CHAPTER - ONE
INTRODUCTION
CHAPTER - ONE

INTRODUCTION

SECTION - ONE

Conceptual Framework of Information Technology
CHAPTER - ONE

INTRODUCTION

SECTION - ONE

CONCEPTUAL FRAMEWORK OF INFORMATION TECHNOLOGY

This section aims at providing brief description of Information Technology in order to facilitate an understanding of the concepts and terms related to information technology and the changes and advancements that have occurred in it during the past period.

INFORMATION TECHNOLOGY

The term, information technology in English, informatique in French and informatics in Russian encompasses the notion of information handling. In stricter sense, Information Technology is the new science of collecting, storing, processing and transmitting information and connotes an ensemble of technologies. Information Technology consists of two words, namely, Information and Technology. The first constituent Information is defined as “Information is data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in current or prospective action or decisions”. (Gordon B. Davis and Margrethe H. Olson). Data is raw materials to information and are facts and figures that are not currently being used in a decision process and usually take the form of historical records that are recorded and filed without immediate intent of retrieving for decision making. L.M. Prasad says Information has three major characteristics – One, Timeliness, that is, information must be made available to the recipient on appropriate time; Two, Adequacy, that is, information must be adequate so that desired actions can be initiated and Three, Form, that is, information must be made available in a form which suits the recipient most. The second constituent Technology is defined by Manfred Kochen as “Systematic knowledge and action usually of industrial processes but applicable to any
"recurrent activity". In providing tools and techniques for action, technology at once adds to and draws from knowledge base in which theory and practice interact and compact. At its most general level technology may be regarded as definable specifiable way of doing anything. In other words we may say a technology is a codified, communicable procedure for solving problems. They particularly cover the computers capability to store and process information (also know as information processing) and communication technology, which is capable of transmitting information to distances (also known as telecommunications). Basically, information technology is application of tools and methods that support through which or by means of which information is transferred, recorded, edited, stored, manipulated and disseminated.

According to Takalkar, Information Technology is a combination of computer and telecommunication technologies, which make possible new systems and products to help people at work, in education, and home. An information technology is the application of a wide variety of electronic technologies to the information handling activities. It may be said that Information Technology (IT) is the combination of computer and communication technology by which information can be stored, processed and disseminated for any future use. In the modern age of computers, all the functions if information technology are carried out by computers, so information technology consists of hardware, software, database management, telecommunication and other information processing technologies used in computer-based information systems. Technology.

Manfred Kochen observed, impacts of Information Technology, in three stages. First, it enables us to do what we are now doing but better, faster and cheaper; second, it enables us to do what we can not do now; and third it changes our life styles.

Information Technology performs a number of functions namely one - data capture (capturing data and converting it in a form which can be stored or transmitted), two – data storage (storing it on media for later retrieval), three – data transmission (transmission data from one place to other), four – data processing (conversion of data into meaningful information) five –
data manipulation (creating new information from the existing information), six – data retrieval (finding out the needed information which may be used by a user and seven – the data display (presenting the information to the user in the form liked by him).

Development of Information Technology

The post industrial period has brought considerable advances and innovations in technology. As a result of this many new interdisciplinary fields have emerged. Information technology is one of them. Information technology is a recent and comprehensive term, which describes the whole range of processes for the acquisition, storage, transmission, retrieval and processing of vocal, pictorial, textual and numeric information. It encompasses information sciences, systems theory, computing, microelectronics, ergonomics, behavioral sciences, organization and research methods and techniques.

Development in information technology is so fast that a new technology emerges before the old technology in fully assimilated for commercial use. Contemporary development in information technology can be seen in the context of increasing computing power, decreased hardware size, fast information communication and increased user friendliness.

Development of computers have passed through first generation (1947 to 1957) to second generation (1957 to 1963) to third generation (1964 to 1979) to fourth generation (1980 to 1999) and to fifth generation (2000 onwards). There has been drastic changes in storage cycle time, storage capacity, number of data transfer channels, number of independent programmes and real time processing capabilities. This has made possible only through improved versions of devices used to perform these functions. Development of devices have contributed in providing cutting edge to information technology and may be classified under the following components of information technology –

Hardware

Computer Systems
The computers operate by counting. They express all quantities
in numbers. They count discretely as compared to measuring continuously. Digital computers are far more in use today than the analog computers. A computer goes through four basic operations

i) Input operation in which the data are entered or otherwise captured electronically and converted to a form that can be understood by the computer;

ii) Processing operation in which the data thus entered are processed or manipulated suitably for retrieval;

iii) Output operation in which the data thus processed or manipulated is produced in a form usable by the end-users; and

iv) Secondary storage operation in which the data and programs are stored in computer-processable form.

Often these four operations occur so quickly that they seem to be happening simultaneously. To these four operations, communications operation can be added as an extension capability of the computer. Communications capability of the computer helps to occur any or all of the above four operations at remote places and transmit the data from one computer to another.

Depending upon their application, digital computers are classified as: *Special purpose computers* - to perform specific tasks. *General purpose computers* - to perform variety of tasks. Modern computers used in offices, libraries, institutions, organizations, commercial bodies are the general purpose computers. Based on the storage capacity and the processing speed, the general purpose computers are further classified as – Microcomputers, Minicomputers, Mainframe computers and Super computers. *Microcomputers* are the smaller range of computers. They are usually designed for personal use and hence are widely known as personal computers (PCs). Microcomputers use microprocessors to perform arithmetic/logic operations and to control input/output operations. *Minicomputers* are medium sized computers, and are more powerful and costly than the
microcomputers. They are designed to serve multiple users at a time. They are very suitable for data processing work. Mainframe computers are very powerful and perform faster. They can support a large number of terminals and can be used as the central host computers in distributed data processing systems. Super computers have very large storage capacity and very fast computing speed, which may be at 100 million operations per second. They are used for large scale work in engineering and scientific fields.

Hardware categories

The machinery or equipment component of the computer system is referred to as its hardware. The physical components of the system which we generally see, feel and touch belong to its hardware. Although specific systems differ, certain basic components exist in all computer systems. According to the operations they perform, the hardware components are categorized as follows:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Devices/components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input hardware</td>
<td>Keyboard, Mouse, Scanners</td>
</tr>
<tr>
<td>Processing and memory</td>
<td>CPU (the Processor), RAM</td>
</tr>
<tr>
<td>Hardware</td>
<td>(Primary storage)</td>
</tr>
<tr>
<td>Output hardware</td>
<td>Monitor, Printers, Sound/audio system</td>
</tr>
<tr>
<td>Secondary storage hardware</td>
<td>Diskette (or floppy disk) Hard disk, Magnetic tape, Optical disk (CD-ROM)</td>
</tr>
<tr>
<td>Communications hardware</td>
<td>Modem</td>
</tr>
</tbody>
</table>

An input device is a peripheral device through which data are entered and transformed into computer-readable form. The input data can be words, symbols or numerals, but the computer-readable form consists of 0s and 1s or off and on electrical signals respectively. The input data can be
entered through the keyboard (keyboard entry), or directly from the source (source data entry) or through Pointing devices or Scanning devices or Magnetic-stripe cards or Smart and optical cards or Voice recognition devices or other input devices such as audio/video input devices, Digital cameras and Sensors.

The data that are entered into the computer by the input devices, are processed by its processing and memory unit. The computer is classified based on the size of its processing unit. The larger the processing unit, the greater it's processing power. The processing unit of the microcomputer is known as the microprocessor. The Central Processing Unit or CPU is the brain of a computer. Its primary function is to execute programs. It manipulates the data by following the instructions of the software. Brief descriptions of the components of CPU are given below:

The Control Unit directs and coordinates the operational activities of the computer. Arithmetic / Logic Unit performs all the arithmetic and logic operations of the computer. Main Memory is the working storage of the computer system. It has three main functions, namely, it holds data for processing, it holds the necessary instructions (programs), and it holds the processed data before it is sent to an output or secondary storage device. Registers are special temporary storage location, within the CPU, which very quickly accept, store and transfer data and instructions. Bus is an electrical pathway through which the bits are transmitted between the components within the computer system.

Main Memory Units are storing devices and essential components of a digital computer. It stores programs, data, results etc. Three kinds of memory are commonly used in modern computers. They are Semiconductor memory; Magnetic memory and Optical memory. The main memory or the primary memory of the microcomputers employs semiconductor memory or magnetic memory as secondary or auxiliary memory. The CPU communicates directly with the main
memory. The data which are not processed currently by the CPU are kept in the secondary memory only to be transferred to the main memory at the time of processing. Semiconductor memories are of two types: RAM (Random Access Memory) and ROM (Read only Memory).

RAM (Random Access Memory) is usually referred to as read and write memory (R/W memory) of the computer. It permits the users to write data on it and also to read data from it. The writing and reading, both can be done at random. But, it is very much volatile and temporary in nature. ROM (Read Only Memory) facilitates the reading facility only. Data cannot be written by the user on ROM. It is nonvolatile and permanent. The data recorded on it is not lost even if the power supply goes off. PROM (Programmable ROM) chips are user oriented ROMs, i.e. the users can decide what contents are to be recorded in them. But once recorded, the data becomes permanent and can only be read and cannot be rewritten again. EPROM (Erasable Programmable ROM) chips are similar to PROM chips with only one difference that the data stored in the EPROM chips can be erased, if necessary, by exposing it to high intensity short wave ultraviolet light for about 20 minutes. EPROMs are cheap, reliable and are widely used to store programs which are permanent but need updating. EEPROM (Electrically Erasable Programmable ROM) chip can be erased and reprogrammed electrically without removing it out of the computer. Flash Memory is a special type of EEPROM which can be erased and reprogrammed in block instead of one byte at a time.

Output Device is a peripheral device which receives information from the computer, transforms it into a usable form and communicates to either the user or to another machine for further transmission. In the later case the output unit may be in a form which can be used as input to other devices, equipments, machines, etc.. Hardcopy refers to printed output like printouts
on paper, microfilm, microfiche etc. Hardcopy devices are printers and plotters. Softcopy refers to information displayed on screen, or in audio or voice form. Display screens or monitors or CRTs (Cathode-Ray Tube) or simply screens, are output devices that display the data at the time of input as well as the data after processing them according to programming instructions. Flat-Panel Displays are thin, weight less and consume less power in comparison to CRTs. Liquid Crystal Display (LCD) does not emit light; images lack contrast, no colour capability and the images not as good as those of a CRT. Electroluminous Display (ELD) are used for clear images and good for graphic display. It emits light and possesses colour capabilities. The images by Gas plasma Display (GPD) are clear, bright upto the standard of CRT, only in single colour (reddish orange) and lacks good contrast. Audio-video output devices, include voice devices and sound (music) devices. Voice output devices are relatively new and can be used in some situations where the users (example: Blind users) cannot take advantage of display screens. These devices convert digital data into speech-like sounds. On the other hand sound devices produce digital sounds, or music. The audio-video devices are extensively used in multimedia systems.

Printers are hardcopy output devices that print characters, symbols and sometimes graphics on paper. Printers used with computers are classified as Character Printers (print one character of the text at a time, low speed printers, examples are dot matrix printers, ink-jet printers), Line Printers (print one line of the text at a time, examples are drum printers, chain printers and band printers) and Page Printers (print one page of the text at a time, speed of printing is moderate, capable of high quality printing example is Laser Printer).

Secondary Storage consists of devices that store data and programs permanently on a tape or a disk. Secondary storage is nonvolatile i.e. the data and programs once recorded remain intact even if the power is turned off. The most popular secondary storage devices are Magnetic tapes, Magnetic disks or diskettes, Hard disks and Optical disks. The
following types of optical disks are used with computers: CD-ROM, CD-Plus, CD-R, WORM, Erasable Optical disk and DVD.

Communications Hardware

Modem are the most common type of communication processors. A modem, stands for Modulator/demodulator, is a device which converts digital signals from the computer and on the other side of communication the modem receives the data. The modems can be built-in with the computer system (internal modems) or can be kept separately and connected to the computer with cables (external modems).

Electronic media

Electronic information is stored in electronic documents or media meant for electronic publishing. The most popular electronic media are Compact Disc Read Only Memory (CD-ROM) is a permanent optical based storage medium for the storage and distribution of large volumes of computerised information. CD-ROM has tremendous storage capacity, long shelf-life, effective medium for backup and archival of data. Almost all publishing products such as full texts, abstracts, catalogues, directories etc. are now available in CD-ROM. Digital Versatile Disk(DVD) has a capacity of packing seven times data onto the same surface that of the CD-ROM. DVD has a great potentiality for storage and distribution of large amount of data in electronic form. Multimedia is integration of text, graphics, audio, video and animation on a single hardware platform. A multimedia computer system, known as Multimedia PC or MPC, is a powerful PC with graphic processor, sound card, video picture card, CD-ROM drive and a set of sound blasters. Several reference sources such as dictionaries, encyclopedias, directories, industrial year books and so on are now available in multimedia formats.

Internet and Web Publishing is the latest and the most widely used electronic media for storing, exchange and distribution of information in electronic form. Internet is a world wide network of networks
which connects the computer systems, local as well as remote, by employing sophisticated telecommunication technology and common language among them. It facilitates downloading and printing of information to the local computers from remote computers. The web is the most widely used navigational tool on the Internet, which helps the users to access hundreds of sites all over the globe without even knowing their addresses or locations. The documents are stored in files in these sites and are known as web pages or homepages. The main products of electronic publishing are electronic books, electronic journals, electronic databases and electronic articles or working papers. The most resembling form of Electronic Book is the CD-ROM since it cannot be erased, rewritten and can hold large volume of data. Electronic Journal is a serial, produced, published and distributed in electronic media. Electronic Databases are used for information retrieval purposes.

The use of Internet further enhances the quality of information dissemination because it is global in scope, informative and participative in nature. Therefore, information can be communicated through any one of the three available media, the only problem is to choose the right medium for providing the right information to the right user.

Operating Systems

An operating system is a set of programs that controls and supervises a computer system's hardware, peripherals, memory units and provides service to the computer users. The basic tasks of the computer are automatically controlled by the operating system. It recognizes the input commands of the user from the keyboard or clicking of the mouse, activates and controls the CPU, hard disks, and other memory devices, keeps track of directories and files on the disks, sends. signals to the display screens, and controls other peripheral devices such as disk drivers and printers. As a whole an operating system is a collection of programs that controls the overall
operation of a computer. Operating systems vary in complexity and size. Their complexity depends on the computer system's size and scope, together with the type of performance provided to the users. Different sizes and makes of computers have their own operating systems. They are usually supplied by the manufacturer when the computer systems are purchased. Software written for one operating system would not run on another operating system. The operating system manages all the tasks that are performed by the computer. Based on the nature of the tasks managed by the operating systems, they are variously known as multitasking, multiprogramming, time-sharing and multiprocessing systems.

Operating systems can be divided into Batch Systems (the data are collected over several days or weeks in a transaction file and then processed all at one time, as a 'batch' against a master file), Multitasking (executes two or more programs concurrently on the same computer with one CPU), Multiprogramming (concurrent execution of two or more programs on a multi-user operating system), Time sharing (accomplishes direct access to a computer's CPU a number of independent users) and Multiprocessing (involves simultaneous processing of two or more programs by more than one computer at a time).

Some important operating systems are DOS (Disk Operating System), OS/2 (Operating System/2), Macintosh Operating System (MacOS), UNIX and XENIX, LINUX, WINDOWS and Windows NT.

Software

Application software is the software that can perform useful work for the users as desired by them. It is a set of programs designed to meet the specific requirements of the users. It helps the users to work faster with efficiency increasing his/her productivity. Application software can be categorized into four types - Entertainment Software, Educational and Reference software and Productivity software. Productivity Software further classified into (Word processing software, Spreadsheet software, Database
software, Graphics software, Communications software, Integrated software packages, Groupware software, Specialized software). There are thousands of specialized programs or tools available for specific tasks. Some of the most popular tools are - Desktop publishing, Computer - aided design, Personal finance, Painting and drawing, Project management, Hypertext etc..

Some of the most important application software packages are described in the following paragraphs.

Word Processing is the software that performs the word processing task. A word processing package (or program) is the software which is used to format, create, edit, print, store and retrieve text material. The text material may be letters, reports, notes, theses, books, invoices, projects or anything else Word processors facilitate faster production of documents as compared to traditional typewriters. Word processors have several text manipulating features. The basic features common to all word processing packages are - Formatting documents, Creating documents, Editing texts, Printing texts and Saving documents.

**Spreadsheet** is a simple worksheet comprising of rows and columns, where any data can be entered. When a computer prepares a spreadsheet it is known as electronic spreadsheet. Electronic spreadsheets, often simply called as spreadsheets are useful tools for large tabulated computations and data analysis. The main functions of spreadsheets are - Present quantitative data in tabular form i.e. in rows and columns, perform simple and statistical calculations, automatically present the result of recalculated data when any change is brought to the existing data, helpful in creating budgets, financial reports, forecast cash needs,- etc., help in determining relationships between two or more sets of data facilitate graphical presentations.

Presentation is a tool which helps us to create eye-catching slides. The slides can be displayed electronically (using a computer), or in
standard 35mm format (using a slide projector), or printed on overhead transparencies or paper. It also helps to bring out printed handouts for presenting a lecture and create notes to be used as references for effective and authentic presentation. Powerpoint has five views, each has a different way of looking at things, Slide view, Outline view, Slide sorter view, Notes page view and Slide show.

Data Communication system, data are propagated from one point to another by means of electrical signals. These electrical signals can be analog or digital in nature. In the initial days of broadcasting and communications, even upto 1950 the communication was purely analog in nature. An analog signal is a continuously varying electromagnetic wave that may be propagated over a variety of media. Voice and video, which have continuously varying patterns of intensity, are examples of analog data. The output of a computer is a pattern of 0s and 1s. Data Communication networks can be classified under the following heads. LAN (Local Area Network) and WAN (Wide Area Network).

Local Area Network (LAN) is a high-speed, fault tolerant data network that covers a relatively small geographic area. It typically connect workstations, personal computers, printers, and other devices. LANs offer computer user many advantages, including resource sharing, data sharing and communications between users via electronic mail and other applications. The way the computers are physically connected is called the network topology. There are three common LAN topologies: Bus, Ring and Star. Network Components apart from other devices provide the connection to a network. i.e. the wire, the port and the network software. When making the connection between two or more computers, there must be three links in the chain. They are - Network Software, Network Card and Network Cable.

Wide Area Network (WAN) basically defines a situation wherein two or more computers (or c equipment) placed at different locations, separated by a distance, communicate with each other. The
distance is logically connected by a medium, either telephone cables or simply space or ether. Computers operate on digital signals whereas the telephone network operates on analog signals. INET is a packet-switched public data network under the control of the Department of Telecom (DOT), VSAT (Very Small Aperture Terminal) is an acronym for Very Small Aperture Terminal. As the name suggests, these terminals have very small antenna (intelligent earth station) connected to the geosynchronous satellite suitable for supporting two ways, telecommunication and information, services such as voice, data and video. First the terminal requests the hub earth station for a channel to be assigned for transmission. And only after the Hub acknowledges the electronic request, which is in the form of a short signal burst, does the terminal starts transmitting. A VSAT network offers following major advantages are - Reliable network performance, High network availability, Modular and easy growth of network, Network access to/from remote parts of the country irrespective of available communication infrastructure support, Cost effective network, Simple to operate, maintain, monitor and control. Essentially there exists two kinds of VSAT Networks etc.. ISDN (Integrated Services Digital Network) is an acronym for Integrated Services Digital Network. It is just what each of the alphabets stands for - a Network that offers Integrated services such as voice, data, taxes, and video transmission all on the same line, over digital lines. "Integrated Services" ISDN lines can allow all of Voce/data/video transmission simultaneously. "Digital" Since all transmission is digital, there is very little noise distortion, of the signals. "Network" Mostly available as Public network--, run by the local telecom authorities. The important difference between old PSTN and ISDN is that the network is digital in nature. also by definition. it is a dial-up network, so payment is dependent on usage like STD/ISD, This is ideal for low traffic volumes that do not warrant a leased circuit. The most common application on ISDN is videoconferencing. Otherwise it is also used
for transmission of data/image/voice - all at the same time with multiple device connected on the line.

**FTP (File Transfer Protocol)** It is an upper layer protocol and functions at the top three layer of OSI model i.e. session layer, presentation layer and application layer. It is used for file transfer between imemnetwork nodes, It enables the users to log on the remote computers and Provides session administration, connection management, message translation and file syntax and file transfer services between dissimilar hosts.

**Online Chat** can to any kind of communication over the Internet, but is primarily meant to refer to direct one-on-one chat or text-based group chat (formally also known as synchronous conferencing), using tools such as instant messengers, Internet Relay Chat, talkers and possibly MUDs. The expression online chat comes from the word chat which means "informal conversation".

A **NEWSGROUP** is a discussion about a particular subject consisting of notes written to a central Internet site and redistributed through Usenet, a worldwide network of news discussion groups. Usenet uses the Network News Transfer Protocol (NNTP).

Newsgroups are organized into subject hierarchies, with the first few letters of the newsgroup name indicating the major subject category and sub-categories represented by a subtopic name. Many subjects have multiple levels of subtopics. Some major subject categories are: news, rec (recreation), soc (society), sci (science), comp (computers), and so forth (there are many more). Users can post to existing newsgroups, respond to previous posts, and create new newsgroups.

Newcomers to newsgroups are requested to learn basic Usenet netiquette and to get familiar with a newsgroup before posting to it. A frequently-asked questions is provided. The rules can be found when you start to enter the Usenet through your browser or an online service. You can subscribe to the postings on a particular newsgroup.

**GOPHER** is a software tool that connects a variety of computers and
information database on the Internet and displays them as a series of menu items. Gopher servers accept simple query and send the clients a document or a list of document.

**WORLD WIDE WEB (WWW)** is a client-server based distributed hypertext multimedia information system on the internet. It was originally developed at the European Particle Physics Laboratory (CERN), Geneva. It has now become the most popular navigation tool on the Internet. Just as one can access Gopher space through a gopher server or client, one can access the WWW through 'browser'.

**INTERNET** technology. Describes a few of the features of Internet and Intranet. Lists the implications of these technologies. Concludes by saying that Internet/intranet technology has valuable scope in updating, management of information and it would improve the traditional information storage and retrieval devices.

The use of computer and its networking, in the libraries, is enviable with present pace of information exchange the world over. No doubt, the application of computer and telecommunication technology has greatly influenced the teaching and research community to get access to information irrespective of, time, space and cost factors. The global networking of libraries has dramatically changed the old concept of library of new information society. By using these, the information storage and retrieval mechanism has now become much faster and specific compared to manual card system. The application of computers and networking technologies has not only improved the efficiency of library services but also solved the present existing information storage and retrieval problem to a large extent.

Among all networking technologies, the internet technology is most useful and economically viable in the era of present communication system. The term "Internet" comes from a concept called inter-networking, that denotes interaction between networks of computers. It is a vast collection of large and small interconnected networks extending all
the way across the world. The Internet world wide web (www, w3 or web) is, therefore, a vast electronic library made-up of millions of pages of information stored in hundreds of thousands of linked computers around the globe. It is basically a network of inter-connected computer systems spread throughout lengths and breaths of globe and which is largest network of computers in the world providing major information services. Thus, information Supply highway enables the following: User from any part of the world can connect or access information, irrespective of time and space factors. The major feature of web are powerful and flexible underline protocol which are able to carry multimedia data and the ready availability of in expensive user-friendly wch hypertext browsers. Browsers are user "Interface programmes"" capable of presenting "Web pages" (The collection of information transmitted at one time for display and interaction on screen on different kinds of computer system. The web of its browser, can support on line Services, e.g. Information retrieval handling, in library with layout images. sound and video, Hypertext, Forms completion, E-mail. Rapid integration with other application etc.,

INTRANET technology is concerned, it is an external web site which utilizes widely available internet technology to enhance the efficiency of internal resources sharing and retrieval of information. Due to explosion of knowledge and multiple categories of information sending the emergence of this technology is must and it can dramatically reduces the cost and time of content development, duplication distribution and usage of information. In library, intranet technology would be of immense use in streamlining the different job oriented work (Systems) into a single information architecture and cost rendered for unit system can -easily be shared. Documents can be created, distributed, retrieved and presented irrespective of any user system on any computer where the relevant documents file has been created e.g. Documents created on UNIX system can now be easily available on WINDOWS operating, system. An intranet facility provides up-to-date access to a wide spectrum of information to end users speedily
and timely.

In context to library, intranet technology may provide the access to information available in different user systems timely within Journal, Advances, Reports, Manuals, Catalogues, directories, reference guide books, statistical data, bulletins, patent information, proceedings, Newspaper, News letter etc. easily accessed through single user system. In future, Internet facilities would provide a new dimension to library state-of-the-art particularly information retrieval handling. This would solve easy excess to information available in different user system. Likewise different libraries available in different operating systems or any software can easily be approached through intranet facilities. This minimizes the cost and time factors for retrieval of information/documents. The various implications of Internet/Intranet technology in reference to library services are- It would allow in PC user to flip and browse each document page by page electronically, It would facilitate users to scan each documents/files irrespective of space, time and minimum cost factors, It will allow users to go through single document to multifaceted documents available in any category of library/organization, It will make easy to formulate queries or place orders of any users on any computer, It allows users of any library to get print of documents e.g. Book, Journals, Newspapers etc. by using www and provides e-mail, Radio, TV, telephone etc. facilities also, It is more democratic, cheap and reliable to access of information, It allows individual library to browse world wide collection of multi libraries, It solves the problem of inter-library loan services, It would be useful in providing latest reference and referral services, SDI, CAS etc. speedily and timely, It would also control over the duplication of research work (Thesis) and Publication of books and journals economically, It would provide teleconferencing facility to till libraries and institutions, It reduces the cost rendered for creation of documents through intranet facilities, It cuts down on training time, It provides easy access to current information, It allows different user system into a single information
architecture and Multi category information created on different users profile can now be easily accessed. The internet/intranet technology has valuable scope in updating, in., Management of information and it would improve the traditional information storage and retrieval process.

Wireless Application Protocol (commonly referred to as WAP) is an open international standard for application-layer network communications in a wireless-communication environment. Most use of WAP involves accessing the mobile web from a mobile phone or from a PDA.

A WAP browser provides all of the basic services of a computer-based web browser but simplified to operate within the restrictions of a mobile phone, such as its smaller view screen. Users can connect to WAP sites: websites written in, or dynamically converted to, WML (Wireless Markup Language) and accessed via the WAP browser.

Before the introduction of WAP, service providers had extremely limited opportunities to offer interactive data services, but needed interactivity to support now-commonplace activities such as: Email by mobile phone, Tracking of stock-market prices, Sports results, News headlines, Music downloads etc..

E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. (Some publications spell it email; we prefer the currently more established spelling of e-mail.) E-mail messages are usually encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams. E-mail was one of the first uses of the Internet and is still the most popular use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between online service provider users and in networks other than the Internet, both public and private.

E-mail can be distributed to lists of people as well as to individuals. A shared distribution list can be managed by using an e-mail reflector. Some mailing lists allow you to subscribe by sending a request to the mailing list
administrator. A mailing list that is administered automatically is called a list server.

E-mail is one of the protocols included with the Transport Control Protocol/Internet Protocol (TCP/IP) suite of protocols. A popular protocol for sending e-mail is Simple Mail Transfer Protocol and a popular protocol for receiving it is POP3. Both Netscape and Microsoft include an e-mail utility with their Web browsers.

Voicemail (or voice mail, voice-mail, vmail or VMS, some times called messagebank), is a centralized system of managing telephone messages for a large group of people. The term is also used more broadly, to denote any system of conveying voice message including the answering machine.

Fax (short for facsimile, from Latin fac simile, "make similar", i.e. "make a copy") is a telecommunications technology used to transfer copies (facsimiles) of documents, especially using affordable devices operating over the telephone network. The word telefax, short for telefacsimile, for "make a copy at a distance", is also used as a synonym. Although fax is not an acronym (as it is abbreviated from facsimile), it is often written as "FAX". The device is also known as a telecopier in certain industries. When sending documents to people at large distances, faxes have a distinct advantage over postal mail in that the delivery is nearly instantaneous, yet its disadvantages in quality have relegated it to a position beneath email as the prevailing form of electronic document transfer except where the legal status of a sent fax and its accompanying sending report are desired.

**VIDEO-CONFERENCING** is very costly affair because it requires a special room and very expensive equipment for every participant at their respective sites. On the other hand video-conferencing over Intranet requires a desktop, a camera and a microphone at its respective sites. This attempt of video-conferencing through Intranet saves a huge cost.

**MULTIMEDIA** concept of multimedia is not new. We, as human beings, can hear, speak, write, draw, make gestures, play music and act out our thoughts and feelings to one another. The integration of these media into
the computer provides additional possibilities for the use of computational power currently available in the form of multimedia. Multimedia is an Information technology product of 1990's which integrates text, sound, images, three dimensional objects and animations into one form document. Etymologically the term 'Multimedia' is a combination of two words i.e. multi [Latin much' mean" many, much, multiple and medium (Latin : Middle, Means) means an intervening substance through which something is transmitted or carried on. The medium through which the transmission of information is carried out can be a text, graphics, speech, music, image or animation. is any combination of text, graphic art, sound, animation and video transmitted by the computer or other electronic means to, its uses. Multimedia Systems denote those computers which have the capability to handle audio, video and graphical information in addition to the text, all at the same time in an integrated manner. Multimedia Libraries denote those libraries having a collection of information in the variety of forms ranging from printed books is electronic publications and video tapes to motion pictures (Singh & Dabas, 1997). Thus the connotation of the term multimedia is varied nature and means differently in different situations. Components of the multimedia system every file containing different information is an 'object'. The files are text files, image files audio files, digital video, animation files, sound tracks and application software programmes. All these files are linked to each other. The essential components of the multimedia system are briefly mentioned below. Text, Graphics / Images, Video / animations, Audio / Sound, 2D and 3D objects and Object Linking and Embedding (OLE). The most important areas where multimedia technology finds its applications are - Presentation of products and services, Information System, Entertainment, Creative arts and cultural informatics, Education including professional drawing, Medical applications, Business and industry etc..

Bulletin Board is a medium for posting messages and announcements to a community of on-line users and to discuss topics of common interest. A central computer stores data, in an organized way and transmits them to the users The user need to have a personal
computer and modem connected to the telephone line which allows transmission of computer generated text and data to and from the bulletin boards.

The developments in the data communication techniques during the past few decades have been so enormous that it has made drastic changes in the information scenario of the present world. The numerous data communication systems and networks set up on a global level enable information to get transmitted freely over space and it is forecasted that the cyber space an imaginary computer generated landscape where one can see the three-dimensional representation of all the information stored in the human/computer systems, which Wilharn Gibson has used as setting for some of his science fictions is coming to reality.

Text mining, sometimes alternately referred to as text data mining, roughly equivalent to text analytics, refers generally to the process of deriving high-quality information from text. High-quality information is typically derived through the divining of patterns and trends through means such as statistical pattern learning. Text mining usually involves the process of structuring the input text (usually parsing, along with the addition of some derived linguistic features and the removal of others, and subsequent insertion into a database), deriving patterns within the structured data, and finally evaluation and interpretation of the output. 'High quality' in text mining usually refers to some combination of relevance, novelty, and interestingness. Typical text mining tasks include text categorization, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summarization, and entity relation modeling (i.e., learning relations between named entities).

Images can be displayed as maps along with other spatial data containing map features. Image data offers a quick way to get spatial data for a large area and is more cost- and time-effective than trying to collect layers of data like buildings, roads, lakes, etc., one at a time. However, image data is one file, or layer, so you can not break down the different components and attach data to them separately. Image data is the best choice if you
need to add a point of reference to vector data without attaching additional information.

Images can also be attributes of map features. In other words, you can add images to other map features so that clicking on the feature would display the image. For example, you might have a map of California with cities. By clicking on the point that is the City of San Francisco, you open up an image of San Francisco.

Almost any document or photograph can be scanned and stored as an attribute in a GIS database. Photos of houses for sale can be linked to a real estate map, field data forms can be linked to sample sites, and scanned permits can be linked to building sites.

Audio data comes in a sometimes bewildering variety of forms. The number of fundamental ways in which sound can be represented is actually fairly small. The variety of audio file types is due to the fact that there are quite a few approaches to compressing audio data and a number of different ways of packaging the data. We first describe how the audio data itself is represented, then how it is packaged into files. People often speak of audio formats sloppily without distinguishing between data formats and file formats, but it is critical to keep this distinction in mind as many file formats can contain date represented in more than one way and most data representations can be packaged in more than one file format. Saying that a sound file is a ".wav" file says nothing about the audio data format. Similarly, saying that a file contains PCM data says nothing about the file format.

Knowledge Management System

According to T. Beckman "Knowledge is reasoning about information and data to actively enable performance, problem solving, decision making, learning and teaching". According to K. Wiig "Knowledge Management is the systematic, explicit and deliberate billing, renewal and application of knowledge to maximize an organization knowledge related effectiveness and returns from its knowledge assets". Knowledge management provides a source of
competitive advantage and acts as the driver for growth. Knowledge management focuses on knowledge as a crucial factor and consists of activities that aim at optimal use and development of knowledge. There are several media in which knowledge can reside: human mind, organization, document and computer. Knowledge in the human mind is often difficult to access, organizational knowledge is often diffused and distributed, document knowledge can range from free text to well structured charts and tables; computer knowledge is formalized, shareable and often well structured and well organized. The dimension of knowledge accessibility is in three stages, Tacit (Human mind, organization), Implicit (Human mind, organization) and Explicit (Document, Computer).

**Expert System**

Expert systems contain knowledge about any specialized area which enables a user to formulate such profiles and obtain relevant information by using an interface engine. The term "expert system" conjures up an image of a tireless robot-like device with vast expertise-a mechanical mind that could replace our best minds and perform the same tasks more rapidly, accurately and for less cost than its human counterparts. Expert Systems are knowledge based computerized system which play a role of intelligent interface or gateway for providing access to databases and to obtain relevant information. According to Encyclopedia of Library and information science - Expert Systems use specialized knowledge about a particular problem area rather than just general purpose knowledge that would apply to all problems, use symbolic reasoning rather than just numerical calculations, and perform at a level of competence that is better than that of non-expert humans. Expert systems can be categorized as Autonomous expert systems which operate autonomously without any human intervention and Knowledge based expert systems which contain a set of assertions that explain certain facts and that a particular relationship exists. The knowledge that is incorporated into
an expert system is elicited from the human expert by a ‘knowledge engineer’ using various interviewing and observation techniques. The inference engine or rule interpreter is the control structures operate on the knowledge base and determines which rule comes first. The solutions, which an expert system gives is in the form of menus, graphics, etc. Present day expert systems are not able to accept natural language from users, but the language, they will use for processing is very much user-friendly. An expert system must have knowledge of its domain before it can work effectively. It not only needs access to domain knowledge, but it needs that knowledge represented in a manner that is amenable to reasoning. Expert systems are intended as aids to decision making in areas where human expertise may be expensive scarce, being lost or needed in several places at once. However, the expert system cannot indicate whether their knowledge is reliable or not, and the advice may are providing is based on sound principles or not. The broad areas where expert systems can be utilized are preservation of the expert knowledge of employees, avoidance of the cost of recruiting new experts by using the knowledge stored in the expert system to solve certain problems at least for a short duration and dissemination of expert knowledge whenever it is required.

Management Information System (MIS)

Dr. Janardan Jha in MITE’s Management Information System defines MIS as computer-based system that provides managers with the tools for organizing, evaluating and efficiently running their departments. In order to provide past, present and prediction information, an MIS can include software that helps in decision making, data resources such as databases, the hardware resources of a system, decision support systems, people management and project management applications, and any computerized processes that enable the department to run efficiently.

It can be defined as a system that:
1. Provides information to support managerial functions like planning, organizing, directing, controlling;

2. Collects information in a systematic and a routine manner which is in accordance with a well defined set of rule and

3. Includes files, hardware, software and operations research models of processing, storing, retrieving and transmitting information to the users.

Objectives of MIS

The objectives of Management Information System are as follows:

1. To facilitate the decision-making process by furnishing information in the proper time frame;

2. To provide requisite information at each level of management to carry out their functions;

3. To help in highlighting the critical factors to the closely monitored functioning of organizations;

4. To support decision-making in both structured and unstructured problem environments and

5. To provide a system of people, computers, procedures, interactive query facilities, and documents for collecting, storing, retrieving and transmitting information to users.

Characteristics of MIS

MIS has four major characteristics. They are as follows

1. It is Management oriented

2. It is management directed

3. It leads to integration of information of all information.

4. Follows common data flows

Decision Support Systems

The term, DSS refers to a class of systems, which supports the process of decision making. The emphasis is on support rather than automation of
decisions. DSS allows the decision maker to retrieve data and test alternative solutions during the process of problem solving.

DSS has following Characteristics:

1. It helps the decision maker in decision-making process;
2. It is designed to solve semi-structured and unstructured problems;
3. It supports decision makers at all levels, but is most effective at the tactical and strategic levels;
4. It makes general-purpose models, simulation capabilities and other analytical tools available to the decision maker;
5. It is an interactive, user-friendly system that can be used by the decision maker with little or no assistance from MIS professionals;
6. It can be readily adapted to meet the information requirements for any decision environment;
7. It provides the mechanisms to enable a rapid response to decision-makers request for information;
8. It has the capability to interface with the corporate database;
9. It is not executed in accordance with pre-established production schedule;
10. It is flexible enough to accommodate a variety of management styles and
11. It facilitates communication between levels of decision-making.

Types of DSS:

Decision Support System can be classified into following five types

1. Status Enquiry System
2. Data Analysis Systems
3. Information Analysis Systems
4. Accounting Systems
5. Model Based Systems
E-Commerce

Electronic Commerce, commonly known as (electronic marketing) e-commerce or eCommerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. The use of commerce is conducted in this way, spurring and drawing on innovations in electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at some point in the transaction's lifecycle, although it can encompass a wider range of technologies such as e-mail as well. Online retailers are sometimes known as e-tailers and online retail is sometimes known as e-tail. Almost all big retailers have electronic commerce presence on the World Wide Web. Electronic commerce that is conducted between businesses is referred to as business-to-business or B2B. B2B can be open to all interested parties (e.g. commodity exchange) or limited to specific, pre-qualified participants (private electronic market). Electronic commerce that is conducted between businesses and consumers, on the other hand, is referred to as business-to-consumer or B2C. Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of the business transactions. e-cash was a trademark of DigiCash, which went bankrupt in 1998, and was sold to eCash Technologies, which was acquired by InfoSpace in 2002.

e-education is constantly changing. The main changes in the last decades are: computers gaining omnipresence; a society diverse in culture, education, and socio-economic levels; a high skilled workforce needed in the majority of work places; a highly competitive business market; the appearance of new educational technologies; and decreasing students' interest to such traditionally prestigious subjects as physics,
math, and engineering. Learning is changing as well, especially the
technologies of learning. E-education (also known as e-learning and online
education) is the process of learning where computers are used at each
possible step of the process: enrollment, instruction design, content
delivery, evaluation, assessment and support. This mean that students
and teachers do not have to sit in the classroom but instead they learn
from anywhere in the world and in any time.

Adult e-education today is more popular than e-education for children.
Thousands of modern companies, universities and colleges have online
courses. It helps them distribute knowledge among learners in a broad and
rapid way. Examples of such online activities are emergency drills, new
company policies, knowledge about a new computer virus, etc. In addition,
e-education includes other examples such as lectures of important
speakers or courses about new company products.

However, e-education for children is not yet very popular today. There are
many online games, virtual laboratories, museum sites, virtual field trips,
etc. on the Internet. More systematical online activities include virtual
schools, college courses by separate subjects, or online tutorials.

e-advertising form of advertising that uses the Internet and World Wide
Web in order to deliver marketing messages and attract customers.
Examples of online advertising include contextual ads on search engine
results pages, banner ads, Rich Media Ads, Social network advertising,
online classified advertising, advertising networks and e-mail marketing,
including e-mail spam. The most common ways in which online advertising
is purchased are - CPM (Cost Per Impression), CPV (Cost Per Visitor) or
(Cost per View in the case of Pop Ups and Unders), CPC (Cost Per Click)
is also known as Pay per click (PPC), CPA (Cost Per Action) or (Cost Per
Acquisition) and CPE (Cost Per Engagement).

E-Banking means any user with a personal computer and a browser can
get connected to his bank's website to perform any of the virtual banking
functions. In internet banking system the bank has a centralized database
that is web-enabled. All the services that the bank has permitted on the
internet are displayed in menu. Any service can be selected and further interaction is dictated by the nature of service. The traditional branch model of bank is now giving place to an alternative delivery channels with ATM network. Once the branch offices of bank are interconnected through terrestrial or satellite links, there would be no physical identity for any branch. It would a borderless entity permitting anytime, anywhere and anyhow banking. The network which connects the various locations and gives connectivity to the central office within the organization is called intranet. These networks are limited to organizations for which they are set up. SWIFT is a live example of intranet application. Following services through E-Banking - Bill payment service, Fund transfer, Credit card customers, Railway pass, Investing through Internet banking, Recharging your prepaid phone, Shopping etc..

Indian IT Scenario

In a very short span of time, India's IT industry has earned global recognition and established itself as the fastest growth sector. The successor of Indian IT entrepreneurs and professionals, those in India as well as the ones working abroad have created a new wave of hope, excitement and self confidence among our talented young men and women.

The engine of growth of the booming Indian IT sector is the software industry, which has grown at an average annual rate of 60 per cent between 1992 and 1999. The Indian software industry, which today employs 1,60,000 professionals, has zoomed from a mare US$ 20 Million 10 years ago to whopping US$ 4 Billion in 1998-99, of which US$ 2.6 Billion was exported. The industry has clearly emerged as a major export earner for the country, contributing 8 per cent of total merchandise exports. It has also achieved world wide reputation for providing excellent quality; many local software firms have earned ISO 9000 as well as SEI – CMM certification. Five have reached level 5 (only nine firms world wide have reached this level). IT industry has achieved a compound annual growth rate of 25.5% in production and 43% in exports during 1994-98. Information technology accounted for 4% and Telecommunications and
Electronics accounted for 24.19% of the total foreign direct investment inflow between January, 1991 – December 1998. The total market capitalization of listed IT companies on 1st January 1999 was US$ 4 Billion and 21st February 2000 stood at US$ 63 Billion. The total market cap of listed Indian companies was US$ 99 Billion. India has achieved this feat by leveraging its most valuable resource: highly skilled manpower. The country today boasts of the second largest English speaking pool of scientific manpower in the world and graduates 70,000 computer professionals every year in addition to the graduates from the Indian Institute of Technology (IIT). Realising strategic importance of IT for the country, the Indian government has set itself on ambitious target of making India a global IT power and a key contributor to the world IT industry by 2008.

Advanced Technology Programme in Networking

Education and Research Network (ERNET) has been servicing the Indian academic and research community since 1990. Today, ERNET provides connectivity to over 750 organizations which represent a cross-section of universities, academic institutions, R&D laboratories, some NGOs and has over 80,000 users. It enjoys the reputation of being one of the most competitive networks and internet service provider in the country.

National Informatics Centre Computer Communication Network (NICNET) National Informatics Centre (NIC) of the Ministry of Information Technology is a premier organization in the field of informatics, services and information technology applications in India. Since its inception, NIC has been playing a pioneering role in propagating IT led development facilitating rapid economic growth and social information in India by setting up a country wide satellite based VSAT network (NIC NET), first of its kind among the developing countries linking about 640 District Administrations, 26 State Secretariats, and 7 NCT/UT Administrations.
Information Technology Act, 2000

The information technology Bill was introduced in Lok Sabha on 16 December, 1999 and was referred to the standing committee. The bill was passed by Parliament on 17 May, 2000.

The Changing Environment

Major change that has had an impact on the way Library managers work is the modern computer, and hence the technical push with the growth in the amount and production of technical and other documentation. One of the major events that has had a significant effect on the way librarians function and perform was the evolution of semiconductor technology and the development of the microcomputer in the mid 1970s. Fairly high powered machines became available at relatively low cost, even more significantly, the microcomputer signaled a basic revolution in the way we as humans perceived computers.

In parallel, there was another major development, the evolution of telecommunications and computer networking, which evolved from dedicated fixed connections to circuit switching, and then more recently to packet switching. The United States, for example, saw the evolution of the uses of networks from ARPAnet, which was used heavily by defence installations and research universities, to what we called NSFnet, which linked more universities to those networks, to the Internet, which includes a variety of institutions. In 1990, the concept of the National Research and Education Network evolved, which was supposed to link government agencies, government installations and research labs and academic and educational institutions, from K-12 through the university system. More recently, in 1992, the concept of NREN evolved to become the National Information Infrastructure and subsequently the global information infrastructure, which for the first time perceived a major role for the private sector in the development and evolution of the global network.

The power of these two converging technologies of increasingly more sophisticated and powerful computers at very reasonable prices, and the revolution of networks to include both wired and wireless network, as
remote mobile communications increases, offers opportunities that have never before been available, some of the ideas and thoughts that librarians had in the 1960s and 1970s and even in the early 1980s that were not feasible for implementations in the technology of the day now become much more realistic in terms of today’s technologies. The opportunities are there for us to take advantage of the technology.

Information Technology in Library and Information Centers

For introduction of IT in the domain of Library and Information Science the work situations are fast changing in library and information centered. In this new environment, the libraries irrespective of type and size have two types of holdings of books and non-book documents in their custody at any particular date or time, viz., (1) new coming books documents and (2) old books and non-book documents those are already procures, processed stored for retrieval.

The procurement, processing, storage and retrieval of that book and non-book documents were managed by library.
CHAPTER - ONE
INTRODUCTION

SECTION - TWO
Conceptual Framework of Management
CHAPTER - ONE

INTRODUCTION

SECTION - TWO

CONCEPTUAL FRAMEWORK OF MANAGEMENT

This section aims at providing brief description of Management in order to facilitate an understanding of the concepts and terms related to management and the changes and advancements that have occurred in it during the past period.

MANAGEMENT

Prof. L.M. Prasad says that one of the most important human activities is managing. Ever since people began forming groups to accomplish aims they could not achieve, as individuals managing has been essential to ensure the co-ordination of individual efforts. Management is the integrating force in all organised activity. Whenever, two or more people work together to attain a common objective, they have to co-ordinate their activity. They also have to organise and utilise their resources in such a way as to optimise the results, not only in business enterprises where costs and revenues can be ascertained accurately and objectively but also in commonwealth and service organisations such as government, hospitals, schools, clubs, etc.. Thus, management is not unique to business organisation but common to all kinds of social organisation.

Management has achieved an enviable importance in our times. It is the specific organ of all kinds of organisation since they all need to utilise their limited resources most efficiently and effectively for the achievement of their purposes. It is most vital for the successful performance of all kinds of organised social activities.

The emergence of management in our times may be regarded as a significant development as the advancement of modern technology. Although management as a discipline is more than 70 years old, there is no common agreement among its experts and practice near about its
precise definition. Change in management styles and practices have lead to changes in the management thought.

According to B.L. Fadia, management being inter disciplinary in nature, has undergone changes because of the developments in behavioural sciences, quantitative techniques, engineering and technology, etc.. Since it deals with the production and distribution of goods and services, dynamism of its environments such as social, cultural, and religious values, consumers, taste and preference, education and information explosion, demoralisation of government etc. have also led to changes in its theory and practice. The most commonly used concept of management, according to Harold Koontz and O'donnel is that managing involves getting things done through and with people. The role of professional managers has increased these days because of separation of ownership from management in case of corporate enterprise and growth of capital intensive techniques of production.

Management Functions

According to Prof. L.M. Prasad, management process suggests that all the managers in the organisation perform certain functions to get the things done by others. Since management process consists of different types of functions, different types of information systems are required for performing these functions. The term process refers to an identifiable flow of interrelated events moving towards some goal, purpose, or end. Flow implies movement through time and in the direction of a result. Interrelatedness implies interaction with in the process and between the events. Events are activities or happenings. Goal, purpose, or end implies some end result, consequence, or conclusion to be achieved by completing the process. The concept of process can be applied to any type system and depending on the nature of the system in which the process is applied. It can be static or dynamic. Since an organization in which context management is applied is a dynamic system, management process can be treated as dynamic in which events and interrelationships must be seen as dynamic, continuous and flexible and must be considered as a whole. Thus, management as a process involves a number of
activities and assumes that the totality of what managers do can be divided into set of interrelated activities. However, what activities comprise management process is not quite clear and precise and divergent views have been expressed on this. The list of functions is very long. However, this can be shortened by combining some functions into one. Thus, managerial functions may broadly be grouped into planning, organizing, staffing, directing and controlling. A brief discussion is given here about what each function includes.

1. **Planning** is the conscious determination of future course of action. This involves why an action, what action, how to take action, and when to take action, when to take action. Thus, planning includes determination of specific objectives, determining projects and programmes, setting policies and strategies, setting rules and procedures, and preparing budgets. Based on the futurity involved in the planning process, plans may be prepared for long-term period. Usually five years or more. Intermediate term usually 2-5 years, or short-term period usually for one year. Plans for these three periods are coordinated and a longer-term plan provides basis for shorter-term plan.

Indian libraries are at present faced with political, economic, social and ethical pressures. Prices and salaries are constantly rising but funds being scarce, planning becomes highly significant. In such a situation, planning helps to combat the uncertainties of the future and environmental changes. It provides directions for carrying out day to day operations of a library.

2. **Organizing** is the process of dividing work into convenient tasks or duties, grouping of such duties in the form of positions. Grouping of various positions into departments and sections, assigning duties to Individual positions and delegating authority to each position so that the work is carried out as planned. Organizing function can be viewed as a bridge connecting the conceptual ideas developed in planning and the specific means for accomplishing these ideas. Organizing function
contributes to the efficiency of the organization by ensuring that all necessary activities are performed and objectives are achieved.

There are a variety of patterns of organizations but none of them is able to meet all the situations satisfactorily. In the choice of a pattern, library objectives, building plan and structure and financial support are important factors. In India, the preference is for functional arrangement for central library of a system. In addition, university libraries have departmental libraries based on subjects.

3. **Staffing** involves manning the various positions created by the organizing process. It includes preparing inventory of personnel available and identifying the gap between manpower required and available, identifying the sources from where people will be selected, selecting people, training and developing them, fixing financial compensation, appraising them periodically etc.. There is a controversy whether staffing function is to be performed by all managers in the organization or it is to be handled by personnel department which looks after the personnel matters enumerated above. The controversy can be settled because staffing function is too complicated and time-consuming. To make it convenient. Some processes of staffing are completed by personnel department. In doing so. It facilitates the performance of staffing function by managers in the organization.

A manager should take a long range view of its staffing problems. He should be aware of sources of supply, growth pattern of staff, demands of growing information technology, etc.. He should possess skills such as staff planning, interviewing, etc. Every time he considers a vacancy, he should review structure of his organization, duties and responsibilities of the vacancy.

4. **Directing** means when people are available in the organization, they must know what they are expected to do in the organization. Superior managers fulfill this requirement by communicating to subordinates about their expected behaviour. Once subordinates are oriented, the superiors have continuous responsibility of guiding and leading them
for better work performance and motivating them to work with zeal and enthusiasm. Thus, directing includes communicating motivating and leading.

The role of a chief librarian and his senior staff is extremely important in developing successful human relations. They should be aware of staff problems and have understanding of the human relations. A library manager should have good knowledge about human psychology. He should treat his staff the way he would like to be treated if placed in their position.

5. **Controlling** involves identification of actual results, comparison of actual results with expected results as set by planning process, identification of deviation between the two, if any, and taking of corrective action so that actual results match with expected results. It brings to light all bottlenecks in work performance and operates as a straight pointer to the needs of the situation.

Managers perform various roles in order to carry out their functions and therefore different supporting information systems have been developed but these are not comprehensive. Similarly managers at different levels of an organization perform all managerial functions. The relative importance of these functions differs at different management levels. Consequently information systems required at different levels also differ. Table 1 presents the roles, functions, and required information systems at different levels of management.

Basic task in library management include the planning of acquisitions (which materials the library should acquire, by purchase or otherwise), library classification of acquired materials, preservation of materials (specially rare and fragile archival material such as manuscripts), the deaccessioning of materials, patron borrowing of materials, and developing and administering, library computer system. More long term issues include the planning of the construction of new libraries or extension to existing ones, and the development and implementation of
outreach services and reading enhancement services (such as adult literacy and children programming).

Table 1: Roles, Functions and Information Systems at Different Management Levels

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Management Level</th>
<th>Role</th>
<th>Nature of Functions</th>
<th>Information System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top</td>
<td>Strategic</td>
<td>Broad and creative</td>
<td>Strategic information system&lt;br&gt;Executive support systems.&lt;br&gt;Part of decision support systems and expert systems</td>
</tr>
<tr>
<td>2</td>
<td>Middle</td>
<td>Tactical</td>
<td>Somewhat broad and creative</td>
<td>Structured information system, decision support system.</td>
</tr>
<tr>
<td>3</td>
<td>Lower</td>
<td>Operational</td>
<td>Routine and detailed</td>
<td>Structured information systems, transaction processing systems.</td>
</tr>
</tbody>
</table>

Decision making is an indispensable component of management process. This is the reason why information systems designers have focused their maximum attention on designing systems that help managers communicate and distribute information for decision making.

The decision is a kind of choice of a desirable alternative. Decision making is a conscious process involving both individual and social phenomena based upon factual and value premises which concludes with a choice of one behavioural activity from among one or more alternatives with the intention of moving toward some desired state of affairs.

There are different ways in which decisions may be classified. One way of classifying these decisions is to group them into routine and non-routine. In another way, these decisions are classified as programmed and non-programmed. These are further classified as strategic and tactical or operational decisions. Strategic decisions are non-programmed and non-routine while tactical (also known as operational) decisions are mostly routine and programmed. Decision making involves selection of alternatives which is put into action and whose impact is known in future period. The future conditions for a decision vary along a continuum ranging from condition of perfect certainty to condition of complete uncertainty through conditions of risks. In each of these conditions,
knowledge of outcome of the decision differs. Table 2 presents the Managerial decisions, level of structuring and support systems

**Table 2: Managerial Decisions, Level of Structuring and Support Systems**

<table>
<thead>
<tr>
<th>Management level</th>
<th>Nature of decision</th>
<th>Level of structuring</th>
<th>Support systems required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Strategic</td>
<td>Low</td>
<td>Strategic information systems/Executive support systems/Expert systems</td>
</tr>
<tr>
<td>Lower</td>
<td>Operational</td>
<td>High</td>
<td>Transaction processing systems</td>
</tr>
</tbody>
</table>

Every decision is the outcome of a dynamic process which is influenced by multiple forces. Herbert Simon, an expert on decision making has proposed three phases of decision making- intelligence, design, and choice. Whereas, Rubenstei and Haberstroh have proposed five phases- recognition of problem or need for a decision, analysis and statement of alternatives, choice among the alternatives, communication and implementation of decision, and follow- up and feedback results of decision. Table 3 presents the summary of decision-making phases. Information requirement, and supporting information systems.

Decision making concepts have a number of implications both for designers and users of information systems to support decision making.

**Table 3: Decision-Making Phases, Information Required, and Supporting Information Systems**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Decision-making phase</th>
<th>Information, required</th>
<th>Supporting information system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intelligence</td>
<td>Exception reporting</td>
<td>Structured information system</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
<td>Specified and directed information</td>
<td>Decision support system and executive support systems</td>
</tr>
<tr>
<td>3</td>
<td>Choice</td>
<td>Information for evaluation</td>
<td>Large models of decision support systems.</td>
</tr>
<tr>
<td>4</td>
<td>Implementation</td>
<td>Graphics and charts for monitoring</td>
<td>Integrated information systems, microcomputers and mainframe decision aids</td>
</tr>
</tbody>
</table>

**Conceptual Framework for Modern Library Management**

Library administration is such an activity by which the purpose of an organizational mechanism is fulfilled through the powerful management.
Management is a generic term while administration is considered only a part of the management. There has been some form of administrative practice in libraries from the earlier times and much has been written about it. The purely possessive 'administration' of such a collection, given adequate physical quarters and staff to deal with few technical problems involved, made little demand on the librarian as administrator.

**Functional Areas of Management**

Management process consists of several functions and distinction should be maintained between management functions (planning, organising, staffing, directing and controlling) and organisational functions (production, marketing, finance and personnel etc.). Organisational functions differ from organisation to organisation depending upon their nature, while the functions of the managers are common to all. Thus, a manager may be put in production function, marketing or finance functions but he completes the activities of these functions through all the managerial functions. These organisational functions are called functional areas of management.

The number and types of functional areas of management are determined by the nature of the organisation and the types of classifications of various activities. A more acceptable and practical classification includes four broad functional areas - Production, Marketing, Finance and Human Resources. These areas have their own organisation, policies, procedures, and sub activities.

1. **Production**: This area is normally kept under the control of a production manager who is responsible for the performance of entire related activities. This area may further be classified into major sub areas like, Purchasing, Materials Management, Research and Development etc..

2. **Marketing**: This area involves the distribution of product to the buyer. This requires a number of steps and can be divided into following sub areas, like. Product, price, place(distribution) and promotion.
(3) **Finance**: This area deals with the record-keeping of various transactions and management of financial resources. It may be further classified into sub-areas like, Financial Accounting, Management Accounting, Costing, Investment Management, Taxation etc.

(4) **Human Resources**: This aspect deals with the management of human beings of the organisation. It includes following areas like Recruitment and Selection, Training and Development, Wage and Salary Administration, Industrial Relations etc..

The classification of the above functional areas does not necessarily support that an organisation divisionalised on the functional basis will have all these departments. This, however, is determined by the specific need of the organisation.
CHAPTER - ONE
INTRODUCTION

SECTION - THREE
Conceptual Framework of Libraries
CHAPTER - ONE

INTRODUCTION

SECTION - THREE

CONCEPTUAL FRAMEWORK OF LIBRARIES

This section aims at providing brief description of Library Science and Libraries in order to facilitate an understanding of the concepts and terms related to Library Science and Libraries and the changes and advancements that have occurred in it during the past period.

The word library has been thought to derived from Latin word *liber* meaning *book*, which in modern times resembles to mean "a collection of written, printed, or recorded material (including films, photographs, tapes, phonograph records. Videodiscs, microforms, and computer programs) organized and maintained for reading, study, and consultation". The word, *L'liura*, in French, being used to denote a bookshop or by extension, a publisher. General term book is denoted collectively for these various forms of the contents of libraries, except when a particular form, such as manuscript or film needs to be specified.

15th century Encyclopedia Britannica Volume-XXII, is widely understood to have used the word library, for the first time, to denote a building, room, or set of rooms in which a collection of books is contained. According to some of the popular definitions, library is a place set apart to contain books for reading, studying for reference (not applied, to the shop or warehouse of a bookseller) in various applications more or less in specific series: the term library is applied to a building room, or set of rooms containing a collection of books for the use of the public or of some particular portion of it, or of the members of some society, or the like, a public institution or establishment, charged with the care of a collection of books, and the duty of rendering the books accessible to those who require to use them. It also denotes a sense of a private commercial establishment for the lending of books, the borrower paying either a fixed sum for each book lent or a periodical subscription. However, with the
collection of media other than books for storing information, many libraries are know also repositories and access points for maps, prints, or other documents and works of art on various storage media such as micro form (microfilm/microfiche), audio tapes, CDs, LPs, Cassettes, video tape and DVDs. Libraries may also provide public facilities to access CD-ROMs, subscription databases and the internet. Modern libraries are increasingly being redefined as places to get unrestricted access to information in many formats and from many sources. In addition to providing materials they also provide the services of specialists, librarians, who are experts in finding and organizing information and at interpreting information needs.

Development and Role of Libraries in Modern Indian Society

Primarily, the libraries were the storage place and intensely personal. According to Levis Mumford, the mass production of books made libraries open to public. During the eighteenth century new social groups or classes came to power and the library was called upon to serve the common man'. In the modern age of specialization, library' has become a great force for understanding and cohesion. Libraries and societies are inter-linked and inter-dependent. Commenting on the role of library, in society, J H Shera writes: "The library is a product of our cultural maturation". It came into existence when societies ceased to be nomadic and started. Library is the only social institution suited to perform the function in furtherance of education to keep continuity in the cultural pursuit of man. The improved social status depend largely upon knowledge. Reading is one of the most important means for the acquisition of knowledge, in view of this the library to achieve its fullest role in society is not passively to make books available when needed by a potential reader, but actively to stimulate the use of books.

There were libraries in ancient and medieval India, but they were different than the modern public libraries. The basic fundamental of Indian learning of the bygone days was Sruti-Smrithi. Vedas and the Upanishads were the main contents of rigorous training in discipline and in Sastras and the Vedas course was over this stage man known as the Snatak the graduation stage of the modern days. Printed books did not exist then and
the large collections of hand written manuscripts were always used by the students. Some of our ancient schools of learning or universities had excellent collections of a hand written books. Monastic libraries generally housed the special literature of the particular sect. The huge library of the monastery having rare books and manuscripts on the religion and philosophy of the Hindus and Buddhists—attracted the attention of the Moslems.

The collections of manuscripts i.e., the library played an important role in this examination. The storehouse of knowledge or the libraries played a very important role in these seminars and discussions as in all cases of disputes references to the authoritative manuscript and books’ were made. The East India Company did a very important work to collect all old records, manuscripts and printed books in the country and established the Saraswati Mahal Library at Tanjore where all these valuable materials were properly housed. The Library had been systematically publishing volumes of catalogues of rare manuscripts on different subjects of Indian religion, philosophy and rhetoric. The libraries then existed were neither meant for public nor for ordinary people. It was for the limited few that the libraries existed viz., the scholar, the student, the Brahmin and the interested learned men were the main agents who had access to these treasure-houses of knowledge. Libraries through their documents are actually repositories of information or knowledge. Information is indispensable for any human activity aiming at social progress. The researchers, teachers, students, administrators, industrial and business managers, entrepreneurs, workers in the factory and in the field, all need information to equip themselves, better for the fruit pursuit of their respective vocations. The basic information role of the library is to collect the materials containing the information required by the various sections of the society and disseminate the information to them through appropriate methods. Libraries perform following functions:

1. Accumulation of knowledge by logical organization of all kinds of reading materials, selected and acquired for convenient, classification and cataloguing;
2. Transition of knowledge through lending of books and periodicals imported to the staff, students and department;

3. Exploration of new merged knowledge, because the knowledge is one-dimensional and multi-dimensional in nature;

4. Library does good deal in aid of research;

5. Providing a large number of bibliographic tools and up-to-date literature on every subject; and

6. Maintaining an efficient reference and information service for long range research projects.

Libraries are treated as the heart of educational set up and system and play a vital and important role in the development of a country. The libraries, to day, are not only the store house of the books, but are also the analysis centers of information, hence their responsibilities towards the uses increase from the point of view of the usage and application of the information. Today, in the libraries, various functions related with information providing for the uses are executed.

Thus, from the above discussions we have seen that libraries are meant for accumulation and dissemination of information. A variety of new machines, tools and technologies have already begun to change the face of library practices. We are aware of the reduced attention to cataloguing and classification, because of the new technology has made the centralized processing really possible. The print-oriented nature of libraries is changing to multimedia approach. The widely accepted use of computers in library operations has brought real changes in the management of libraries.

Dr. Ranganathan gave an oriental touch to 'Library Science'. After acquiring the theoretical knowledge as well as practical experience at the school of Librarianship in the University College, London, British Libraries he came back home from England in 1925, and joined the Madras University Library. In 1923 he formulated the following Five Laws of Library Science:
1. Books are for use;
2. Every reader his book;
3. Every book its reader;
4. Save the time of the reader;
5. Library is a growing organization.

"According to Ranganathan these laws are the fundamental Laws of Library Science. These form the normative principles which contain in a latest form all the Library practices current at any time and to be evolved at a later time."

Ranganathan’s enunciation of the Five laws is truly epoch making. It is he who established the claim of subject to be a Science on sound basis. We find that subsequently the term 'Library Science' has been accepted by many in and out of the field. Many of the training institutions in the United States have included the term "Library Science" in their names now, of course everybody agrees that there is a Library Science. India is proud of its lead in this subject: But the Five laws stated by Ranganathan may not be only the laws of Library Science. There might be still other laws. It is up to us the Librarians of the new generation to carry the torch forward.

Different types of Libraries and Their Functions

Libraries are generally classified into three categories, namely, Academic Libraries, Public Libraries and Special Libraries. A brief description of each category follows:

1. Academic Libraries: Education is a process of learning, with the aim to develop the capabilities in the people at all levels. In this process schools, colleges and universities play a vital role. In all these efforts to modernize our educational system, libraries have been considered vital components and integral parts of the entire educational process. Academic libraries are classified into School, College and University libraries. A brief description of each category follows:

i) School Libraries: School libraries are meant for pre college students. They are of two types, namely, Primary School Libraries
(for children between five and ten or eleven years of age and the teachers who are involved in teaching and shaping them. This is the age of children when they form attitudes and habits.) and Secondary School Libraries (Secondary school libraries support school programmes at three stages, viz. middle-classes 6 to 8, secondary classes 9 to 10, and higher secondary-classes 11 and 12; constituting a total period of seven years of the school programme. These are crucial formative years of the children and good habits formed at this stage would be everlasting.

ii) College Libraries: In college, the class size is large, therefore, the students of college have to depend much on self-learning. Therefore, the college library is the automatic choice for students to supplement their classroom teaching. The ingredients that make a college library an efficient system are a collection of books and other learning and teaching material; the user community, comprising students, teachers, the college management and others getting standard library services; physical facilities like building, furniture, equipment; professional staff of the library; the college management; finance and budget.

iii) University Libraries A University cannot function without a library. For all practical purposes, the word university includes conventional universities, professional universities, deemed to be universities, institutions like the Indian Institutes of Technology, (IITs), the Indian Institutes of Management (IIMs), Agricultural Universities the open universities and other institutions of higher learning. Today, university libraries have a very large and difficult role to play in order to meet a variety of demands of information and knowledge by far larger number of people on far larger number of subjects at far higher prices and negligible grants. The collections in a university library system cater to the needs of teaching and learning, research, generation of new ideas and new knowledge and publication.

The academic material collected in university library require proper organization. The five major functions of a university are: Learning
and teaching; Research and generation of new knowledge; Dissemination and publication of research results; Conservation of knowledge and ideas; and Extension and services. University libraries support and help the university in achieving each of the objectives of the University. The derived functions are: Development of a collection in a wide variety of subjects for learning, teaching, research, publication, etc; Getting the stock of knowledge materials organised and maintained for use; Organise and provide a variety of library, documentation and information services, both responsive and anticipatory. The user community of university libraries include - Students at different levels of study in different subjects; Teachers, imparting instructions and guiding students at different levels and in different subjects; Doctoral research students; Post-doctoral research scholars working on specific projects; Professors and experts guiding research projects and managing research activities of the university; Members of the various academic and executive bodies of the university; The university management involved in its major task of managing of a large scale institution of higher learning and research; Scholars in general, who get special privileges of using the university library; and other sections of the society. The university libraries offer a number of library, documentation and information services including - lending; information and reference, reading room; assistance in the use of the library; and display of current additions or preparation of lists of current accessions. Current awareness services (current contents of journals; alerting services to important literature in select fields; selective dissemination of information; and newspaper clipping service), bibliographic services (literature search; compilation of bibliographies on specific topics; and Index to current literature), condensation services (preparation of abstracts on specific topics; digest services; preparation of reviews/progress/advances on specific subjects; and state-of-art-reports) specialized services (user education; exhibition and special displays; special lectures and demonstrations; and user oriented seminars, workshops) and other services (document supply services;
reprographic services; translation services; and computer-based
information retrieval) etc..

2. Public Libraries are social institutions offering information
dissemination services based upon knowledge for various public groups,
on social, political, economic, cultural and other matters.

The evolution of a public library is resultant of some crucial factors,
important among them are: Urge for knowledge; Literacy; Universal
public education; Enlightened leadership and philanthropy; Rapid
advancement in science and technology; and Fruitful utilization of
leisure.

The most widely accepted, comprehensive and exhaustive definition of a
public library was formulated by UNESCO in 1949, which was revised in
1972 and again revised in 1994, and is known as the UNESCO Public
Library Manifesto. According to this manifesto, “it is a public library
which being the local gateway to knowledge, provides a basic condition
for lifelong learning, independent decision-making and cultural
development of the individual and social groups; a living force for
education, culture and information, an essential agent for the fostering
of peace and spiritual welfare through the minds of men and women;
the local centre of information, making all kinds of knowledge and
information readily and freely available to its users; accessible for all,
regardless of age, race, sex, relation, nationality, language or social
status; and lastly, the libraries which have collections and services, all
types of appropriate media and modern technologies, as well as
traditional materials with high quality and have relevance to local needs
and conditions. Material must reflect current trends and the evolution of
society, as well as the memory of human endeavour and imagination.”

Basic elements unique to a public library are:

i) A public library does not charge its users any fee for any of its
services like consultation of books on its premises or loan of books
for home reading or for rendering reference service. However, a
nominal charge may be made in cases when a particular product or a
service passes to a reader as his own.

ii) The finance needed for the establishment, maintenance and development of public libraries is secured mostly from public funds.

iii) The academic libraries are unable to meet all their demands. So, the public libraries assist the students/teachers by providing suitable educative material. In this sense, a public library serves as an auxiliary educational institution serving each person according to his requirements.

iv) In a democratic welfare nation it should be legally ensured that a public library is established, maintained and developed in all localities so as to enable a citizen to reap the benefits, whatever free access to information, education and culture could bring.

The characteristic features of public libraries are Socio-economic; Politico-historical features; Educational features; and Socio psychological features. Functions of Public Libraries are generally described in terms of serving institution as Centre for Information; serving institution as Centre for Self-Education; serving institution as Centre for Culture; serving institution as Centre for Local Cultural Materials; serving institution for Development of understanding democratic spirit; and as an impartial service agency.

**Special Libraries and Information Centers** are a natural outcome of the need for information support to research and development, business and industry, expanded functions of governments and similar other organizations. M.L.M. Harrod in his "Librarian's Glossary of Terms" defined that a "Special Library is a collection of books and other printed, graphic or recorded material dealing with a limited field of knowledge and provided by a learned society, research organization, industrial or commercial undertaking, government department or even an educational institution. It may also be a special branch of a public library serving certain interests or occupational groups such as a technical library or a special subject library, meeting the needs of all enquiries on that given subject such as a music library". Whereas, D.J. Foskett defines a special library as "one serving a group, having an extra-library existence, whose members direct at least some of
their activities towards a common purpose. This excludes academic libraries as their users pursue their individual ends, and are in no sense united by a Common Purpose". According to him, "The group served, may be a government department, a professional association, an industrial firm, a research association or an institute or any similar organization. Special libraries serve organizations with a clearly defined group policy, and members of the group have indicated their acceptance of this policy by the fact of their joining, which implies their recognition of a common interest". Dr. S.R. Ranganathan, prefers to call it as specialist Library to supply detailed information regarding some subject field - scientific, technical and otherwise.

Special libraries exist in a wide variety of organizations, most of them being units of larger organizations. Their purposes are usually other than provision of education or conventional library services, invariably meeting the information requirements of the organizations to which they are attached. Special libraries are formed in research and development establishments, government departments, directorates, industrial and business undertakings, learned societies and professional associations, trade and business associations, hospitals and health services, social and welfare organizations, museums, national gallery of arts; etc. However special libraries are also established to serve a particular group of users or specialists working on a subject or a group of subjects or on a particular type of documents, etc. Examples are Libraries for the Doctors, Entrepreneurs, Industrialists, etc., Library of the National Institute of Nutrition, Hyderabad, Library of the Central Food and Technological Research Institute, Mysore) .

A special library provides the services including, Issue of documents, including inter-library loan; Routing of periodicals; Reference service; Literature search; Current awareness; Bibliographic services; Referral service; Selective Dissemination service; Document supply; and Translation.

A specialized information centre serves the needs of the persons within a special subject field, often inter-multipdisciplinary in nature, providing comprehensive information based on needs, regardless of the location of documents. Such centers are directed to help scientists, technologists and others. The key activities of an information analysis centre are analysis,
interpretation, synthesis, evaluation and repacking of information for the purpose of enabling the users to assimilate better the information of a specific field. Specialists in subjects with communication abilities, present this analysis and synthesis. The final product of an information analysis centre contains evaluated information in the form of critical reviews, state-of-art monographs, data correlation and compilations. Information Dissemination Centre offers customer-oriented information services by searching computer data bases of diverse subjects. This type of centre also known as information brokers or information consultants who charge a fee for the services they offer. The services these organizations offer may range from simple literature searches to the preparation of critical and comprehensive reports: These institutions are tending to become commercial, and are currently identified as one of the comporting an information industry. The seven Sectoral Information Centres are:

1. National Information Centre for Drugs and Pharmaceuticals (NICDAP) at Central Drug Research Institute, Lucknow.
2. National Information Centre for Machine Tools and Production Engineering (NICMAP) at Central Machine Tools Institute, Bangalore
3. National Information Centre for Leather and Allied Industries (NICLAI) at Central Leather Research, Institute, Madras.
4. National Information, Centre for Food Science and Technology (NICFOS) at Central Food and Technological Research Institute, Mysore
5. National Information Centre for Crystallography (TTICRYS) at Deptt. Of Crystallography and Biophysics, Chennai University, Chennai
7. National Information Centre on Chemistry and Chemical Technology (NICCHEM) at National Chemical Laboratory, Pune.
Digital Library

More recently libraries are understood as extending beyond the physical walls of a building by including material accessible by electronic means and by providing the assistance of librarians in navigating and analyzing tremendous amounts of knowledge with a variety of digital tools. The library community has used several terms to denote the concept, like - electronic library, virtual library, library without walls, web library, online library, and recently digital library. The working definition of digital library is given by American Digital Library Federation (ADLF) which says, - "digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they readily and economically available for use by a defined community or set of community."

The purpose of digital library is to provide: Interaction with potential information users; Interaction with information resources: and Mediation between information resources and users to add value during the information transfer process.

Advantages

1. Digital libraries are essential to enable more people to create and use vast amounts of distributed information and to contribute to the quality and quantity available via the web and future access frameworks.

2. Digital libraries remain closely linked to advances in high performance computing and networking and both contribute to and validate these technologies.

3. Digital libraries are inherently international knowledge is recorded and stored in many forms, often using different languages and symbol systems.

Organization of Library

Libraries have materials arranged in a specified order according to a library classification system, so that items may be located quickly and collections
may be browsed efficiently. Some libraries have additional galleries beyond the public ones, where reference materials are stored. These reference stacks may be open to selected members of the public. Others require patrons to submit a "stack request," which is a request for an assistant to retrieve the material from the closed stacks. Larger libraries are often broken down into departments staffed by both paraprofessionals and professional librarians.

Circulation handles user accounts and the loaning/returning and shelving of materials. Collection Development orders materials and maintains materials budgets. Reference staffs a reference desk answering user questions (using structured reference interviews), instructing users and developing library programming. Reference may be further broken down by user groups or materials; common collections are children’s literature, young adult literature, and genealogy materials. Technical Services works behind the scenes cataloguing and processing new materials and deaccessioning weeded materials.

Diagram 1: Function-wise Organizational Chart of Large Library

Diagram 2: Function-wise Organization Chart of Medium Special Library
Indian Scenario

Regarding library environment, the digital movement is yet to take off. In the absence of strong telecommunication channels, the Internet facility is yet to find its success. Financial constraints are the major hindrance for the growth at national, local and organizational levels. As a result the implementation of IT facilities for libraries are not receiving adequate support from their parent body. Majority of libraries in India do not have computer facilities. The print media is still a major source of information in libraries. The Indian libraries will be deprived of digital information if they cannot find a mechanism to acquire such materials and a facility to read them. Sooner or later the management authorities would realize the need of this vital change and start tuning to the present day requirements.

The Information Technology and Libraries

The information technology has brought revolutionary changes in the functioning of libraries. Information technology has vast potential for a number of applications in libraries. According to Bannon and Barry, application of information technology as far as library is concerned, can be grouped into following three areas:

1. Introduction of computing power into wide spectrum of information handling process, bringing about a new level of automation in this field. The development of micro-electronic components, which are small, compact, cheap and reliable make it possible to integrate computing power at much reduced cost.

2. Convergence of telecommunications and computer systems caused by a number of technological developments finds very useful for message transmission. 'Telematics', is one of such new fields, where computer is incorporated into satellite communication system. The new system provides computing and related services. The speed and capacity of data transmission are such that vast amount of data are capable of being transmitted across the world in seconds. Development of computer net-works allows for the collection, colla-
tion, integration and dissemination of information on an unprecedented scale.

3. Development of wide range of equipment capable to bring office automation. Microelectronics allows for the development of highly complex distributed processing system which can support the integrated office. New office equipment allows an individual worker to test his skills, reduce repetitive work. and show quality as well as quality in his work.

Diagram 3: Information Technology and Relevance to Library Functions

The information technology can be applied in the following areas of concerns to library managers, as pointed out by Shri S.S.Murthy:

1. Library Management (classification, cataloguing, indexing, database creation, CAS, SDI, etc).

2. Library Automation (organizing databases and automating library housekeeping operations)
3. Library networking (for resource sharing and information dissemination)
4. Reprography (photography, microfilms, microfiches, audio and video tapes, printing, optical disks, etc.)
5. Technical Communication (technical writing, editing, publishing, including DTP systems, etc.)

Information technology offers the following benefits for the management of libraries. The list is only suggestive.

1. IT helps to avoid duplication of effort and work in library operations.
2. IT facilitates cooperation and resource sharing through library network.
3. IT helps to introduce new services and improve existing services.
4. IT allows integration of various library operations.
5. IT executes repetitive nature of works.
6. IT facilitates faster information communication.
7. IT facilitates easy and wider access to all kinds of information, sources.
8. IT helps to increase efficiency and effectiveness in library operations.
9. IT ultimately helps to save time, space, energy, and resources.
10. IT helps to improve productivity and image of the library.