of the information officer/section-in-charge is cent percent whereas user response is 78.3 per cent of both the centres. User response of NSL is more than NASSDOC library.

1.13. Planing of the Study

It is important to plan a study carefully from the beinning to the very end and to layout a detailed plan of each step ahead of any survey, observation and data collection. Plunging ahead without considerable planning is a sure prescription for a disaster, i.e. a useless or even misleading study. The plan consists of the following steps (Satish, 1994):

- Surveying the literature on special libraries and IT and learning about all the aspects of library services.
- Determining the objectives of the study.
- Proposing the hypotheses for the study.
- Determining the method for collection of data.
- Determining the ways of presentation and utilization of results including dissemination.

1.14. Scheme of Work

The present work organised under five chapters, brief details of which are given below: Chapter one is introductory. It gives a detailed background, justifying the need for the investigation, important facets discussed in this chapter are Introduction, Information Technology, Application of IT in information handling, Need for IT, Advantages of use of IT in the libraries, Problems in switching over to IT, Statement of the problem, Objectives of the study, Scope and limitation of the study, Review of related literature, Hypothesis, Methodology, Planing of the study, Significance of the study, Constraints. Chapter two deals with the Development in IT, Facets of IT, Features of IT, IT as relevant to libraries, Areas of application of IT, Application of multimedia systems in libraries and Impact of IT. Chapter three devotes to Special library, Brief outline of INSDOC & NASSDOC, Library services and products of the both centres. Chapter four throws light on Application of IT and its impact: Analysis. Chapter five depicts the Findings, Suggestions and Recommendations of the study. At the end of the work, a Bibliography of documents used for the preparation of this dissertation work is appended.

1.16. Significance of the Study

- The result of this study may help in improving the function and services of the special libraries in general so as to provide effective and efficient services to the users.
- This study is providing information with regard to nature of application of IT in different library services of both the documentation centres, namely INSDOC and NASSDOC.
- It provides current status of the libraries of both the documentation centres and impact of IT on their services.

1.17. Constraints Encountered

1.18.

- The main difficulty what I faced during preparation of the questionnaire was the time factor. It took totally more than two months to prepare the final questionnaire by following the usual procedure of its preparation.
- At the initial stage, response was very low. Beside sending the questionnaire, personal contact was also established to persuade the respondents. However, some fields in the questionnaire where not filled up by the respondents. Received from the respondents were having inadequate data. The investigator tried to supplement those left out data from the library records like annual, diaries, etc., wherever it was possible.
- As regards the attitude of user respondents, some of them were very cooperative and forthright in responding to all the questions seriously and sincerely. While a few of them expressed little faith on the usefulness of the library survey.

CHAPTER 2

INFORMATION TECHNOLOGY: DEVELOPMENT, USE AND ITS IMPACT

2.1. The Development in IT

As indicated earlier, there has been three distinct strands namely computers, microelectronics and communication technology in the development of IT. Computer is used to record and store data, microelectronics deals with the techniques to analyse and process the data and the communication technology is used to communicate information. Today, there has been a convergence of these technologies by using different sophisticated equipment to carry out all these three tasks. It become difficult to think at present that those were quite separate operations in the past.

However, in looking at the historical background to IT, we need to treat them separately in three different aspects, namely- ***a.*** development of technology for recording and storing data, ***b.*** development of technology for analysis and process of data, and ***c.*** development of communication technology. All these three aspects have gone through well-defined stages of development, which correspond to man's over all technological development. These stages include-manual method, mechanical methods, electromechanical methods and electronic method. The historical perspectives woven around the four stages listed above are linked with modern development in digital computing and digital communications (Carter, 1987).

2.1.1. Technological Development in Recording and Storage of Data

The storage media used at various times in history has determined the development in storing and recording. They include clay tablets, paper, punched cards, electronic media etc. In the Babylonian civilization of 3000 to 1000 BC, clay tablets formed the universal medium for recording, transactions, laws and other information. Obviously, this medium does not lend itself to neat card index systems and the like, and inventive though they were, the Babylonians contributed little to development of modern office system. The Egyptians developed a new storage media, 'Paper' during early 14th century (Carter, 1987). The present development in IT has sprung up on this paper medium. After the development of paper, information growths become very high, which latter on caused information explosion. It is an ideal

medium for recording large quantities of information. Information is recorded on the paper with the help of manual, mechanical, electromechanical and electronic methods. It is the cheapest, handy and long-lasting medium for recording and storage. Information can be arranged in a systematic order on a paper, but it occupies more space, not able to record audio form of information, machine can not read easily and preservation of information on paper for a long time is also some times, not possible. The next major development in recording and storing is the punched card during early 19th century. In fact data are stored and recorded by holes punched in cards and such recorded data are to be read by electromechanical machines. Thus, a new storage media during the 19^{th} century was conceived and developed like microfilm, microfiche, ultratfiche and microcard. These storage media are machine readable, small in size but with more storing capacity and consume less space. It is the cheapest information storage medium but unable to provide multi-user facility and very large storage capacity. To achieve these advantages, magnetic storage media were developed which are known as floppy disks, hard disk and magnetic tape. Floppy disks are thin and bendable as the name suggest and are used for microcomputer storage. Different sizes (mostly 51/4 inch and 31/2 inch diameter) are used, with the smaller sizes tending to have the greater capacity (Whitehead, 1987). Floppy disks are cheap and keep getting cheaper. Hard disks have long life and large capacities than floppy disks. Hard disks are rigid so that the head - the part of the drive, which actually transfers data, does not touch them. It is literally less than a hairs breadth away. For this reason, dust has to be avoided and they operate inside a vacuum. Magnetic tapes provide only sequential access because the driver can move the tapes in only one direction. This is a cheap medium. They are now used almost entirely as backup, i.e. for storing. Data to be used should be stored in the master copy on a disk. These media are not useful for networking and online services. Thus, optical storage medium was developed to meet the new challenges. There are a number of devices, all of which use the same basic technique of having a laser. Optical digital recording on disks (videodisks) was originally developed as a storage and distribution medium for television and as a higher quality alternative to the videocassette tapes. As the recording technique was digital, it appeared to be readily adaptable for storing the machine - readable computer data. It has high storage capacity. The disk could be mastered and duplicated. The production costs were expected to be low once the master copy had been produced. However, their physical size (30-cm diameter) was inconvenient for use. There are three different standards for colour television and so the disks were likely to be manufactured in three different standards. Thus another new technology, i.e. CD-ROM was developed for storage of data during 1980s. CD-ROM is the abbreviation of Compact Disk Read-only Memory. It is a high capacity optical storage device of 12-cm diameter, which can store up to

650 MB of information. It provides high capacity at a comparatively low cost and single manufactures standard for sound recording and computer data storage (Whitehead, 1987). But it is a read-only medium and data can not be rewritten on them for updating purpose. Currently developed digital versatile disk or digital video disk (DVD) is a new optical storage technology having a large capacity CD with advanced multimedia support with at least seven times the storage capacity of CD-ROM and can be manufactured with about the same price. DVD technology consists of five different formats -DVD Video, DVD-Audio, DVD- ROM; DVD-R, DVD-RAM. DVD-RAM drives allow rewriting, DVD-RAM disks many times (Reddy and Rajan, 1998). Thus, storage and recording technology has developed from the clay tablets to the DVD technology in terms of increasing storage capacity, easier portability, long-life span and reduction in size and cost.

2.1.2. Technological Development in the Analysis and Process of Data

The task of analyzing data includes both calculating and comparing. Calculating primarily means adding, subtracting, multiplying and dividing. Comparing means determining whether data of one item is greater or less than the other. It is often carried out with a view to sorting data. The gradual development in this technology occurs in the following sequence:

The abacus → mechanical calculators → Punched card equipment → electronic computers.

A primitive form of abacus was used in ancient Greece and Egypt, and consisted of rows of beads laid out in grooven or threaded on wires. Numbers were represented by pushing beads to the results of the side of the wires. It performed only addition, subtraction and multification. Multiplication was carried out by repeated addition. These mathematical operations were possible when the value of number falls between zero to ten. Abacus can not perform these operations speedily and accurately. Thus mechanical calculators were developed which carried out these operations accurately and speedily than abacus. Sir Charles Babbage, who designed the first computer in the year 1833, used an early type of punched card to enter and store the data. He called it the analytical engine. Mechanical and electromechanical devices are not able to perform ballistic calculations and take more time for ordinary calculations. This gave rise to the development of electronic digital computer. Modern electronic digital computer systems have gone through five generations of evolution (Carter, 1987). The term 'generation' refers to the chronological development of computer technology, which is related to the major developments in electronic data processing. The first generation of computers was designed in the late 1940s and early 1950s. Use of

binary notation (i.e. 0 and 1) as machine language, use of vacuum tubes for the central processor construction and magnetic core devices for stored programs are some of the important features of the machines in the first generations of computers. Their vacuum tubes took large time to warm up and emitted great amount of heat. A huge amount of electricity was needed to run electric current through the tubes and the tubes had to be replaced very often because of low reliability. These computers were very costly in terms of production as well as maintenance. IBM650, ENIAC, MARK-I, EDSAC, UNIVAC and EDVAC belong to the first generation computers. The second-generation computers came in to being in the early 1960s with the advent of transistor technology. Transistors are semiconductor devices that are functionally equivalent to vacuum tubes but smaller in size, consume much less power and are far more reliable compared to the vacuum tubes. The Third generation computers were developed using integrated circuits (ICs) in the early 1970s. The new technologies further reduced of the computer size and power consumption of computers and also improved the reliability. The development of high level language also provided better human machine interface. The Fourth generation computers came into existence during early 1980s with high technology like small-scale integration (SSI), medium scale integration (MSI), large-scale integration (LSI) and very large scale integration (VLSL). The development of VLSI led to the emergence of microprocessor, which constitutes the entire central processing unit [CPU] on a single chip. Computers built with microprocessors are known as microcomputers. Two major manufacturers of microprocessor emerged in the field: Motorola Inc and Intel Corporation. IBM adopted Intel series of microprocessor for their personal computers (PCs). The latest chip from Intel Corporation is known as 'Pentium'. On the basis of microprocessor number, the PCs are named like PC/XT, PC/AT, Pentium, Pentium II, Pentium III, Pentium IV and the like. PCs and Super computers come under fourth generation. These computers have large storage capacity, memory, speed, accuracy and diligence. The fifth generation of computers came in to being in the early 1990s with desire to handle sophisticated non-numeric applications such as pattern or speech recognition, knowledge processing etc. It includes Inference Engines, Knowledge bases, Natural language Inference, Photonic devices and computing in optical domain (Satyanarayana, 1995).

2.1.3. Technological Development of Communication Technology

One can preserve, store and processed the information through storage and processing technology, but the dissemination of information can be only through communication technology. The power and importance of information can be enhanced with the help of communication technology. The development of communication technology is related to development of all these technologies, which are communicating and disseminating, of information. Telecommunication means communication at a distance. It is based upon the transmission of electromagnetic signals. The developments in communication technology is based on the following aspects:

Messenger and Portal services → Mechanical and Electromechanical system → Telephone and related system→ Digital telecommunication system.

2.1.3.1. Messenger and Postal Services

Messenger and postal services between major cities existed in the ancient Babylonian Empire and in the Persian Empire that succeeded it. In addition, these were special messenger services for urgent matters of state. The term runner was used for those who carried the letter, usually on horseback. In England, a Royal messenger service was established in quite early times and private portal services were operating by the 14^{th} century (Carter, 1987). But that communication methods were not very effective and quicker, these take more time and manpower in dissemination and communication of information to the right user at the right time. Thus libraries can not use these methods and developed new communication media.

2.1.3.2. Mechanical and Electromechanical System

During the industrial revolution, a number of mechanical and electromechanical devices were developed for communication instructions to machines in order to control the process. One was a loom developed by Joseph Jacquard at the end of the eighteenth century for weaving intricate designs on silk. The designs were first punched as a Pattern of holes in siff cards, which were placed in the Path of rods carrying the thread. Some rods were blocked by no-holes in the card, whereas the other was passed through the holes. In this way, the information on the cards controlled the weaving process. Postal and messenger services and document conveyor systems achieve communication at a distance by physically moving the media on which the information is stored. These mean have more time and manpower, thus developed a new communication technology, i.e. Telecommunication technology.

2.1.3.3. Telephone and Related System

Telecommunication systems on the other hand achieve this by transmitting the information by electromagnetic waves. In 1838, Samuel Morse invented the telegraph. The letters of the alphabet were converted to strings of long and short electrical pulses and transmitted down a wire. Telegraph is communicate information or message speedily, but it is a one-side communication system, Thus Alexander Graham Bell invented the telephone for the transmission of speech. One part of the telephone receiver consists of a microphone for converting the sound waves that make up speech into electrical waves, which are transmitted down the wire. The other part consists of an earpiece, which converts the electrical waves back to sound waves. From the above means only oral communication is possible, consequently, library can not provide recorded information. It is difficult to remember a piece/bit of information or any intricate information for a long time. It needs to write down on a paper or any other recordable media. To overcome this limitation developed such a new technology by which library and documentation centre can be communicated the recorded information, i.e. telex, Facsimile etc. (Martin, 1987). Telex has communicated the text over the telephone network. The text is typed into a teletypewriter. This looks like an ordinary typewriter but which converts the keystrokes to electrical signals. These signals modulate the telephone carrier wave. Before a message is sent, it is necessary to dial upto-receiving machine, which is also a teletypewriter. This converts the electrical signal back into the text, which it types out. Particular the uses of telex have made it possible for the dissemination of information and leading of material to be speeded up. Telex services now link many of the large public, academic and special libraries. Telex is generally more effective than the telephone or postal communication (Kaushal, 1995). But telex can not be transmitted picture and graphics on the telephone line. To overcome this limitation developed the new technology, i.e. Facsimile (Fax). Fax has to transmit the picture over the telephone lines. Imagine that a picture is split into many horizontal lines, and each line into many light or dark dots, rather like the dots on a black and white TV picture. A Fax machine scans these dots and converts them into electrical signals -- a dark dot is a pulse, a light dot is the absence of a pulse. These modulate the telephone carrier wave, and are decoded by the receiving Facsimile machine, which reproduces the picture line by line and dot by dot. Above technologies are not save the information or data in the route and can not transfer to many users at a time. To overcome this limitation developed optical new communication technologies like digital and optical fiber technology. The message is converted into a series of electrical pulses, like pulses produced from the holes in punched cards or punched paper tape when they are passed through reading machines and which represent numbers, i.e. digits or letters. Information that is sent in this way instead of in the form of

waves is called digital (Whitehead, 1987). The new transmission technologies such as communication satellites and optical fibers are that they have been designed to digital transmission from the start. It is generally recognized that is convergence of computers and telecommunications both sharing the same kind of logic, storage, switching and transmission capabilities. Computers tend to use digital techniques, thus it causes fewer problems it telecommunication technologies also use digital techniques. Another advantage in a digital transmission system, the signal can be regenerated many times to eliminate the noise and distortion which would otherwise accumulate. Teletext, Videotext and E-mail are digital technologies. Teletext is a system where one can also get alphanumeric information on your television set. Teletext is narrow-band service where by digital data is inserted into the unclosed lines of the blanking fields of TV signal which are then transmitted as broadcast to the users' TV set. Decoders in ordinary domestic TV receivers extract, store and decode the data into wards figures, diagram etc., which then appear on the screen. Teletext services are one-way and non-interactive- the information being transmitted continuously with the user pulling off the appropriate page as and when one needs it (Morgan, 1981). These are few libraries, which also provide teletext services. Videotext is one of the prominent developments, which using telecommunication technology. Videotext is a two-way interactive, telephone-based system linking computers to TV set which display alphanumeric information. Videotext can be transmitted over various telecommunication media, fiber optics, satellite coaxial and wire pairs links (Ball, 1980).

2.1.3.4. Digital Telecommunication System

Electronic mail (E-mail) is a general term covering the electronic transmission, as distribution of messages. E-mail can be distinguished from most areas of telecommunication by its capability for 'non-real time' use. Unlike a telephone conversation, messages can be transmitted at one time for reception as reading at a later time. The delay can be brought about by the transmission system employed: for example a 'store and forward system which may have a central facility which stores received messages and subsequently transmits them down another line. Alternatively, messages may be stored at the receiving end, to be read at the convenience of the recipient. Most telephone networks are heavily used only at peak periods, and may be relatively little used at other time. A typical network may be only twenty percent utilized. E-mail permits the usage of this store capacity, transmitting in the off-peak periods. This may be of particular value for business mail, much of which is already generated by computers for eventual ingestion into other computers, e.g. orders, invoices, receipts etc. Application in libraries include online ordering document delivery and information transfer avoiding phone request for information paper request for generation at hard copies of request and confirmation of receipt as well as billing and payment details (Shukla, 1996). Ever growing literature or information explosion creates problems in dissemination and communication of

information to the right reader at the right time. Thus new communication technologies are developed for effective, speedily and proper communication. In the coming future more and more advance communication technologies are developed for information communication.

2.2. Facets of Information Technology

IT is a comprehensive term used for all the activities connected with computer based processing, storage and transfer of information. It involves computers, electronic media, satellite, and telecommunication and mass storage devices. “IT is the application of computer and other technology to the acquisition, organization, storage, retrieval and dissemination of information” (ALA glossary, 1983). IT does not confine only to hardware and software but it also covers the techniques and methods used for collection, storage, processing and dissemination of information. The IT can be grouped in following areas: Computer, Communication technology, Networking technology, Reprographic and Micrographic technologies, Storage technology, Publishing technology, Barcode technology and Multimedia, etc (Ghosh, 2001).

2.2.1 Computer

Computer is a device for automatic processing of information. It has three component viz. input device, central processing unit (CPU), and output device. Input devices are keyboard and floppy disks. CPU processes the information received through input devices. Output devices are monitor (video display unit), printer, on-line transfer of information. Computer can store, process and transfer/retrieve information with greater accuracy and speed. That is why these two aspects, i.e. computer and library are coming closer now a days.

2.2.1.1. Hardware

The physical parts of a computer system, i.e. the one you can touch, as opposed to software (operating instruction) that makes that system work.

2.2.1.2. Software

It is the general term used for computer programmes. The set of programmes, procedures, etc. that makes the computer work.

2.2.2. Communication Technology

The marriage of computer technology and communication technology has resulted into a new technology know as communications (Slamecka, 1979). Telecommunications technology refers to the transmission of data as represented by electronic signals and to the hardware, software and procedures that make it possible. The emerging trends in telecommunication play a pivotal role in dissemination of information.

Communication in a two way process. When two computers communicate, the process is termed "Data communication". Data communication refers to the means and methods where by data is transferred between the processing locations. It is the link that permits a direct interactive bond between the people at the workstations and the central processing system. When the computer communication over telephone the data communication process is called telecommunication. Data transmission can be made with the help of three types of equipments - Terminals, MODEMS and Multiplexes. These equipments are the interface element to bridge different operating environments (Varalakshmi ; 1992).

2.2.2.1. Satellite Technology

The use of man made satellites travelling in earth orbits to provide communication links between various points on earth is man's most important exploitation of space technology communication satellites permit an interchange of live television programmes and news events between nations and continents. International telephone service is carried out through earth stations located in over 50 countries. Basically the technique involves transmitting the desired signals from the earth station to an orbiting satellite. The equipment aboard the satellite receives the signals, amplifies them and rebroad cast them to another earth station, thus providing the desired communication (Reddy, 1994). Satellite technology has revolutionised the quality of life. A global satellite communication network could employ as few as three satellites, but in fact, many satellites make up the present day satellite communication network. As the marriage of computers, digital and cellular technologies with satellite communication takes place, a global seamless information infrastructure that will significantly enhance the value of the connectivity, is provided. This enables satellite technology to knit the world more closely together than ever before to truly realise a concept of global village (Shokeen and Kaushik, 2001).

2.2.2.2. EMMS Technology

The electronic mail and message system (EMMS) means any message that uses a mailbox for storing, forwarding and accessing message electronically. In this technology, the motion of paper as the medium of the message is discarded. There are different types of E-mail mail options such as: Telex based E-mail, Teletext based E-mail, Facsimile based E-mail [i.e. Fax] and computer based E-mail. Though the concept of E-mail in the process of information transfer among the Indian libraries is in its infancy yet some of the institutions and libraries availing this facility are DOE, CSIR, IITs, INSDOC, TIFR, IIS, BARC, etc.(Gautam; Shrivastava and Shrivastava, 2000).

2.2.2.3. Voice Mail Technology

The first voice mail technology was introduced in India by Mahanagar Telephone Nigam Limited in 1992. Being a low investment service, this technology would further be enlarged according to the demand (ILA-Newsletter, 1992). However, time will tell the extent to which this technology can meet the needs of common man with cost effective measures in general and application in libraries in particular.

2.2.2.4. Facsimile Technology

This technology is an old one but earlier attempts of using of using it are all in vain because of rudimentary nature of equipment, the high cost, and a lack of understanding of the pace of technology with the library service. But the new machines transmit digitalized data faster and are more economical on telephone time.

2.2.2.5. Video and Teletext Technology

Both videotext and teletext fall under the category of video-based information system. The term videotext refers to interactive systems of transmitting text or graphics stored in computer databases via telephone network, for display on a television screen. Since video text is simple to use, low-cost information system and catering for large number of users, it is being used, developed and implemented in USA including the one developed by AT&T and Bell system as a mark of national identity. Similarity, Teletext service in UK-Ceefax and Oracle are accepted as model services but in India, teletext service is yet to take its proper stride (Gautam; Shrivastava and Shrivastava, 2001).

2.2.3. Networking Technology The conglomerations of computers, databases and telecommunication have led to the ceation of information network. Since no library is self - sufficient, libraries of one region/nation are coming together to shave their resources and services by using modern telecommunication facilities. Further they are linked up with the international information systems. The participating libraries are termed as nods. (Reddy, 1994). The networks facilitate access to information at great speed, high reliability and reduced cost. Some of the successful networks in the world are OCLC, INIS, AGRIS, MEDLARS, INFLIBNET, ERNET, SERNET, MALIBNET, DELNET, etc.

2.2.3.1. LAN

LAN is abbreviation of local Area network. It is a network linking computers and other devices with in a restricted geographical area, usually not more than a kilometer or two from the central service (for e.g. Campus-wide network in university)

2.2.3.2.MAN

Metropolitan Area Network is a network linking several organigation, may be at Metropolitan City level. (e.g. DELNET, CALIBNET, etc.)

2.2.3.2. WAN

Wide Area Network is a network linking several organisations, may be at national level or at international level (e.g. NICNET, INFLIBNET)

2.2.3.1. Internet

Internet is the networking of computer network around the world which facilities transfer or a haring of information among all the computer users connected to these networks. It is a worldwide communication system, which links together thousands of computers and global interconnection of network of networks. The concept of Internet working of networks exists in earlier day also. According to the Internet Society, it consists today over 30,000 networks in 96 countries. Worldwide wave (WWW) made the Internet usage more popular among the users. Internet usage more popular among the uses. Internet has made it possible to reach any people or access any information on the cyberspace. Connectivity of computers and the development of various tools and techniques for networked information provision and access. Starting with basic tools like E-mail, FTP (File Transfer Protocol) and Telenet (Remote Login), the Internet has progressed to provide user-friendly tools like Gopher, WAIS (Wide Area Information Server) and WWW for information publishing and access.

2.2.4. Mass Storage Preservation and dissemination of information are the two dual objectives of any library and information systems. The dual roles of watchful custodial care and providing public access to information can be done with the help of the magnetic storage media, like CD-ROM, audio, video, teletext, hypertext and hypermedia (Gautam; Shrivastava and Shrivastava, 2001):

2.2.4.1. CD-ROM

Compact Disk Read Only Memory has been developed as a medium for the storage and distribution of large volumes of computerised information. It was jointing introduced by Sony and Philips in 1980 and after five years of its commercial introduction. CD-ROM's have an indispensable role to play in the dissemination of electronic information and are finding a special place in the rapidly growing digital libraries. A compact disk (CD) is a 12-cm diameter disk made from polycarbonate substrate and a reflective metalised layer. It weights 16 grams, a CD-ROM can store about 650 MB data (about 250000

pages of text). Many databases are now available on CD-ROM like Oxford English Dictionary, encyclopaedia of Britannica, etc. The access time through a CD is in milliseconds.

2.2.4.2. Audio and Video Technology

Although this tool emerged quite early yet its potential was tapped by libraries after quite some time when many libraries in USA started using video technology for recording and displaying of visual information, this in turn reserved the place for video cameras and video cassettes in libraries.

2.2.4.3. Video Disk Technology

Videodisk, the second group of read-only optical disk, contains digitally coded information. Digital optical videodisks on the other hand can store computer processible, character-coded data, or digitised documents and images. As a result, several libraries in USA and other European countries have resorted to this technology in their library application as a viable storage medium. The popular video formats found in libraries today are Betan, VHS and Philips V2000.

2.2.4.4. Hypertext and Hypermedia Technology

In order to cope up with the twin problem of information explosion and recording the information in sequential and linear fashion, the concept of Hypertext was evolved in which the information is represented in a non-linear and non-sequential text, which is a more natural way. Therefore Hypertext technology offers the users the flexibility of manipulating documents in new ways.

2.2.5. Reprographic and Micrographic Technologies

Reprographic technology and micrographic technology are a means to provide access to document resources to users scattered in various locations. There are thus indispensable in dissemination of information (Prasher, 1990). In order to develop and manage their collections, to reproduce and preserve library material and to reduce storage and binding costs, libraries have used microforms. Besides as the times moved on, the feasibility of micrographics emerged as one of the most viable tools. Several institutions and associations regarded to be the pioneer in implementing this tool to library and information services.

2.2.6. Publishing Technology

The developments in the computer industry brought in major changes in printing industry also. This has been the result of the success of library of congress in exchanging the bibliographic records on magnetic tape. Further advancements in electronic printing technology like Demand, Hologram, stereogram, image easyfile and electronic beam made it easy to print information on magnetic and optical disks. DTP has emerged, in the last few years as the latest application at the microcomputers. It has changed the concept of publishing, and brought on to the desktop high quality and low cost printing. The computers with the aid of software package like Ventura, PageMaker, etc can make writing, editing, graphic design, illustration, typography, type setting and printing operations. A terminal word processor and PageMaker and other DTP software, mouse, scanner and printer are the basic elements of desktop publishing system.

2.2.7. Barcode Technology

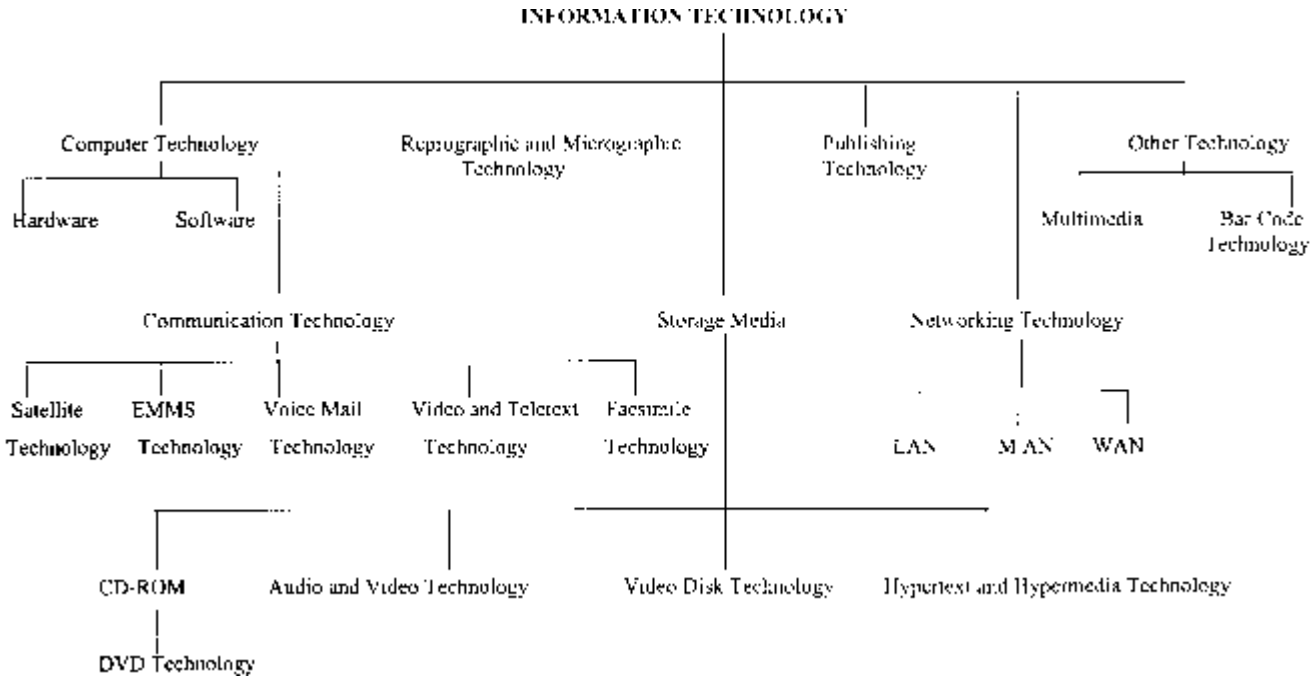
The bar-coding setup includes the barcode scanner to read the bar-coded information, its interfacing with the library computer, the software to convert the requisite information to barcodes and the printer. The bar code software converts the data into barcodes (series of black and white lines) which can be printed through printer and then pasted on the documents or borrowers' identity cards. The light beam flashed from the barcode scanner on the barcode label undergoes reflection at the white lines and absorption on the dark bands. This reflected light is collected back and is converted into electric pulses by the photoelectric circuitry of the scanner. Further, these pulses are converted into binary digital information by the interface circuitry of the scanner before they are fed to the computer for further processing. The information read from the bar code acts as a substitute for the same information entered through keyboard, to handle circulation/other routines of the library database (Shokeen and Kaushik, 2001).

2.2.8. Multimedia

Multimedia, a sub field of computer science, has now progressed to the point that some of its innovative methods are of practical use for information retrieved system design. The term 'Multimedia' first appeared in education during 1960s and the 70s when it described new media supporting the learning process in classroom instruction. This technology first flowered in the USA but is now being rapidly advanced by Japanese Companies. Digital media can store sound, picture and data in various combinations. The new medium is the compact disk [CD-ROM] or optical disk or laser disk. Compact disks containing digitally encoded music came into the market in 1983. The CD-ROM is not the latest word in information storage technology. That honor probably goes to digital auto tape (DAT). Actually DAT and its player or recorders

are being introduced in Japan. Multimedia is an advanced technology in computer science and it gets the advantage of both CD-ROM and DAT for its application. Multimedia (MM) as the integrated use of two or more media- meaning, in every day terms, the simultaneous communication of voice plus hard writing, data, fax and video images. The multimedia system supports different media like audio, graphics and text including animation on the same computer system for efficient information handling. MM is concerned with both input and output including their combination, which is called interaction. Input MM is concerned with simultaneous input events generated by one or several different devices, e.g. keyboard, spoken commands, data glove, data suite, finger mouse, touch screen eye tracker, musical instruments, etc. all being used in parallel. Output MM is concerned with multiple streams operating in parallel (e.g. reactor, graphics, roster graphics, text, video sound etc.), Channel, track and mode are alternative terms for stream. The thrust on MM was mainly due to the need to have a single source of basic information on digital media. MM is a systematic network of communication, electronics and computer technology (Bashir; Khan and Wani, 1996).

Structure of Information Technology



2.3. Features of Information Technology

Thus, the convergence of electronics, computers and communications formed the basis for an advanced information society. The main features of IT, that has a direct impact on information society, can be summed up as follows (Fjalbrant, 1990):

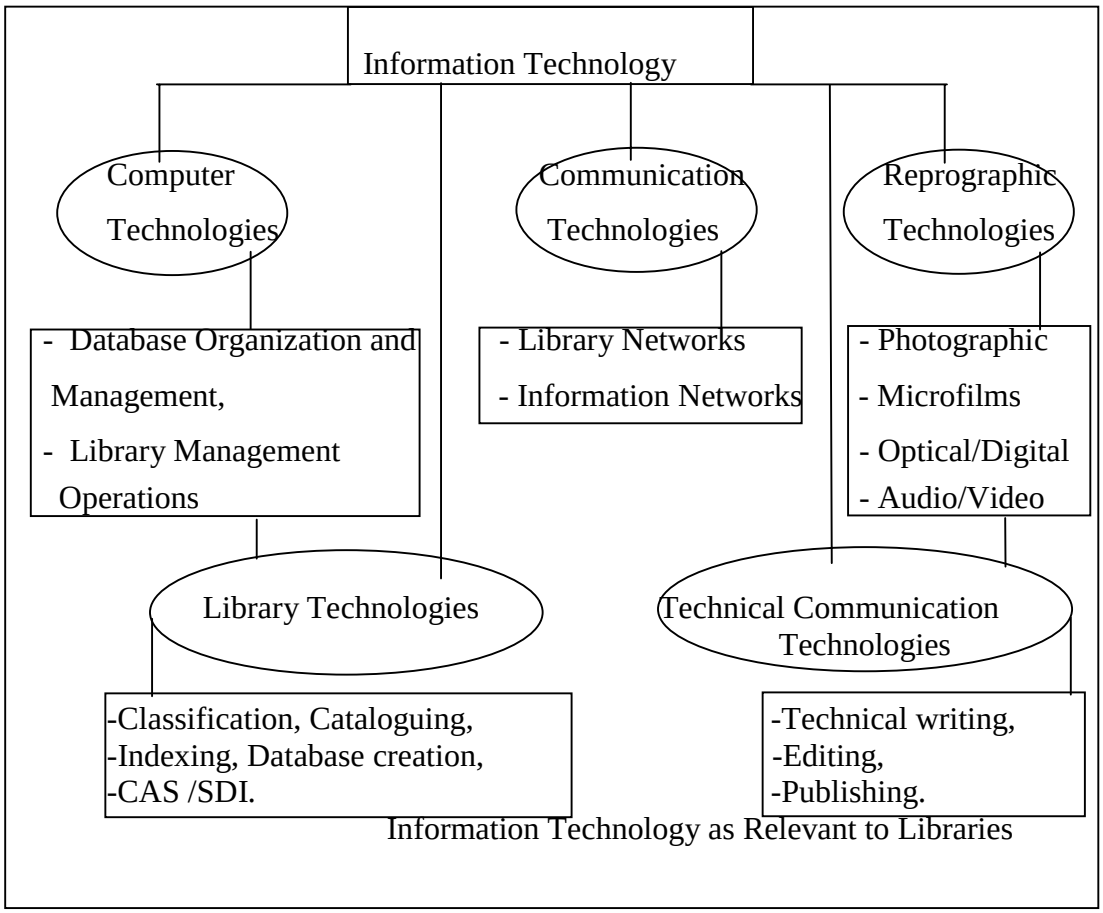
1. Increased computer power leading to faster and cheaper computer processing which facilitated automation of even low budget libraries.
2. Cheaper data storage e.g. optical storage media that increased the storage capacity of the libraries.
3. Digitization of information- text, graphic photographic speech, sound etc. that provides quick transmission of any type of data.
4. Better data transfer between different systems and media, which have promoted the resource sharing among the libraries.
5. Improved telecommunications, such as ISDN with greatly increased capacity for data transmission, which facilitated introduction of new
   services such as E-Mail, Fax etc.
6. Increased reliability of hardware and software, which has increased the performance efficiency.
7. User friendly systems that are developed to enhance the interface between technology and users of the library.

2.4. Information Technology as Relevant to Libraries

The IT that a relevant to libraries mainly cover the following:

(a) Computer technologies
(b) Telecommunication technologies
(c) Reprographic technologies
(d) Library technology
(e) Technical communication

The activities and services in libraries which these technologies are used are indicated in figure no.2. (Murthy, 1999).



Information Technology as Relevant to Libraries

2.5. Areas of Application of Information Technology in Libraries

The applications of IT in different library activities are briefly describe in below:

2.5.1. Acquisition

The computers have eased the burden of acquisition system of the libraries. With the help of computer reordering, checking of duplicate orders and follow up action can be taken care of automatically (Shokeen and Kaushik, 2001). A vender list may be prepared in data base form. Books awaiting selection can also be entered in a computer database. A list of books under selection can be generated and circulated among selection committee members by E-mail. If the library has a website, these can be hosted on the website. User's opinion can also be taken through a hosted on the website. User's opinion can also be collected through an interactive website. Selection committee members can electronically convey their advice. Users can directly send their suggestion for acquiring particular books or subscribing to certain Journals. Purchase order can also be generated through computer. Bills can be obtained electronically. Payments can

also be electronically done making use of electronic commerce facility. Selected books can then be accessioned (Kundu, 2001).

2.5.2. Classification

In classification activity also, electronic media can be of great help. Classification schedules are now available on CD-ROM and on line. (www.purl.org/oclc/fp) Some software can be generated which help in on-screen classification. Such software can even be saddled with artificial intelligence. Barcode strips can be generated containing accession number and book number. These can then be affixed on the books. This last work, viz. barcode generation is already being done in several places including INSDOC (Kundu, 2001).

2.5.3. Cataloguing

The application of IT in the are of cataloging can be made in following ways:

1. The information of the accessioned books ways can be converted to the catalogue data.
2. The catalogue can be queried on screen.
3. Some data are entered directly for titles not coming through acquisition.
4. Arrangement of catalogue cards can be in classified as well as alphabetical sequences.
5. Computerised catalogue makes possible import/export of bibliographic data in both standard exchange format (MARC) and non-standard format (Non MARC) and automates the stock verification process.
6. To verify the technical term automatically through thesaurus.
7. Printing of the holding and other bibliographical record easily for documentation services.
8. Bibliographical information/catalogue can be made available on the Internet. Online Public Access Catalogues (OPAC) are becoming quite popular (Kundu, 2001).

2.5.4. Circulation

Circulation is a front office job, which has undergone changes because of library automation. Request for a book can be checked for availability on the shelf. When the book is available, the same can be issued to the reader, if not available, then it may be reserved. Upon the availability of the document, E-mail can send computer-generated notice to the requestee. E-mail can also send the request for a book. The book can be issued electronically by making use of the bar code strip pasted externally on the book and handed over in person or dispatched to the user by courier (Kundu, 2001). Query and reports facilities cover a rang of

statistics on both borrowers and collection, including highly reserved titles, non circulating material, number of checking by title borrower, delinquency cases etc. Computerised system keeps a complete log of all circulation transactions.

2.5.5. Serial Control

IT helps in periodical subscription and subsequent monitoring of the receipt of individual issue .IT helps in maintaining record of budget sanctioned and expenditure on various categories of periodical. Computer has made it possible for the automated reminder generation of missing issues of the periodicals (Shokeen and Kaushik, 2001).

2.5.6. Reference Services

Reference services can also be operated electronically. E-mail can give a request for a reference service. Catalogue, database, CD-ROM journal, abstracting journals can all be queried for providing reference service. Reports can be prepared by using various automation packages and sent electronically to the user (Kundu, 2001). "Digital reference services have made a solid beginning in the libraries. However, it appears that using the Internet as a medium for the reference process in still in its infancy" (Janes; Carter and Memmott, 1999) User education and referral services provided through IT equipment are very effective and quickly.

2.5.7. Document Supply

Document supply can be variously automated using IT. E-mail can send request for a document. A document can be located through a union catalogue on CD-ROM or even an on-line database. The document can then the obtained as an image form the point of availability by file transfer and sent to the user as a file, which the user can download. This electronic document delivery will speed up the process of document delivery tremendously (Kundu, 2001).

2.5.8. Documentation and Information Services

This may include the following services: CAS, SDI, indexing and abstracting, reprographic, bibliographic and bibliometric services.

2.5.8.1. CAS (Current Awareness Services)

Anticipatory current awareness services can be given by keeping in mind the focus of the library. The CAS of an automated library can do the following: - review the select publication immediately upon receipt, select the items of relevance to the program of the R & D under taken by institutions, notify the items to the departments to whom they are related or to the scientists who are working on those topics (Nair, 1994). IT helps to increase the reach, the depth and the quality of this service with the help of Internet connection, the worldwide wed electronic bulletin board facility and direct to user syndrome through network connection.

2.5.8.2. SDI (Selective Dissemination of Information)

The selective dissemination of information (SDI) activity was enabled because of computer databases and information retrieval software. It essentially consists of scanning key words (research profile of individual users) in the current literature, filtering of information, and transmitting the retrieved information to the users on their desks. The construction of profiles according to the standardised terms is an intellectual Job. It can form a foundation for routine SDI service. A continual tuning of the profiles is desired as per the feed back. A constant monitoring mechanism of service is evolved out of useful feedback and constructive comments (Jagajeevan and Katna, 1998). Based on a user profile, on line database can be queried, searches can be conducted through the Internet, electronic journals can be looked up, then a report can be prepared and delivery can be done to the user electronically.

2.5.8.3. Abstracting and Indexing Service

Abstracting and indexing services can take the help of it to a great extent. INSDOC and NASSDOC as well as major abstracting and indexing services started including some titles available on Internet for indexing and coverage in their databases. Author abstracts can be transcribed in a database, edited on screen to bring homogeneity, can be arranged subject wise, using broad classification or in-depth classification, depending upon target user requirement; then a hard copy may be produced using desk top publishing (DTP) or it may be web enabled or it can be cut in to a CD.

2.5.9. Bibliographic service

The bibliographic service can now be given making use of multiple sources: books, journals, abstracting journals, on-line databases, the Internet, electronic journals, etc. The collected information can all be put

together using some office automation package and supplied to the users. Commercial bibliographic service products are also available in the market. For example, Book Find-Online is a Web-based bibliographic service product (www.bookdata.co.uk.). Similarly, Lib web is an online bibliographic service for libraries by Whitekar (Kandu, 2001). Bibliographic service of INSDOC and NASSDOC and available on online. (http://www.insdoc.org) and (http://www.icssr.org/dabase-publication.htm).

2.5.10. Bibliometric service

Bibliometric service is now more betters handled making use of the It tools like CD-ROM and on-line databases. Some statistical packages can also be used for better analysis. Office automation packages allow much better packaging of bibliometric service (Kandu, 2001).

2.6. Application of Multimedia Systems in Libraries: Multimedia is a combination of text, graphics, animation, audio and video, which are converted from different formats into a uniformat digital media and is delivered by computers. Different people in different organisations/offices/environment are using multimedia systems for many purposes. The main functions include media integration, storing, organisation and dissemination at different places in different ways. (Ramaiah, 1998). Today the most explosive technology in the area of IT is multimedia. The cost of computers is going down and the computing power of the systems is almost doubling every year. So, libraries have stared using the multimedia PCs (MPCs) for acquiring, processing, organising and disseminating multimedia information to the users. In India, as on today, an individual user can now afford to buy MPCs that are becoming a part of daily requirement even at home. However, there are about 2.3 million PCs in India, which is not a significant percentage when compared with PCs installed in the advanced countries. Many libraries are still to automate their services and they have not yet started using multimedia information resources. In a survey on use of multimedia in the major special libraries in Delhi carried out by Ramaiah, It was found that only 43 percent libraries are having multimedia facilities that are being used for providing library services. The application of multimedia in Indian libraries is very limited, which includes use of multimedia CDs in the from of encyclopaedias, year books, dictionaries, databases, product catalogues, software tools, web-pages designs, multimedia kiosks, multimedia presentation and user training programmes. Some of the general applications of multimedia are given below (Ramaiah, 1998):

1. Instruction/training and technical presentation for user education.

2. Exhibitions such as conferences, trade shows, new products, facilities, museums, libraries, etc.

3. Interactive display is museums, hospitals, libraries, etc.

4. It can helps satisfying different information needs such as reference, enrichment, entertainment, leisure, etc.

5. It can help meeting various types of information preference of the users such as scholarly, scientific, vocational, artistic, recreational, etc.

6. Being in digital format, information can also be accessed by remote users on a network. It also helps in over coming the barriers of boundries, proximity and physical capacity of a library to accommodate users.

7. It is interesting and easy to use over the existing form such as print, microforms, online, etc.

8. Its control and interactivity helps the users and provides the benefits of books (information) and human beings (interactivity).

Electronic information and multimedia in general is about to become a vital part of our cultural heritage. Libraries have throughout the history ensured a democratic, independent and free access to the knowledge and intellectual value represented by conventional books. It is evident that this principle is also valid for electronic information and multimedia. The availability of multimedia information through data networks may also open completely new way for the libraries to obtain information for the common users.

2.7. Impact of Information Technology

Information is a vital resource and valuable input for societal development. The information revolution makes development more speedy than ever before. Now the avenues in new information technologies and plummeting computing coasts are sticking distance and eroding borders and time. The rapid development of information and IT has tremendously increased our capacity to process information and accelerated growth in the information intensive sector. The impact of IT arises from its attributes such as enabling technology, which can be applied in a wide range of different circumstances, the capacity of the technology increasing at an exponential rate, and the cost of the technology falling rapidly. These attributes of IT will

trigger a new wave of economic growth stimulating the development of information society. It is indeed the avenues of IT that should be utilised to the possible extent in libraries and information to make use of the information centres speedily, effectively, efficiently and with precision (Devarajan, 1999).

The impact of new technologies is seen in almost every human activity. The change in the pattern of collection, storage and dissemination of information are some of the major challenges in any library. The basic concept in the use of new technology is to free the librarian and information officer from the routine jobs connected with the library operation in acquisition, classification, cataloguing, circulation control, serial control, etc. which can be entrusted to computer. New storage technologies enabled information to be stored in far less space and in a more retrievable format. Modern databases management systems (DBMS) enabled information to be accessed much more quickly, more accurately, more comprehensively and provide analytical tools to give management more pertinent data (Whitehead, 1987).

Communication technologies are help to communicate information to the users, more quickly and more efficiently. EMMS is suitable for promoting interaction between libraries. The use of EMMS for library vendor communication is even cheaper than the conventional postal communication and of course it is definitely faster.

The technology of reprography made a big impact on the document delivery system. Most of the research libraries have reprographic machines and provide photocopy of document on demand. The microforms will have a great impact on libraries and the world of books will be replaced by the world the microforms. Using reprography and micrographic techniques, we can condense the bulky archives and newspapers and solve the storage problems. They also serve the purpose of preservation. They help in resource sharing and save the time of users (Saknure, 2001).

IT has not changed the mission (to provide right information for user community), but the IT has assisted the methods of executing it, by giving information and documents at the desk of patrons. Mission is not technology dependent but technology helps to achieve the mission by providing more comprehensives and extended services to patrons in a more flexible manner. IT has changed the boundaries of the library (Navalani, 1998). These facets have significant impact on libraries, as a modern library is smaller in size but bigger in respect of image or value of libraries, information storage and retrieval.

CHAPTER 3

INSTITUTION PROFILE

3.1. Special Library

A special library is one, which serves a particular group of people, such as the employees of a firm of government department, or the staff members of a professional or research organisation. Such a library deals essentially in information (Bakewell, 1977). Special library is often called an " information bureau". The main function of the general library is to make books available; the function of the special library is to make information available (Katz, 1969). Special library is a library established, supported, and administered by a business firm, private corporation, association, government agency or other special interest group or agency to meet the information needs of its members or staff in pursuing the goals of the organisation. Scope of collection and services is limited to the subject interests of the host or parent organisation, (ALA, 1983). Thus, the libraries of the two institutions under survey; i.e. INSDOC and NASSDOC fall under special library category.

3.1.1. Function of Special Library:

Primary function of the special libraries to collect and storage nascent information or data. After storage of data or information, processed them and disseminate to special users or scientist on demand or anticipation. Weisman (1972) stipulates the following functions of a special library:

1. Selection of the data, information and documents.
2. Acquisition of the data, information & documents.
3. Processing of the data, information & documents.
4. Retrieval/dissemination of the data, information & documents.
5. Publication or reproduction of the data, information & documents.

Indian National Scientific Documentation Centre
(INSDOC)

Indian National Scientific Documentation Centre , New Delhi

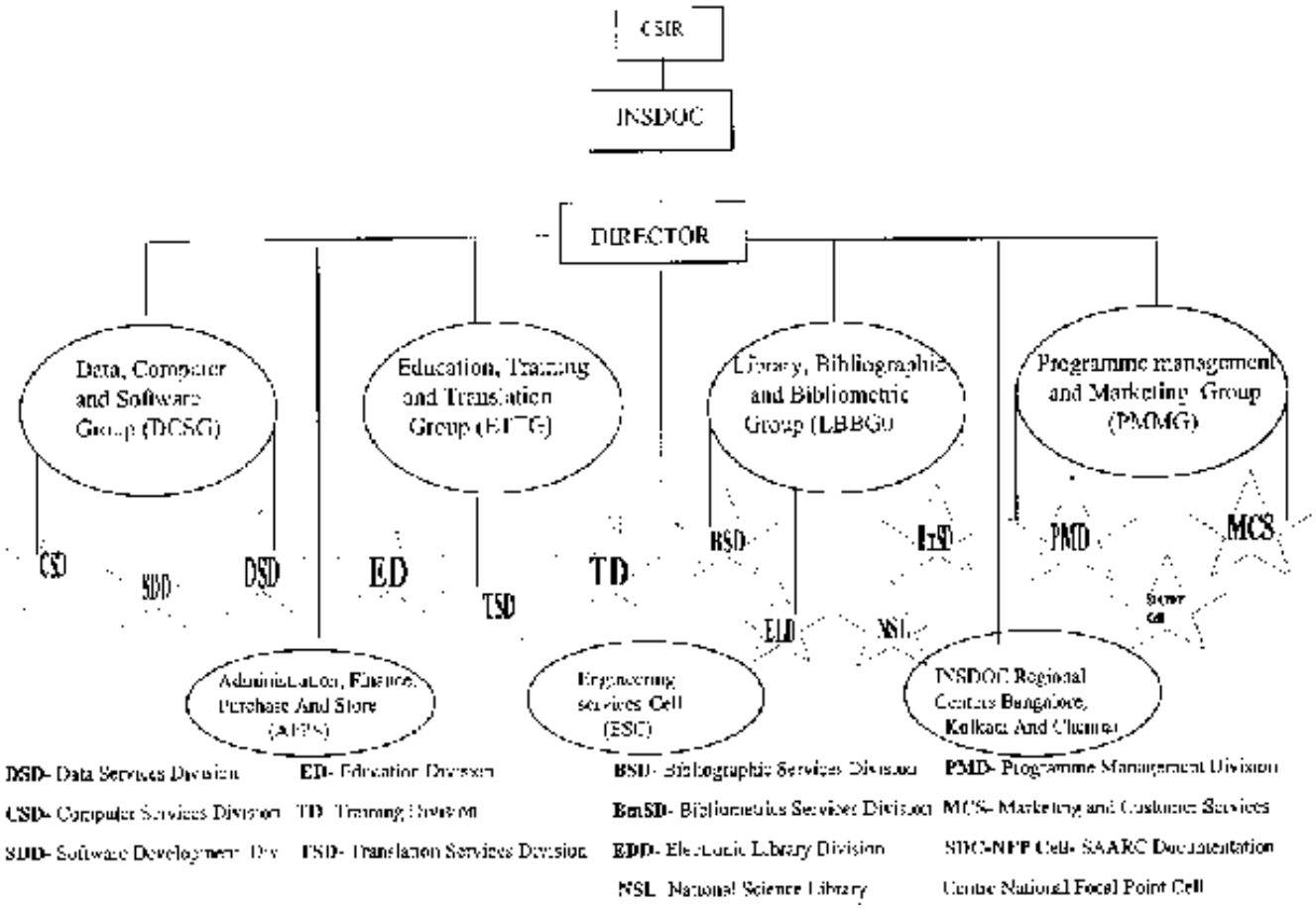
Indian National Scientific Documentation Centre (INSDOC) is a premier information organisation dealing with library, documentation and information science, technology, services and systems. It is a national laboratory under the Council of Scientific and Industrial Research (CSIR) providing information and documentation services both at the national and the international level. INSDOC□fs activities fall under five broad categories:

1. Services, Products and Publications
2. Projects in Competency Areas
3. National Information Resource
4. Education and Training
5. International Colloboration

INSDOC,s competency areas include : Library automation, Library networks, Computer networking, Electronic libraries, CD-ROM networking, Design and development of databases, Access to international information sources, On-line systems, Feasibility studies, and Design, establishment and operational management of library-cum-information centres. A team of about 300 personnel comprising scientific, technical and administrative staff is handling the programmes of the centre.

Wide dissemination of S&T information is an important aim of INSDOC. For this purpose, it has a network of regional centres located at Bangalore, Calcutta and Chennai to provide information services in these regions. In addition, INSDOC□fs services are available through Communications Research Consultants, Calcutta for the Eastern and North-Eastern regions of the country.

Infrastructure of INSDOC



INSDOC SERVICES, PRODUCTS AND PUBLICATIONS

Over the last four decades, INSDOC has evolved many information products and services to suit the S&T information requirements of researchers and scientists in the country. These innovative products and services aim at providing packaged S&T information catering to the specific needs of individuals, institutions and corporate bodies.

INSDOC SERVICES

S. No.	Service Name
1.	Contents, Abstracts and Photocopy Service (CAPS)
2.	Standing Order Abstract Service (SOAS)
3.	Chemical Abstract Keyword Index Service (CAKIS)
4.	Full Text Journal Service (FTJS)
5.	Journal List Service (JLS)
6.	Recent Books Service (RBS)

7.	Bibliometrics Services
8.	Literature Search Service
9.	Foreign Languages Translation Service
10.	Document Copy Supply Service

INSDOC PRODUCTS ON CD-ROM

S.No.	Current Products
1.	National Union Catalogue of Scientific Serials in India (NUCSSI)
2.	Indian Patents (INPAT)
3.	Indian Science Abstracts
4.	Granthalaya- a Library Automation Package

INSDOC PUBLICATIONS

S.No.	Name of the Publication
1.	Indian Science Abstracts
2.	Annals of Library and Information Studies
3.	Directory of Indian Scientific Periodicals
4.	Directory of Scientific Research Institutions in India
5.	Directory of S&T Awards in India
6.	Periodical Publications in India
7.	National Union Catalogue of Scientific Serials in India (1988, Four Volumes)
8.	Union Catalogue of Scientific & Technical Conference Proceedings: Bangalore 1977-1990.
9.	Proceedings of the Seminar on Learned Periodicals in India (1989)
10.	CISMOD'92
11.	CISMOD'93
12.	CISMOD'95

49th FID CONFERENCE AND CONGRESS PUBLICATIONS, October 1998

S.No.	Name of the Publication
1.	Papers of Seminar on Classification Research in the Electronic Information Era
2.	Papers of National Seminar on National Environmental Information Systems: Planning and Implementation.
3.	Papers of Seminar on Education and Training in the context of evolving New Information Society
4.	Papers of Workshop on Developing a National Information Infrastructure
5.	Proceedings of Main Congress: "Towards the New Information Society of Tommorrow: Innovations, Challenges and Impact".

SAARC DOCUMENTATION CENTRE (SDC) PUBLICATIONS

S.No.	Name of the Publication
1.	A Select Bibliography on Alternative Systems of Medicine in SAARC Region
2.	Directory of Research and Industrial Institutions in the SAARC Region

LIBRARY VISION

With the advent of electronic information era and network based information services, libraries all over the world are computerising their services and converting their library resources to electronic form. India is estimated to have around 65,000 libraries which include public libraries, college libraries, University libraries, departmental and other libraries. Computerisation of library services has been slow in India so far and it is expected to turn into a movement in the coming years given the requisite attention and fillip.

INSDOC vision of how the libraries are evolving the worldover and the current status in India are summed up in the following table:

S.No.	Library Type	Characteristics	Current Status
1.	Traditional Library	Holdings in hard copy form. No computerisation	> 97% libraries
2.	Automated Library	Automation of library functions. Computerised catalogue, circulation, acquisition etc. Holdings mostly in print form. A few electronic resources.	< 3% libraries
3.	Electronic Library	Fully automated functions. CD-ROM networking. Resources in Electronic and conventional form.	< 100 libraries
4.	Digital Library	Fully automated. All resources in digital form. High speeds optical fibre LAN.	Experimental
5.	Virtual Library	Library without walls. Provides access to resources. Library without resources.	Research

Library Automation

Computers have made foray into the libraries world over. Almost all the operations in a library can be computerised to achieve more effective functioning. Library automation has been an area of specialisation of INSDOC for many years now. Several projects for the automation and modernisation of libraries of prestigious institutions have been taken up and successfully completed by INSDOC. In many cases, INSDOC library automation package, Granthalaya has been used to meet the computerisation requirements of libraries and information centres.

Granthalaya is a state of the art library automation package designed and developed by a unique blend of professionals at INSDOC including information specialists, software personnel and the library professionals. The package has been designed using an object oriented approach and uses a directory concept that facilitates easy data input and brings about better data integrity. The package uses a modular design which offers flexibility for libraries to go in for selective automation. Granthalaya can also be

customised to meet a library special functional needs. The package is available on a variety of platforms like DOS and WINDOWS-95. LAN version of the software package is under develpoment.
In addition to its sophisticated features, its user friendliness and cost-effectiveness make Granthalaya almost the best available library automation package in the country today.

ELECTRONIC LIBRARIES AND CD-ROM NETWORKING

Automated libraries are slowly evolving to Electronic Libraries characterised by large scale CD-ROM networking. With the increasing trend in electronic publications particularly on CD-ROMs and networks, INSDOC has been advocating the conversion of automated libraries into electronic libraries.

The Electronic Library Division of INSDOC now has a rich collection of more than 3,000 full text journals, patents, conference proceedings etc. on CD-ROMs. The division houses a CD-ROM facility consisting of a 4-drive tower, a 6-slot mini-changer (juke box) and five Pentium systems. Plans are underway to establish a large CD-ROM network with 20-50 workstations using a 28-56-tower drive. Several cost-effective services like the Full Text Journal Service, Standing Order Abstracts Service and Chemical Abstracts Keyword Index Service are provided by this division

CD-ROM Networking is a an area of research interest to INSDOC. The usefulness of tower and jukebox technologies have been studied for different environments and several access techniques have been evaluated. INSDOC has gained adequate expertise to design and establish cable or optical fibre LANs with CD-Server, File Server, Internet Server etc.

DATABASE DESIGN AND DEVELOPMENT

Computerised databases help in collection of data and its efficient retrieval. INSDOC has developed good expertise in the design and development of databases. In addition to development of in-house databases, INSDOC has carried out a number of consultancy/turnkey projects for prestigious organisations. The database contents vary from bibliographic to multimedia in nature
Databases are designed using the state of the art information technology tools. All the indigenous databases are available online.

Indigenous Databases

- Indian Science Abstracts
- National Union Catalogue of Scientific Serials in India
- INSDOC Serial Contents on Multi-Media Database
- Polymer Science Database
- Indian Patents

Consultancy/Turnkey Databases

- Multimedia Photo Identity Card Project
- Electronic Imaging Project
- Codification of Figurative Elements of Trademarks in Trademarks Registry
- Directory of Research/Industrial Institutions in SAARC Region
- Database on Ongoing Intramural R&D Project in S&T Research Institutions in India

To harness the advantages of the CD-ROM like high storage capacity and ease of use, databases are being brought out on CD-ROM.

A recently concluded project involving large scale data management has been the computerisation of electoral data for about 5 million voters in New Delhi. The project involved handling image and textual databases in multilingual form.

ONLINE ACCESS AND SYSTEMS

Instantaneous access to latest information on the desktop encompasses a combination of computer and communication technologies. INSDOC offers indigenous databases on its linline host system for public access.

Indigenous Online Databases

- Polymer Science Literature Database
- Material Science Bibliographic Database
- Medicinal and Aromatic Plants Database
- Indian Patents Database
- INSDOC Serials Contents on Multi Media (ISCOMM) Database
- National Union Catalogue of Scientific Serials in India (NUCSSI) Database

International Online Databases

- Dialog
- STN International
- Datastar
- Easynet

The databases have been created by INSDOC or by other organisations and ported on to INSDOC system for online access.

In addition to indigenous databases, INSDOC also has access to several international databases.

Information is obtained through online searching of over 1500 international databases. Skilled personnel at INSDOc perform searches for research scientists and the corporate sector who use these databases for the latest R&D commercial and market information.

In the coming years INSDOC would be increasingly postioning itself as a major information service provider on networks. For this Internet/Internet facilities would be further consolidated and harnessed.

Presently INSDOC has its web site with following URL : http://www.insdoc.org

PROJECTS AND LIBRARY MANAGEMENT

Over the years INSDOC has gained wide expertise in the management and execution of multifaceted and time bound projects in the areas of networking and library management. INSDOC undertakes turnkey projects on the BOT (Build, Operate, Transfer) mode. In this mode, INSDOC takes up the full responsibility for feasibility study, system design, procurement, implementation, pilot operations and training. The system is handed over to the client after pilot phase of operations.

INSDOC has successfully completed a complex and time bound technical consultancy and project management assignment for establishing an online trading system for the Delhi Stock Exchange. The work involved activities ranging from interior furnishing design to the establishment of a VSAT network.

Recently completed Projects

- Library automation in Nuclear Science Centre
- Library management in Central Fuel Research Institute

- Modernisation of Library-cum-Documentation Centre of Madhya Pradesh Council of Science and Technology
- Modernisation and management of Central Forensic Science Laboratory
- Delhi Online Trading System: Overall technical consultancy and project management
- Database of Intramural R&D Projects in S&T Institutions In India
- Automation of Archival Centre and library of Arthur Andersen & Associates
- Computerisation of Plot holders Data of Urban Improvement Company Pvt. Ltd.
- Database of Small Scale Enterprises in the Northern Indian Region
- Establishment of Library and Information Centre for Rajiv Gandhi National Drinking Water Mission

INSDOC has recently undertaken a consultancy project for the establishment of a Rubber Database System for the Rubber Research Institute of India (RRII). The project encompasses the design of the database system, networking of RRII, Rubber Research Stations and the Rubber Board and the design and hosting of a web page on the Internet.

Establishing Library-cum-Documentation centres, modernization of libraries and their management have been areas where INSDOC has been actively involved in. Several projects in these areas have been successfully completed.

INFORMATION SERVICES ON NETWORK

INSDOC has ambitious plans of providing wide ranging information services on networks. These services include:

-Full Text Journals
-Web Page Design
-Web Server Based Services
- Network Based Training

INSDOC has a web site with the domain name www.insdoc.org. This web site will be consolidated to serve as host for network-based services of INSDOC.

INSDOC operates the Scientific and Industrial Research Network (SIRNET), a computerised network linking S&T institutions throughout the country. The network facilitates exchange of electronic-mail service and provides access to indigenous online databases to its subscribers. SIRNET has its network management centres at New Delhi, Bangalore, Calcutta and Chennai. INSDOC provides consultantancy services on establishing computer networks, web page design, web access etc. based on the competency acquired in this area.

ONLINE ACCESS SYSTEMS

Instantaneous access to latest information on the desktop encompasses a combination of computer and communication technologies. INSDOC offers indigenous databases on its linline host system for public access. There are presently ten databases available on the host system for on-line access.

Indigenous Online Databases

- Polymer Science Literature Database
- Material Science Bibliographic Database
- Medicinal and Aromatic Plants Database
- Indian Patents Database
- INSDOC Serials Contents on Multi Media (ISCOMM) Database
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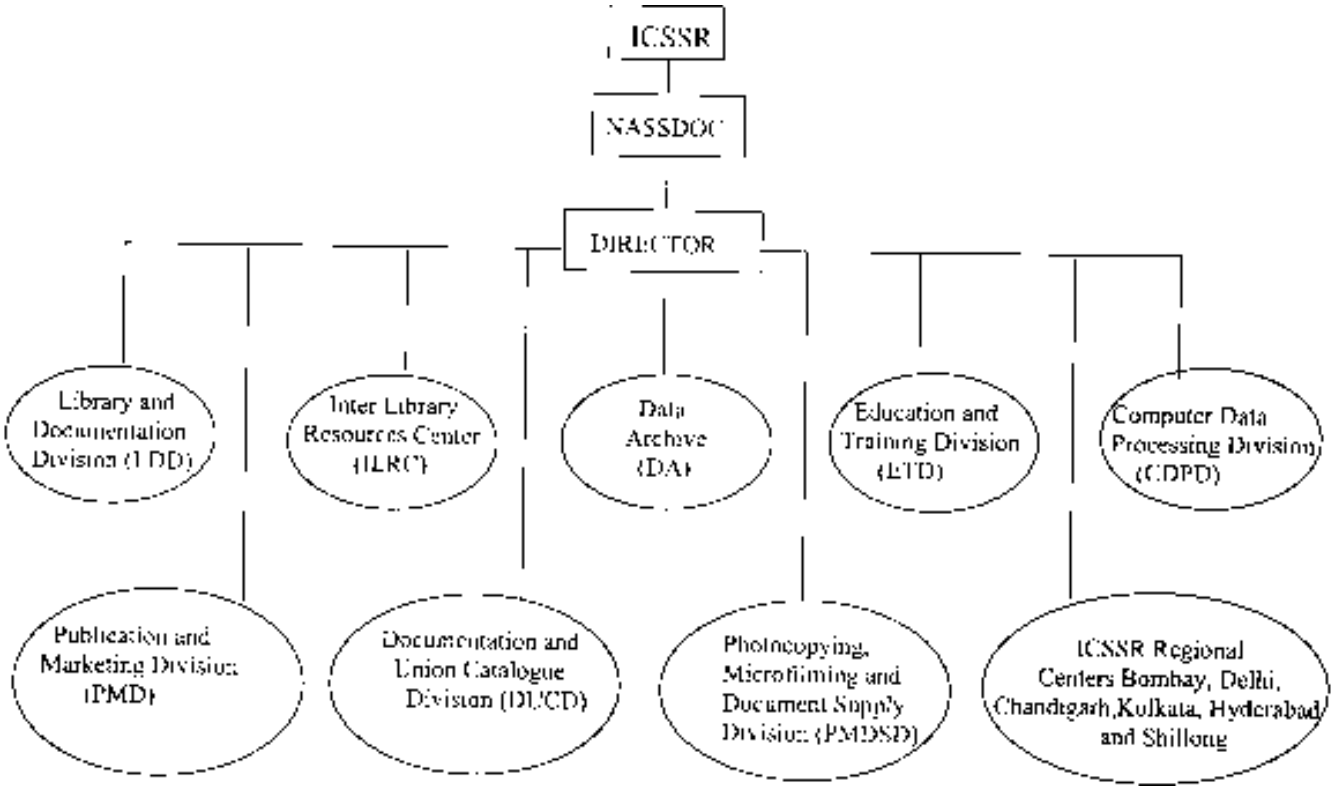
More information from http://www.insdoc.org

National Social Science Documentation Center, New Delhi

NASSDOC is pioneer documentation centre in the field of social science. It was established in 1979 under ICSSR.

More information from http://www.icssr.org/nassdoc

Infrastructure of NASSDOC



CHAPTER 4
ANALYSIS

The present study is related to the survey of special library in the field of science and social sciences. Documentation centres of national level, one in each field, has been chosen for the survey. Indian National Scientific Documentation Centre (INSDOC) in the field of science and National Social Science Documentation Centre (NASSDOC) in social sciences, both located in Delhi, have been selected for the purpose. To study the impact of IT on the technical and users services, the libraries of both INSDOC and NASSDOC have been surveyed through questionnaire prepared for the library staff. Another questionnaire was also designed for the users of the libraries to know their opinion on the services provided by the concerned libraries. The analysis is based on the data collected through the above said sets of questionnaires. The collected through the questionnaire meant for the users may serve as a counter check for the data obtained from the library staff.

4.1. INSTITUTIONAL PROFILE

Table 4.1. 1. Institutional Background

S. No.	Name of the Institution	Year of establishment		Year of computerisation	
		Institution	Library	Institution	library
1.	INSDOC	1952	1964	1964	1964
2.	NASSDOC	1970	1970	1985	1996

Table 4.1.1 Indicate the year of establishment of the institutions under survey, the year of establishment of their concerned libraries and year of in0ception of computerisation in those libraries. INSDOC was established in the year 1952 whereas NASSDOC came to existence in 1970, i.e. after 18 years of the establishment of INSDOC. But as regards the establishment of their libraries, it is observed that in case of

INSDOC, it established its library in 1964, i.e. after 12 years of the establishment of the parent body. However incase of NASSDOC, it started its library in the same year of its own establishment. As regards computerisation of libraries, INSDOC started the computerisaton of the library services immediately along with the establishment of the library, i.e. in the year 1964. Through NASSDOC started the computerisation of different activities in the year 1985, it introduced computers in the library services in the year 1996. Thus after 26 years of its establishment and after 15years of the establishment of it own library. It is thus observed that out of two national organisation, INSDOC is late in establishment of its own library where as NASSDOC is late in computersation its own library.

Table 4.1. 2. Staff structure

S. No.	Categories	Number of position					
		NSL			NASSDOC library		
		E	P	I	E	P	I
1.	A	34(26.4%)	34	20	20(28.5%)	20	5
2.	B	29(22.4%)	29	24	11(15.9%)	15	9
3.	C	6(4.6%)	1	6	9(5.6%)	-	4
4.	D	60(46.6%)	-	19	35(50%)	-	3
	Total	129 (100%)	54 (49.69%)	69 (53.5%)	70 (100%)	35 (50%)	21 (30%)

A-Professional B-Semi professional C-Computer specialist
D-Non professional E-Educational qualification P-Professional qualification
I- Qualification in IT.

Table 4.1.2 shows the staff position of both the documentation centre. Staff are grouped in to four categories, i.e. professional, semi professional, computer specialists and non-professional basing on their nature of job and required qualifications for the said posts. INSDOC has a total number of 129 staff members. Out of 129, professionals are 34 (26.4%), semi professionals are 29(22.4%), computer specialists are 6(4.6%) and 60 (46.6%), non-professionals. On the contrary, NASSDOC has a total number of 70 staff members, out of which, 20(28.5%) professionals, 11(15.9%) semi professionals, 4(5.6%) computer

specialists and 35(50%) non professionals. It observed that the INSDOC has more IT qualified and similar professionals qualified staff members than NASSDOC.

Table 4.1.3. Budget Allocation

S. No.	Name of the library	Total Budget	Reading Material		Information Technology	Miscellaneous
			Print	Non Print		
1.	NSL	2 Crores	40 (20%) Lakhs	60(30%) Lakhs	60(30%) Lakhs	40(20%) Lakhs
2.	NASSDOC Library	1 Crores	15 (15%) Lakhs	30(30%) Lakhs	40(40%) Lakhs	15(15%) Lakhs
	Total	3 Crores	55 Lakhs	90Lakhs	100 Lakhs	55 Lakhs

Table 4.1.3 gives information about the budgetary provision of the libraries under survey. The annual budget provision of INSDOC for its library is two crores rupees. Out of this, it spends Rs. 40 Lakhs (20%) on print forms, Rs. 60 Lakhs (30%) on non print materials, Rs 60 Lakhs (30%) on application of IT and Rs. 40 Lakhs (20%) on miscellaneous items. In a similar way, the annual budget provision of NASSDOC is one crore rupees. NASSDOC library allocates Rs.15 (15%) Lakhs on print forms, Rs. 30(30%) Lakhs on non-prints reading materials, Rs. 40(40%) Lakhs on IT and 15(50%) Lakhs on miscellaneous items. It is thus observed that NSL allocates more found on print form compare to NASSDOC. Both the institutions spend equal percentage of their budget on non-print materials. However, NASSDOC allocates more founds on IT. Expenditure on miscellaneous items of NSL is more compared to that NASSDOC library.

4.2. INFRASTUCTURE OF IT

Table 4.2.1. Availability of Hardware

S. No.	Hardware	Quantity	
		INSDOC	NASSDOC
1	Type of Computer System		
1.1	IBMPC	35	25
1.2	Apple Mac	0	0
1.3	Power PC	0	0
2	Type of Processor		
2.1	PC/AT80386	5	3
2.2	PC/AT80386	3	4
2.3	Pentium-I	2	1
2.4	Pentium-II	7	3
2.5	Pentium-III	18	14
2.6	Pentium-IV	0	0
3.	Server	2	1

Table 4.2.1 shows the availability of computer system and processor in both the documentation centres. Both the centres use IBM PC Computer System. INSDOC possesses 35 IBM PCs whereas NASSDOC has 25. Apple Mac or Power PCs are not available with any centre. Though server is available with INSDOC and NASSDOC, they have 35 processor for 35 PCs. Similarly, NASSDOC has 25 processors for their respective number of PCs. It is also observed that Pentium-IV model of Processor is not available with any centre.

Table 4.2.2. Availability of Input/Output Device

S. No.	Input/Output device	Quantity	
		INSDOC	NASSDOC
1.	Keyboard	35	25
2.	Mouse	35	25
3.	Scanner	5	2
4.	Barcode reader	2	0
5.	Modem	15	10
6.	Microphone	10	5
7.	Monitor	35	25
8.	Digital Video Camera	N.R.	0
9.	Printer	15	7
10.	Speaker	10	5
11.	Other Devices (Please specify)	N.R.	N.R.

N.R.-No. Response

Table 4.2.2 shows the input/output devices, which are available and used in both the documentation centres. INSDOC has more input/output devices than that of NASSDOC because of early inception of computerisation in the NASSDOC library. It is further observed that some input/output devices like Barcode reader and digital video camera are not available with NASSDOC. INSDOC is silent about the availability of Digital Video Camera. Both the centres are also silent on the point of other devices, if available.

Table 4.2.3. Use of Application Software (AS)

S. No.	Application Software	No. of software used	
		INSDOC	NASSDOC
1.	Data Base Software	5	3
2.	Spread Sheet Software	2	1
3.	Graphic Software	3	2
4.	DTP Software	3	3
5.	Multi-media Software	2	1
6.	Networking Software	5	3
	Total	20	13

Table 4.2.3 shows the quantity of application software available and used in both the documentation centres. INSDOC uses a total of 20 application softwares and NASSDOC uses 13 of that. Database, Graphic, DTP and Networking Softwares are popularly used in both the centers. INSDOC uses more application softwares compared to NASSDOC, because of late inception of computerisation in NASSDOC. Both the centres have equal number of DTP software only.

Table 4.2.4. Use of the Operating Systems (OS).

S. No.	Name of Operation System	Name of the Library		Total
		NSL	NASSDOC library	
1.	PC DOS	1	0	1
2.	MS DOS	1	1	2
3.	WINDOWS	1	1	2
4.	UNIX	1	1	2
5.	LINEX	0	0	0
6.	Developed in-house Software	1	0	1
7.	Any Other (Specify)	NR.	NR.	NR.
	Total	5(62.5)	3(37.5%)	8

1- Available. 0-Not available. NR.-No Response.

Table 4.2.4 shows the operating system software, which are uses in both the documentation centres. NSL use PC DOS, MS DOS, WINDOWS, and UNIX, Operation software system, It also developed in house operation system software. In other hand NASSDOC use MS DOS, WINDOWS and UNIX. It is observed that INSDOC use more than 25% operating system software than NASSDOC. Both the centres are silent on the point of any other operating system software, if available.

Table 4.3.1. Use of IT in Particular Services

S. No	Services	Name of the library					
		NSL			NASSDOC library		
		Manual	Computer	Both	Manual	Computer	Both
1.	Acquisition	0	1	0	0	1	0
2.	Classification	1	0	0	1	0	0
3.	Cataloging	0	1	0	0	1	0
4.	Serial control	0	0	1	0	1	0
5.	Circulation	0	1	0	1	0	0
6.	Ref. Ser.	0	0	1	0	0	1
7.	Docu. Ser.	0	1	0	0	0	1
8.	CAS/SDI	0	1	0	0	1	0
9.	Ind./Abs.Sers.	0	1	0	0	1	0
10.	Reprography		1			1	
11.	Translation	1	0		1	0	
12.	Biblom. Stu.	0	1	0	0	0	1
13.	Biblio. Sers.	0	1	0	0	1	0
14.	Database Cre.	0	1	0	0	1	0
15.	Lit. Search	0	1	0	0	0	1
	Total	2	11	2	3	8	4
	Percentage	13.3%	73.4 %	13.3 %	20 %	53.3 %	26 .7%

0-No 1- yes

Table 4.3.1 provides information with respect to the application of computer in various in-house library activities, i.e. Acquisition, Classification, Cataloguing, Serial Control, Circulation, Reference Services, Bibliometric Study, Documentation Service, etc. INSDOC library provides 73.4 per cent of its services through computers, 13.3 per cent of its services are semi-mechanical, i.e. by both methods (manual & mechanical) and 13.3 per cent of services (Classification and Translation) are purely on manual method. On the other hand, NASSDOC library provides 53.3 per cent of its services with the help of computers, 20 per cent of services are manual and 26.7 per cent of services are both in manual and mechanical methods. Thus, maximum library services of NSL are computerised compared to the NASSDOC library. Acquisition, Cataloguing, Bibliographical services, Database creation, and Documentation services like CAS/SDI, Indexing/Abstracting, Reprography, etc. are provide with the help of computers in both the centres.

Table 4.3.2. Use of Classification Scheme, Cataloguing Code and Subject Heading List.

S.No	Name of the Library	Classification Scheme	Subject Heading List	Cataloguing Code	
				Before using IT	After using IT
1	NSL	UDC Medium Edition (1985)	LCSH-13	AACR-II	CCF
2	NASSDOC library	DDC 21st Edition (1996)	LCSH-22	AACR-II	AACR-II

Table 4.3.2 gives information about classification schemes used, cataloguing code followed and the subject heading list used for technical processing and organisation of documents in the libraries under survey. INSDOC is using UDC medium edition (1996) for classification of documents whereas NASSDOC uses DDC 21st edition for classifying the documents. As UDC is flexible and more useful for science libraries, INSDOC might use the said scheme of classification. NASSDOC being a centre for social science, it manages with DDC. INSDOC was using AACR-II for cataloguing of documents before using IT, at present INSDOC is using Common Communication Format (CCF) for cataloguing, whereas NASSDOC is continuing with AACR-II. AACR-II and CCF are adopted by most of the available computer systems and facilitate computerised technical processing. INSDOC and NASSDOC are using Library of Congress Subject Heading List for subject entry of documents. It observed that the NASSDOC use latest edition of classification scheme and subject heading list, whereas INSDOC is used latest format for cataloguing.

Table 4.3.3. Computer Facilities

S.No.	Name of the Library	Computer Facilities						
		Internet	Online search	CD-ROM search	Multi-user facilities	LAN	WAN	E-mail
1.	NSL	1	1		1	1	0	1
2.	NASSDOC library	1	1	1	1	1	0	1

Table 4.3.3. indicates about the availability of computer facilities in the libraries under survey. Computer facility like Internet, On-line search, CD-ROM search, LAN, E-mail and multi-user facilities are available in both the libraries. However, WAN provision is not available in any one of them.

Table 4.3.4. Networking Facilities.

S. No.	Name of the library	Name of Network							
		DELNET	CALIBNET	SIRNET	NICNET	MALIBNET	INFLIBNET	ERNET	Other
1	NSL	1	1	1	0	1	1	0	0
2	NASSDOC library	1	0	0	0	0	0	1	0

Table 4.3.4 indicates the networking facilities of the libraries under study. NSL is connected with DELNET, CALIBNET, SIRNET, MALIBNET and INFLIBNET, whereas NASSDOC is connected with DELNET and ERNET only. Both the libraries are connected with DELNET. INSDOC has a wider networking system then NASSDOC because it is connected with more number of networks.

4.4. NATURE OF APPLICATION OF IT.

Table 4.4.1. Acquisition System

S. No.	Areas/Functions	Name of the library	
		NSL	NASSDOC library
1	Duplication checking	1	1
2	Preparation of order list	1	1
3	Sending orders to book supplier (s)	1	1
4	Monitoring orders and follow up action	1	1
5	Verification with order file and invoices	1	0
6	Maintaining state of funds, budget control, etc.	1	1
7	Any other (specify)	1	0
	Total	7(100%)	5(71.5%)

Table 4.4.1 depicts the areas/functions of computerised acquisition system of both the documentation centres. Acquisition procedure of documents in INSDOC is fully computerised, whereas 71.5 per cent of acquisition works is done through computer in NASSDOC. NASSDOC is not using computer in payment work.

Table 4.4.2. Cataloguing

S. No.	Areas/Functions	Name of the library	
		NSL	NASSDOC library
1	Duplicating catalogue cards	1	1
2	Preparation of authority file	1	1
3	Sorting, checking and filing of catalogue cards	1	1
4	Automatic generation of added entries	1	1
5	OPAC facilities	1	0
6	Generating the monthly accession list	1	0
7.	Any other activity	1	0
	Total	7 (100%)	4 (66.6%)

Table.4.4.2 shows the areas of computerisation in the fields of library catalogue system of both the documentation centres. INSDOC has fully computerised catalogue system whereas NASSDOC has 66.6 percent of the activities involved with library cataloging. NASSDOC does not provide OPAC facilities.

Table 4.4.3. Circulation

S. No.	Areas/Functions	Name of the library	
		NSL	NASSDOC library
1	Master file	1	1
2	Registration of members	1	1
3	Charging of document	1	0
4	Discharging of document	1	0
5	Reservation of document	1	0
6	Renewable of document	1	0
7	Overdue charge	1	0
8	Preparation of reminders	1	0
9	Maintaining statistics	1	0
10	Printing of records	1	0
11	Any other (Please specify)	1	0
	Total	11(100 %)	2(20 %)

Table 4.4.3 shows the areas of computerised circulation services followed by both the documentation centres. INSDOC has computerised the entire circulation activities of its library whereas NASSDOC has computerised only 20 per cent of the circulation work. Both the library software's (GRANTHALAYA / LIBSYS used by INSDOC / NASSDOC) provide better facilities for circulation works but computerisation of circulation section is an initial stage in NASSDOC. Thus an optimum benefit is yet to be derived.

Table 4.4.4. Serial Control

S. No.	Areas/Functions	Name of the library	
		NSL	NASSDOC library
1	Ordering of serials	1	1
2	Receipt and updating the record file	1	1
3	Reminders to venders / publishers	1	1
4	List of holdings	1	1
5	Accessioning	1	1
6	Renewable of presently subscribed serials	0	1
7	Maintaining state of funds, budget control, etc.	1	1
8	Preparing list of additions	0	1
9	Preparing list of binding	1	1
10	Any other(Please specify)	0	1
	Total	7(70 %)	10(100 %)

Table 4.4.4 shows the areas of computerised serial control, followed by both the documentation centre. NASSDOC has computerised the entire activities of serial control of its library whereas INSDOC has computerised only 70 per cent activities of serial control. Though INSDOC is using the GRANTHALAYA, Software where facilities are not available for all types of serial control works. Thus an optimum benefit is yet to be derived.

Table 4.4.5. Documentation Services.

S. No.	Areas/Functions	Name of the library	
		NSL	NASSDOC library
1	Creation of the database	1	1
2	Indexing of micro and micro documents	1	1
3	Updating of the databases	1	1
4	Receiving the quire's	1	1
5	Searching	1	1
6	Thesaurus construction	1	1
7	Feed back	1	1
8	Any other (Please specify)	1	1
	Total	8(100 %)	8(100%)

Table 4.4.5 shows the areas of computerised documentation services used by both the documentation centers. Documentation works are fully computerised in both the centres. Thus, it is observed that both the library softwares (LIBSYS and GRANTHALAYA) used by both the centres have better provision for documentation work.

4.5. IMPACT OF IT

Table 4.5.1. Impact of IT on Different Library Services.

S. No.	Library services	Impact of IT						
		Improvement				Save		
		Efficiency	Speed	Accuracy	Simplicity	Money	Time	Staff
1	Technical							
a.	Acquisition	1	1	1	1	0	1	1
b.	Classification	-	-	-	-	-	-	-
c.	Cataloguing	1	1	1	0	0	1	1
d.	Serial control	1	1	0	0	1	1	0
e.	Biblio. Cont.	1	0	0	0	1	1	0
2	Users services							
a.	Ref. Ser.	1		1	1	0	1	0
b.	Circulation	1	1	-	-	-	1	1
c.	Inf. & docu. Sers.	1	1	1	1	1	0	1
d.	Lit. Search	1	1	1	1	1	1	1

1-Yes. 0-Not.

Table 4.5.1 points out the impact of IT on the library services, i.e. technical and users services. Impacts of IT identify in the term of improvement of efficiency, speed, accuracy, simplicity and economy of money, time, and staff. Implementation of IT has brought improvement in efficiency, speed accuracy and saving the time of maximum services.

Table 4.5.2. Improvement in Technical Services

S. No.	Technical services	Number of document processed per day					
		NSL			NASSDOC library		
		Before using IT	After using IT	Times	Before using IT	After using IT	Times
1.	Classification	20	25	1.25	15	20	1.3
2.	Cataloguing	10	35	3.5	10	50	5
3.	Circulation	100	300	3	10	40	4
4.	Docu. works	05	15	3	03	10	3.3

Table 4.5.2 shows number of documents processed per day in different library services, before and after using IT. In INSDOC, there is no big difference between before using IT and after using IT in classification, cataloguing is increased by 3.5 times, circulation and documentation is enhanced by 3 times. Whereas NASSDOC, there is not a big difference between before using IT and after using IT in classification. Cataloguing is enhanced by 5 times, circulation is increased by 4 times and documentation is enhanced by 3 times. It observed that the more enhance the technical services of NASSDOC than INSDOC after using IT.

Table 4.5.3. Improvement in User Services

S. No.	Users services	Number of satisfied quire's per day					
		NSL			NASSDOC library		
		Before using IT	After using IT	Times	Before using IT	After using IT	Times
1.	Ref.Sers.	30	70	2.3	50	100	2
2.	Docu. Sers.	15	50	3.3	20	50	2.5
3.	Biblio. Sers.	10	30	3	20	60	3
4.	Any other	NR.	NR.	NR.	NR.	NR.	NR.

NR.-No Response

Table 4.5.3 shows number of satisfied quires per day before using IT and after using IT. In INSDOC, reference services is increased by more than 2 times, documentation and bibliographic services are

increased by more than 3 times. In NASSDOC, reference service is increased by 2 times, documentation services are increased by 2.5 times and bibliographic services are increased by 3 times. It observed that NSL is satisfied more quires than NASSDOC library. Because inception of IT in initial stage in NASSDOC library.

Table 4.5.4. Amount of Impact of IT on Different Library Services.

S. No.	Library services	Name of the library					
		NSL			NASSDOC library		
		To great extent	To some extent	Not much	To great extent	To some extent	Not much
1	Acquisition	1	0	0	1	0	0
2	Classification	0	0	1	0	0	1
3	Cataloguing	1	0	0	0	1	0
4	Serial control	0	1	0	1	0	0
5	Ref.Ser.	0	1	0	0	1	0
6	Docu.Ser.	1	0	0	1	0	0
7	Circulation	1	0	0	0	0	1
8	Publication	1	0	0	0	1	0
	Total	5	2	1	3	3	2
	Percentage	62.5%	25%	12.5%	37.5%	37.5%	25%

Table 4.5.1 shows the views of librarians on impact of IT on the above mentioned library services, in terms -- to great extent, to some extent and not much. Acquisition, Cataloguing, Documentation, Circulation and Publication services are improved to great extent in INSDOC, Whereas NASSDOC has progressed to great extent in Acquisition, Serial control and Documentation services. Application of IT in the field of Library Classification has not improved much in both the documentation centres. In INSDOC 62.5 per cent services are improved to great extent, 25 per cent services are improved to some extent and 12.5 per cent services improvement is not much. In case NASSDOC, 37.5 per cent services are improved to great extent, 37.5 percentage services are improved to some extent and 25 per cent service, improvement is not much. Thus, it is observed that the application of IT in the library services has been done to a greater extent in INSDOC compared to that of NASSDOC.

4.6. USERS OPINION

Table 4.6.1. Status of the users

S.No.	Name of the library	Status of the users				Total
		Student	Research Scholar	Staff Member	Scientist	
1.	NSL	15(60%)	6(24%)	-	4(16%)	25
2.	NASSDOC Library	3(13.7%)	15(68.1%)	3(13.7%)	1(4.5%)	22
	Total	18(38.3)	21(44.7)	3(6.4)	5(10.6)	47

Table 4.6.1 shows the designation of the users of both the documentation centres under survey. Maximum number of users 21(44.7%) of both the centres are research scholar. How ever, the number of research sc holars that among the users category in NSL are less compared to that of NASSDOC library.

Table 4.6.2. Application of IT in Library Services

S.No	Services	Name of the library					
		NSL			NASSDOC library		
		Manual	Computer	Both	Manual	Computer	Both
1.	Acquisition	NR	NR	NR	0	0	3
2.	Classification	NR	NR	NR	3	0	0
3.	Cataloging	0	20	5	17	0	5
5.	Circulation	0	10	15	3	0	0
6.	Ref. Sers.	0	0	25	10	0	12
7.	Docu. Sers.	0	15	10	0	15	7
8.	CAS/SDI	0	20	5	0	10	12
9.	Ind./Abs. Sers.	0	25	0	0	18	4
10.	Biblio. Sers.	0	15	10	3	0	18
11.	Lit. Search	0	20	5	4	4	14
14	Reprography	0	25	0	0	10	0
15	Translation	25	0	0	10	0	0
	Total Response	25	150	75	50	57	75
	Percentage	6.7%	40%	20%	15.2%	17.3%	22.8%

N.R.-No Response

Table 4.6.3 indicates the users' view on the library services through manual, computerised and the both. In NSL, maximum services are provided with the help of computers and few are manually provided, whereas in NASSDOC library, maximum services are provided both manually and through computers. Some services are provided through manual system.

Table 4.6.3. Awareness and Use of Information Technology.

S. No.	Users of the Library	Known IT	Unknown IT	Used IT			Total
				Rarely	Some-times	Frequently	
1.	NSL	25 (100%)	NR.	3 (12%)	7 (28%)	15 (60%)	25 (100%)
2.	NASSDOC library	20 (90.9%)	2 (9.1%)	10 (45.5%)	5 (22.7%)	5 (22.7%)	20 (90.9%)
	Total	45	2	13	12	20	45
	Percentage	95.7%	4.3%	27.6%	25.5%	42.5%	95.7%

NR.- No Response

Table 4.6.2 indicates about the users' awareness about IT. The maximum number of users of both the documentation centres 45(95.7%) are aware of IT and they also use it. However, only few users, i.e. 2(4.3%) are not aware of IT and its facilities.

CHAPTER 5
FINDINGS, SUGGESTIONS AND CONCLUSION

5.1. Findings

Findings of the study are based on the analysis of data, which are collected from the libraries of the two national documentation centres, namely INSDOC and NASSDOC.

5.1.1. About the Institution

1. INSDOC was established in the year 1952 and after 18 years of it, NASSDOC came to existence in 1970.
2. NSL was established in 1964, i.e. after 12 years of the establishment of its parent body, whereas NASSDOC started its library in the same year of its own establishment.
3. INSDOC implemented the IT in the library services immediately along with the establishment of NSL whereas NASSDOC used IT in different library services in the year 1996, i.e. after 15 years of the establishment of NASSDOC library.

5.1.2. Library Staff

1. INSDOC has more IT qualified personnel than NASSDOC whereas both the centres have equal percentage of professional staff members.
2. Heads of both the libraries do not have formal computer education or training.

5.1.3. Budget

1. NASSDOC allocates more funds on IT than the INSDOC.
2. Both the libraries spend equal per cent of their budget on non-print materials.

5.1.4. Library Classification and Catalogue

1. NSL library uses UDC medium edition (1985), whereas NASSDOC library uses DDC 21st edition (1996) for their shelf arrangement.

2. The NASSDOC library follows AACR-II catalogue code. NSL follows CCF after implementation of IT although it was also using AACR-II beforehand.
3. Both the libraries use Library of Congress Subject Heading List.

5.1.5. Infrastructure

1. NSL has large infrastructure of IT (Hardware and Software) than the NASSDOC library.
2. Both the centres use IBM PC or compatible computer systems, but NSL has more processor than NASSDOC Library.
3. Both the centres have similar computer facilities but NSL uses these facilities extensively.
4. NSL has a wider networking system than the NASSDOC Library.
5. Both the documentation centres are using PC-DOS, MS-DOS, WINDOWS and UNIX operating systems.
6. NASSDOC library uses LIBSYS software for library automation; on the contrary, NSL is using in-house developed library software, i.e. GRANTHALAYA.

5.1.6. Application of IT in Library Services

1. Acquisition, cataloguing, circulation and documentation services are fully computerised in NSL. On the contrary, NASSDOC library has fully computerised the serial control and documentation services. Computer is partially used in other services of the library.
2. Both the documentation centres are using computers proving thereby that there is now a shift from the manual methods to the computer application.

5.1.7. Impact of IT

1. The technical services of NASSDOC library are more enhanced than NSL whereas user services of NSL are more satisfied than the NASSDOC library.
2. Implementation of IT has brought improvement in terms of efficiency, speed and accuracy in maximum services of both the centres.
3. The library staff and the users confirm that computerisation has brought improvement in the working and the services of their libraries.
4. Application of IT in the library services has been done to a greater extent in NSL compared to that of NASSDOC library.

5. A larger user group of both the centres are aware of IT and its use. Only few users of NASSDOC library are unaware about the IT.

5.2. Suggestions of the Information Officers/Librarians

The suggestions provided by the information officers and section-in-charges of both the documentation centres are as follows:

1. Library needs more IT qualified staff.
2. All the modern techniques and facilities need to be introduced in order to improve the professional efficiency.
3. IT techniques are to be adopted in all the library services.
3. The library users are to be regularly provided proper guidance to use IT facilities.

5.3. Suggestions of the Users

The suggestions offered by the users are as follows:

1. Need-based current reference tools are to be added in the reference collection.
2. LICs are required to provide separate reading room for the readers.
3. The libraries should be connected with global information network.
4. Training classes are to be conducted for the users for handling the IT facilities.
5. User services should also be provide in regional languages along Hindi with English.
6. Collection of the library should be up to date.
7. Reviews of Indian literature should be available on the CD-ROM and online.
8. Trained and qualified staff should be provided to implement latest technology in library services.

5.4. CONCLUSION

The study reveals the impact of IT on the technical and user services of the National Science Library and NASSDOC library, New Delhi. Information center or library is the heart and soul of an organisation. There is no doubt that the information environment is becoming increasingly digital and the IT has a wide-ranging impact on the library and information work. IT will shape the future information world and is considered to be a new wealth creator by offering immense opportunities for the libraries. Use of IT in a

special library environment like NSL and NASSDOC library, has been able to improve the overall library management activities and enhance the library services, both qualitatively as well as quantitatively. NSL has a larger infrastructure of IT compared to NASSDOC library. Maximum services of NSL are computerised than NASSDOC library. Both the libraries are continuously in the process of transforming into more electronic culture and trying to cope up with the latest technological developments. But as the technology is changing at vary fast rate, there is still scope for the librarians and others involved in library activities to develop more skill and have matching human resources to keep pace with this changing IT environment. I believe, the following observation of Eliot is relevant in the present IT era and will also be so in the new millennium of IT:

> Where is the life we have lost in living?
>
> Where is the wisdom we have lost in knowledge?
>
> Where is the knowledge we have lost in information?

BIBLIOGRAPHY

1. Agrwal, S.P. (1982). Times to Lunch National Information System for Social Science. ***Library Herald***. 20 (2-4) ; 164.
2. Ahmed, S.M. Javed & Munshi, Md -Nasir-Uddin (1995-96). Using IBM PC in Libraries: Some buying Tips. ***Library Herald***. 30(3-4) ; 90-8.
3. Ahuja, J.P.S. (1992). Building a Micro Computer based Local Area Network for Libraries: From Concept to Percept. ***Locknow Librarian.*** 24 (1) ; 2.
4. Akthar, Mubeen A. (1998). Library Automation. ***Indian Journal Information Library and Society.***11(1-2) ; 93-100.
5. ALA Glossary of Library and Information Science. (1983). Ed.by Heartskill Young. Chicago: ALA ; 212.
6. Anand, C.M. & Sen, B.N. (1991). Manpower Development for Computer Application to Library and Information Activities: Role of INSDOC. ***IASLIC Bulletin***.36 (4) ; 137-69.
7. Bakewell, K.G.B. (1977). The Special Library. ***In*** Annual of Library Economy. Ed. by R. Northwood Lock. London: Cure Bingley ; 14.
8. Ball, A.J.S. (1980). Videotext Network. ***Computer.*** 13 (2) ; 8.
9. Bashir, Ahmad; Khan G.M. & Wani G.M. (1996). Emerging Information Technology. ***Lucknow Libraries.*** 28(1-4) ; 14-24.
10. Carter, Roger. (1987). The Information Technology Handbook. London: Heinemann Professional Publisher ; 29-39.
11. Cochrane, Pauline A. (1992). Information Technology in Libraries and Ranganathan Five Laws of Library Science. ***Libri.*** 42 (3) ; 235-41
12. Devarajan,G.(1999).Information Technology in Libraries.NewDelhi : Ess Ess Publication ; 1-3.
13. Dhiman, Anil Kumar (1997). Computers and their Applications in Libraries***. Lucknow Librarian.*** 29 (1-4) ; 11-5.

APPENDIX- 2

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
DR. HARISINGH GOUR VISHWAVIDYALAYA, SAGAR (M.P.)

"Impact of Information Technology on the Technical & Users Services of the Libraries of INSDOC and NASSDOC, New Delhi: A Comparative Study"

Supervisor
Dr.K.C.Sahoo
Professor and Head
Dr.H.S.Gour Vishwavidhayalaya,
Sagar (M.P.).

Investigator
Deepak Kumar Namdev
M.Lib.I.Sc.Student.

QUESTIONNAIRE

1. Please tick mark () wherever appropriate.
2. You may also provide more relevant information, which is not included in this questionnaire.

PART- A
INSTITUTION PROFILE

1. Name of the institution :_____
2. Year of the establishment of the institution :_____
3. Name of the library :_____
4. Year of the establishment of the library :_____
5. Name of the librarian/Information officer :_____
6. Name of the in-charge of the computer section :_____
7. Budget (2000-2001).

a. The annual budget of the institution.
b. The annual budget of the library
c. The annual budget of the Information Technology and library automation work.
d. The annual budget of the reading material non print .
e. The annual budget of the library before using of Information Technology.

Year _____ Amount _____
Year _____ Amount _____

f. Miscellaneous _____

8. Staff pattern/Staff structure

S. No.	Designation	No. of Position		
		Educational Qualification	Qualification in IT.	Total Position
1.	Professional staff			
a.	Director			
b.	Deputy Director			
c.	Information officer			
d.	Any other			
2.	Semi progessional			
a.	Professional asstt.			
b.	Scientific asstt.			
c.	Any other (Please specify)			
3.	Computer specialist (Please specify)			
a.				
4.				
a.	Non professional(please specify)			

PART- B

INFRASTRUCTURE AND USAGE OF COMPUTERS

1. Is your library/Information center using computers? Yes No
2. Date of inception of computerisation in the library. Year---------
3. Hardware available in the library.

S.No.	Hardware	Y/N	Quantity
a.	Computer System		
	i. IBM PC or Compatible	☐	
	ii. Apple Mac	☐	
	iii. Power PC	☐	
b.	Processor		
	PC/AT 80386/486/Pentium I/II/III/IV Celeron		
c.	Storage Devices	☐	
	i. Hard disk	☐	

	ii. Floppy disk	☐	
	iii. CD-ROM	☐	
	iv. Magnetic tape	☐	
d.	v. any other (Please specify)	☐	
	Input/output devices	☐	
	i. Keyboard	☐	
S.No.	Hardware	☐	Quantity
	ii. Mouse	☐	
	iii. Scanner	☐	
	iv. Bar code Reader	☐	
	v. Micro Phone	☐	
	vi. Monitor	☐	
	vii. Digital Video Cemera	☐	
	viii. Printer	☐	
	ix. Speakers	☐	
	x. Modem	☐	
	xi. Other Devices		

4. Library Management Software used in the computer system It yes, please specify.

a. Name of Operating System

i. PC-DOC ☐ ii. WINDOWS ☐ iii. UNIX ☐

iv. Mac OS ☐ v. MS-DOC ☐ vi. Linux ☐

vii. Any other (please specify)_____

b. Name of Application software software Name of software (s)

i. Database software : _____

ii. Spread sheets software _____

iii. Graphic software _____

iv. DTP software _____

v. Multimedia software _____

vi. Networking software _____

vii. Any other (please specify)_____

c. Can software be operated by

i. Multiusers ☐ ii. Single user ☐

d. Software problems (Please specify)

PART-C
LIBRARY SERVICES

1. Please indicate the services available in the library either manual, computerised or both.

S. No.	NAME OF SERVICES	MANUAL	COMPUTERISED	BOTH
1.1	TECHNICAL SERVICES			
	a. Acquisition	☐	☐	☐
	b. Classification	☐	☐	☐
	c. Cataloguing	☐	☐	☐
	d. Serial control			
	e.Storage/preservation of documents	☐	☐	☐
	f. Creation of data bases	☐	☐	☐
	g. Bibliographic control	☐	☐	☐
	h. Bibliometric services	☐	☐	☐
	i. Any other (Please specify)			
1.2	USERS SERVICES			
	(i) Reference Services:	☐	☐	☐
	a. User education	☐	☐	☐
	b. Referral service	☐	☐	☐
	c. Any other (Please Specify)			
	(ii) Inf./Docu. Services	☐	☐	☐
	a. CAS	☐	☐	☐
	b. SDI	☐	☐	☐
	c. Indexing services	☐	☐	☐
	d. Abstracting services	☐	☐	☐
	e. Reprographic services	☐	☐	☐
	f. Translation services			
	g. Any other (Please specify)			
	(iii) Circulation services	☐	☐	☐
	(iv) Literature search services	☐	☐	☐
	a. On-line	☐	☐	☐
	b. Off-line	☐	☐	☐
	c. Current literature search	☐	☐	☐
	d. Retrospective search	☐	☐	☐
	e. Any other (Please specify)			

2. Have you got INTERNET connection? Yes ☐ No ☐

If Yes, please indicate following

a. On-line Bibliographic searching services ☐ b. E-mail services ☐

c. CD-ROM services ☐

d. Any other (Please specify)_____

3. Have you got connectivity with networking system? Yes ☐ No ☐

If Yes, please indicate following

vi. DELNET ☐ ii. NICNET ☐ iii. MALIBNET ☐

iv. CALIBNET ☐ v. SIRNET ☐ vi. Any other (Please specify)

4. Have you got interactive connectivity with any database vendor? Yes ☐ No ☐

if Yes, Please indicate following

i. DIALOG ☐ ii. STN ☐ iii. BRS ☐

iv. SDC ☐ v. Any other (please specify)_____

5. Are you providing On -line Bibliographic database service in information retrieval?

Yes No ☐ ☐

i. INSPEC ☐ ii. AGRIS ☐ iii. MEDLARS ☐

vii. Any other (Please specify)_____

PART – D

NATURE OF THE APPLIATION OF (IT)

1. Please indicate the nature of use of computerisation work in the particular service.

1.1 Has your library computerised the acquisition system? Yes ☐ No ☐

(i) If yes, then please indicate the areas :

a. Duplication checking ☐

b. Preparation of order list ☐

c. Sending order to book supplier(s) ☐

d. Monitoring orders and follow-up action. ☐

e. Maintaining states of funds, budget control, etc. ☐

f. Any other (Please specify) _____

(ii) To what extent has it improved the working in acquisition section?

a. To great extent ☐ b. To some extent ☐ c. Not much ☐

1.2 Has the library developed a computerised acquisition work? Yes ☐ No ☐

(i) If yes then please indicate the areas :

a. Duplicating catalogue cords ☐

b. Preparation of authority file ☐

c. Shorting, checking and filing of catalogue cards ☐

d. Automatic generation of added entries ☐

e. Generating the monthly accession list. ☐

f. Any other (Please specify) _____

(ii) Do you provide OPAC services? Yes ☐ No. ☐

(iii) No. of documents catalogued No. of documents Per day/mon./year per person

a. Before computerisation _____ _____

b. After computerisation _____ _____

(iv) Do your use any standard format for data entry ? Yes ☐ No ☐

If yes, Please indicate

a. CCF ☐ b. ISBD ☐ c. MARC ☐ d.. ISO 2709 ☐

e.. Any other, please specify _____

1.3 Has your library developed computerised periodical and serial control? Yes ☐ No ☐

(i) If yes, please indicate the routines :

a. Ordering of serials ☐

b. Receipt and updating the record file ☐

c. Reminders to venders/publishers. ☐

d. Accessioning of individual issues ☐

e. Preparation of list of periodicals received ☐

f. Preparation of list of holding with their status ☐

g. Any other (Please specify) _____

(ii) To what extent this computerisation has added to the efficiency of periodicals and serial control?

a. To great extent ☐ b. To some extent ☐ c. Not much ☐

1.4 Has he library developed computerised circulation systems? Yes ☐ No ☐

(i) If yes, please specify the area

a. Preparation of master life. ☐

b. Registration of members ☐

c. Charging of document ☐

d. Discharging of documents ☐

e. Reservation of documents ☐

f. Maintaining statistics ☐

g. Any other (Please specify) _____

(ii) Number of documents issued per day.

a. Before computerisation _____ b. After computterisation _____

1.5 Has the library developed any indigenous technique to classify the documents mechanically?

Yes ☐ No ☐

(i) If yes, please specify the areas.

a. Select isolate terms and group them and arrange them in their hierarchical sequence

b. Synthesise the class number ☐

c. Any other (Please specify) ☐

(ii) Number of documents classified

	Number of document	Perday/mon./ year Per person
a. Before computerisation	_____	_____
b. After computerisation	_____	_____

(iii) The scheme of classification used in the library (Please specify) _____

1.6 Do you provide reference service with the help of computers? Yes ☐ No. ☐

a. To great extent ☐ b. to some extent ☐ c. Not much ☐

1.7 Have the documentation/information services of your library bee computerised?

Yes ☐ No ☐

(i) If yes, please indicate the area :

a. Creation of the database ☐

b. Indexing of macro and micro document ☐

c. Updating databases ☐

d. Receiving the quire's ☐

e. Searching ☐

f. Thesaurus construction ☐

g. Feedback ☐

h. Any other (Please specify) _____

(ii) How far the computerisation of docmentation services have contributed to the satisfaction of the user?

a. To great extent ☐ b. to some extent ☐ c. Not much ☐

1.8 Has the library developed any technique for electronic publishing? Yes ☐ No. ☐

(i) If yes, please indicate the services

a. Electronic clipping services ☐ b. Electronic references ☐

c. E-journal ☐ d. Any other (Please specify) _____

(ii) Please give the name of publications of the institutions :

_____

(iii) Please give the name of publication, which are published through electronic publishing.

_____

2. Please give the future plan regarding the computerisation of the library activities, if any

_____

3. Please give the suggestion with regard to the improvement of the Technical & Users services of the library and maximum utilization of information Technology.

_____

4. Brief history of library (please provide related documents giving information about your library).

_____

5. Is there any impact of information technology on the mission of your library? (Core mission is reason to be in an environment and library activities), please specify.

[SIGNATURE]

NAME :_____

DESIGNATION :_____