A STUDY OF AN INTEGRATED LIBRARY NETWORK AND CONSORTIUM OF CENTRAL UNIVERSITY LIBRARIES IN THE NORTH EAST REGION

A Thesis submitted to the Mizoram University
for the award of Degree of
DOCTOR OF PHILOSOPHY
in

Library and Information Science
(School of Economics, Management and Information Science)

by

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D E C L A R A T I O N

I hereby, declare that the thesis entitled **"A Study of An Integrated Library Network and Consortium of Central University Libraries in the North-East Region**" submitted by me has not been previously formed the basis for the award of any Degree or Diploma or other similar title of this or any other University or examining body.

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C E R T I F I C A T E

This is to certify that the thesis entitled "**A Study of An Integrated Library Network and Consortium of Central University Libraries in the North-East Region**" submitted by Sri C. Lawmzuala for the award of **Doctor of Philosophy in Library & Information Science** is carried out under my guidance and incorporates the students bonafide research and this has not been submitted for award of any degree in this or any other university or institute of learning

Date: 11th June, 2012 **(Dr. R.N Mishra)**
Aizawl **Asst. Professor (SS) & Supervisor**

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ABBREVIATIONS AND ACRONYMS

AICTE	All India Council for Technical Education
ARPA	Advanced Research Project Agency
AULC	Arizona University Library Consortium
BALNET	Balancing Network
BARC	Bhabha Atomic Research Centre
BONET	Bombay Library Network
BSNL	Bharat Sanchar Nigam Limited
CALIBNET	Calcutta Library Network
CALICO	Cape Library Cooperative
CALIM	Consortium of Academic Libraries in Manchester
CALIS	China Academic Library and Information System
CAS	Current Awareness Service
CATV	Community Antenna Television
CAVAL	Cooperative action by Victorian Academic Libraries Limited
CCALD	The Council of Connecticut Academic Library Directors
CD	Compact Disk
CD/DVD	Compact Disk Digital Video Disk ?
CD-ROM	Compact Disk Read only Memory
CFTRI	Central Food Technology Research Institute
CHEST	Combine Higher Education Software Team
CMC	Computer Maintenance Corporation
CPPUL	Council of Prairie and Pacific University Libraries
CSIR	Council of Scientific and Industrial Research

CUPGC	Calcutta Post-Graduate Centre
CURL	Consortium of University and Research Libraries
DDC	Document Delivery Centre
DEC	Distance Education Council
DELNET	Developing Library Network
DESIDOC	Defence Scientific Information and Documentation Centre
DLC	Data Link Control
DOE	Department of Electronic
DOD	Department of Ocean Development
DRTC	Documentation Research and Training Centre
DSIR	Department of Science and Industrial Research
DVD ROM	Digital Video Disk Read-only-Memory
EDINET	Electronic Digital Integrated Network
EDST	Database in Science and Technology
EDUSAT	Educational Satellite
ERIC	Educational Research Information Centre
ERNET	Education and Research Network
ETD	Electronic Thesis and Dissertations
FAX	Facsimile Transmission
FORSA	Forum for Resource Sharing in Astronomy
FTE	Full –Time Equivalent
FTP	File Transfer Protocol
HELINET	Health Science Library and Information Network Consortium
HTML	Hypertext Mark-up Language
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technology
IEEE	Institute of Electrical and Electronic Engineering
IGCAR	Indira Gandhi Centre for Atomic Research
IGNOU	Indira Gandhi National Open University
IIM	Indian Institute of Management
IITs	Indian Institute of Technology
ILSCO	Illinois Library Computer System Organisation
ILL	Inter Library Loan
INFONET	Information Network

INDEST	Indian National Digital Library in Science and Technolog y
INDONET	Indore Library Network
INFLIBNET	Information and Library Network
INSPEC	Information, Service for Physics Engineering And Computing
IP	Internet Protocol
IPR	Intellectual Property Right
ISI	Indian Statistical Institute
ISO	International Standards Organisation
ISP	Internet Service Provider
ISSN	International Standard Serial Number
IUC	Inter University Centre
IUCAA	Inter-University Centre for Astronomy and Astrophysics
J- Gate	J-Gate Custom Content for Consortium
JSTOR	Knowledge Resource Centre
KRC	Knowledge Resource Centre
LAN	Local Area Network
LIS	Library and Information Science
LISA	Library and Information Science Abstract
LMLA	Lib-license Model License Agreement
MAC	Media Access Control
MALIBNET	Madras Library Network
MAN	Metropolitan Network
MAPA	Medicinal and Aromatic Plants Abstract
MARC	Machine Readable Catalogue
MB	Megabyte
MHRD	Ministry of Human Resource Development
MIRACL	Missouri Research Consortium of Libraries
MPT	Madras Port Trust
MOU	Madras Port Trust
MYLIBNET	Mysore Library Network
NEHU	North –Eastern Hill University
NEIST	North East Institute of Science and Technology
NELIBNET	North Eastern Library Network
NERI	North Eastern Region India

NERL -	North Eastern Regional Libraries
NESLI	National Electronic Site Silencing Initiative
NIC	National Informatics Centre
NCLIS	National Commission on Libraries and Information Science
NICNET	National Informatics Network
NISCAIR	National Institute of Science Communication and Information Resources
NISCOM	National Institute of Science Communication
NISSAT	National Information System for Science and Technology
NKN	National Knowledge Network
NPD	National Programme Document
NUCSSI	National Union Catalogues of Scientific Serials India
OCLC	Online Computer Library Centre
OCN	Open College Network
OPAC	Online Public Access Catalogue
OECD	Organisation for Economic Corporation and Development
OPNET	Open Education Network
OSINET	Open System Interconnection
PALCI	Pennsylvania Academic Library Connection Initiative
PC	Personal Computer
PLACON	Promotion of Library Automation and Networking in North-East Region Consortia
PLANNER	Promotion of Library Automation and Networking in North- East Region Consortia
PRL	Physical Research Library
PUNENET	Pune Library Network
RAM	Random Access Memory
REC	Regional Engineering College
RFID	Radio Frequency Identification
RGUHG	Rajiv Gandhi University of Health Science
SBDNs	Satellite Based Data Networks
SDI	Selective Disseminating Information
SGML	Standard Generalised Mark-up Language
SIRNET	Scientific and Industrial Research Network
SINP	Saha Institute of Nuclear Physics
SOLINET	South Eastern Library Network

SOUL	Software for University Library
SSCI	Social Science Citation Index
TCP/IP	Transmission Control Protocol
TDNs	Terestrial Data Network
TELNET	Tele Network
TIFR	Tata Institute of Fundamental Research
UGC	University Grant Commission
UGC InfoNet	University Grant Commission Information Networking
UNDP	United Nationals Development Programme
UNESCO	United Nations Educational Scientific Cooperation
UNIMARC	Uniform Machine Readable Cataloguing
URL	Uniform Resource Locator
USMARC	United States Machine Readable Catalogue
VAN	Value Added Network
UNDP	United Nationals Development Programme
UNESCO	United Nations Educational Scientific and Cooperation
UNIMARC	Uniform Machine Readable Cataloguing
URL	Uniform Resource Locator
VPR	Virtual Private Network
VSAT	Very Small Satellite
VSNL	Videsh Sanchar Nigam Limited
WAIS	Wide Area Information Service
WAN	Wide Area Network
WRLC -	Washington Research Library Consortium
WISER	Welcome group's Indonet System of Enhanced Reservation
WWW	World Wide Web
XML	Extra Mark-up Language

CHAPTER – 1

Introduction

1. Education: The Concept

Education comes from the Latin word “Educare” that is to bring up to foster, to lead. It is, therefore, necessary to set some objectives to be reached through education. Whitehead says, “The only object of education is the development”. Thus, it involves a continuous process of socialization for adjustment to reality. In other words, education consists in the manipulation of experiences and the potential of an individual towards better adjustment to life. In fact, education and life are inseparable.

The meaning and scope of education has been widened greatly. In the olden days, education was limited to religious education, performance of religious rites and practices. It was also limited in the sense that it was available to selected few only. Nowadays, it is incumbent upon democratic governments to arrange for education of every child. Education is a growing science and its foundations are to be explored with reference to its various dimensions. It is an interdisciplinary approach demanding a critical study of the different perspectives and interaction between them.

1.1 Higher Education

Higher education stands at the crossroads of the cultures and has entered an unprecedented period of globalization in the knowledge economy (Paul,1998). Globally almost all nations are investing good sum for the development and expansion of tertiary learning and to promote research. It is visible in the present days that universities both at national and international level are progressively doing a lot of value added work. It could be further visualized that in the competitive world, skills along with technical knowledge and work culture have been recognized as the indispensable components for sustainable growth and development. Higher education is therefore, recognized as the principal provider of creating such an environment of manpower including new ideas, technologies, methods, products and services. The world economy is changing as knowledge supplants Physical capital as the source of present and future wealth. Technology is driving much of this process, with information technology, biotechnology, and other innovations leading to remarkable changes in the way we live and work. The independence of global economies has led to situations where the impact of change in one region or country is increasingly felt all over the world (Thorne, 1999). The categories into which new knowledge falls are becoming increasingly specialized, and a revolution has occurred in people’s ability to access knowledge quickly and from increasingly distant locations. Higher education has acted as a powerful mechanism for upward mobility in many countries, allowing the talented to thrive irrespective of their

social origins. Higher education institutions, as the prime creators and conveyors of knowledge, must be at the forefront of efforts to narrow the development gap between industrial and developing countries.

1.2 Expansion of Higher Education

In economies where scientific capacity is expanding rapidly, such as China, Hong Kong, Singapore, South Korea, and Taiwan, the publication rate of scientific research papers has more than doubled in the past decade with new titles reflecting increasingly narrow specialties. In both industrial and developing countries, the number of patent applications has been increasingly steadily. To a large extent the knowledge revolution has been driven by the use of personal computers and the internet. The spectacular advances in recent decades in computerization, communications, and information technology have greatly enhanced the ability of researchers and entrepreneurs to create new knowledge, products, and services. Internet has allowed people to access information about an unprecedented number of topics virtually instantly and, in most cases, cheaply. Beyond all these advances lie revolutions in other fields. New techniques in genetics and molecular biology have made possible new products, therapies, and cures, all of which promise to transform radically the quality of life. Chemists, physicists, and engineers have created into the heart of industrial operations and adopting fiber optics as the lifeblood for international communication. The linkage between learning, research and innovation within higher education is the key to building of sustainable knowledge societies.

There is a need to look at the type of research that is being promoted for understanding the adequacy of human and financial resources required for cutting edge research that is relevant to the needs of countries and regions. Therefore, while there is a need for public funded research in basic sciences and frontier areas of technology like Nano Science, Bio-Science, etc. the importance of linkages with the industry, particularly private sector, for funding innovation and technological developments have emerged for more encouragement. There has also given rise to a need for regional and global partnership for research. These changes would also be creating formidable new geopolitical, ethical, legal, and human rights issues related to, for example, the development of new weapons, the possibilities inherent in cloning, and the threat to privacy posed by centralized database and their phenomenal reach (Strata, 2002).

The developed world is reacting quickly with education as a major political priority. High quality/human capital is developed in high quality education systems, with tertiary education providing the advanced skills that command a premium in today's workplace. Most

developed countries have seen a substantial rise in the proportion of their young people receiving higher education. Lifelong learning is also being used to help workers adjust to rapidly changing economies.

1.3 Global Dimensions of Higher Education

Expansion in Higher Education has emerged as a global phenomenon, which has resulted due to tremendous increase in the number of students. The growth has been followed by a profound change in the institutional framework of higher education including; creation of a variety of institutions, strengthening of networks and academic associations, establishment of evaluation and accreditation of training areas and programs of studies, growth of postgraduate programs, professionalization of teaching staff, and an increase in R&D activities, among others. This process has led to the transition from the elite to the mass model of higher education.

From the end of the 60's onwards, higher education has experienced a remarkable expansion and transformation all over the world. It's worth remembering that by 1965 there were around 13 million students worldwide, which have increased to around 140 million by 2005. Since 1999, total enrollment has increased by around 50 million worldwide. In the 1960's there were about 500,000 students, which has swelled to almost 18 million students, representing a far faster growth rate than the global average. In 2009 there were just under three million students enrolled outside their country of origin, a 50% increase within the last ten years has been witnessed. Traditionally more than 90% of foreign students have been enrolled in institutions in countries that belong to the Organization for Economic Cooperation and Development (OECD) with the main destinations being the United States of America, The United Kingdom, Germany, France, Australia and Canada. Today the choice of academic disciplines and institutions, both for study and research, between students and professors bring not only vast benefits but also new and evolving challenges. Moreover, a recent study has suggested that a total demand for international student places will exceed 7.5 million by 2025. Higher education is thus entering new, yet exciting territory which no one can ignore.

Existing institutions have grown in size, transforming themselves into mega-universities; in other cases, traditional institutions have been replicated by public or private means. An even more creative response has been seen in differentiation, a process whereby new types of institutions are born and new providers enter the sector. In parallel to the university level, many private universities/ institutions have joined in the public domain by opening a number of job oriented courses which include both vocational and professional courses and infect, they could establish in a salutary position. This no doubt, created a healthy environment in

the educational sphere. It could be observed that, private institutions are in a better stand and growing rapidly with their infrastructures, skill power, building, quality of education etc. In the public sector, the Government needs to formulate viable and constructive policies, plan for the higher education in the country with special emphasis on quality education, infrastructure, skilled manpower etc. These also can be supplemented with students' amenities, scholarship support to increase the efficiency of the students.

1.4 Multifaceted Dynamics of Higher Education

There has been a huge expansion of higher education sector – rather we can even term it as an 'explosion' of increased opportunities in higher education. There have been about 152.5 million students worldwide in year 2007 for the tertiary sector; which reflected nearly an increase of 50% as compared to the year 2000. Globally, the percentage of university aged young people enrolled in tertiary education has increased from 19% in 2000 to 26% in 2007. According to the 2009 Global education Digest published by UNESCO's Institute for Statistics, since 2000 an additional 51.7 million tertiary students have been enrolled around the world and 2.8 million students have currently been studying outside their home country. However we must appreciate that the Gross Enrolment Ratio in higher education has widely varied and has ranged from 70% in North America and Western Europe and 11% in South and West Asia to mere six percent in Africa. Within the countries too, there have been groups, who cannot have access to education due to various factors related to socio-economic status, low incomes gender or disabilities (Sibal, 2009).

Over the past 50 years educational development has focused on expanding access to primary education. Starting from a low based, the results have been extraordinary. In recent decades, secondary enrollment ratios have increased significantly, and further expansion has been almost certain. For example, between 1965 and 1995 the secondary enrollment ratios has increased from 16 to 47 per cent in Brazil, from 5 to 32 per cent in Nigeria, and from 12 to 30 per cent in Pakistan. This has a double impact on higher education. More secondary students would mean more people entering higher education sector, even if the proportion progressing remained constant. However, the proportion who do want to graduate to higher education has been increasing substantially, as globalization has made skilled workers more valuable and the international market for ideas, top faculty, and promising students has continued to develop fast (Kripp, 2003). The substantial widening of access to primary and secondary education has combined with two other factors to impel the expansion of the higher education system: (i) a rapid increase in the number of people at the traditional ages for attending higher education institutions, and (ii) a higher proportion of secondary school graduates progressing

to higher education. Demographic changes, income growth, urbanization, and the growing economic importance of knowledge and skills have combined to ensure that, in most developing countries, higher education is no longer a small cultural enterprise for the elite. Rather, it has become vital to nearly every nation's plans for development. As a result, higher education has indisputably emerged as the new frontier of educational development in growing number of countries. The number of adults in developing countries with at least some higher education has increased by a factor of roughly 2.5 between 1975 and 1990. In 1995 more than 47 million students were enrolled in higher education in the developing world, up from nearly 28 million in 1980. For most developing countries, higher education enrollments have been growing faster than their populations; a trend that shall continue for at least another decade.

This continued expansion of higher education is clearly necessary to meet increased demand. However, it has brought with it some new problems. For example China, India, Indonesia, the Philippines, and Russia now have systems of higher education serving two million or even more students. Further seven developing countries – Argentina, Brazil, Egypt, Iran, Mexico, Thailand, and Ukraine have enrolled between one and two million students. To accommodate so many students, some institutions have had to stretch their organizational boundaries severely, giving birth to "mega-universities" such as the National University of Mexico and the University of Buenos Aires in Argentina, each of which has an enrollment of more than 200,000 students. Expansion, both public and private, has been unbridled, unplanned, and often chaotic. As a result deterioration in average quality, continuing interregional, inter-country, and intra-country inequities, and increased for-profit provision of higher education all have given rise to serious consequences.

1.5 Growth of Higher Education in India

There were 20 universities and 500 colleges at the time of Independence which have gone up to more than 519 universities and university-level institutions, 243 state universities, 53 state private universities, 40 central universities, 130 deemed universities, 33 institutions of national and importance established under Acts of Parliament along with five institutions established under various State Legislations. There are more than 25,951 Colleges including around 2,565 Women Colleges. Out of 25,951 Colleges, 7,362 Colleges (28%) have been recognized under section 2 (f) and 5,997 colleges (23%) under section 12-B of the UGC Acts, 1956. At the beginning of academic year 2009-2010, the total number of students enrolled, in the formal system, in the Universities and Colleges has been reported at 136.42 lakhs, 16.69 lakhs (12.24%) in University Departments and 119.73 lakhs (87.76%) in affiliated colleges.

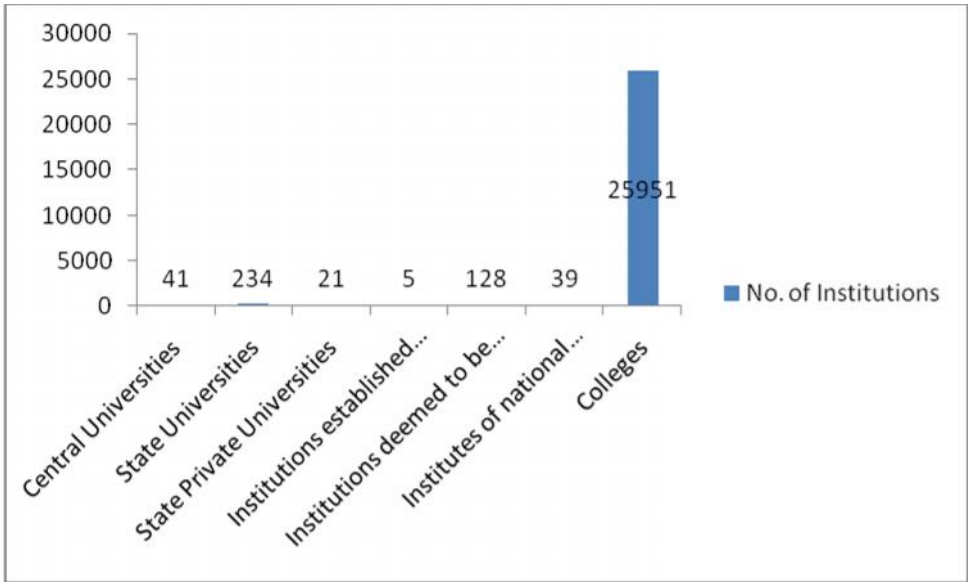
The enrolment of women students at the beginning of academic year 2009-2010 is 56.49 lakhs which constitute 41.40% of the total enrolment. Out of the total women enrolment, 14.72% women have been enrolled in professional courses. The women enrolment as a percentage of total enrolment in the States is the highest in Goa (59%) and the lowest in Bihar (30%). In terms of absolute number enrolment, Uttar Pradesh tops the list of states with 8.00 lakhs, followed by Maharastra 7.8 lakhs. The number of doctoral degrees (Ph.D.) awarded by various universities (during 2007- 2008) was 13,237. Out of which, the faculties of Sciences had the highest number with 4574 degrees, followed by the faculties of Arts with 4405 degrees. These two faculties together accounted for 67% of the total number of doctoral degrees awarded. The regular faculty strength in the universities was 0.90 lakhs (15%) and 4.98 laks (85%) in colleges, totaling 5.89 lakhs in the beginning of the 2009. It should be noted that Indian spend nearly $4 billion annually to send their children abroad for higher studies and technical training while there is no reason for India not emerging as a global hub for higher education and technical training. The real challenges therefore, are to expand capacities in higher education to keep ahead of the curve of rising domestic and global demand (Praveena and Srinivasa; 2010; pp. 18).

The type of universities and university level institutions available in India has been reflected in Table-1 along with Graph-1. The growth of university and colleges in India during the year 2004 to 2009 is placed in Table-2 supported with Graph-2. The growth of students' enrolment in various universities and colleges in India during the year 2004-2009 also has been shown in Table-3 along with Graph- 3 and the growth of teachers in universities and colleges in India during 2004-2009 in Table-4 with Graph- 4 for clear vision of the related information.

⇨ **Type of Universities and University Level Institutions in India**

(Table-1: Type of Universities and University Level Institutions in India)

Sl.No.	Types of Institutions	No. of Institutions
1	Central Universities	41
2	State Universities	234
3	State Private Universities	21
4	Institutions established through State legislation	05
5	Institutions deemed to be universities	128
6	Institutes of national importance	39
7	Colleges	25951

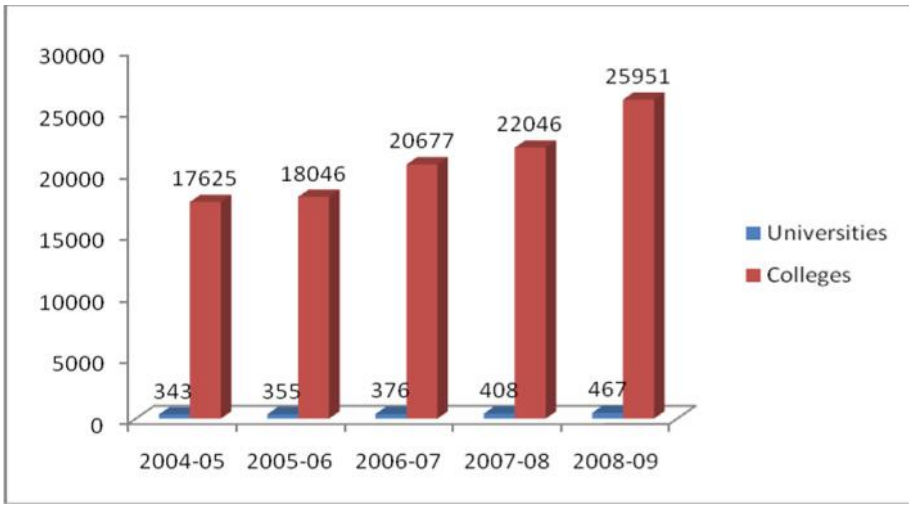


(Graph-1: Type of Universities and University Level Institutions in India)

⇨ Growth of Universities and Colleges in India

(Table-2: Growth of Universities and Colleges in India)

Sl.No.	Year	Universities	Colleges	Total
1	2004-05	343	17625	17968
2	2005-06	355	18046	18419
3	2006-07	376	20677	21053
4	2007-08	408	22046	22472
5	2008-09	467	25951	26418

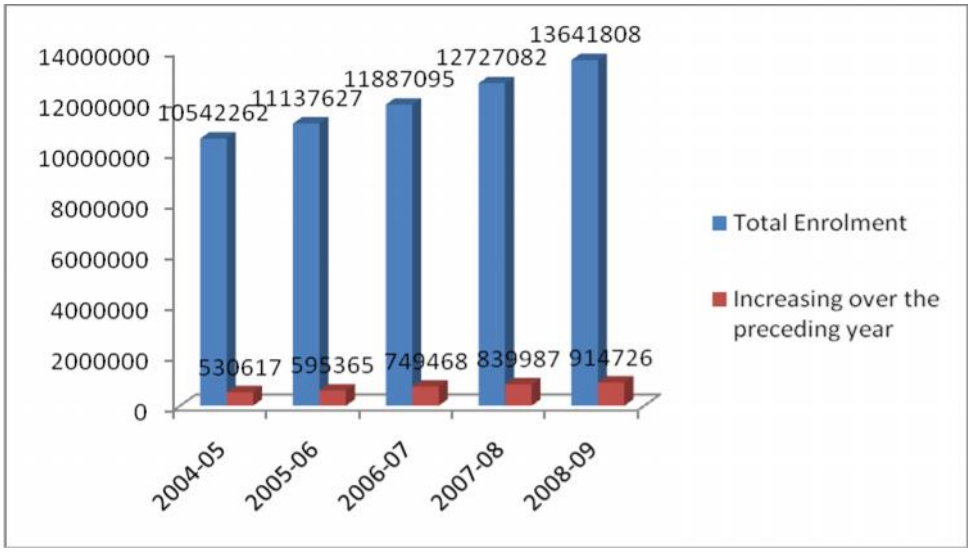


(Graph-2: Growth of Universities and Colleges in India)

⇨ **Growth of Students Enrolment in Universities and Colleges in India**

(Table-3: Growth of Students Enrolment in Universities and Colleges in India)

Sl. No.	Year	Total Enrolment	Increasing over the preceding year	%
1.	2004-05	10542262	530617	5.3
2.	2005-06	11137627	595365	5.6
3.	2006-07	11887095	749468	6.7
4.	2007-08	12727082	839987	7.0
5	2008-09	13641808	914726	7.2

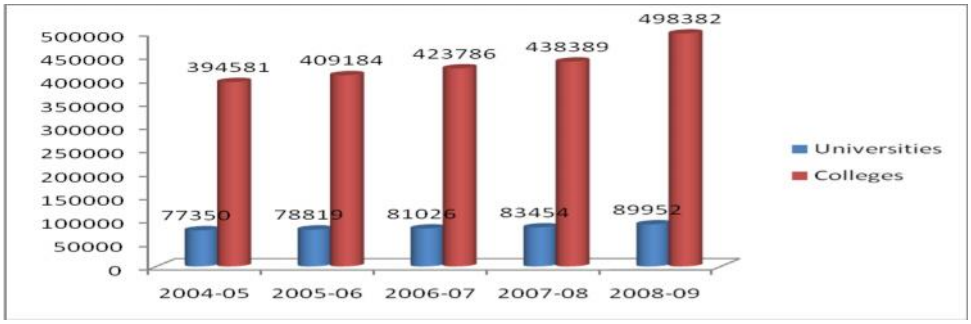


(Graph-3: Growth of Students Enrolment in Universities and Colleges in India)

⇨ **Growth of Teachers in Universities and Colleges in India**

(Table -4 : Growth of Teachers in Universities and Colleges in India)

Sl. No.	Year	Universities	Colleges	Total
1.	2004-05	77350	394581	471931
2.	2005-06	78819	409184	488003
3.	2006-07	81026	423786	504812
4.	2007-08	83454	438389	521843
5.	2008-09	89952	498382	588334



(Graph-4: Growth of Teachers in Universities and Colleges in India

1.6 Libraries in Higher Education

Higher education comprises both studies and training activities at the initial stage. Higher education is imparted not only in classical disciplines such as, Arts, Science, but also in the branches like, agriculture, engineering, science and technology etc. Further, it integrates institutions like, polytechnics, training colleges etc. And thus, it has a wide range of accommodating all forms of vocational training institutions, trainees, nursing schools, military, police, forestry, veterinary, tourism and secretarial institutions, etc.

A higher educational institution is composed of interacting subsystems that could depend, in several respects, on a larger entity but which can also influence such an entity in a relatively conscious and voluntary manner. In a broader sense, the higher educational institution operates in an environment. The context in which higher education functions is changing dramatically; consideration of the current and potential role of distance education, higher education community should take into account these dramatic changes policy makers need to examine the distance education futures available, evaluate and select a preferred future or futures, and make sure that public policy and regulatory considerations enable rather than inhibit achievement of this future.

1.6.1 Importance of library in Higher Education

Higher Education especially at the level of university keeps a formidable place which imparts higher learning to the students, research scholars etc. It has an indispensable role in making the society in a well defined manner i.e, cultural, economical and social where the entire individual in the society recognizes his stand to build up the society and understands the responsibility. It makes the society a learned one by eliminating the darkness prevailing upon them. The importance of the library in higher education has been often emphasized by educationists, librarians, education commissions and committees. The library is second only to the instructional staffs in its importance for high quality instructions and research. Both for

humanities and scientific studies, a worthy library with sufficient collection developments with proliferated resources are essential to promote research and development in higher education.

1.6.2 Function of Library in Higher Education

Library has a positive role in higher education especially at the college and university level. Primarily, it is intended to,

- Provide useful information resources for teaching, learning and research.
- Aid substantial information to the teacher and in keeping abreast of current developments in the field.
- Submit instructions and guidance necessary for all academic programs.
- Opening avenues for global knowledge, that lie beyond the borders of teachers own field of specialization and
- Bringing together information, students and teachers in one umbrella for encouraging reading habits, self discovery, personal growth and sharpening of intellectual curiosity.

1.6.3 Role of UGC in Libraries

The establishment of the university Grants Commission is a land mark in the growth and development of higher education in general and of university and college libraries in particular in the country. Since its very inception the UGC recognized the importance of libraries and gave top priority for their developments as well as colleges by giving grants for library buildings and equipment, books and journals and for setting up text-books libraries (Nair; 1996; pp.18-20).

1.7 College Education

One of the most important issues before the higher education system in India is enhancing access to higher education so as to build a knowledge based society. However, colleges in higher education occupy a predominant position to promote literacy and make the society educated. The State Government, Central Government, Private authorities whole heartedly support the cause of flourishing the cause of education almost in all dimensions whether general, technical or special. However, in India much initiative have been taken mostly by three wings such as, State Government who is responsible to establish colleges almost in all districts, Central Government through University Grants Commission (UGC) who use to fund the colleges for better infrastructural development to promote higher and qualitative education. Like wise the private enterprises are not lacking behind it as they solely fund the

development of colleges managed by them. Since the establishment of UGC, most of the colleges in India are being funded for the development of infrastructure, building, library etc. However, the administration of the respective colleges lies with the respective state governments. According to Goil (2004; 320), the purpose of college education can be summarised as to-

- Develop the personality of the individual.
- Provide him with the knowledge of the world in which he lives.
- Develop skills needed to sustain and advance social life so that he can be a creative member of the society.
- Satisfy the individual's search for values.

It becomes important for each college to include the above discussed proposes for the growth and development of the students with regard to subject, techniques, skills, habits of thought and methods of work in their respective fields. To achieve all these, the mere class instructions are not sufficient and one has to resort to other sources and methods.(bsth2.2)

1.7.1 Objectives and Functions of a College

The objectives of the colleges as has been discussed are not only to promote literacy and built a knowledge based society but also to build intellectual wealth for the society for future use. The objectives and missions of the colleges have been defined in many ways by the educationists. To quote some of them, Hulbe (1967; 218) mentioned the following four missions for any college or university, namely:

- Presevation of knowledge,
- Extension of knowledge,
- Training of professional workers, and
- Social Mission.

He further stated that colleges or universities are aware of the first three of above missions, but unfortunately much attention has not been given to the social mission neither in college nor university. Kaula (1974;p.108) while analyzing the students population in his studies deduced that, 90 % of the students population in the universities and colleges belong to the streams of Arts, Science, Commerce and Law among whom, the incidence of unemployment is highest and 90% of them are from the affiliated colleges. This however according to experts, are lacking of standard of education in colleges than the universities. The affiliated colleges are also increasing immensely with an inclination towards postgraduate studies and

research work and if the present policies are continued it is likely to prove a serious contender or a lion's share of this sector, particularly in the humanities and in the social sciences.

1 .8 University Education

The word 'University' connotes the existence of a corporate body of teachers and scholars, a place where student would be attracted to drink freely from the fountain o knowledge provided by the teachers and of course, the students for whom the former exists. The dictionary meaning of the university is a corporate body of teachers and students which deals with higher education, and confer degrees to the worthy students. It is a social institution, which has to interact with the society.

According to Nehru (1947), a university stands for humanism, for tolerance, for reasons for the adventures of ideas, and for the search of truth. It also stands for the onward march of the human race with higher objectives. If the universities discharge their duties adequately, then it is well with the nations and the people. These great words highlight the basic truth that universities have a crucial part to play in the life, welfare and strengthen of a nation. They can however, justify this role only if they own the uncompromising loyalty to certain fundamental values of life. They are essentially a community of students and teachers, where in some way, all form a team from one to another or at any rate, strive to do so. Their principal objective is to deepen man's understanding of the universe and of himself in body, mind and spirit, to disseminate his understanding throughout the society and to apply it in the service of mankind. They are the dwelling places of ideas and of idealism and expect high standard o conduct and integrity from all their members. Many commissions in India also have opened their minds and given multidimensional views in the area. Some of them have been quoted below.

Education Commission (1964-1966) has viewed that university education should attend to three-fold emphasis such as,

- ⇨ Internet transmission so as to relate it to the life, needs and aspirations of the nation.
- ⇨ Qualitative improvement so that the standards achieved are adequate.
- ⇨ Expansion of education facilities broadly on the basis of manpower needs with emphasis on equalization opportunities.

1.9 Universities in India: An Overview

The university in India was earlier considered as an informal, unstructured and a spontaneous organization. The approach was at individual basis. Slowly and steadily universities grew and become formal organization where students who were aware of these institutions visited them

and acquired education. The development and growth of universities can be studied into four phases such as,

- ⇨ Higher Education in Ancient India,
- ⇨ Higher Education in Medieval India,
- ⇨ Higher Education in Colonial India and
- ⇨ Higher Education after Independence

1.9.1 Development of Universities in India

The development of universities in India has gone through many phases. However, presently the University Grants Commission has shouldered the responsibility to formulate rules and regulations of all the universities whether state, central etc. and practically, it has become the pioneer body to extend financial help for the growth and development of universities India. However, the UGC considers the following guidelines while extending funds to the universities.

- On going programmes and inputs for strengthening the existing courses with a view to meet the challenges of areas which are crucial for national development;
- Replenish infrastructural facilities; and
- Growth for higher education through the establishment of new institutions where absolutely necessary and increase in the intake capacity of existing institutions in order to have some optimal utilization of available resources.

1.10 Central Universities in India

As already discussed, there are many universities both at state and central catering education to the aspirants for development. However, there are 41 central universities in addition to the state and deemed universities. A list of the same showing their establishment and place has been shown in Table-5.

(Table-5: List of Central Universities in India)

Sl No.	Name of the University	Year of Establishment	Place
Andhra Pradesh			
1	English and Foreign Languages University	1958	Hyderabad
2.	Maulana Azad National Urdu University	1998	-do-
3.	University of Hyderabad	1974	-do-
Arunachal Pradesh			
4	Rajiv Gandhi University	2008	Itanagar
Assam			
5	Assam University	1994	Silchar
6	Tezpur University	1994	Tezpur
Bihar			

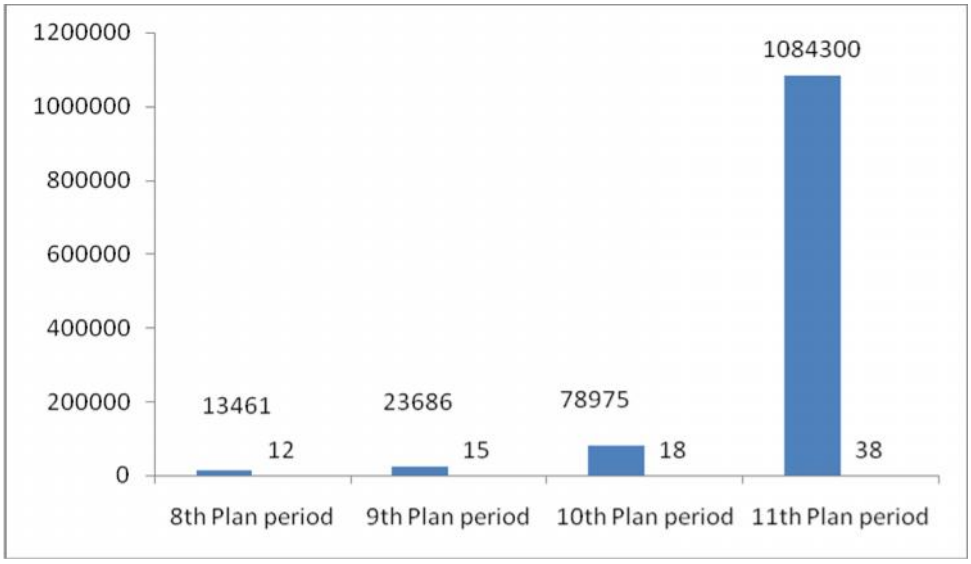
7	Central University of Bihar	2009	Bihar
Chhattisgarh			
8	Guru Gashidas University	2008	Bilaspur
Delhi			
9	Jawaharlal Nehru University	1968	New Delhi
10	Jamia Milia Islamia University	1989	-do-
11	Indira Gandhi National Open University	1985	-do-
12	University of Delhi	1921	-do-
Gujrat			
13	Central University of Gujrat	2009	Ahemadabad
Harayana			
14	Central University of Haryana	2009	Harayana
Himachal Pradesh			
15	Central University of Himachal Pradesh	2009	Shimla
Jammu & Kashmir			
16	Central University of Kashmir	2009	Srinagar
17	Central University of Jammu	2009	Jammu
Jharkhand			
18	Central University of Jharkhand	2009	Brambe
Karnataka			
19	Central University of Karnataka	2009	Gulberga
20	Kuvempu University	1987	Shivamogga
Kerala			
21	Central University of Kerala (earlier University of Travancore)	1937	Kasaragod
Manipur			
22	Central Agricultural University	1993	Imphal
23	Manipur University	2005	-do-
Madhya Pradesh			
25	Dr.Hari Singh Gaur Vishwavidyalaya (Formerly University of Saugar	2009	Sagar
24	Indira Gandhi Tribal National University	2008	Sagar
Maharastra			
26	Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya	1997	Wardha
Meghalaya			
27	North Eastern Hill University	1973	Shillong
Mizoram			
28	Mizoram University	2001	Aizawl
Nagaland			
29	Nagaland University	1994	Kohima
Orissa			
	Central University of Orissa	2009	Koraput
Pondicherry			
30	Pondicherry University	1985	Pondicherry
Punjab			
31	Central University of Punjab	2009	Bathinda
Rajasthan			

32	Central University of Rajasthan	2009	Jaipur
Sikkim			
33	Sikkim University	2007	Yangang
Tamil Nadu			
34	Central University of Tamil Nadu	2009	Tiruvarur
Tripura			
35	Tripura University	2007	Agartala
Uttarakhand			
36	Hemwati Nandan Bahuguna Garhwal University	2009	Garhwarl
Uttar Pradesh			
37	Aligarh Muslim University	1921	Aligarh
38	University of Allhabad	2006	Allahabad
39	Banaras Hindu University	1915	Varanasi
40	Babasaheb Bhimrao Ambedkar University	1996	Lucknow
West Bengal			
41	Visva-Bharati University	1951	Shantiniketan

For smooth functioning of the central universities in India, the central government allocates funds during a plan period. Budget allocations made available during five year plan period to the central universities in India has been placed below in Table- 6 supplemented with Graph-5 for clear understanding.

(Table-6: Trend of Allocation of Plan Grants to the Central Universities during the Five Year Plans)

Sl.No.	Plan Period	Allocation of Grants	Number of beneficiaries
1.	8th Plan period	`13461.00	12
2.	9th Plan period	`23686.00	15
3.	10th Plan period	`78975.00	18
4.	11th Plan period	`1084300.00	38

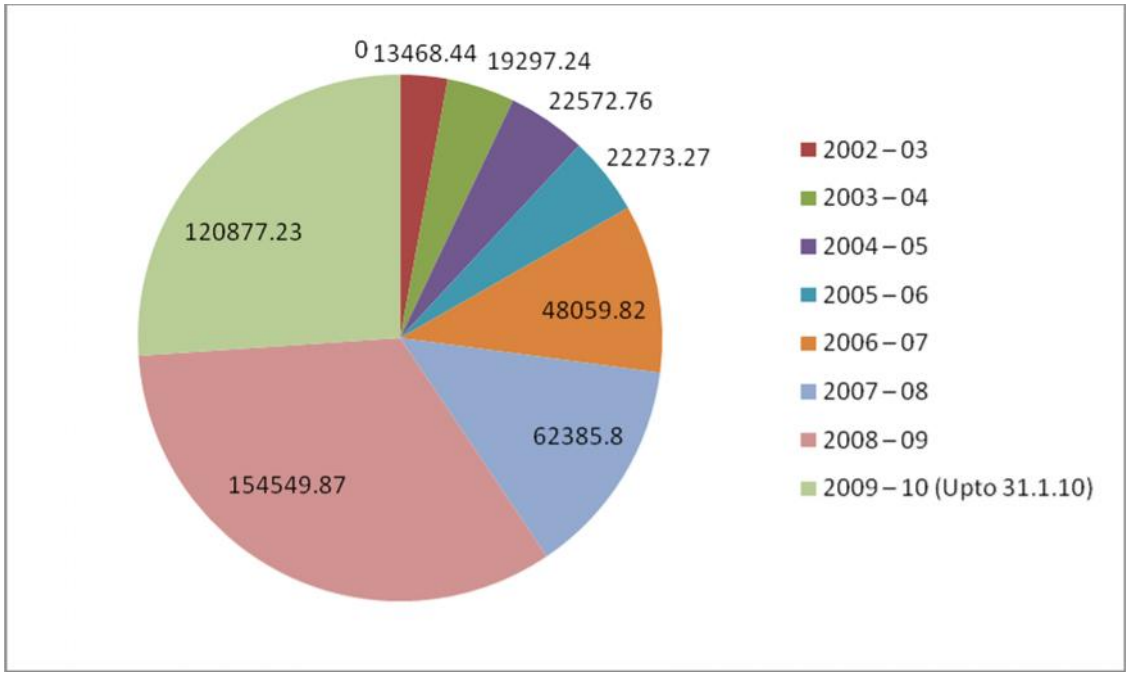


(Graph-5: Trend of Allocation of Plan Grants to the Central Universities during the Five Year Plans)

The year wise breakup of grants allocated through both Plan and Non-Plan to the central universities in India has been mentioned in Table- 7 supplemented with Graph- 6.

(Table- 7: Plan and Non-Plan Grants to the Central Universities in India)

Sl. No.	Year	Plan Grants (Development Grants) in `	Non-plan Grants (Maintenance Grants) in `	Total of Plan and Non-Plan grants in `
1.	2002 – 03	13468.44	71829.30	85297.94
2.	2003 – 04	19297.24	71695.04	90992.28
3.	2004 – 05	22572.76	75050.00	97622.76
4.	2005 – 06	22273.27	90050.30	112323.57
5.	2006 – 07	48059.82	101503.00	149562.82
6.	2007 – 08	62385.80	130553.00	192938.80
7.	2008 – 09	154549.87	179581.00	334130.87
8.	2009 – 10 (Up to 31st January, 2010)	120877.23	209850.52	330727.75
	Total	**`4,63,484.43**	**`9,30,112.16**	**`13,93,596.59**



(Graph- 6: Plan and Non-Plan Grants to the Central Universities in India)

1.11 Central Universities in North-East

At present, the university network in North East, India comprises of 9 (Nine) central universities as stated below which however, has been reflected in detail about their establishment, place etc. in detail in Table- 5.

❶ Assam University, Silchar, Assam

❷ Nagaland University, Nagaland

❸ North-Eastern Hill University, Meghalaya,

❹ Manipur University, Manipur,

❺ Mizoram University, Mizoram

❻ Rajiv Gandhi University, Arunachal Pradesh

❼ Sikkim University, Sikkim

❽ Tripura University, Tripura

❾ Tezpur University, Tezpur, Assam

All the above mentioned universities are attached with a central library to impart library services to the users' communities to promote teaching, learning, research and development in their respective field of interest of the concerned universities.

1.12 Central University Libraries

Education is extremely important for the development of a nation and is entirely unimaginable, inconceivable in the contemporary world to think of a society or a nation without the education. It is the education which contributed immensely for the growth and development in every sphere of life. Higher education equally is considered to be one of the key factors in promoting and accelerating the process of national development. Higher educational institutions, therefore, play a significant role in providing knowledge through their teaching and research programs.

The onus of framing of policies concerning to the higher education lies with the Central Government which also takes the responsibility of instituting central universities in different states through the acts of legislation passed by the parliament. The central universities have always reflected a national diverse character in the composition of students, teaching and non-teaching staffs. Further, it not only facilitates these universities in attracting students from across the country but also prompt to retain the talents of the faculties, researchers. As discussed, each of the nine central university of North-Easts is attached with a central library to equip the students, teachers, research scholars with intellectual wealth, resources comprising both print and electronic to build the nation. A detail account of the central library attached to the institution is as follows.

⇨ Central Library, Assam University

⇨ Central Library, Manipur University

⇨ Central Library, Mizoram University

⇨ Central Library, Nagaland University

⇨ Central Library, North-Eastern Hill University

⇨ Central Library, Rajiv Gandhi University

⇨ Central Library Sikkim University

⇨ Central Library, Tezpur University

⇨ Central Library, Tripura University

1.12.1 Central Library, Assam University

Assam University was established by an Act of Parliament in 1994. The total holding of library books about 52557, 199titles of current Journals have been subscribed (Foreign Journals -13) and (Indian Journals (186), News papers - (16) Popular Magazines – (12).

Assam University library is one of the libraries selected by UGC for automation and networking under INFLIBNET programme in the year 1998-1999. The library automation is under progress and a database of 25000 books have already been created using SOUL software provide by INFLIBNET Centre, Ahmedabad.

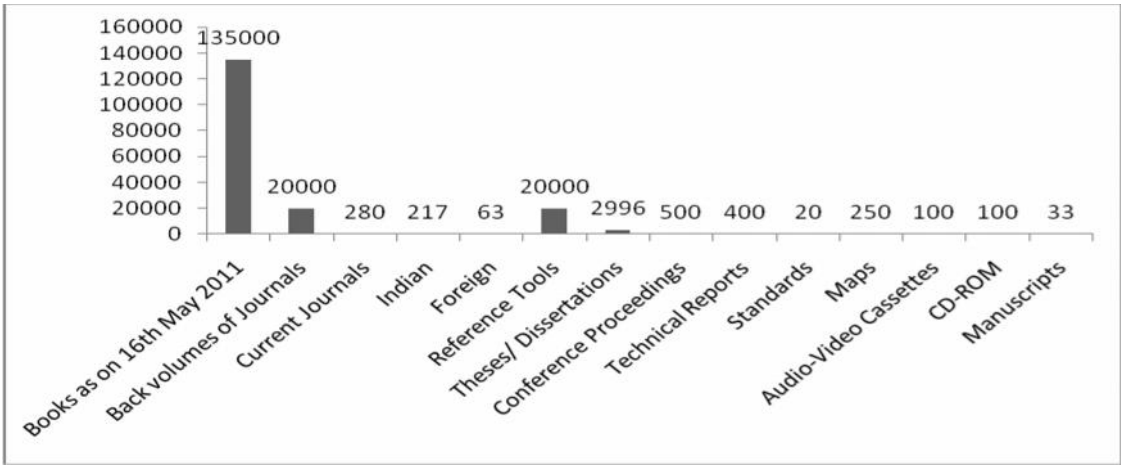
The university has nine schools on major discipline are as follows :- i) Social Sciences, ii) Humanities, iii) Language, iv) Life Sciences, v) Physical Sciences, vi) Environmental Sciences, vii) Information Sciences, viii) Management Studies and xi) Technology There are nine (29) departments under these nine (9) Schools.

1.12.2 Central Library, Manipur University

Manipur University was established in 5th June 1989 and it was converted to Central University status on 2005 and the library can be accessed through its website as given in Appendix-I. The central library of the university through its well-built collections provides an effective service to its users. The collections of the library have been shown in Table- 8 which has been supported with Graph- 7.

Table- 8: Collection Development of Manipur University Central Library

Sl.No.	Description	Number
1	Books as on 16th May 2011	135000
2	Back volumes of Journals	20000
3	Current Journals	280
4	Indian	217
5	Foreign	63
6	Reference Tools	20000
7	Theses/ Dissertations	2996
8	Conference Proceedings	500
9	Technical Reports	400
10	Standards	20
11	Maps	250
12	Audio-Video Cassettes	100
13	CD-ROM	100
14	Manuscripts	33



Graph- 7: Collection Development of Manipur University Central Library

The said library uses SOUL- 2.0 for library automation and various library activities are done with the help of the software. It is a fully automated library. Library further is a member of UGC-Infonet getting thereby, a link to multiple e-resources for its users. Further, all the academic departments of the university is connected with the central library facilitating thereby, access to e-resources by the academic communities. The university library also gets access to e-resources and bibliographical databases from Springer, Nature, J-Gate and JCCC. It also provides the Web of Science service to its communities.

Infrastructures

Infrastructures available in the library under discussion are as follows.

- ✓ Number of Computers : 35
- ✓ Number of Scanner : 2
- ✓ Number of Barcode : 1
- ✓ Number of Printers : 2
- ✓ Number of Photocopiers : 1
- ✓ Number of Fax Machine : 1
- ✓ Number of Telephone : 1
- ✓ Number of TVs : 1
- ✓ Number of Projectors : 1

1.12.3 Central Library, Mizoram University

Mizoram University was established in 2001. Central Library, Mizoram University has been witnessing noteworthy development in various spheres during the last few years. Though it is a university with only 9 complete years, still it has a well built collection imparting services to a total number of 1617 comprising 1058 number of-Undergraduate and Post Graduate Students, 39 and 273 no. of M. Phil and Ph.D Scholars respectively including 152 no. of

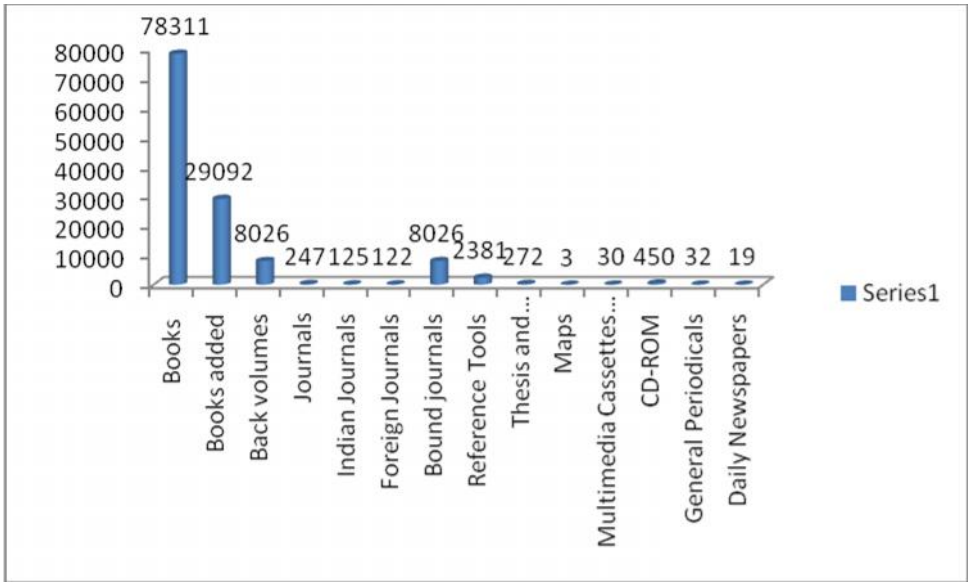
Teachers, 3 no. of Guest Lecturers, 2 no. of Department Libraries , 90 no. of Non- Teaching Staffs The entire library holdings have been available in machine readable catalogue since 2008;and the computerized bibliographic information of the library holdings have also been available for users' searching throughout the campus Network (Intranet) using web OPAC. Automated circulation system using barcode technology has bee used since 1st December 2008 which provides easy and prompt service.

Digitization of Mizoram University's own documents and publication for setting up of an Institutional Repository is an ongoing process. The repository will collect and provide free online access to all types of institutional research output initially within the campus network (Intranet). Library also initiated the process of implementing CD/DVD mirror sever to store the contents of CDs and DVDs and provide accessibility of the digital data achieve throughout the campus network.

The collection developments of the Mizoram University Central Library have been shown in Table-9 followed with Graph-8.

(Table- 9: Collection Development of Mizoram University Central Library)

Sl.No.	**Description**	**Number**
1	Books as on 16th May 2011	78311
	Books added during the year	29092
2	Back volumes	8026
3	Total no. of Journals	247
4	Indian Journals	125
5	Foreign Journals	122
	Bound volume journals	8026
6	Reference Tools	2381
7	Thesis and Dissertations	272
10	Maps	03
12	Multimedia Cassettes (Audio-Video)	30
13	CD-ROM	450
14	General Periodicals	32
15	Daily Newspapers	19



Graph-8: Collection Development of Mizoram University Central Library

The central library of the university has applied Libsys software for its automation and as of now taking all activities of library operations through an automated environment. The library also provides e-content service which is accessible in the library. However, the LAN has been extended to all the academic departments, all the laboratories, centers, units. Further, library is well connected with the departments through intranet and a campus network along with library network has been established with internet connectivity. To provide the optimum services to its users, the library is a member of UGC-Infonet through which multiple number of journals and articles in electronic form in the streams of Arts, Science, Commerce are accessible along with the access to a wide range of e-resources with full text and bibliographical databases from the site of Springer Link, Nature, J-Gate and JCCC. Mention may be made that, the bibliographical databases are Web of Science.

The library of the university through automation provides cataloguing, circulation, e-mail, Check-in, Check-out, Renewal, Reservation and Facsimile transmission (FAX) service to its users. Moreover, with the application of the library software the library also provides OPAC and Web OPAC Services to the users.

Infrastructures

Infrastructures, one of the major components required to be built immensely so as to facilitate the service in an effective way and this could be visualized of the library under discussion which is having a good collection of the same. Infrastructures available in the library are placed below.

- ✓ Number of Computers : 25
- ✓ Number of Scanners : 2

- ✓ Number of Barcode : 2
- ✓ Number of Printers : 3
- ✓ Number of Photocopiers : 2
- ✓ Number of Fax Machine : 1
- ✓ Number of Telephone : 3
- ✓ Number of Projectors : 1

It could also be observed that, the latest security system in the central library of Mizoram University has been installed known as Radio Frequency Identification (RFID) which is primarily used for (i) Security, (ii) Self Check-out, (iii) Self Check-in and (iv) Misplace Shelving.

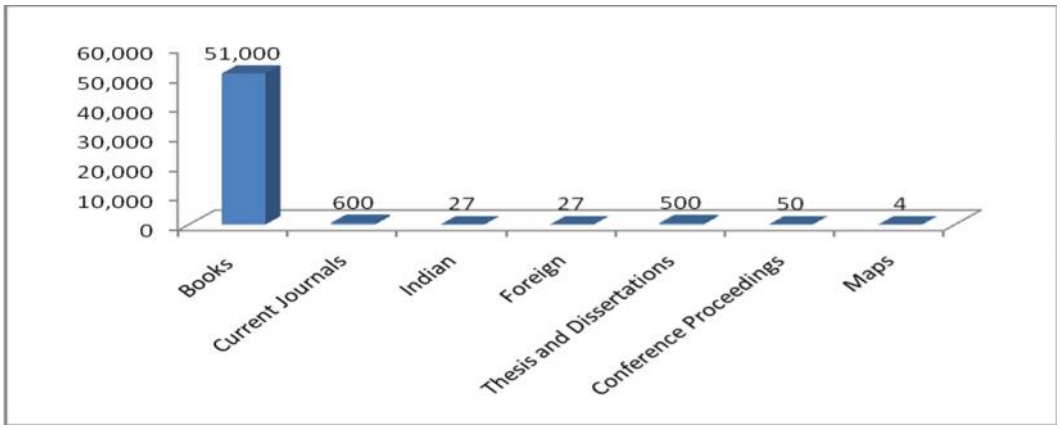
1.12.4 Central Library, Nagaland University

Nagaland University was established by an Act of Parliament in 6th September 1994. The library is holding the following collections to serve its user community. Data relating to the holdings of the Nagaland University Central Library has been mentioned in Table- 10 supplemented with Graph- 9.

(Table-10: Collection Development of Nagaland University Central Library)

Sl.No.	Description	Number
1	Books as on 16th May 2011	51,000
2	Current Journals	600
3	Current subscription of Journals Indian Foreign	54 27 27
4	Thesis and Dissertations	500
5	Conference Proceedings	50
6	Maps	04

(Source: www.nagalanduniv.ac.in- Accessed on 16.5.2011)



(Graph-9: CollectionDevelopment Nagaland University Central Library)

The following infrastructure facilities are also available in the library.

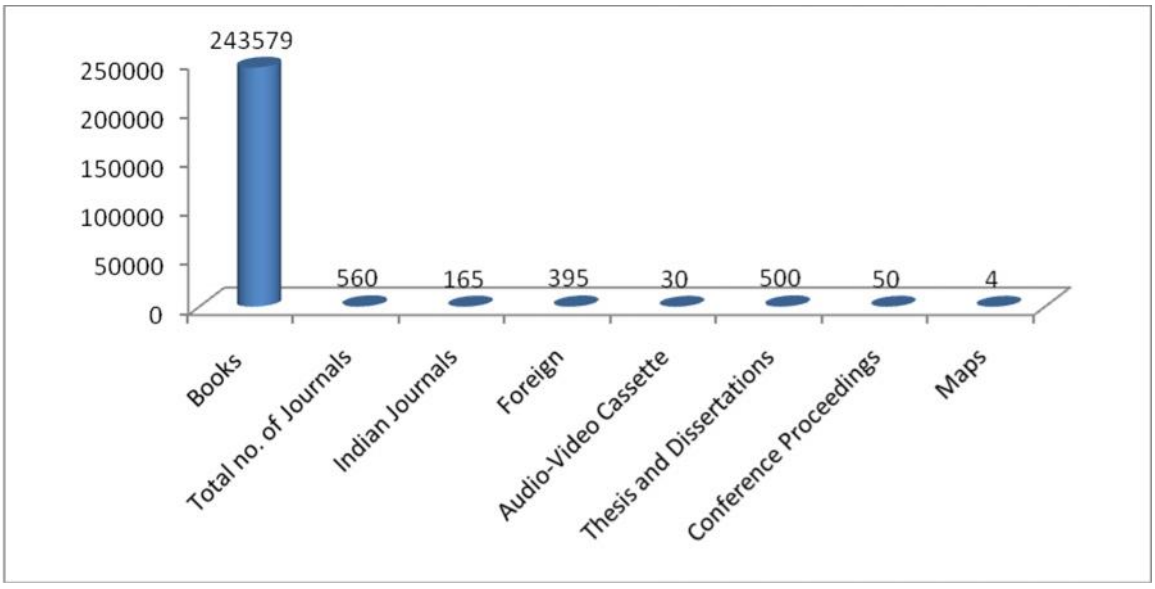
- Number of Computer : 8
- Number of Barcode Scanner : 1
- Scanner : 1
- Number of Printers : 1
- Number of Photocopiers : 2

1.12.5 Central Library, North-Eastern Hill University (NEHU)

NEHU established in the year 1973 is supported with a well built library comprising the following collections to serve the users. The data relating to the collections of the library have been placed in Table-11 affixing Grpah-10.

(Table-11: Collection Development of NEHU Central Library)

Sl.No.	Description	Number
1	Books as on 16th May 2011	243579
2	Total no. of Journals	560
3	Indian Journals	165
4	Foreign	395
5	Audio-Video Cassette	30
6	Thesis and Dissertations	500
7	Conference Proceedings	50
8	Maps	04



Graph-10: Collection Development of NEHU Central Library

The central library of the university uses Libsys software for automation and as of now, it is fully automated which along with other services also provides e-content service. The library along with the campus is connected with LAN support thereby, facilitating all academic

departments including the library with internet and intranet connectivity. Further, the campus network and library network are connected with BSNL Broadband Internet connections with a bandwidth of library network > 6.0Mpbs and above. The library has also taken all out measures to provide e-resource service to the academic community, students and research scholars through consortia through UGC-Infonet from INFLIBNET. The library not only gets connected to UGC-Infonet consortium but also INDEST, CSIR consortium to facilitate e-resources to the science stream academicians. Full text and bibliographical databases available in NEHU central library are, Science Direct, ACM Digital Library, IEEE Online, Springer Link, Proquest, ASME, ASCE, Nature, ASTM journals and Standards, J-Gate, and JCCC. Further, bibliographical databases available for the users in the central library include Chemical Abstracts, Biological Abstracts and MathSciNet. The central library, NEHU provides the following networked services such as, automated cataloguing, circulation, e-Current Awareness Service, Online Databases, CD-ROM/DVD, Electronic Thesis and Dissertations (ETD), Multimedia Databases like, audio and video etc., Standards (CD-ROM or intranet version), Internet, E-mail, Video and Teleconferencing, Facsimile Transmission (FAX), and Web-based document delivery services. Again, for a wider benefit of the users, the library is not lacking behind in providing OPAC and Web OPAC services.

The library is more exposed and transparent to the users in providing the optimum services inside the library which include Check-in, Check-out, Renewal, Reservation and Inter-library loan, current contents, new arrivals, alert and newspaper clipping etc.

Infrastructures available in the library are mentioned below.

- ✓ Number of Computers : 120
- ✓ Number of Scanner : 6
- ✓ Number of Barcode : 4
- ✓ Scanners : 4
- ✓ Number of Printers : 26
- ✓ Number of Photocopiers : 6
- ✓ Number of Fax Machine : 3
- ✓ Number of Telephone : 30
- ✓ Number of TVs : 1
- ✓ Number of VCP/VCRs : 2
- ✓ Number of Projectors : 1

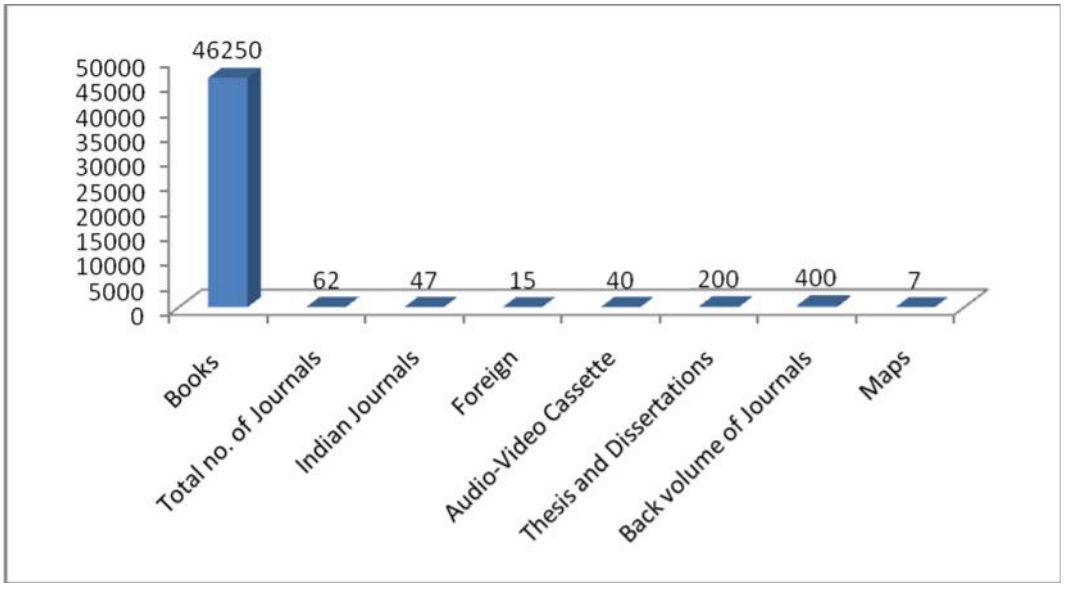
However, the library has provided separate area/space for e-contents and for this 30 computers are provided for the benefit of the users.

1.12.6 Central Library, Rajiv Gandhi University

Rajiv Gandhi University, Arunachal Pradesh was established in 1984 and was converted to central university in the year 2008. The university central library also equally put emphasis in providing services to its users in multiple ways. The university central library uses Libsys software for its library automation and also a member of UGC-Infonet getting thereby, a lot of e-resources for the use in the library and the faculties, research scholars, students etc. The library also access e-resources and full text databases from IEEE Online, Springer link, proquest, ASME, ASCE, j-Gate and JCCC. Bibliographical databases available from Biological Abstracts and provides access to e-journals and other network services such as, OPAC on intranet, and e-mail service. The services could be more prominent after the application of library software which facilitated the library to opt for most of the functions of the library activities which could be carried out automatically. The collection development of the library is mentioned below in Table- 12supplemented with Graph- 11.

(Table-12: Collection Development of Rajiv Gandhi University Central Library)

Sl.No.	Description	Number
1	Books as on 23th May 2011	46250
2	Total Number. of Journals	62
3	Indian Journals	47
4	Foreign	15
5	Audio-Video Cassette	40
6	Thesis and Dissertations	200
7	Back volume of Journals	400
8	Maps	7



Graph- 11: Collection Development of Rajiv Gandhi University Central Library

1.12.7 Central Library, Sikkim University

Sikkim University was established on 2nd July, 2007. Sikkim University central library endeavors to establish a world class library with up-to-date, contemporary academic and general books, journals, magazines, research publications, manuscripts, reports and other documents in various disciplines and subjects. University has got access to more than 5000 e-Journals available. Ten (10) computers in the library are solely dedicated to access INFLIBNET based e- resources. In a very short period of over about two years, the University Central Library has spread into more than 9000 sqft and has acquired over 10000 books from across the disciplines/subjects.

In order to promote research activities and broad based teaching practices, the library is in the process of acquiring the publications of various Multilateral and national institutions. The library is also in collaboration with Inter-University Centre (IUC) of UGC and Information and Library Network Centre, connected with Information and Library Network (INFLIBNET), a network that allows free access to e-journals published from India and abroad. Through INFLIBNET, now the Library can access journals listed in e-resources like American Chemical Society, American Institute of Physics, American Physical Society, Annual Reviews, Blackwell Publishing, Cambridge University Press, Economic & Political Weekly, Elsevier Science, Emerald, Institute of Physics, ISID, JCCC, JSTOR, MathSciNet, Nature, Oxford University Press, Portland Press, Project Euclid, Project Muse, Royal Society of Chemistry, SIAM, Springer Link and Taylor & Francis. Apart from these e-resources, University is also enlisted in DelCON, an e-resources consortium for biological sciences in North East India under Department of Bio Technology, Govt of India. Under this INFLIBNET and DelCON connectivity, University has got access to more than 5000 e-journals available in Microbiology, Bio-Technology, Zoological, Chemical, Environmental, Social, Humanities and Life Sciences. About 10 computers in the library are solely dedicated to access INFLIBNET based e-resources. University is in the process of extending this connectivity to other academic buildings for maximum utilization by various stakeholders. The University Library is also subscribing leading international, national journals, magazines, news papers in various disciplines.

1.12.8 Central Library, Tezpur University

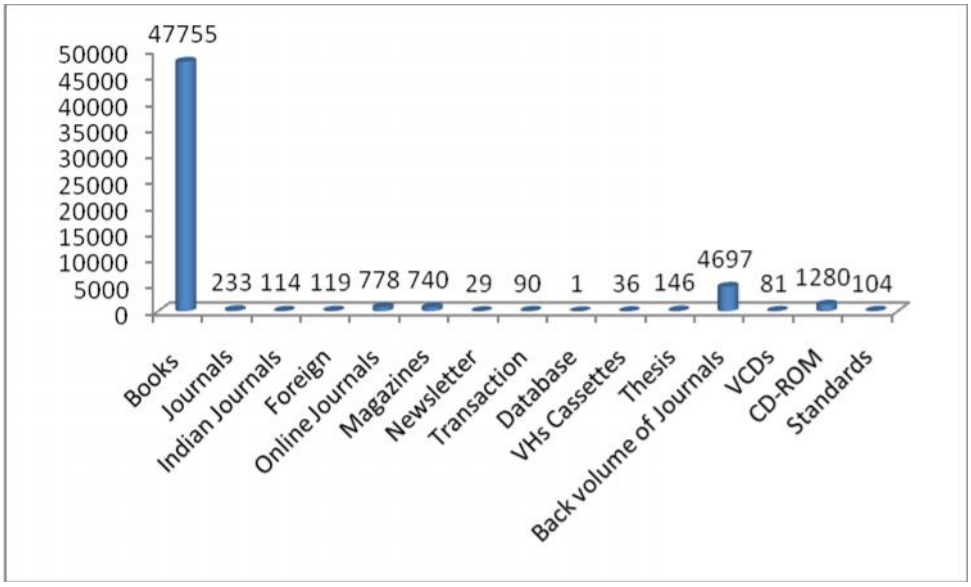
Tezpur University was established by an Act of Parliament in the year 1994. Tezpur University also put emphasis on the users need and to meet the demands of the users especially research scholars and faculties including the students of various academic disciplines, the library has strengthened its collection development to provide the use oriented

service. The Central Library moved to its new permanent building in February, 2009. The library holds its goal to achieve the height as an ideal University library in the region as well as in the country. The objective ahead is to serve the university community in the sphere of literature and information services both in qualitative and quantitative terms in a sustained manner towards attainment of the academic and research pursuits as set by the University. In order to achieve the objectives, the library is continuously striving to adopt the best practices in all endeavours of its activities *viz.* acquisition, technical processing, scientific organization of the resources housed in the library as well as services to its clientele.

The total collections of the library as on date comes to 1011 current Journals out of which 233 are the print and 778 are the on-line journals. It also strengthens its holding through the database including accessing electronically to the other national database from INDEST, AICTE Consortium and other publishers. The total collections of the library have been shown in Table- 13 supplemented with Graph-12.

(Table-13: Collection Development of Tezpur University Central Library)

Sl.No.	**Description**	**Number**
1	Books as on 23th May 2011	47755
2	Total Number. of Journals	233
3	Indian Journals	114
4	Foreign	119
5	Online Journals	778
6	Magazines	740
7	Newsletter	29
8	Transaction	90
9	Database	01
6	VHs Cassettes	36
7	Thesis	146
8	Back volume of Journals	4697
9	VCDs	81
10	CD-ROM	1280
11	Standards	104



Graph-12: Collection Development of Tezpur University Central Library

Further, the UGC-Infonet e-journal consortia of INFLIBNET are also providing access facility to 6624 e-journals and 10 (Ten) databases. The library also holds 81 VCSs and more than 1200 CDs scattering to different thought contents. Library users can access book databases, these database, journal database, e-journals and other e- resources from any terminal within the university campus.

1.12.9 Central Library, Tripura University

Tripura University was established in 2nd October 1987 and it was converted to Central University on 2nd July 2007. The Central Library of Tripura University came into being in the same year with an initial collection of 18780 books and documents, taken from the erstwhile Calcutta University Post-Graduate Centre (CUPGC). The collection development of this university is shown as under in Table-14.

(Table-14: Collection Development of Tripura University)

Sl.No.	Description	Number
1	Books as on 23th May 2011	97500
2	Total Number. Of Journals	141
3	E-Journals from UGC-Infonet	8000

The computerization of library services and the creation of database a under process by "SOUL" Software and new advanced technology is under active consideration under INFLIBNET. In 2004, the ERNET's 64 kbps VSAT Connectivity was separated to 250 kbps SCPC VSAT connectivity under UGC INFONET programme, currently the library is equipped with 10 Mbps dedicated leased line under the UGC –INFONET programme and 1Gbps dedicated leased line under NKN NMEICT.

1.13 Statement of the Problem

To promote research and development in the academic sphere extensive measures have been taken by various organizations to provide electronic resources in one form or other. To mention, the UGC–Infonet through INFLIBNET provides a good length of e-journals as mentioned in Appendix-II. The UGC-Infonet as of now facilitates electronic resources services through consortia to its 142 member libraries in India including all the nine central universities of North-East as discussed above. The geographical location of the central universities located in North Eastern States constantly encounter problems while accessing the e-resources from UGC–Infonet causing thereby, a lot of inconveniences in research activities among the university libraries in these states. The problems associated with such access include Internet, Bandwidth, Service Provider, Infrastructures, and Devices etc. including the acquaintance with technology This is further accumulated with the accessing problems in constant failure of the proxy server (under firewall environment) to the member libraries of INFLIBNET, Network, and broadband etc. The problems caused serious inconveniences to the users especially in the above central universities of North-East to take the benefits of the library consortia model developed by UGC–INFLIBNET causing thereby, serious dislocation in research, teaching and development.

1.14 Objectives of the Study

The primary objectives associated with the present study include to:

- ⇨ Develop a strategic model of an Integrated Library Network and Consortium among the Central University libraries in North-East Region.
- ⇨ Extend a model system of cooperative acquisition of information resources in electronic form.
- ⇨ Suggest a mechanism for easy access to provide vast amount of e-resources with less cost.
- ⇨ Derive the maximum benefit of Library Network/ Consortia by all categories of users of universities of North-East Region.
- ⇨ Design economically viable model of Library Network and Consortium using latest ICT technologies for North-East Region and the operational organization.

1.15 Scope of the Study

Developing an Integrated Library Network/ Library Consortium among the central university libraries of North-Eastern States has been taken in the purview of the present research. The scope of the study further extends to i) Library Networking, ii) Types of Networking, iii) Internet iv) Networking and Technologies, v) Collection and Management of e–resources, vi) Developing policies for building of digital collections, vii) Requirements of electronic infrastructures for digitization etc. for making an exhaustive approach to the study and suggest viable model of library network and consortia in North-East Region.

The present study is limited to all nine central university libraries of North Eastern as already discussed above for which the scholar made effective use of information from various libraries, e-resources through network. A sound collection of e-resources and sharing of the same among the central university libraries in North Eastern States could facilitate the research work among the various scholars pursuing research work in their respective universities in different multi-disciplinary subjects. The present study, however, excludes the study of any other central organization libraries prevailing in the North-East. Further, as the filled-in questionnaire submitted to the users of Tripura University and Tezpur University were not received by the scholar in due time despite the best efforts, the two universities were excluded from the purview of the study and thereby, the study was further limited to 7 central universities instead of 9.

The scope of the study limits to the proposal for effective use of resources among the member libraries of each Universities and Colleges covered under UGC-INFONET Digital Library Consortia. The administrative studies of the same have been excluded from the purview of this study.

1.16 Methodology

The central university libraries happen to be the right platform for pursuing higher education and research in accessing and using rich collections available both in traditional and electronic form. This is supplemented with the Library Network and Consortia program developed by various national organizations such as UGC-INFLIBNET, DELNET, IIT, and CSIR etc. The scholar prepared a structured questionnaire covering various relevant facets relating to research topic and submitted to the Librarian of the respective all nine central universities out of which, 7 (seven) filled-in questionnaires were received which constituted 78% responses leaving behind 2 (22%) who did not respond. Further, the scholar adopted a stratified sampling technique to obtain representative samples as the user samples constitute a heterogeneous group. The scholar divided the total population in to several sub-population

groups which are individually homogenous and the scholar selected the items from each stratum to constitute a sample. Accordingly, the scholar distributed 50 questionnaires to each of the library users constituting faculties, research scholars and the students of all nine central universities which formed a total population of 450 excluding 7 librarians. As mentioned, the scholar did not receive the filled-in questionnaire in due time from the users of Tripura University and Tezpur University, the total population for the study was confined to 350 instead of 450. Thus, out of 350 questionnaires, 312 filled in questionnaires were received from the users of seven central universities which formed 89% in total leaving behind the non-respondent 38 (11%).

Apart from the above method, the scholar also applied interview and observation methods to ascertain the view from the users encountering problems while accessing the e-journals. The personal interview enabled the scholar to meet and discuss the library authorities with regard to ICT infrastructures requirements including other related issues. After collection of filled-in questionnaires by the Librarian and the users were scrutinized, analyzed, tabulated for interpretation of data to draw conclusion which helped the scholar to develop a plan for implementation in the respective central university libraries under study for effective dissemination of information and resource sharing.

1.17 Review of Literature

Substantial number of literature are available through books, journals, conference proceedings, reports, pamphlet and web etc. with regards to Library Network and Consortia, which have been properly taken care by the scholar. Further, the scholar consulted literatures which are available in form of theses and dissertations concerning to library network and consortia. Both documentary and electronic sources were consulted to ascertain the available literature in the field of research. The scholar has put forth below the list of some of the consulted literatures.

- Sharma, SK and others. (2006).UGC-InfoNet: A cross-sectional view on infrastructure. *In.* Digital Preservation, Management, and Access to Information in the Twenty-first Century. *Ed.* Manoj Kumar K. *Planner Proceedings.* Ahmadabad; INFLIBNET. pp.322-335.

The authors in their papers have described about the role of UGC-INFLIBNET to modernize the university campuses with the state-of-the-art campus wide networks and nationwide communication network through UGC-InfoNet.

- Chandran, D. and Reddy, J. Yadagiri. (2004). *In.* Library Consortia and Networks. Library Consortia: *Seminar Papers & Proceedings*. *Ed.* N L Rao et.al. Hyderabad;

Indian Association of Teachers of Library & Information Science (IATLIS). pp. 156-164.

The authors in their paper explained the need and importance, advantages, operating principles/ guidelines. They also enumerated the international and national library consortia including the consortia initiatives in India and the Indian Libraries.

◈ Geetha, V and Kumar. (2004). Library Consortia Models. *In.* Library Consortia and Networks. Library Consortia: *Seminar Papers & Proceedings*. *Ed.* N L Rao et.al,. Hyderabad; Indian Association of Teachers of Library & Information Science (IATLIS). pp.245-249.

In this paper, the authors have mentioned about library consortia and various models relevant to the libraries in the changing situations.

◈ Prem Chand. (2004). Consortia Model for Academic Libraries in North East Region. *In.* Library Consortia and Networks. Library Consortia: *Seminar Papers & Proceedings*. *Ed.* N L Rao et.al. Hyderabad; Indian Association of Teachers of Library & Information Science (IATLIS). pp. 15-26.

The author categorically pointed out the aim, types and growth of consortia. Apart from discussing the consortia initiatives in India, the author focused on the proposed consortia model in the North-East for al where he discussed that, the consortia can be categorized into four different models i.e., (i) By Sector, (ii) By Funding Source, (iii) By Governance/ Organizational Structure, and (iv) By Specific interest.

◈ Rao, K Somasekhar. (2004). Consortia: The Indian University Libraries. Library Consortia: Seminar Papers & Proceedings. Hyderabad; Indian Association of Teachers of Library & Information Science. pp.152-155.

Author in this paper has described vividly the library consortia and its characteristics. Apart from the discussions on need and importance of consortia in university libraries, the author also discussed on the areas of its application.

◈ Uma, V and Ganeshan. (2004). Library Consortia in the Digital Age. *In.* Library Consortia. *Seminar papers and proceedings. Ed.* N.L.Rao et.al. Hyderabad; IATLIS. pp. 144-151

The authors have discussed the need of library consortia due to technological advancements, revolutionary changes and invention of high storage/computing devices and high-speed networks.

◈ Hangsing, R and other. (2003). *In.* Automation of Libraries in North Eastern Region: Trends, Issues and Challenges. *Ed.* TAV Murthy. Ahemadabad; INFLIBNET.pp. 288-294.

The authors through the paper have discussed the problems associated with academic libraries of North-East for resource sharing. Further, the benefits of library automation have been well explained by the authors.

◈ Krishnapal, J and others. (2003). *In.* Automation of Libraries in North Eastern Region: Trends, Issues and Challenges. *Ed. TAV Murthy.* Ahemadabad; INFLIBNET. pp. 253-273.

The authors including the other areas of library consortia also have suggested a consortia initiative through a model approach known as 'PLACON' (PLANNER- Consortia) (Promotion of Library Automation and Networking in North Eastern Region- Consortia).

◈ Alemna, A A. and Antwi, I K. A Review of Consortia Building among university libraries in Africa. *Library Management.* 23(4-5); 2002; 234-238.

The authors in this paper have mentioned about the evolving trends in library consortia building against the backdrop of recent developments in some African countries. The expected benefits and barriers to consortia building are highlighted. The writers also suggested the way for forwarding the same in successful consortia building among university libraries in Africa.

◈ Evans, J E. Management issues of co-operative ventures and consortia in the USA, Part one. *Library Management.* 23(4-5); 2002; 213-22.

The author was cautious about whether the cost savings can actually be realized through membership in a consortium that shares access to members' collections. He emphasized that is seductive to assume cost savings that could be gained but in reality, the efforts need to be coordinated within a consortium that would offset gains made through complementary collecting of materials.

◈ Peters, T A. Consortially speaking: E-reference: How consortia add value. *The Journal of Academic Librarianship.* 28(4); 2002; 248-50.

The author in the paper discussed that e-reference offers opportunity to capitalize on the resource sharing potential for staffing such a service where, consortia efforts could provide the critical mass of staffs to make an e-reference service sustainable among a group of small

libraries. He also mentioned that consortia have the buying power to grab the attention of vendors that traditionally, it cannot be marketed.

- Thornton, G A. Impact of electronic resources on collection development, the roles of librarians and library consortia. *Library Trends.* 48(4); 2000; 842-856.

The author traced the history of cooperative purchasing, the impact of electronic resources on library purchasing and provided a case study of his experience at Cleveland State University. He mentioned that due to rising in costs, the university decided not to carry both electronic and paper copies of journals. He stressed upon the consortia arrangement which may limit the ability of academic departments to select and deselect journals as they might wish.

- Kopp, J J. Documenting Partnership: here a MOU, there a MOU. *Library Administration and Management.* 13 (2); 1999; 68-77.

The author in the paper outlined the structure for determining costs for a partnership venture declaration for the purpose, terms of the agreements, purchase, ownership and management including the systems maintenance and support, service availability, right to data file, confidentiality, cost allocation, distribution, vendor contracts, expansion governance, insurance, withdrawal/ dissolution etc.

But, no scholar has taken up the study pertaining to Library Network and Consortia in North-Eastern region in doctoral research level.

Moreover, it further requires obtaining more literature in the field so as to make the study an exhaustive one and to draw a proper plan to be used in the Central university libraries.

1.18 Hypothesis

The hypothesis for the study developed by the scholar has been mentioned below which were tested on the basis of data collected, interpretation and findings.

- Networking, which is indispensable for collection of electronic information and its organization for effective dissemination to the users, is a continuous problem in the North-Eastern states.
- Library Consortia acts as a supplement to provide the e-information to the user communities.
- Accessing of Electronic documents through Library Consortia requires a viable networking system in the library.

⇨ Network connectivity failure causes a serious threat in accessing the electronic resources and it hampers in research.

⇨ Library Consortia is eminent for acquiring electronic information and distribution through sharing which facilitate comprehensive accumulation of e-information and budget control.

1.19 Chapterization

The present study is divided in to 7 (seven) chapter. Chapter-1 of the study is discussed on 'Introduction' that includes, Education: the Notion, Higher Education, Expansion of Higher Education, Growth of Higher Education in India, Importance and Function of Library in higher education, Role of UGC in Libraries, College Education, University Education, Broad view of Central Universities in India and North-East in particular, Statement of the Problem, Objectives and Scope of the Study, Methodology, Review of Literature and Hypotheses. Chapter -2 of the study focuses on Growth and Development of Library Networks and Digital Library where, Networking, Types of Networks such as, LAN, WAN, MAN, VAN, Characteristics, Objectives, Implication, Need of the Network. Further, this chapter discusses on Library Network including its purposes. National Efforts and Status of Networks in India, Need, Objectives of Library Network, and Internet etc. have been deliberated in the chapter. Chapter- 3 of the present study centers round the discussion on 'Library Consortia: Organization and Services', where, Library Consortia, Scope , Opportunities, Need, Emergence, Goals and Objectives, Characteristics, Prerequisites, Trends, Issues, Infrastructure, Standards etc. of Consortia have been discussed. UGC InfoNet, different consortia projects in India, Types of Consortia etc. also have been discussed in the chapter. Chapter-4 of the study deals with 'Library Network and Consortia for North-East Region Central University: A Model'. Model for Library Consortia, Consortia Pricing Model, International Consortia Model, Consortia Models in India, FORSA, CSIR, INDEST etc. are the focal discussion of the chapter. Other discussion of the chapter includes, Proposed Model, Observed Model, PLACON Model, License Agreement, Management Structures etc. Chapter-5 of the study primarily stress upon 'Electronic Licensing' where, over-riding principles, legal issues, consortia licensing, strategies, advantages and disadvantages of licensing also have been discussed. Chapter-6 of the study is based on the Data Analysis and Findings including testing of hypotheses. Chapter-7 of the thesis mentions about the suggestions and conclusions.

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CHAPTER – 2

Growth and Development of Library Network and Digital Library

2. 1 Networking – The Concept

The advancement of science and technology has made unparallel improvements especially in all the service spectrums and library and information service is no exception to it. Information Technology (IT) consequent upon its applications in a wide area has changed its notion to Information and Communication Technology (ICT), which is used to describe the equipments (hardware), and computer programs (software) that allow the libraries and user communities to access, store, retrieve, organize, manipulate and present information through electronic means including the application of communication technology. It is the electronic storage, processing and display of information but not necessarily the transmission of information. ICT involves the application of computer technology based hardware and software systems and communication systems enabling the libraries for acquisition, representation, storage, transmission and use of information. As already mentioned, Information and Communication Technology is the convergence of Information Technology and Communication Technology which work on the platform of networking, software and hardware. It is associated with communication mechanisms, collaboration and engagement that enable to process, manage and exchange of data, information and knowledge. The technology is required for information processing and dissemination of information in general and the use of computers and computer software's for conversion, storage, preservation, processing, transmission and retrieval of information in particular.

Application of Information and Communication Technology (ICT) has dramatically altered the library services globally concerning organization, management of resources in the libraries. ICT not only primarily holds the key to the success of modernizing information services but also has introduced new ways of information handling. It also brings about a sustainable change in accessing, structure, management and dissemination of information. The application of ICT has a far-reaching impact in wide dimensions of library services in general but in particular, it is applied for converting the existing paper-print records in to digital form including the storage, dissemination and retrieval, etc. to make free flow and exchange of information both nationally and globally. In academic libraries especially in higher education field such as college and university, ICT presents an opportunity to provide value-added information services and access to a wide range of digital-based information resources to their clients. Further, libraries are also using modern ICT to automate their core functions, implement efficient and effective library cooperation and resource sharing networks, implement management information systems, develop institutional repositories of digital local content, and digital libraries; and initiate ICT-based capacity building

programmes for library staff and information literacy programmes for library users. However, for most libraries in India, use of ICT is largely restricted to traditional library automation, i.e. replacing manual operations by computerized methods. Innovative use of information and communication technologies in libraries is not widespread. It could be applied in the libraries within the purview of many constraints. It encountered several challenges and constraints, such as, lack of funds to sustain the ICT infrastructure, inability by librarians/libraries to keep up with the pace of developments in ICT, inadequate ICT facilities in the libraries, lack of staff with appropriate skills to manage etc. ICT both at the strategic and operational levels, absence of institutional policies and strategies to support and guide the use of ICT, and lack of adequate knowledge and skills to manage digital information resources and to deal with issues relating to copyright intellectual property rights in a digital information environment . ICT have brought revolutionized the total library sector with regard to its management, services as already discussed. Conventional LIS such as OPAC, User Services, Reference Service, Bibliographic Service, Current Awareness Service, Document Delivery, Inter-library loan, Audio-Visual Services and Customer Relations could be provided more efficiently and effectively by using ICT, as they offer convenience of time and place, cost effectiveness, faster and most up to date dissemination and end user's involvement in the LIS processes. Impact of ICT on information services is characterized by changes in format, contents and methods of production and delivery of information products, emergence of Internet as largest repository of information and knowledge, etc. that changed role of LIS professional from intermediary to facilitator. New tools for dissemination of information, shift from physical to virtual service environment, and extinction of some conventional information services and emergence of new and innovative web based LIS changed the entire scenario of the library. Web enabled services are provided through library web page. New services included access to internet and internet based tools and services, access to electronic information sources and digital library of local and institutional documents. Journals, books, dissertation & theses, course material and patents are some of important sources of information that are now available in electronic form. Electronic resources provide 24 hours any where flexibility and convenience of use by multiple users and full text searches and faster delivery. The academic library finds itself in a time of tremendous challenge but it is also a time of boundless opportunity to use ICT creatively to enhance service delivery to the user.

Network signifies the concept of linking of one computer with another either through cable or wireless which facilitate not only the sharing of resources but also the hardware, software and other devices such as, operating software, printer etc. Information/ data sharing, device

sharing etc. can operate in a network environment only through the computers. As discussed, network links not only to one or two computers but also connects to millions of computers which of course, depend upon the network type. The fundamental purpose of computer network is to provide users with a means of communicating and transferring information electronically as well as sharing hardware, data files and programs.

Networking has become a predominant issue both in national and international. Maximum efforts are put by the international organizations to promote teaching and learning through e-resources and have opt for its maximum use which could be possible through networking and application of the related devices such as, computer, software etc. Accordingly, in India, pragmatic steps have been taken by the Government of India by setting of a National Knowledge Network (NKN) project aimed at establishing a strong and robust internal Indian network, which will enable to provide the protected dependable connectivity. All vibrant institute of national and international importance with vision and passion through NKN will be able to transcend space, time limitations in accessing information and knowledge, and derive the associated benefits for themselves and for the society. NKN is an intermediary organization for linking up many national and international organizations to provide a transparent resource sharing and its use. Establishing NKN is a significant step towards ushering in a knowledge revolution in the country with connectivity to more than 1500 institutions. NKN is intended to connect all the knowledge and research institutions in the country using high bandwidth / low latency network. Globally, frontier research and innovation are shifting towards multidisciplinary and collaborative paradigm and it require substantial communication and computational power. In India, NKN with its multi-gigabit capability aims to connect all universities, research institutions, libraries, laboratories, healthcare and agricultural institutions across the country to address such paradigm shift. The leading mission oriented agencies in the fields of nuclear, space and defense research are also part of NKN. By facilitating the flow of information and knowledge, the network addresses the critical issue of access and creates a new paradigm of collaboration to enrich the research efforts in the country. The network design is based on a proactive approach that takes into account the future requirements and new possibilities that this infrastructure may unfold, both in terms of usage and in terms of perceived benefits. This will bring about a knowledge revolution that will be instrumental in transforming society and promoting inclusive growth (NKN; 2010).

Sharing of resources, communication etc. from one computer to another is a successful venture of the network and this revolution in computer industry facilitated the departments

for better performance with efficiency through linking each of them by way of networking. Networking of computers allowed the people to come together to exchange the product, ideas, innovations, resources etc.

2.2 Types of Network

Basically, there are four types of networks such as, (i) Local Area Network (LAN), (ii) Wide Area Network (WAN), (iii) Metropolitan Area Network (MAN) and (iv) Value Added Network (VAN).

2.2.1 Local Area Network (LAN)

A local area network (LAN) typically is limited to one geographical area and allows individuals workstations to access data, application on a server. LAN usually resides within a building or plant, the topology inherently tends to be more ordered and structured, taking such shapes as the bus, ring or star configuration. The primary wealth or asset of the library is the information and or resources both acquired physically and electronically. A lot of efforts are put by the librarian and the library staff including involvement of energy, manpower, time and money in the creation of on-line catalogue, subject databases, accessing to e-resources, selection of resources both documentary and electronic etc. which happened due to proliferation of literature and interdisciplinary research. In the process of building of local area network, not only the resources are shared from one system with other but also sharing of devices could be feasible. Dissemination of information and preservation of information which are prime functions of the library could become easier through LAN. The LAN is built up to connect the workstations and personal computers. The Workstations generally come with a large, high-resolution graphics screen, at least 64 MB (megabytes) of RAM, built-in network support, and a graphical user interface. Most workstations also have a mass storage device such as a disk drive, but a special type of workstation, called a diskless workstation, comes without a disk drive. The most common operating systems for workstations are UNIX and Windows NT (http://www.webopedia.com/TERM/W/ workstation.html). In terms of computing power, workstations lie between personal computers and minicomputers, although the line is fuzzy on both ends. High-end personal computers are equivalent to low-end workstations. And high-end workstations are equivalent to minicomputers.

In the Local Area Network, each node otherwise known as individual computer has its own Central Processing Unit for executing programs but it also is able to access data and devices anywhere on the LAN. This means that many users can share expensive devices, such as laser printers, as well as data. Users can also use the LAN to communicate with each other, by

sending e-mail or engaging in chat sessions. To explain more about the node, it connotes to a system or any other devices that can be shared with each other. However, every node has a unique network address, sometimes called a Data Link Control (DLC) address *or* Media Access Control (MAC) address. For the effective functioning of LAN, Ethernet has to be developed through various topologies such as either, bus, ring or star so as to enable for transferring data seamlessly from one system to other or from server computer to other workstations. The Ethernet specification, however, functions as the basis for the IEEE (Institute of Electrical and Electronic Engineering) 802.3 standards, which specify the physical and lower software layers. Ethernet uses the CSMA/CD access method to handle simultaneous demands. It is one of the most widely implemented LAN standards. Mention may be made that, the institute has prescribed multiple standardization on Ethernet which has been mentioned below in Table- 15.

(Table-15: IEEE Standards for Ethernet)

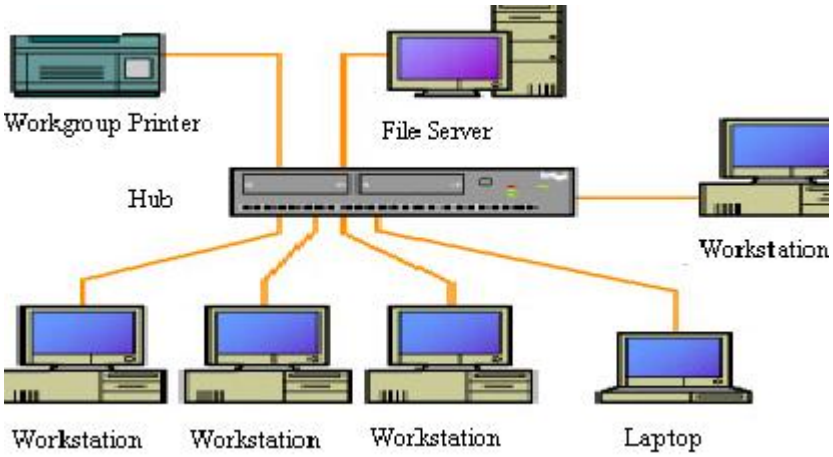
Sl.No.	Standard Specification of Ethernet	Description
1	IEEE 802.1	Network Management is concerned with managing of broad subjects through computer networks.
2	IEEE 802.2	Provides general standard for the data link layer in the Open System Interconnection, which is an ISO standard used for global connectivity through a networking framework for implementing protocols in seven layers. The standard also facilitate the media access control layer which of course, vary from different networks types as defined in the IEEE 802.3 through IEEE 802.5
3	IEEE 802.3	The media access control layer for bus networks is defined.
4	IEEE 802.4	Defines the MAC layer for bus networks that use a token-passing mechanism (token bus networks).
5	IEEE 802.5	Defines the MAC layer for token-ring networks.
6	IEEE 802.6	Explains about the standards for MAN

It could be ascertained from the above discussions that, LAN works on the basis of Ethernet which has got the multiple standards as specified above. Further, it is pertinent to mention that, IEEE 802.3 specifies a series of standards for telecommunication technology over Ethernet local-area networks and the standards differ from one another. The list of Ethernet

standards have been shown in the following Table-16 supported with Figure- 1 showing the building of Local Area Network with its related components.

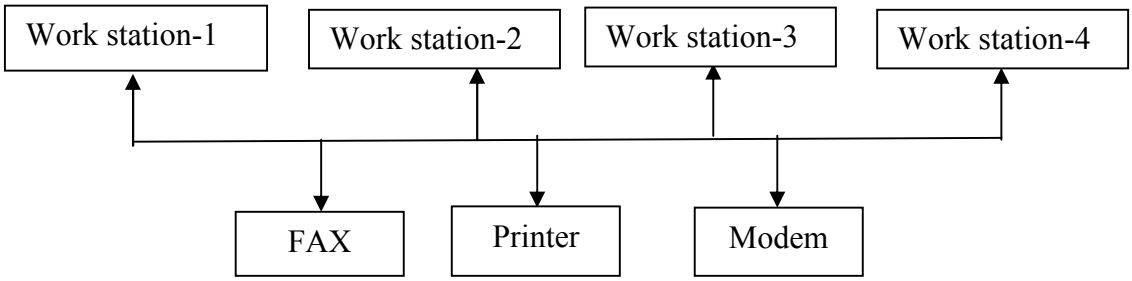
(Table-16: Series of Standards for Telecommunication Technology)

Designation	Description
10 Base-2	10 Mbps baseband Ethernet over coaxial cable with a maximum distance of 185 meters. Also referred to as Thin Ethernet or Thin net or Thin wire.
10Base-5	10 Mbps baseband Ethernet over coaxial cable with a maximum distance of 500 meters. Also referred to as Thick Ethernet or Thick net or Thick wire.
10Base-36	10 Mbps baseband Ethernet over multi-channel coaxial cable with a maximum distance of 3,600 meters.
10Base-F	10 Mbps baseband Ethernet over optical fiber.
10Base-FB	10 Mbps baseband Ethernet over two multi-mode optical fibers using a synchronous active hub.
10Base-FL	10 Mbps baseband Ethernet over two optical fibers and can include an optional asynchronous hub.
10Base-FP	10 Mbps baseband Ethernet over two optical fibers using a passive hub to connect communication devices
10Base-T	10 Mbps baseband Ethernet over twisted pair cables with a maximum length of 100 meters.
10Broad-36	10 Mbps baseband Ethernet over three channels of a cable television system with a maximum cable length of 3,600 meters.
10Gigabit Ethernet	Ethernet at 10 billion bits per second over optical fiber. Multimode fiber supports distances up to 300 meters; single mode fiber supports distances up to 40 kilometers.
100Base-FX	100 Mbps baseband Ethernet over two multimode optical fibers.
100Base-T	100 Mbps baseband Ethernet over twisted pair cable.
100Base-T2	100 Mbps baseband Ethernet over two pairs or higher unshielded twisted pair cable.
100Base-T4	100 Mbps baseband Ethernet over four pairs or higher unshielded twisted pair cable.
100Base-TX	100 Mbps baseband Ethernet over two pairs of shielded twisted pair or Category 4 twisted pair cable.
100Base-X	A generic name for 100 Mbps Ethernet systems.
1000Base-CX	1000 Mbps baseband Ethernet over two pairs of 150 shielded twisted pair cable
1000Base-LX	1000 Mbps baseband Ethernet over two multimode or single-mode optical fibers using long wave laser optics
1000Base-SX	1000 Mbps baseband Ethernet over two multimode optical fibers using shortwave laser optics.
1000Base-T	1000 Mbps baseband Ethernet over four pairs of unshielded twisted pair cable.



(Figure-1: Local Area Network)

The Local Area Network from the above figure visualizes clearly the connectivity made connected centrally through a hub which in turn connects to a file server system to retrieve data. In such a networking information/ data can be seamlessly accessed and information can be retrieved. The application of Local Area Network especially in Library and Information Centers has proved to be most worthy and cost effective as it provides benefit of Personal Computing, Sharing of Equipment, Sharing of Personal Files, Sending of Messages, Sharing of Databases, Office Automation, Fire and Security problem. Process control and above all administer common sharing of Software. The schematic view submitted in Figure-2 of Local Area Network has been depicted below.



(Figure -2: Schematic View of Local Area Network))

2.2.2 Wide Area Network (WAN)

Wide Area Network (WAN) is another breakthrough in the field of computer network technology which not only connects to the far distance but also removes many hurdles in communication system. WAN interconnects different sites, computer installation and user terminals and enable LANs to be networked together, irrespective of distance. In WAN, the

transmission medium used are normally public systems such as telephone lines, microwave and satellite links.

To mention a brief outline, Wide Area Network was established in 1960 specifically for promoting research project and sharing of knowledge located far off area with the intellectuals, subject experts, professionals etc. Wide Area Network is infect, a telecommunication network that connects a number of computers through regional, national and international networks to make it a bigger form of networks over greater geographic areas covering multiple continents. Wide Area Network, however, does not restrict to any distance which of course requires certain devices to be implemented. In Wide Area Network, the system provides ability for hosts at geographically scattered sites to communicate with one another. The hosts' computers are generally on Local Area Network which is connected to regional networks which in turn are interlinked with routers to form World Wide Network (Patnaik; Ibid; p.152). They may link the computers by means of cables, optical fibers, or satellites, but their users commonly access the networks via a modem (a device that allows computers to communicate over telephone lines). However, the function of modem is to modulate the signal from Analogue to Digital and vice-versa. The largest Wide Area Network is the Internet, a collection of networks and gateways linking billions of computer users on every continent (Encyclopedia Britannica CD). Based on the communication infrastructure, they are classified as Terrestrial Data Networks (TDNs) or Satellite based Data Networks (SBDNs). In TDNs, data communication is organized using cables, fiber optic lines or radio links (IGNOU; 1995; P.40). As already discussed that, the computer network signifies to the linking of two or more computers and associated peripherals for sharing the information resources, devices etc. and more prominently exchange of ideas, electronic marketing, and promotion of research activities including the connectivity among different class of people. All the service organizations irrespective of the types almost are connected with WAN for different activities and purposes including the libraries and information centers.

Library network may be defined as "a distribution system composed of two or more libraries and/or other organizations engaged in a common pattern of information exchange, through communications for some functional purpose". Library network is a formal organization among the libraries for cooperation and sharing of resources, in which the group as a whole is organized into sub-groups, with the exception that most of the needs of the library would be satisfied within the subgroups of which it is a member.

The exponential growth of information in all fields of knowledge, intense demands of information, accuracy of information and the need for the latest information have become the erroneous task for the library to satisfy the users. It is next to impossible for any individual library to satisfy the multifarious needs of the users and cannot meet this emerging challenge with its own resources when there is a serious curtailment of budget. This added another serious threat for the library with the escalating price of print documents. In this juncture, library has no other option than to go in favour of the electronic resources and for this, all the required parameters with necessary infrastructures required to be built up in the library including networking. Networking of similar libraries is imperative to overcome this perspective challenges to suit to the users requirements. The fastest growth in electronic information makes easier the resource sharing of information through networking whether through LAN or WAN. Network of libraries is a co-operative endeavor among the libraries which not only accelerates the services of the library but also improves other areas such as cataloguing process, database creations and staff development and most prominently the optimum utilization of library resources. In addition to that, it drastically reduces the financial burden of the individual library by the sharing of common resources.

⇨ **Application of Wide Area Network**

Resource sharing library networks are increasingly becoming popular among the 21th century librarians and information professionals. This is due to the growing inflation and sinking budget and also the escalation in publishing cost which have direct repercussions on the library services in healthy collection developments especially in print form. Networking has also optimized the usefulness of the resources of the world. Wide Area Networking in particular has been instrumental in writing mainframes, mini PC's and peripheral technologies and thus bridging the gap generated by geographical barriers in information communication. Wide Area Networking finds applications in the following areas of library work and services.

❖ **Inter Library Loan**

This is one of the important applications of Wide Area Networking, which helps in the accessing of remotely situated information from any corner of the globe. This has been greatly helped by the implementation of E-mail.

❖ **Interlinking CD-ROM Database**

The rapidly increasingly number of databases on CD-ROM's and subsequently the high cost of them have forced organizations to investigate using Local Area Network and Wide Area Network to access CD-ROM's.

❖ **Providing Access to Bibliographical Information**

The development of library based Wide Area Network has application in searching bibliographic information. The dial-up packet switching which was found to be an economic alternative to the dedicated lines, have facilitated libraries to access online data base through Wide Area Networking.

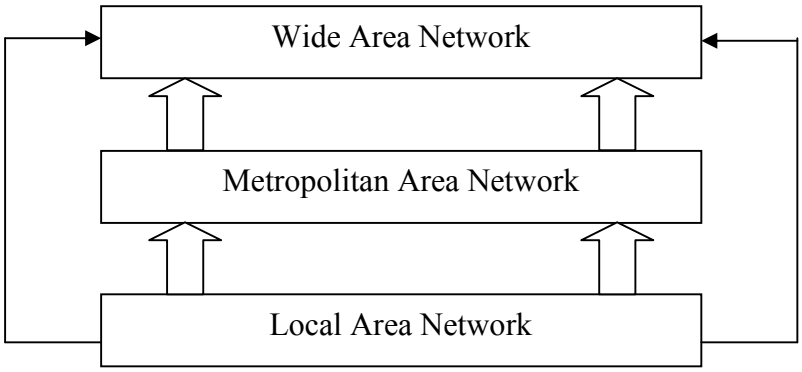
2.2.3 Metropolitan Area Network (MAN)

A Metropolitan Area Network interconnects computers with a metropolitan city which of course, works on the platform of WAN technology. Community Antenna Television (CATV) cables, twisted pair wires or shielded lines, optical fibers, radio link are provided as the communication medium for MAN. This network is primarily applied for multimedia applications.

2.2.4 Value Added Network (VAN)

Value Added Network yield a better result in the network sector as this is applied primarily in a commercial service sector. As the Library and Information Center are non-profit organizations, hardly VAN is applied in these organizations. However, the intellectual value is added through VAN in the Library for better understanding the value of a theme. This type of network promotes the business sectors such as bank, insurances to satisfy the customers. The difficulty of keeping Wide Area Network networks operating is one of the principal reasons for using VANs that are public data networks which 'add value' by transmitting data and by providing access to commercial databases and software. The Library and Information Centers cannot be excluded with from this network system as reputed firms have started creating commercial databases pertaining to various scientific and technological areas. This adds a substantial value for promoting research and development in an academic and as well as special institution. As VAN is cost effective, many companies who are lack of in the technical expertise opt for it. Added to this, VAN provides a convenient access to data that would not otherwise be available.

Local Area Network, Metropolitan Area Network and Wide Area Network are generally interconnected in a hierarchical manner to form a global network that has been depicted in Figure-3 (IGNOU, ibid; p.41). The global network is proved to be the most effective means of transmission of information. Accessing of different national and international databases, collection of e-books, e-journals, scientific reports etc. could be possible for imparting better and update and authentic service by the libraries to its clienteles. This facilitated the Library and Information Centers to accumulate multiple resources in electronic form.



(Figure –3: Data Network Hierarchy)

2.3 Characteristics of Network

The characteristics of a network are discussed below. Swank (1971; p.19-20), the stalwart in the field has acknowledged the characteristics of Information Network as:

- Information Resources which concerns with collection of documents or data and database;
- Readers, who usually are at the remote places from the main source of information;
- Schemes for intellectual organization of documents or data which act as directories for use by readers;
- Methods for the delivery of resources to readers is the output;
- Formal organization of cooperating or contracting formations, representing different databases;
- Bi-directional communication Networks which is the requirement preferably through high speed, long distance electrical signal transmission with switching capabilities and computer hookups.

According to Atherton (1994; pp.138-39) the information network has been divided into following components.

- Organizational structure that provides for fiscal and legal responsibility, planning and policy formulation which requires commitment, operational agreements and common purpose among the cooperating agencies;
- Collaborative Development of resources;
- Identification of nodes which provides for designation of role specialization as well as for geographical configuration;
- Identification of primary patron groups and provision for assignment of responsibility for information service to all within the network;

- Identification of levels of service that provide for basic needs of patron groups as well as special needs, and distribution of each service type among the nodes with the provision of transfer of document, data and information;

- Establishment of communication system that provides 'conversational mode' format and is designed to carry the desired message load at each level of operation;

- Common standard message code that provides for understanding among the nodes on the network;

- Switching capability that provides for interfacing with other network and determines the optimum communication path with the network;

- A central bibliographic record that provides for location of required items with the network;

- Guidelines for selection of what is to be placed on the networks;

- Evaluation criteria and procedures to provide feedback from users and operators and means for network evaluation and modification to meet specified operational utility; and

However, Cesar Mercado (1982; p.12) has acknowledged the following characteristics of information network.

- ❖ The members are located in different places such as, regions, states, provinces or districts;

- ❖ They have ways of organizing and transmitting information or data (e.g., the collection of data based on standard classification system or the use of computerized storage/ retrieval system;

- ❖ They have ways of organizing and transmitting information or data
- ❖ There is two way communication and transfer of information among the members; and
- ❖ They have information resources and produce publications and documentation for members.

Thus, in addition to above characteristics of information network, the following are some of the major components that add a substantive value in promoting network among the Libraries and Information Centers.

- ☞ It is a decentralized multilateral arrangement for the sharing of information;
- ☞ It is a completely voluntary arrangement with autonomy;

- ☞ It strengthens interdependence among the participating nodal organizations;
- ☞ It promotes greater accessibility to information and more amenable to users;
- ☞ It reduces expenditure on building up huge complex infrastructures and thus, proves cost effective;
- ☞ It accelerates standardization in the organization and free flow of information with least time and supports the decision-making system.
- ☞ It also sparks off the usage of resources which include all types of media and formats such as serials, monographs, documents in printed form and also non-print materials including on-line databases of the organization;
- ☞ Extending of integrated of services of all types of libraries and segments of the information and library community including abstracting and indexing services;
- ☞ The rapidly changing and expanding technologies in the fields of communication through networks accelerate research and development in many areas.

2.4 Objectives of Network:

The primary objectives of a library network in a digital environment can be spelled out as follows (INFLIBNET; 2003; P.72):

- ⇨ To increase the availability and accessibility of resources. The resources of the Library are transferred from one destination to other through the modern technological means;
- ⇨ Resource sharing encourage building specialized collection in the networked Libraries and avoid possession of duplicate documents which facilitate to provide effective services to the clientele;
- ⇨ Resource sharing advocates the exposition of availability of reading materials to the readers of different libraries;
- ⇨ Network also promote in Cooperative Acquisition, Exchange of Data or Information, Storage of Documents, providing Documentation Services etc.;
- ⇨ Network also boost for preparation of Union Catalogue, Bibliographical Control, Exchange Agreements, Document Delivery Service, Exchange of Information with cooperative networks, Creation of Authority Files, stimulate the improvement of library facilities and services and above all, the fiscal control;

⇨ Optimum utilization of library materials, Current Awareness Service, developing a State Standard for Information handling and research and development etc. are viable in a networked Libraries and Information Centers.

2.5 Implications of Networking

In the electronic environment, it has become the necessity of the hour to provide the electronic services to the users of the Library and Information Centers by providing a vast array of information irrespective of the fields. The applications of computer and network have become indispensable in the library as it enhances the capability of:

- Policy Development;
- User Feedback Analysis;
- Performance Analysis;
- Procurement sources;
- Order preparation and control;
- Transaction control like additions and deletion;
- Online Public Access Catalogue;
- Remote login;
- Cataloguing of network resources;
- On line Catalogues
- World Cat (OCLC);
- Web OPAC; and
- Metadata Standards- Dublin Core;
- Cooperating Cataloguing;
- Standardization; and
- Marketing;

However, the networking plays a pivotal role in serials control in the Library, as serials control is one of the complex and expensive procedures in any Library system. An automated serial control though computerization and networking perform:

❖ Establishment of policies and procedures;
❖ Subscription control;
❖ Providing e-journal;
❖ E-publishing;
❖ E-Atlas;
❖ Creation of Databases;

- ❖ Providing of CAS Service;
- ❖ Extending of SDI Service;
- ❖ Preparation of Bibliographies;
- ❖ Thesaurus construction.
- ❖ Document Delivery Services;
- ❖ Inter Library Loan;
- ❖ Resource Sharing;
- ❖ Database Access comprising Bibliographical and Full Text

Apart from the above discussions about the types of networks, multiple types of networks are in promulgation in India primarily aiming towards the sharing and distribution of resources including other infrastructures, devices among the member bodies of the network. Such types of networks have been discussed below available in India.

2.6 Need for Networking

As a universal phenomenon, libraries the world over are facing two major problems. These are:

- Information explosion
- Price escalation of library documents
- Increased cost of library services

The number of publications in various disciplines, especially in Science and Technology is alarming. It is estimated in the past that the primary source of literature in the field of Science and Technology is doubling in every 15 years whereas it now doubling in 10 years. According to UNESCO statistics of World Book Production, about three lakh books are published every year. The number of learned journals in the field of science and technology alone has now come to the tune of 60,000 adding at the rate of 1000 journals a year approximately.

Another important problem the librarians/information professionals are facing is the constant increase in the prices of library documents. Since Indian libraries have to depend mainly on foreign publications, especially in the case of science and technology journals they have to face sharp increase in the rates of subscription and downward changes in the value of rupees. This hydro-headed problems have forced the librarians and information specialists to cut down the number of journals they procured to manage the situation within the available resources.

Another problem is increasing cost of library services as costs of library services have skyrocketed, libraries have realized that through cooperative arrangement there is the

possibility of providing new services whose cost would be spread over many institutions. The concept of cooperation proves much effective and satisfies the user needs in a better way.

Thus, in order to find a solution to the problems faced by libraries/information centers regarding information explosion and costs, library networks have been established for cooperation and resource sharing among libraries so that one individual libraries may not feel burdensome while handling vast amount of information and price escalation of library documents and services.

2.7 Purpose of Library Networks

The basic purpose for creating a network is to provide information services to member libraries through sharing of resources of the participating libraries of the network. This may lead to member libraries to depend more on access to documents held in the other member libraries than on depending only on their respective collection. The main aims and objectives of library network are stated as the following:

- To promote resource sharing and co-operation activities among libraries by providing efficient and reliable means of resource sharing, e.g.
  - Inter library loan for maximum use of resources;
  - Document Delivery Services – providing the copies of the document what is not available in their respective libraries;
  - Manpower training and refresher course facilities – stimulating, promoting; and co-ordinating research and training programme for library staff and network members;
  - Access to national and international databases
  - Communication link through publication and inter-personal communication.
- To improve resource utilization and service level at the individual libraries by providing automation facilities in the following areas:
  - Acquisition and fund accounting;
  - Cataloguing – assist member libraries in cataloguing of books, serials, non-book materials and catalogue production;
  - Serials control;
  - Circulation;
  - User services – implementing electronic services in the libraries for fast communication of information

- Making coordinate efforts for building user-centric collection development and condense preventable duplication. The purpose of such efforts is to,
  - Develop collection by mutual cooperation;
  - Reduce the operational cost of the collection development;
  - Control the rate of rising cost of the collection development
- Establishing referral centers to monitor and facilitate catalogue search and maintain a central on-line union catalogue of books, serials and non-book materials of all the participating libraries.
- Developing a specialist bibliographic database of books, serials and non-book materials for search and access.
- Creating a database of projects, specialists and institutions for providing online information services.
- Coordinating with other regional, national and international networks for exchange of information and documents for the use of libraries and users.
- Evolving standards and uniform guidelines in techniques, methods, procedures, hardware and software, services and so on and promote adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchanging resources and facilities towards optimization.

2.8 Library Networks: Indian Scenario

Library and Information Network in Indian scenario has been discussed in detail for a clear understanding of the phenomena.

2.8.1 Networking: In Indian Context

Libraries are storehouses of information and knowledge. In this modern world, access to information holds the key to development. The rapid and exponential growth of information has made it necessary for librarians and information scientists to employ new techniques to cope with the massive proliferation of literature in all subjects' fields Research in the science and social sciences has led to high productivity in document publications. To bring this vast amount of information under bibliographic control and to render it useful and accessible to potential users is a task of great magnitude which the information people face. So through the application of communication techniques and electronic data processing, library and information centers have now begun to realize the need of computers and associated facilities as indispensable for steady and accurate storage, processing, retrieval and dissemination of information and above all sharing resources among libraries. For libraries to use their resources more efficiently and effectively for the users is a great task. This task can be solved

to a great extent by resource sharing and cooperative functioning among libraries. And for this, networking of libraries, applying latest modern techniques is a must.

In India, networking of libraries is even more necessary than in the developed nations. The following important factors that may be considered for networking of resources (Libraries holding resources) in India as:

- ⇨ It is not possible for all the organizations and agencies to design a system to cater to its resource needs because their main aim is to provide resources rather than designing the system for providing resources. So they have to purchase an appropriate latest system to cater to their needs. Generally, it is very difficult or rather impossible to find a system which could entirely satisfy its needs. In India, manually such technologies are purchased from abroad and afterwards people face a number of maintenance problems. So while opting for networking, annual hardware maintenance, some initial training is required.

- ⇨ The cumulative collection of scientific serials held by many important libraries in India is quite poor when compared to USA, UK and other developed countries while in India, some libraries have a very good collection, the majority of libraries suffer from very inadequate collection. There is a great need to consider the entire resources of the country as a single entity that can be available to the entire user community of the country. Networking the libraries is the best way to make resource sharing very effective in order to ensure equitable availability of required information.

- ⇨ Literature being generated as a result of research activities being carried out is doubling every five years. Over 10 million journal articles are published every year besides news items, editorials and articles appearing in popular print media. It is not possible for all the libraries and information centers to acquire all the bibliographic material at one place due to storage problem as well as paucity of funds. Even to maintain a reasonable level of acquisition of journals, books and reports, calls for heavy budgets in libraries. Therefore, networking with other institutions, libraries, information centers, etc. is easy and economical way to get what a particular center does not have in its capacity.

- ⇨ Budget of the libraries/information centers/institutions and restriction on staffing has also forced institutes to opt for networking in the country and this is on the increasing

trend. As for example, it is not possible to give a laser printer to each individual in many of the organizations, so best way to provide printing facilities to each of them is put the printer in the network and let all the computers users share it by way of networking operating system.

Similar methods also can be adopted to share other hardware resources like Modem, CD-ROM drive, etc.

India is a vast country with caste, cultural and linguistic diversities. Planning for their development is done at the center only. Planning for such a big country by sitting in the capital requires an extremely fast flow of information from all parts of the country to the center. This can be done effectively by networking all the information centers in the states with the center. Poor infrastructure is a hindrance in this flow of information. With the introduction of better telecom facilities like optical fibers, satellite communication, powerful computer, this is likely to increase but still many parts of the country do not have these facilities.

Because of the above mentioned reasons, resource sharing and cooperative functioning through networking have become inescapable for libraries and information centers in this country.

2.8.2 National Efforts and Status of Networks

2.8.2.1 National Efforts

There have been many attempts in the country in the last two decades in computer application to library and information activities. During last so many years, libraries and information centers have become more earnest to computerize their operations and services. NISSAT (National Information System for Science & Technology) was once upon a time instrumental in promoting an integrated approach in library automation in the country, the efforts was by and large, at the institutional level. Some of the major organizations engaged in computerized information handling are:

BARC	Bhabha Atomic Research Centre, Trombay
DESIDOC	Defense Scientific Information and Documentation Centre, Delhi
DRTC	Documentation Research and Training Centre, Bangalore
IIM	Indian Institute of Management (Ahmadabad, K
IISc	Indian Institute of Science (Bangalore,
IIT	Indian Institute of Technology (Delhi, Chennai, Kanpur, Kharagpur, Mumbai Guwahati, Roorkee, Raipur, Bhubaneswar, Hyderabad, Gandhinagar, Patna, Rajastan, Mandi, Indore & Varanasi)

NISCAIR	National Institute of Science Communication and Information Resources, New Delhi
NIC	National Informatics Centre, New Delhi
PRL	Physical Research Laboratory, Ahmadabad
TIFR	Tata Institute of Fundamental Research, Mumbai

Besides the above, University Grants Commission (UGC), Department of Electronics, Department of Telecommunication, Planning Commission and other various Departments of Government of India have also been engaged in establishing various networks. There are possibilities of mounting bibliographical databases on these networks for providing online access-to-access.

The growth of Indian Library Networks may be traced to the efforts made during the last forty years and this has been depicted in Table-17. The chronology is given below.

(Table-17: Growth of Indian Library Network)

Year	Description
1958	1958 Scientific Policy Resolution. It was adopted at the instance of Pt. Jawaharlal Nehru. It emphasized the fostering of scientific temper in people. In pursuance of this agenda, several committees and commissions were appointed to look into specific issues and come up with necessary recommendations.
1959	Sinha Committee Report
1965	Ranganathan Report to College Grants Commission (UGC)
1972	V A Kamath Report
1977	Establishment of NICNET by NIC (1975)
1983	Technology Policy Statement. It emphasized the need for a technology information base.
1984	Working group of the Planning Commission headed by Dr N Seshagiri recommended to the govt. the need for modernization of library services and information during Seventh Five Year Plan (1985-90)
1986	NISSAT initiated the establishment of CALIBNET, Calcutta
1988	The National Policy in Library and Information System submitted in 1988. It recommended using of information technology on a national level.
1988	The UGC established INFLIBNET
1992	NISSAT supported the establishment of DELNET, DELHI
1993	NISSAT supported the establishment of ADINET, Ahmedabad.
1993	INSDOC supported the formation of MALIBNET, Chennai.
1994	NISSAT supported the establishment of MYLIBNET, Mysore
1995	NISSAT supported the establishment of BALNET, Bangalore

2.8.2.2 Planning Commission Efforts

The Planning Commission, Government of India, has been taking considerable interest in library resource sharing and library networks. Its efforts in these areas have increased since the Seventh Five Year Plan covering 1985-90. The Commission appointed a working group on modernization of Library Services and Informatics in November, 1983. In July 1984, the working group submitted its report. It recommended among others, interlinking of library systems through library networks. This report was to be considered for the Seventh Plan. The Commission appointed another Working Group which submitted its report in May, 1989. It again recommended among others interlinking of library systems in the country. The Planning Commission appointed in February 1995, a Core Task Group to prepare an approach paper for enhancing inputs of Science and Technology for library resource sharing.

The Commission again constituted a working group on Libraries and Informatics under the Department of Culture, Ministry of Human Resource Development, and Government of India, which report was to be considered for the Ninth Plan for the period 1997-2002. The report of the Working Group of the Commission includes many important recommendations for the networking and modernization of libraries in the country. All these initiatives by NISSAT, UGC, Planning Commission and other departments of Govt. of India have led to increased efforts to the establishment of library networks and library automation in the country.

2.9 Networks in India

The most simplistic definition for a data network is an electronic communications process that allows for the orderly transmission and receptive of data, such as letters, spreadsheets, and other types of documents. What sets the data network apart from other forms of communication, such as an audio network, is that the data network is configured to transmit data only. This is in contrast to the audio or voice network, which is often employed for both voice communications and the transmission of data such as a facsimile transmission.

There are two basic types of data networks in operation today. The private data network is essentially a local network that is designed to allow for the transmission of data between the various departments within a given entity, such as a company. All locations of the company may be included as nodes on the network, and be able to communicate through a common server that functions as the repository for all data files that are used throughout the business. There are also examples of a private data network that allows for data sharing between several companies that are part of the same profession or industry. Connections to this type of

network can be achieved through the creation of a virtual private network, or VPN that resides on a master server, or by provisioning the connections through a communications carrier.

In contrast to the private data network, the public data network will be widely accessible to both residential and corporate clients of a given carrier network. The setup of a public network may involve the utilization of multiple servers and connection to the network through several different processes. Often, a public data network will require some type of subscription process, such as a monthly usage fee. Upon receipt of the fee, the service provider will allow the creation of access credentials that will allow the consumer to access authorized portions of the network and engage in several functions commonly involved with data. These include the ability to retrieve stores documents, create backups of important data files, and archiving data such as historical information or other data that is understood to be valuable for future applications. As already mentioned, many networks are operating in India and mostly they are national networks which, however can be accessed through Internet.

- **Videsh Sanchar Nigam Limited (VSNL) Data Networks**

  It is a gateway to world data networks by Videsh Sanchar Nigam Ltd. (formerly Overseas Communication Service) at Mumbai. In 1991 VSN introduces a number of new services, like X-400 based Gateway Mail Service, a store and forward fax service, T-Fax service, voice mail service, etc.

- **Easynet**:

  It was inaugurated at Chennai during July 1990, which emphasized the need to develop local databases and network them. Easynet is the world's first intelligent knowledge gateway to multiple online hosts like Dialog and others, which offer single password access to over 1,000 databases.

- **Electronic Digital Integrated (EDI) Network**

  Electronic Digital Integrated network was developed by the federation of Indian Export Organization and the All India Shippers Council for International trade in 1992.

- **Educational Research Network (ERNET)**

  It was launched by the Department of Education (DOE), Govt. of India in late 1986 with financial assistance from UNDP (United Nationals Development Programme) to provide academic and research institutions with electronic mail facilities. It is currently used by DSIR Labs, research centers and academic institutions. The department electronics introduced and implemented this education and research

network, linking academic and research institutions to BINET which is a major academic data network in the US, primarily used for the e-mail during 1990s.

- **Indonet**:

  India's first data communication and computer network in a commercial basis was started in March 1986 by CMC Ltd. It was launched as a solution to the growing need for providing timely well processed data to various institutions. In the First phase, they have mainly networked Mumbai, Calcutta and Chennai during 1990s. Later, Delhi and Hyderabad were also linked as additional stations. INDONET presently has an international gateway which provides access to worldwide pocket switched networks like USA's Global Networks Systems (GNS) and Internet. The enhanced network system is now called WISER (Welcome group's Indonet System of Enhanced reservation). The primary objective of Indonet project was to provide a network of computer facilities accessible to remote areas so as to deliver the benefit of information processing to a wider cross section of the users.

- **National Informatics Network (NICNET)**

  It was established by National Informatics Centre (NIC) in 1977 and started in the late 87's. It was launched basically for getting and providing information from/to district levels to facilitate planning process. It links for regional nodes at Delhi, Pune, Bhubaneswar and Hyderabad and has established 32 nodes at state and union territory levels and 439 nodes at district headquarters. By 1991, NICNET has achieved success in the creation of databases and networking. It also provides E-mail and other facilities to users using its already existing infrastructure.

- **Open System Interconnection (OSINET)**

  It is network protocol software based on a subject of ISO-OSI (International Standards and Organization-Open System Interconnection) reference model that was developed by ISO in 1990.

- **PORNET**:

  The PORNET through the NICNET was implemented in the Madras Port Trust building in the 1990s. A statement of the position of ships of the Chennai harbour can be transmitted in 5-10 seconds from a computer in MPT to another port office through Nicnet.

- **Open Education Network (OPNET)**

  Open College Network – Many institutions are venturing into the field of education and are offering professional and technological courses by using communication

technologies. They are using television, computer communication, email and network to reach the students. Indira Gandhi National Open University (IGNOU), which is an apex body for open and distance education, is engaged in the task of developing a network of open universities in India called OPNET. This is a network of physical, intellectual and academic resource organized under the aegis of the Distance Education Council (DEC), an independent arm of IGNOU and distance education in India. All the open universities are partners of OPNET. The resources that are pooled together include academic programmes, norms and sharing programmes, delivery mechanisms and interactive software for student services. The OPNET will be an umbrella network with the subnet of every partner college for delivery of their own courses.

- **Scientific and Industrial Research Network (SIRNET)**
  It was established by INSDOC in late 1989 to interconnect all the CSIR laboratories and other R&D institutions in India. Its main objective is to harness the vast S&T information resources available with national laboratories and inculcate the habit of resource sharing among them-selves. Its ultimate aim is to link the entire scientific community of the nation with the national library system and the international links to achieve efficient scientific communication.

2.10 Library Network – The Concept

The National Commission on Libraries and Information Science (NCLIS) in its National Programme Document (1975) defined a network as a distribution system composed of two or more libraries and /or group of other organizations engaged in a common pattern of information exchange through communications for some functional purpose. A network usually consists of a formal arrangement whereby materials, information and services provided by a variety of libraries and other organizations are available to all potential users. Libraries may be in different jurisdictions but agree to serve one another on the same basis as each serves its own constituents. Computer and telecommunications may be among the tools used for facilitating communication among them". According to Martin, "A network is a group of individuals or organizations that are interconnected. The linking must include a communication mechanism, and many networks exist to express the purpose of facilitating certain types of communication among their members. In the library world, institutions from network primarily to achieve better sharing of resources–resources consisting of bibliographic information and of collection–and better services to patrons". It must be emphasized that the particular focus in this gathering will be on online networks, those using

computers and linking members to the computer resources by means of telecommunication connections.

A library network is a description of an activity, which existed before the term itself was devised. When any two libraries talk to each other, we have the fundamental condition for networking that is exchange. When one library provides service to another, we have the rudiments of network behavior. Inter-library loan or bibliographic exchange in any form is the chief justification of a network. In a library network, the member libraries required to operate their services in a common platform so as to facilitate their collection developments, utilization of budget, systematic holding of reading materials, sharing the devices, manpower, expertise and knowledge thereby, giving a wide range of information resources for the users to promote their teaching, learning and research. The development of sophisticated technologies in computer and communication field has upset libraries worldwide in storing and transmitting information. The computer and its communication circuits link to other computer or to terminals constituting an integral information machine. This technology introduced the `Network System'.

Networking is a system with a predominant flow of service and a reverse flow of demand. When a librarian asks his neighbour for a book or a citation and his request is honoured the networking begins. Librarians now tend to view a collection as not merely what they possess in their institution, but all materials they have access to through photocopying, inter-library loan and reciprocal borrowing privileges. In a library networking where, A, B, C, D, E are participating libraries, the central node (A) has the responsibility of maintaining and operating the centralized databases. In such environments, the participating libraries have the obligations to contribute all the bibliographical data pertaining to their respective collection to the central node. The libraries may be linked through telephone lines or through satellite depending upon the situation. In whatever way, they are connected the most important issues in such a network are related to creation, maintenance, and operation of centralized databases. So on the basis of above explanations; we notice that library networks have the following characteristics:

- Data - Bibliographic Records (MARC) frequently
- Retrieval - Author/title/number (subject) (keyword)
- Access - Telecommunication network / Private Network / Hard wired Network
- Users - Librarians (Public)

The above classification shows that library networks have the following features:

⇨ One type of data;

⇨ Committed user base;

⇨ High Professional needs; and

⇨ Low end-user needs.

Networks enable librarians, faced with clients' information needs beyond their local resources, to identify and obtain materials and services for those clients. As we move increasingly into electronic information era, we see technology and networks working together to reduce the physical movement of materials.

2.11 Objectives of Library Network

The objectives of library networks can be summarized as follows.

- Providing an array of good length of library materials to the users;
- Reducing the burden of an individual library to obtain a vast amount of resources in a stage of shrinking budget provision;
- Improve the sharing of resources among the member libraries;
- Centralize the information processing system;
- Reduce the communication gap among the libraries;
- Sharing of the resources among libraries;
- Diminishing the cost and making lessening to the financial hardship;
- Distributing efforts, expertise and technology;
- Standardization of input, output and processing of resources;
- Undertaking scientific research in the area of information science and technology;
- Coordinating efforts for suitable collection development and to reduce duplication;
- Maintaining bibliographic database of books and other materials;
- Offering technical guidance to the member libraries on collecting, storing, sharing; and dissemination of information.

2.12 Need for Library Network

As a universal phenomenon, libraries the world over are facing major problems. These are:

- Information explosion;
- Price escalation of library documents; and
- Increased cost of library services.

Due to limited fund and limited staff it is impossible for any library to acquire this unlimited and endless knowledge. The only alternative is resources sharing. The need for resource sharing can be further explained through the following points;

- Proliferation of literature in each and every field of knowledge;

- Multiple o documents in different subjects, language and format;
- Development of new subjects and subject specialization;
- Increase in reading community and information seekers;
- Diversity of user groups and their information needs;
- Demand of pinpointed, exhaustive and expeditious information services;
- Increased access to information and at less cost.

The number of publications in various disciplines, especially in Science and Technology is alarming. It is estimated in the past that the primary source of literature in the field of Science and Technology is doubling in every 15 years whereas it now doubling in 10 years.

2.13 Functions of Library Network

The functions of library network are summarized as follows. It is primarily meant to provide excellent and befitting services both in traditional and electronic form. It may be mentioned that the library especially in a digital environment functions more efficiently than the traditional way.

- Service directly to the users irrespective of the types or size.
- Exchange of expertise, resources directly with the member libraries.
- Effective collection developments both in traditional and electronic form.
- Creation of databases.
- Listing of websites regarding the availability of free electronic resources.
- Itemization of URL sites for different library consortia.
- Linking sites of other research, academic libraries.
- Cataloguing of national websites of both State and Central Government.
- Listing of the websites of international reputed organizations, libraries.
- Scientific organization of library resources for its effective use.
- Network support and management service.
- Optimum utilization of existing library resources.
- Making provision for speedy access to information resources located at different Places at both national and international level.
- Economization of funds and avoiding duplicate collections.

2.14 Library Network in India

The National Knowledge Commission set up in 2006 has put emphasis on the availability and usability of library resources judiciously and transparently and has observed that, the key to opening the resources of a library is its access mechanism which is the need of the hour. This could be possible through the technology application in the libraries so as to bring together

the resources of small individual libraries into one seamless large library. The ability to retrieve information from this library depends on standardization of classification, cataloguing, database structuring and exchange formats. It further stressed upon the following components.

- **Collection, Organization and Integrated Access Locally**

- Access to every document (print and electronic) in a library should be possible through a proper system of cataloguing and classification.
- To help all libraries accomplishing this task easily and without delay, and to ensure optimal utilization of expertise and resources, it is essential to develop bibliographic utilities which permit downloading of records (catalogue entries) and uploading of holdings information by all libraries.
- Libraries having collections of print and electronic resources should provide integrated access using the latest ICT.

In view of the demands of the users, library has the responsibility to provide the user- centric information including documents. In view of this, many national networks have been established which not only facilitated providing the useful information and need based documents to the users of their region but also could be possible to get access to all library networks setup regionally, nationally through networking. Such types of library networks have been discussed below.

❶ **Ahmadabad Library Network (ADINET)**

Consequent upon the addition of electronic resources in the collection development due to multifarious demands of the users and availability of innumerable resources pertaining to the users, the libraries could not become a mere centre of knowledge accumulator but transformed to information exchange hub and this phenomena geared up especially after the adoption of ICT in libraries. Boundaries of the Libraries expanded beyond four walls and Library professionals are gearing up to take up the challenge of using ICT in disseminating authentic, latest and right kind of information to the right type of audiences. With the rapidly growing advancements in every field, more and more documents are becoming available the world over, in both printed and electronic format. No library can afford to stock every necessary document in the area of its users' interests, but it certainly can provide a 'link' to the User to locate desired information. Networking and Resource sharing thus assumes a great importance at this juncture and such a solution is being effectively provided by the "Ahmadabad Library Network" (ADINET) to the users and librarians specializing in any

discipline of knowledge and available anywhere in the world. ADINET is an Information Network of Libraries in and around Ahmadabad and is also accessible in many other libraries both in State and outside the State. Through the Internet, the information centre is also accessible from any part of the globe.

To mention a brief genealogy about ADINET, it was registered as a society in October 1994 under the sponsorship of National Information System for Science and Technology (NISSAT), Department of Scientific and Industrial Research, Government of India, which however, became a functional unit in February 1995 only after signing a memorandum of understanding (MOU) with NISSAT. ADINET was initiated to support the objectives of NISSAT with a primary focus to avoid needless and expensive duplication of library holdings and better utilization of funds. The primary objectives and functions as envisaged in the memorandum are enumerated below.

- ⇨ Bringing about cooperative mode of working amongst the libraries and information Centers in the city of Ahmadabad;
- ⇨ Evolving a network of libraries and information Centers in an around Ahmadabad;
- ⇨ Facilitating sharing of resources among the libraries and information centers in and around Ahmadabad;
- ⇨ Coordinating with other regional, national and international networks, libraries, information and documentation centers for exchange of information and documentation;
- ⇨ Offering technical guidance to the member libraries on collecting, storing, sharing and disseminating information;
- ⇨ Developing resources and to propagate in ways appropriate to the needs of users in an around Ahmadabad.
- ⇨ Creating awareness amongst all user groups to educate them in the utilization of information;
- ⇨ Building up databases of projects, specialists and institutions in an around Ahmadabad;
- ⇨ Aligning efforts for suitable collection development and reduce unnecessary duplication wherever possible;

However, ADINET is presently engaged with the following activities.

- ☞ Computerization of library services;
- ☞ Cataloguing, classifying the library resources both manually and through computer;
- ☞ Data entry of the records of the library;
- ☞ Labeling and shelving of books;
- ☞ Stock verification of library holdings;

- ☞ Manpower development programs;
- ☞ Planning for library developments etc.

❷ **Bombay Library Network (BONET)**

The Bombay Library Network or (BONET) was inaugurated by Mr. N.Vital, Secretary, Department of Electronic, Government of India at National Technology, Bombay (NCST) on 6th November, 1992. The network center of software sponsored by National System for Science and Technology (NISSAT) is the latest in the chain of projects like DELNET, CALIBNET and PUNENET.

The aims and objective of BONET summarized as follows.

- Building a library and information system in a cost effective way so as to enable the perspective librarians to use it as a model for future establishment of library building and with a provision of expansion in future.
- Expand the services throughout the state and nationwide.
- Ambition to accelerate services in a new horizon of ICT and making the resources including services available on Internet.
- Building up the database of library holdings including e-resources with the help of the expertise and subject experts.
- Making utilization of the expertise in developing resources and facilities through Education and Research Network (ERNET) project of the Department of Electronics, Government of India.
- Promoting cooperation among the libraries in Bombay.
- Focusing on inter library activities.
- Offering training related to library computerization and networking and speed up computerization of Bombay libraries.

❸ **Calcutta Library Network (CALIBNET)**

CALIBNET with a financial support from NISSAT was conceived of as a metropolitan network in 1993 giving link to more than 38 libraries in Calcutta. It came up with a mission to develop the library services in eastern India to economize the procurement of resources in a collective basis, accelerating the use of library resources in a meaningful way among the users, providing facility to use of the resources, creation of a network among the libraries housed in and around Calcutta (Kolkata) etc. It commenced initially with a project in 1986 supported by NISSAT and managed by the CALIBNET Society established under the West

Bengal Government's Societies Registration Act 1961 with its headquarters at Jadavpur University Campus, Kolkata.

The primary objectives of the CALIBNET can be summarized as follows (IGNOU;) .

- ⇨ Interlibrary co-operation and document delivery among the members libraries in a network environment for effective resource sharing.
- ⇨ Establishing an automated environment and developing networking among the member libraries to make correspondences through e-mail, file transfer, remote login to various databases and document access.
- ⇨ In-house functions such as, cataloguing, serial control, acquisition, fund accounting, circulation and user services.
- ⇨ Interconnecting the libraries through X.25 protocol.
- ⇨ Facilitating remote online access to the holding data of Calcutta libraries and other specialized databases.
- ⇨ Providing electronic access to globally available information, imbibing its information centre approach.

The Network Services Centre of CALIBNET provides a global information services which include Current Awareness, Union Catalogue, Database and allows the users of the participating libraries to access to the resources including the databases both national and international. It further provides assistance in an effective way to solve any emerging problems encountered by the member libraries. CALIBNET was established principally to provide the following services to the users of the member libraries in the network.

- ◈ **Software Development:**

  Consequently upon the requirements of the users and proliferation of literature, all out efforts were made by the CALIBNET to develop a software making available to the member libraries for operation in their respective libraries and the software could be developed by taking help of national organizations.

- ◈ **Sanjukta:**

  This in-house software has been developed for storage and retrieval which was used in Centralized Database of CALIBNET for providing online access from remote locations. The software provides options and flexibility for record generation, organizing and searching information.

- ◈ **Parapar:**

  Parapar has been developed to support interchange of bibliographic data between different bibliographic standards like, USMARC, UNIMARC and CCF. It converts

other format data to ISO-2709 format which can be imported into the centralized Database of CALIBNET.

- **Document Delivery Service: Caliborder**:

  Caliborder is a document delivery service which delivers full text of any article and even patents on demand.

- **Selective Dissemination of Information: ConAlert:**

  ConAlert service is designed to give current and tailored bibliographic information. A user profile is created based on the keywords. Notification about the arrival or availability of the document is sent to the user. On demand document is also delivered at user's desk.

- **Institutional Resources Development Services:**

  CALIBNET supports institutes to build library. It also assists and provides consultancy in library automation and creation of databases and electronic resources. It runs wide range of training programs and customized courses based on institutional needs.

- **Databases:**

  CALIBNET maintains a centralized database of holding of Kolkata libraries. It also maintains database of Asiatic Society Journals, and current serials acquired by Kolkata Libraries. Through website, CALIBNET also provides links to;

  - Overseas Library Resources on India;
  - Worldwide Library Catalogues;
  - National Libraries of the World.

❸ Information and Library Network (INFLIBNET)

Information and Library Network (INFLIBNET), a pioneer body in the field of information and library network emerged initially, as a project under the Inter-University Centre for Astronomy and Astrophysics (IUCAA) in 1991 and subsequently, it was set up in 1996 as an independent and autonomous Inter-University Centre of the UGC with its headquarters at Ahmadabad to promote library services and computerization in the libraries. Major activities and services of the centre include automation of academic libraries and information centers, creation of union databases of resources available in academic libraries, promote resource sharing among academic libraries, encouraging information access and transfer, support scholarship, learning and academic pursuits. The center acts as a nodal agency for networking of libraries and information centers in universities, institutions of higher learning and R&D

institutions in India with an aim to promote scholarly communication. INFLIBNET is a major supportive organization for helping in automation and modernization of university library system including the colleges with autonomous status by way of providing high-speed bandwidth for accessing e-journals. It has become a major player in enhancing scholarly communication in India.

Objectives

Primary objectives associated with the INFLIBNET center apart from the promoting the library services and computerization also include the following.

- ⇨ Encouraging and establishing communication facilities to enhance capability in information transfer and access that provide support to scholarship, learning, research and academic pursuit through cooperation and involvement of agencies concerned.
- ⇨ Installing a computer communication network for linking libraries and information centre in universities, deemed universities, autonomous colleges, UGC information centre, institutions of national importance and Research and Development institutions, etc. including averting duplication of efforts.
- ⇨ Coordinating and implementing a nationwide high-speed data network using state-of-the-art technologies for connecting all the university libraries in the country.
- ⇨ Promoting the users irrespective of the types the use of e-resources provided to the member libraries both colleges and universities nationwide through UGC-Infonet Consortium.
- ⇨ Promoting scholarly communication among academicians and researchers in India.

❖ **Functions**

In order to fulfill the broad objectives listed above, the, INFLIBNET performs the following functions:

- ⇨ Promotion and implementation of a uniform standard practice in disseminating information.
- ⇨ Accomplishment of uniform guidelines in techniques, methods, procedures, computer hardware and software, services in order to facilitate pooling, sharing and exchange of information for optimal use of resources and facilities.
- ⇨ Establishing a national network interconnecting among various libraries and information centers in the country to improve information handling and service.
- ⇨ Provide reliable access to document collection of libraries by creating on-line union catalogue of serials, theses/dissertations, books, monographs and non-book materials

(manuscripts, audio-visuals, computer data, multimedia, etc.) in various libraries in India.

- ⇨ Provide access to bibliographic information sources with citations, abstracts, etc. through indigenously created databases of the Sectoral Information Centers of NISSAT, UGC Information Centers, City Networks and such others and by establishing gateways for on-line accessing of national and international databases held by national and international information networks and centre respectively.
- ⇨ Developing new mechanism and techniques for archival of valuable information available as manuscripts and information documents in different Indian Languages, in the form of digital images using high-density storage media.
- ⇨ Optimize information resource utilization through shared cataloguing, inter-library loan service, catalogue production, collection development and thus avoiding duplication in acquisition to the extent possible.
- ⇨ Enabling the users dispersed all over the country, irrespective of location and distance, to have seamless access to information regarding serials, theses/dissertations, books, monographs and non-book materials by locating the sources wherefrom available and to obtain it through the facilities of INFLIBNET and union catalogue of documents.
- ⇨ Creation of databases with regard to projects, institutions, specialists, etc. for providing on-line information service.
- ⇨ Encouraging co-operation among libraries, documentation centre and information centre in the country, so that the resources can be pooled for the benefit of helping the weaker resource centre by stronger ones.
- ⇨ Provide training and development of human resources in the field of computerized library operations and networking to establish, manage and sustain INFLIBNET.
- ⇨ Facilitating academic communication amongst scientists, engineers, social scientists, academics, faculties, researchers and students through electronic mail, file transfer, computer/audio/video conferencing, etc.
- ⇨ Undertaking system design and studies in the field of communications, computer networking, information handling and data management.
- ⇨ Establishing appropriate control and monitoring system for the communication network and organized maintenance.
- ⇨ Collaborating with institutions, libraries, information centre and other organizations in India and abroad in the field relevant to the objectives of the Centre.
- ⇨ Creating and promote R&D and other facilities and technical positions for realizing

the objectives of the Centre.

⇨ Generating revenue by providing consultancies and information services.

❖ **Services**

In order to support the above mentioned objectives INFLIBNET promotes following activities:

⇨ **Library Automation*:***

INFLIBNET allocates grants to university libraries for automating the library activities. Automation is first step towards creating network of libraries. So far, more than 123 libraries have already been given the grant for building infrastructure and automation. INFLIBNET through UGC is providing the support in phases. Not only for creating infrastructure, INFLIBNET is financially supporting the project for another five years. INFLIBNET has developed a library automation package called SOUL (Software for University Libraries). SOUL works in client server environment. Currently, SOUL2.0 is developed on Windows platform but efforts are being made to port on Linux platform. It has all the necessary modules which, a library needs.

⇨ **Software Development**

Besides SOUL, INFLIBNET has developed several small utilities for day-to-day libraries operations. It also develops solution on demand by university libraries, like retro conversion, preparation of catalogue cards, duplicate checking of library records and so on.

⇨ **Union Databases**

It has created 8 Union databases which are continuously being updated and appended for

- Books,
- Theses,
- Serial holdings,
- Current serials,
- Experts,
- Research projects,
- Secondary serials/CD-ROMs, and
- DDC serials.

Online access to these databases is given through web interface. Besides, INFLIBNET has developed a system called SEWAK which automatically processes offline queries sent through email. Mail with request should be sent to sewak@mail.inflibnet.ac.in.

⇨ **Databases**

INFLIBNET subscribes several databases in CD ROMs. It provides database search service for researchers of universities free of cost. The Following databases are subscribed by INFLIBNET:

- Current Content on Diskette: Social and behavioral Sciences;
- Dissertation Abstracts International: Humanities & Social Sciences;
- EconLit: Economic Literature;
- EMBASE Drugs & Pharmacology CD;
- ERIC: Education and Research Centre;
- IICD: Inside Information;
- Inside Science;
- Inside Social Science;
- ISSN Compact: The ISSN register on CD-ROM;
- LISA: Library and Information Science Abstract;
- NUCSSI: National Union Catalogue of Scientific Serials in India;
- Philosopher's Index;
- PsycLit: Psychological Literature;
- SSCI: Social Science Citation Index;
- Sociofile: Sociological Abstracts;
- Ulrich's On Disc: International Periodicals Directory.

INFLIBNET also provides a facility to search OCLC's First Search service. This service covers 85 journals. The service is given in offline mode that means one needs to send are quest (as email or post) for literature search to INFLIBNET and search will be done at INFLIBNET and results will be sent to requester.

⇨ **Human Resource Development**

INFLIBNET runs several short-term courses for university staffs in order to train them with new automated tools and techniques.

a. **One month Short Term Training Programme:** It has conducted many programs for working university library professionals. The course contains training module in computer application for library and information centers.

b. **On-site Training*:*** INFLIBNET conducts on-site short training programs. It also conducts customized programs to orient library staff towards library automation particularly SOUL.

c. **Document Delivery Service:** INFLIBNET has established 6 centre as Document Delivery Centre (DDC). This service is given on 'No profit No loss' basis. A union catalogue of Serial Holdings, Secondary Serials and Current Serials is kept in each university library. Same can be searched online as well. Anyone can contact these libraries and request for the document. Request can be made by email, fax, telephone, post or even in person. Photocopy or electronic form of document is sent to the requester on nominal payment basis. The 6 centers are: Banaras Hindu University, Varanasi, University of Hyderabad, Hyderabad, Indian Institute of Science, Bangalore, Jawaharlal Nehru University, New Delhi, Punjab University, Chandigarh Tata Institute of Social Science, and Mumbai.

⇨ **Document Delivery Services**

INLIBNET has initiated interlibrary loans and document delivery services from the comprehensive collection of subscribed journals under JCCC@UGC- INFONET. ILL is also known as Inter-Library Lending. INFLIBNET has designated 22 libraries to fulfill ILL request from the users, affiliated to 149 universities covered under UGC. The ILL libraries together subscribe for 2000 plus journals that is not available through consortia. Universities can request for articles from the journal holdings of those libraries wherever they find useful articles in JCCC search, that are not available in that library (www.inflibnet.ac.in).

⇨ **Bibliographic Union Databases**

Creation of databases is one of the major activities of INFLIBNET. This activity has been initiated since inception of the programme. Currently there are eight databases under development. These are grouped under following two categories.

1. **Bibliographic Databases**
   - Serials Holdings
   - Current Serials
   - Secondary Serials Catalogue
   - Theses
   - Books
2. **Non-bibliographic Databases**
   - Research Projects
   - Database in Science and Technology (EDST)
   - Online Profile of Academic Community of Indian Universities

The bibliographic databases represent the holdings of university libraries, for which the data is contributed by participating libraries. These databases provide an access to large pool of information available besides, serving as tool for resource sharing. Non-bibliographic databases are created to promote the communication among the scholars.

⇨ Print Archival

Besides receiving access to e-resources on complementary basis under the UGC-InfoNet Digital Library Consortium, the Centre maintains a separate Archival Library consisting of print journals received as a part of the agreement with the participating publishers of the UGC InfoNet Digital Library Consortium. Under the agreement, the publishers are requested to submit a copy of all the issues of the journals. This archival library is open to all users interested in using these print resources for their study / research.

The Centre has received issues of 286 journal titles from different publishers. During this year under review, issues of 100 journals each were received from the Taylor and Francis, Blackwell and Oxford University Press. Users can access information about these journals on their desktops at the website.

Inflibnet also has taken major initiatives in providing UGC-InfoNet Digital Library Consortium service to the users. The Consortium provides current as well as archival access to more than 7000+ core and peer-reviewed journals and 10 bibliographic databases from 26 publishers and aggregators in different disciplines. The programme has been implemented in phased manner. Mention may be made that, as of June 2011, the total members covered under the umbrella of UGC-Infonet are 280 where, in the first phase in 2004, access to e-resources was provided to 50 universities who had Internet connectivity under the UGC-InfoNet Connectivity programme of the UGC while, in the second phase, 50 more universities were added to the programme in the year 2005. Subsequently, in the third phase 72 universities were included and associate members comprising of IUC and other associated institutions total 5 in number were included under the purview of the consortium along with the national law schools/ universities 14 in number also included under the consortium. E-resources provided under UGC-InfoNet Digital Library Consortium covers almost all subject disciplines including arts, humanities, social sciences, physical sciences, chemical Sciences, life sciences, computer sciences, mathematics and statistics, etc. (http://www.inflibnet.ac.in/)

⇨ N-LIST

National Library and Information Services Infrastructure for Scholarly Content (N-LIST), jointly executed by the UGC-InfoNet Digital Library Consortium, INFLIBNET Centre and the INDEST-AICTE Consortium, IIT Delhi was initiated as a project to fulfill the following objectives.

- Cross-subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE resources for universities and UGC InfoNet resources for technical institutions.

- Access to selected e-resources to colleges.

The N-LIST project provides access to e-resources to students, researchers and faculty from colleges and other beneficiary institutions through server(s) installed at the INFLIBNET Centre. The authorized users from colleges can now access e-resources and download articles required by them directly from the publisher's website once they are duly authenticated as authorized users through servers deployed at the INFLIBNET Centre. (http://nlist.inflibnet.ac.in/about.php). The N-LIST projects has got four components such as,

- Subscribing and providing access to selected UGC-INFONET e-resources to technical institutions (IITs, IISc, IISERs and NITs) and monitor its usage.
- Pledging and provide access to selected INDEST e-resources to selected universities and monitor its usage.
- Subscribing and allowing access to selected e-resources to 6,000 Govt./ Govt.-aided colleges and monitor its usage; and
- To act as a monitoring agency for colleges and evaluate, promote, impart training and monitor all activities involved in the process of providing effective and efficient access to e-resources to colleges.

It may be mentioned that, the responsibility of N-LIST program however, has been shouldered on the INDEST and UGC-InfoNet for the above mentioned two features while, the INFLIBNET Centre is responsible for the rest of the two activities out of the four as mentioned above. Further, the INFLIBNET is accountable for the developing and deployment of appropriate software tools and techniques for authenticating authorized users. The present status as of June 201 of the N-LIST is that, a total number of 1889 colleges have registered which includes 1347 Govt. / Govt.-aided colleges covered under the 12 B Act of the UGC and have been given link to access e-resources through N-LIST website. Initiatives are going to include the remaining colleges to be the member of the program. Remaining colleges are being advised to join the initiative as N-LIST Associates.

⇨ **Shodhganga**

Shodhganga is a project of Indian Electronic Theses/Dissertation Repository. It is an admitted fact that theses and dissertations are known to be the rich and unique source of information, which are often the only source for research work that does not find its way into various publication channels. Doctoral dissertations are manifestation of result of four to five years of intense work involving huge investment of resources, both mental and physical and infrastructure and other support from the universities. A thesis reflects quality of research work conducted by a student and the ability of an institution to lead and support original work

of research in a given discipline (http://shodhganga.inflibnet.ac.in/). Mention may be made that as of June 2011, 23 leading universities of India have already enrolled as a member of this enriching mission while, other 24 universities have signed Memorandum of Understanding.

❹ Developing Library Network (DELNET)

DELNET with its headquarters at New Delhi has been sponsored by the National Information System for Science and Technology (NISSAT), Department of Scientific and Industrial Research, Government of India and is currently being promoted by the National Informatics Centre, Department of Information Technology, Ministry of Communications and Information Technology, Government of India and India International Centre, New Delhi. Though it became a registered body in 1992 but was functional since 1988. DELNET was originally established as Delhi Library Network and subsequently the name was changed to Developing Library Network (IGNOU. Library and Information Service Networks in India. IGNOU; New Delhi).

Objectives

DELNET is fully functional with following objectives -

- Promoting sharing of resources among the libraries by developing a network of libraries, by collecting, storing and disseminating information and by offering computerized services to the users.
- Undertaking scientific research in the area of Information Science and Technology, create new systems in the field, apply the results of research and publish them.
- Offering technical guidance to the member-libraries on collecting, storing, sharing and disseminating information.
- Coordinating efforts for suitable collection development and reduce unnecessary duplication wherever possible.
- Establishing /Facilitating the establishment of referral and /or research centres, and maintain a central online union catalogue of books, serials and non-book materials of all the participating libraries.
- Facilitating and promote delivery of documents manually or mechanically.
- Developing specialized bibliographic database of books, serials and non-book materials.
- Developing databases of projects, specialists and institutions. To possess and maintain electronic and mechanical equipment for speedy communication of information and delivery of electronic mail.

- Coordinating with other regional, national and international networks and libraries for exchange of information and documents. Currently, DELNET has about 800 members from India and 12 members from abroad including Nepal, Oman, Philippines, Sri Lanka, United Arab Emirates and United States.

❖ **Services**

DELNET promotes the following services.

⇨ **Online Databases**

DELNET provides online access to several databases to member libraries and information centers.

☞ Union Catalogue of Books in Common Communication Format (CCF).
☞ Union List of Current Periodicals: in science and technology, social sciences and humanities.
☞ Union Catalogue of Periodicals.
☞ Database of Periodical Articles.
☞ Indian Specialists: A Who's Who: For eminent scientists, educationists and writers from all over the country.
☞ CD-ROM Database.
☞ Union List of Video Recordings.
☞ Union List of Sound Recordings.
☞ Union List of Newspapers.
☞ Union List of Serials: Management Libraries.
☞ Union List of Serials: Petroleum and Natural Gas.
☞ Union Catalogue of Hindi Books.
☞ Multilingual Books: Sample Database.
☞ Urdu Manuscripts Database.
☞ Database of Theses and Dissertations.

⇨ **Inter Library Loan Online**

Member libraries can request online for a document using inter-library loan facility of DELNET through DELNET server and the document is couriered to the requesting library. The member library needs to pay an annual subscription for this service.

⇨ **Retro-Conversion and Creation and Maintenance of Bibliographic Databases**

DELNET entertains requests for retro conversion from one MARC standard to other on demand. DELNET also entertains requests for creation of bibliographic databases for

member libraries so that they can create their own OPAC. It provides Document Delivery Services to its users and maintains a referral centre which provides reference service to members.

⇨ **Training Programmes:**

DELNET organizes monthly training program with NIC on topics like Web page design, Internet search strategies and other resources, etc. It also conducts courses on Machine Readable Cataloguing and bibliographic standards like MARC21.

⇨ **Conferences, Lectures and Workshops:**

DELNET organizes the National Convention on Library and Information Networking (NACLIN) annually at different parts of country including organizations of workshops, lectures in different parts of country and abroad.

⇨ **Internet, Electronic Mail and Videoconferencing**

DELNET provides e-mail facility through National Informatics Centre (NIC). It also provides Internet Connectivity to its member-libraries in Delhi through NIC.DELNET is providing value added service to its member libraries. It is deeply involved in the development and promotion of automated services. DELNET is also working towards propagating the concept of creation of digital libraries and multilingual access to information.

❺ **Mysore Library Network (MYLIBNET)**

Mysore Library Network (MYLIBNET) was initiated in 1995 with the support of NISSAT. It is stationed in Central Food Technology Research Institute (CFTRI), Mysore. About 116 colleges/institutions are affiliated to the University of Mysore out of which, 34 college libraries are located within Mysore, which are covered under networking for sharing their resources, activities etc.

❖ **Objectives**

The objectives of Mysore Library Network are as follows:

- Sharing resources available with all the libraries;
- Providing a faster communication to all the libraries through Electronic Mail facility;
- Developing software tools for better library management;
- Creating awareness in the field of latest Information Technology by conducting seminars/workshops/training programmes;
- Setting-up a Information base in collaboration with industries and
- Flashing arrival of new books/journals, announcement of events like seminar/ Workshop/ training programmes.

❖ **Services**

MYLIBNET provides following services:

⇨ **Union Catalogue of Journals**

In order to achieve the objective of 'Resource Sharing' for optimum utilization of available resources and to avoid as far as possible duplication, a project was initiated in 1990 by Academy of Information Science to conduct a survey & bringing out a hard copy of the "Union Catalogue of S&T Serials in Mysore City Libraries". The project has been completed and a hard copy of the catalogue was published in 1991.

⇨ **Experts Database**

The database contains the list of library professionals and their details. One can search for details of an Expert either by selecting the Name of the Expert or by selecting the Name of the Institute. The database is not very exhaustive and is still being developed.

⇨ **E-Journals**

MYLIBNET provides links to several free online e-journals in the field of medicine, physics, mathematics and chemistry. The lists of journals are available from website, http://www.mylibnet.org/hold.php.

❻ **Madras Library Network (MALIBNET)**

MALIBNET was established in 1993 with the support of Indian National Scientific Documentation Centre (INSDOC). It provides information to the users in and around Chennai. Nearly 50 libraries in Madras are member contributing actively to the creation of various databases on MALIBNET.

❖ **Objectives**

- ☞ Fostering growth in the field of information science & technology;
- ☞ Undertaking scientific research in the field of library & documentation;
- ☞ Evolving a network of libraries & information centres in India;
- ☞ Establishing appropriate links to national & international libraries and networks; and
- ☞ Facilitating resource sharing & information dissemination through networks.

❖ **Services**

MALIBNET provides following services.

⇨ **Databases**

Directory Database of Current Serials - The directory contains information of 5200 serials currently subscribed by 50 libraries in Chennai. It covers journals in the area of basic sciences, applied science & technology, medicinal science and life science discipline. The

service is available online and on diskette and search can be performed on title, subject and by library options.

⇨ **Content Database**

The Content database of MALIBNET holds article index of nearly 500 journals online fully searchable through author, title and keyword options. It is distributed through E-mail and on diskettes.

⇨ **Specialized Database for Automotive Industries**

MALIBNET maintains a specialized database covering Automobile Engineering discipline which is useful for Research Professionals and Industrialists. It covers a number of national and international journals.

⇨ **National Union Catalogues of Scientific Serials in India (NUCSSI)**

MALIBNET also maintains National Union Catalogues of Scientific Serials in India, Chennai Region covering 60 libraries. This union catalogues is very useful in cooperative acquisition of journals as well as locating the journals.

⇨ **Medicinal and Aromatic Plants Abstracts (MAPA)**

MALIBNET maintains database of "Medicinal and Aromatic Plants Abstracts (MAPA)", which covers 600 journals with 19000 records starting from 1990.

⇨ **Patent Database**

This database covers patent details in scientific research. It presently, holds about 40,000 records. The coverage is since 1970s.

⇨ **Polymer Science Database**

It also maintains database on polymer chemistry and related topics with coverage of over thirty national and international journals.

⇨ **Content Search Service**

This service allows a search on the contents database existing at MALIBNET. It contains almost 500 online journals. This database is searchable through journal title, year, volume & issue. Results are sent back to the user through E-mail. Requests for availing these services can be made by filling up a request form. Any member library can use this service.

⇨ **Literature Search Service**

Keywords for performing literature search are available through the above-mentioned databases at MALIBNET, which however, is extended to the users on request.

⇨ **Document Procurement Service**

MALIBNET provides full text of articles from Science and Technology journals. One needs to provide journals, year, volume, & issue along with page numbers. The service is available

on nominal charge. MALIBNET maintains a website with URL as http://www.angfire.com/in/malibnet/.

2.15 Internet

Internet is the networks of networks formed by the cooperative venture of inter connections of computer networks to achieve a goal and to communicate with each other. It is a place where persons engaged in various professions can communicate with each other about their ideas, and view in real time. The Internet is the worldwide connection of thousands of computer networks all of them speaking the same language. It allows the people to share their findings and their findings and help in discussing the matter.

2.15.1 Internet: The significance

Internet is data communication system that interconnects computer systems at various sites without any geographical limitations. A network may be established through LAN, WAN or MAN depending upon its need. A network consists of connecting two computers with a length of wire between them letting them to communicate each other. At its most complexes as in the Internet, a network is global spinning heterogeneous mix of technologies and operating systems. It is broadly defined as the cooperative group of networks that have agreed to connect to one another to use special communication protocol. It is an impressive combination of information and communication software artifact and activity, on object as well as process. In other word, the Internet is a network for exchanging information and data. The real striking thing about the internet is its constant growth, and the reason for its growth is that the internet allows its users multiple things like mailing downloading, searching, learning, chatting, conferencing, shopping, business, banking etc.

2.15.2 Internet- Origin and Growth

The origin of Internet dates back to mid of 1960's. When the researchers were experimenting with computer networks formed through telephone lines. Growth of computer networks led to the development of data traffic through network to communicate each other from one platform to the other. In 1968, the United States Department of Defense Advance Research Projects Agency (ARPA) started a project called ARPANET with an aim to establish a computer network for carrying government as well as military information, which could withstand adverse conditions such as nuclear attacks. During the 1970's it became clear that no single network could satisfy all these requirements. Researchers then tried to connect different small networks to form a single large network. This led to the formation of interconnected networks. In course of time, the network spread throughout the world. This infect precipitated to the term Internet. Consequent upon the growth of other networks

confusion and agony had a serious impact on the communication system leading thereby, ARPA to develop a set of rules known as protocols. Based on these protocols more and more computer networks were connected to the network and thus the Internet spread across the globe.

2.15.3 Internet Services and Features

The Internet is a worldwide collection of computer networks connecting Academic, Government, Commercial, Organizational, and Individual sites, which provides access to communication services and information sources to millions of users around the globe. The main Internet services features are as follows.

- **Internet Service Provider (ISP)**

An ISP or Internet Access Provider is a company that provides the Internet access. Customers can be businesses, individuals and organizations. The two common types of Internet access are dial-up shell accounts and SLIP/PPP accounts.

- **World Wide Web (WWW)**

The World Wide Web is a system based on hypertext and HTTP, for providing, organizing, and accessing a wide variety of resources (text, images, and sound) that are available via the Internet.

- **Web Page**

Web is a composition of electronic resources where millions of information are available in electronic form. A web page is a unit of information, which often called a document that is available over the World Wide Web. Web pages are created using HTML, and other programming languages such as XML, SGML, C++, Java etc. which define the contents of a web page such as images, text, and provides links to hypertext, hyper media etc. Web pages are sent and received through HTTP, a method used to transfer hypertext files across the Internet. The user through internet browser such as, Internet Explorer, Mozilla fire fox, Google Chrome gets link to the hypertext and hyper-media information.

- **Hypertext Markup Language (HTML)**

HTML is a set of standardized programs, codes, and tags that have been derived from the Standard Generalized Markup Language (SGML) standard. HTML defines and describes the structure of a web page and is used to prepare documents for the World Wide Web. In addition, HTML documents are portable –they can be viewed with any web browser o any type of computer.

❖ **Web Browser**

A browser is a software program that acts as an interface between the user and the World Wide Web. The browser sends requests for information that is available on the Internet and displays the information for the user. There are many different types of browsers. A text-based browser shows a user text only. A graphical browser allows the user to see more of what the WWW has to offer, such as graphics, photographs and multimedia.

❖ **Web Index**

A web index collects and organizes resources that are available via the World Wide Web, and is designed to provide a starting point for locating information. Web indexes may be organized in a variety of ways, including alphabetically and topically, and generally offer users the option of connecting directly to the resources listed.

❖ **Search Engine**

A web search engine is an interactive tool that enables users to locate information available via the World Wide Web. Search engines provide "fill-out" forms and other interfaces so the user can type in a query, submit the request, and retrieve a list of resources that match the search criteria. The hypertext environment makes it possible to offer a link directly from the list of results to the resources themselves.

❖ **Web Browsing/Net Surfing**

Internet browsing or 'net surfing' as it is often called is the process of visiting the different web sites on the Internet hosted by the various companies, organizations, educational institutions, magazines, individuals, etc.

❖ **IP Address**

An IP address is unique, numeric identifier used to specify a particular host computer on a particular network, ad is part of a global, standardized scheme for identifying machines that are connected to the Internet. IP address consist of four numbers between 0 and 255, separated by periods, which represent both the network and the host machine.

❖ **Domain Name**

A domain name is a way to identify and locate computers connected to the Internet. A domain name must be unique; no two organizations on the Internet can have the same domain name.

❖ **E-mail**

Electronic mail, or e-mail as popularly known, is a system that allows users to send and receive messages and data through the data.

❖ **Uniform Resource Locator (URL)**

URL provides a standard hierarchical way of identifying and locating Internet resources on the World Wide Web. URLs include letters, numbers and punctuation.

❖ **Transmission Control Protocol/Internet Protocol (TCP/IP)**

TCP/IP is a suite or family of protocols work together to break the data into small pieces that can be efficiently handled by the network, communicate the destination of the date to the network, verify the receipt of the date on the other end o the transmission, and reconstruct the data in its original form.

❖ **File Transfer Protocol (FTP)**

FTP is the protocol or set of rules, that enables files to be transferred from one computer to another. It is part of the TCP/IP protocol suite. Files that are available for FTP are stored on computers called TP servers. An FTP client program is a interface that allows the user to locate the file(s) to be transferred and initiate the transfer process.

❖ **Hypertext Transfer Protocol (HTTP)**

HTTP is the set of rules, or protocol, which enables hypertext data to be transferred from one computer to another. HTTP enables users to retrieve a wide variety of resources, such as text, graphic, sound, animation and other hypertext documents, and allows hypertext access to other Internet protocols.

❖ **Telnet**

Telnet is the protocol that enables one computer to establish a connection to another computer. The computer establishing the connection is referred to as the local computer; the computer accepting the connection is referred to as the remote, or host computer. Telnet can provide access to many resources around the world, such as library catalogs, databases, and other Internet tools and applications.

❖ **Gopher**

Gopher is a protocol designed to search, retrieve, ad display documents from remote sites on the Internet. In addition to document display and document retrieval, it is possible to initiate on-line connections with other systems via Gopher.

❖ **Wide Area Information Service (WAIS)**

WAIS is an Internet search tool that has the capability of searching many databases at one time. WAIS can be accessed via Telnet, Gopher or WAIS client program and increasingly, WAIS indexed databases are accessible through the World Wide Web (Leon, and Mathews; p.4-7).

2.15.4 Needs and access the Internet

The Internet is a network of millions of computers at innumerable of sites around the world which communicate to each other through a common language using the internet protocol. In addition to the traditional uses of telecommunications for phone conversations and paging, there is an increasing need for remote communication. Physicians might wish for use computers at home to track the status of patients or receive notification of important laboratory results. There are at least five reasons as to why the users require to access information centers and libraries from the Internet.

- ☞ To get help in publishing their information.
- ☞ To get help in locating information (on-line services and catalogues).
- ☞ Full text documents and information are also available via-Internet.
- ☞ User can find path to current information about many organizations.
- ☞ User can browse or search these documents by using tools viz. Gopher, Mosaic, World Wide Web.
- ☞ With e-mail services, the individual can learn about health issues and correspond with others who share common interests by joining electronic mail lists dedicated to discussions on medical conditions.
- ☞ To get help determining the quality of various information sources.

2.15.5 Impact of Internet in Libraries

In effect, Internet has made a great impact on library and information services by offering new modes for information delivery and a vast variety of information sources. In recent years, our world of librarianship has become an interconnected global community. Its extensive application has changed fundamental roles, paradigm shift and organizational culture of libraries and librarians as well. The innovative and planned approach to Internet related technologies will enable us to reach both on campus and on distant users much more easily and effectively than hitherto possible. Particularly, E-mail and web have opened up a number of opportunities or library and information professionals to deliver the information to the end users' desktops. The web offers significant advantages by integrating different library and information services etc. with common user interface offer by web browsers. It is indeed an effective channel to the academic librarians to promote the services.

With the advent of Internet, the entire gamut of publishing is undergoing a drastic change. There are more and more publishers, both commercial and professional bodies, individuals and institutions shifting from print media to electronic media.

In nutshell it can be viewed that, internet is an embodiment of electronic resources covering a wide spectrum of subjects including other dimensions such as social networking etc. It has proved to be a viable platform of information exchange from one system to another irrespective of its location. The users get hundreds of options to link to any site which however, can be accessible with the help of search engines like Google, AltaVista, All-in-One Search, All the Web, Ask Jeeves, Excite, GO.com, Hoover's Online, HotBot, Inference Find, Lycos, Medical World Search Engine, Meta Crawler, Monkey sweat, Yahoo etc. which however, have different functions to retrieve diverse resources.

2.16 Conclusion

Libraries and Information Science centers in the wake of ICT have seen radical changes in the service sector. Initiatives from all quarters have been made for the development of library services and the efforts of the National Knowledge Commission in this regard are worthy. The commission stressed upon maintaining a well-rounded core collection, including reference material to satisfy the regular needs of its user community which may be supplemented through networks, e-resources, etc, to achieve better qualitative and quantitative standards (NKC; 2006). Accordingly, the National Knowledge Network also took sporadic attempts to connect all the knowledge and research institutions in the country using high bandwidth / low latency network. Further, networking is indispensable in the libraries to get the global connectivity. Hence, the NKC also emphasized upon building networking with state-of-the art technology with following features (NKC; 2006).

- ☞ Open source platform for the software, which also supports multilingual environment with multi-user and multimedia content creation capabilities.
- ☞ Storage, dissemination and replication of the data through mirror sites, gateways, portals, and inter-library loan facilities.

The Information and Library Network also equally took positive measures in allowing access to e-resources to all the universities recognized by the UGC and developed computer and network infrastructure and other logistic support with static IPs addresses. Substantial progress could be visualized through UGC-InfoNet Connectivity Programme and UGC-InfoNet Digital Library Consortium. The Internet bandwidth for 130 universities was increases to 2 Mbps and seven more universities were included under the UGC INFONET programme. (INFLIBNET; 2008).

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CHAPTER- 3

Library Consortia:

Organization and Services.

3.1 Library Consortia: Meaning and Concept

The concept of Consortia in the days of yore signifies to strategic alliance among the institutions having common interests. Basically, consortia denote to a group of libraries come together with common interest to form consortium. In consortia, one among the group of libraries or agencies is vested with the responsibility and performs as a coordinator for identification of libraries for each publisher, including the task of negotiation and legal issues. The aim of the consortia focuses to achieve the resources in a group which may be impossible to acquire for an individual library. In consortia, an agent working in the capacity of either Private or Government owns the responsibility of subscribing the resources in electronic form from different publishers around the globe and makes the payment with a licensing to provide the benefits of the resources to its member libraries. The member libraries opt a memorandum of understanding to use the same for academic purpose and with in the campus only.

Consortium concerns to a community or cooperation among a group of libraries built up with two or more information agencies who formally agree to a common sense of understanding to coordinate, cooperate and consolidate certain functions to achieve mutual objectives. Consortia may be formed on a local, regional, or larger basis and also can be classified on functional type, and format or subject basis.

The exact date of the first use of the term "Library Consortium" is not clear but the concept of a consortium as being an association or partnership, has long been a tenet of librarianship. The published literature in the field indicates that the concept is not new. It refers to co-operation, co-ordination and collaboration among the libraries for the purpose of sharing their resources, manpower, expertise, devices etc. However, libraries did not take its proper advantage nor widely recognized until 1980s. The main drive for co-operation has been due to the increase output of publications, information explosion, astounding rise of cost of publications coupled with stringent budget allocations in libraries, staggering collection of multifarious resources and growth of library users. This added another pertinent issue of multidisciplinary research including the growth of subjects.

A library consortium is a formal association among the libraries which may not be essentially to be under the same institutional control, but usually restricted to a geographical area, number of libraries, types of materials, and subject interest which is established to develop and implement resource sharing among the members. Basic purpose of consortia is sharing of resources, financial utilization in regards to resource building and human power. Consortia are regarded as an effective strategy to increase the buying power and unlimited access to

electronic resources. Publishers, aggregators' heavy discount to their products under the terms and conditions of consortia purchase and hence, member library can save significant amount of their finance. In recent years libraries have realized that there is an advantage in developing a common strategy. The library consortia have become powerful negotiating parties which succeed in adding their own clauses to contracts and no longer sign "standard" contract texts offered by licensors/publishers.

There are multiple definitions on consortia. While, dictionary.com defines consortia as a cooperative agreement among groups or institutions, Oxford English Dictionary viewed it as a community of two or more information agencies that have formally agreed to coordinate, cooperate or consolidate certain functions to achieve mutual objectives. Likewise, Webster's 19th new collegiate dictionary defined consortium as an agreement among a group of libraries to undertake an enterprise beyond the resources of any one member. Therefore it can be inferred that, consortia is a kind of formal cooperative arrangement where the staff of the libraries agree to exchange information or resources. Moreover American Heritage Dictionary observed consortia as an association or society.

The true value of the consortium comes from helping the library to learn how about analyzing the quality of resources, choosing the correct methods of acquiring the documents, judicious decision in utilization of the budget, value-oriented investments in building up the resources, putting emphasis on priority on collection developments, and infrastructure building. A library consortium in broad sense of the term entails its significance to coup up with the issues and opportunity to explore various mechanisms to share views, resources etc. along with understanding and articulating the emerging trends for creating standardized methodologies for implementation in the respective libraries.

3.2 Scope of Library Consortia

Library consortia have multiple scopes that have been discussed below.

- ⇨ Strengthening library resources, services, and faster cooperation including establishing communication among the member libraries;
- ⇨ Reinforcing the pooling, sharing and electronically accessing library resources;
- ⇨ Providing access to global literature to the users communities on Internet;
- ⇨ Nucleating the culture of electronic access resulting to the evolution of digital libraries and
- ⇨ Intensification of inter-library loan service in traditional library system and document delivery service in an automated environment.

3.3 Opportunities of Library Consortia

Library Consortia provides a wide range of opportunities to achieve the following issues.

- A comprehensive collection is possible
- Avoidance of duplication of core collection, especially for core journals
- Resource sharing will reduce the cost of collection development among the participating libraries
- Users' demand is considered for collection development
- Every library is liable to send their respective holding to other libraries under resource sharing programme
- Easy access to resource sharing on Internet by creating databases among the libraries.

3. 4 Need for Consortia

A number of factors need to be considered before opting for library consortia. Components need to resolve include,

- ⇨ Resources identification on the basis of usage and usability,
- ⇨ Long run planning of the technology infrastructures,
- ⇨ Access to back volume of periodicals,
- ⇨ Copyright and licensing,
- ⇨ Archival issue,
- ⇨ Price issue which needs to clearly spell out so as to form a economically viable environment and
- ⇨ Designing and launching of a long term sustainability of library consortium among the libraries.

Information revolution has brought a dynamic change in the libraries especially in building the resources. Further, the adoption of Internet and World Wide Web in libraries have revolutionized at all levels of functioning in the services, acquiring and scientific organization of resources, effective dissemination of information etc. ICT could not restrict its boundary in mere collection development in the libraries rather exemplified its dimensions to reach to the end users. Users reciprocally expected speedy delivery of their requests in full-text including retrieval of information from the various sources of the library which include electronic resources, databases, on-line public access catalogue on web. User expectations ascended with the enhancement of technological changes. Libraries finding no alternatives than to satisfy the multiple wants of the users started in progressing in tune with the present requirements and applied advanced technologies. This is corroborated with the budgetary limitations which forced libraries to adopt a means of cooperation in building the scholarly

publications collectively. This approach of the library practically germinated the notion of resource sharing that could be applied among the libraries for providing services through a common gateway and thus, ended with consortium.

Access to resources is now considered more important than collection building. The consortium facilitates the libraries to get the benefit of wider access to electronic resources at affordable cost and the best terms of licenses. A consortium with the collective strength of resources of various institutions available to it, is in a better position to address and resolve the problem of managing, organizing and archiving the electronic resources. Moreover, technology has changed expectations of researchers, their patience and willingness to accept services that are available on demand. The web based electronic resources are an apt answer to the expectations of researchers. Consortium eradicates the problems of the users in a multiple ways. However to be more specific, the foregoing discussions put emphasis on resolving various issues of the library.

- Eliminating the problems encountered by the libraries while providing varied services to the users.
- Meeting the thrust of information of the wide range of users.
- Cope up with the newly generated knowledge published in different forms, such as, printed and non- printed documents, electronic media on various disciplinary and new generated subject areas.
- Collecting all the documents published at the national and international level because of the financial crunch; and
- Overcoming the language barriers as, most of the primary documents are published by the developed countries like US and UK etc. while non- English speaking countries produce scientific literatures in their native languages.

In addition to the above, the following are the various factors that applied the sense of consortia approach practically which could be possible in the present day requirements.

- Unexpected onslaught of new materials and electronic versions of old materials;
- Users demand to access to the materials not only quickly but also effectively at their respective terminals.
- Willingness and eagerness of the Governments of various countries in providing additional funding to support broad based consortia designed to improve access to electronic information for the benefit of the citizens of their respective countries.
- Agreeing in principles by the publishers, information providers to use the resources collectively by multiple libraries at one point of time.

- Redress to the problems encountered in scientific publishing and pricing of publishers that, posed new threats and additional constraints among the libraries especially in academic and special in judicious collection developments and managing with the ever increasing serials within their restricted stipulated budget.
- Abrupt price increase for scientific information coupled with the lack of funding for academic libraries which led to massive yearly collections of scientific journals.
- Access to e-resources in a multiple ways round the clock.
- Facilitating the libraries to get hold of the benefit widely to the electronic resources at an affordable cost within the terms and conditions.
- Strengthening the collection strength of resources of various institutions available to including archival of resources.
- Building up knowledge databases of individual library with the help of library software and sharing with other member libraries.
- Creating institutional or digital repository allowing access the intellectual wealth of the institution to the users.
- Improving skills of information literacy among the library professionals and users to optimize the use of resources.
- Instant delivery of information to the users.
- Amplification the week libraries to stand at par with the developed libraries in regards to the resources, infrastructures etc.
- Enhancing the capability of the libraries to improve upon the library services in a wider dimension and
- Creating a sense of value based information gathering for the benefit of the users.

3. 5 Importance of Library Consortia

The modern society is gifted with hi-tech gadgets and complex networks, through which we can derive benefits to unimaginable extent. To succeed in the future, consortia will need to differentiate themselves on grounds greater than which consortium provides the best deal for particular electronic resources. Consortia need to develop new consultation, training and service programs that are predictive to the member libraries needs. The consortium services must manage more than cost they must manage change. A consortium can do this by providing leadership for its members that generates cooperative action that advances the educational environment, improves institutional fiscal health and improve the quality of services for the clients of the library. Most importantly, it must help members manage change

collectively in a way that is more productive than what the individual member libraries could achieve separately.

A library consortium is gaining momentum due to the many advantages where, the participating libraries are the major gainers because of the following discussions.

- In this electronic era there is a significant increase in the international cooperation towards the library consortia in order to fulfill the multidimensional approaches of users in multidisciplinary subjects.
- Advances in hard ware and software for the digitization of information have made electronic publishing a valuable means for scholarly communication. The rapid success of electronic information resources has raised the importance of library consortia.
- The development of the new technologies, new processing tools and new methods of information transfer makes it possible to process any data and transfer instantaneously to any point on the globe. Today, technology makes it possible to automate files, transfer their contents via tele-matic means and create text bases that can be consulted at a distance.
- The collection management is also pursuing new ways while in the past, it was expensive in some cases to reconfigure the company network.
- Certain professional users like doctors, engineers, lawyers, businessmen etc. show interest in fast direct information accessible from their work place.

With the help of available modern technologies, communication can be arranged in variety of models for sharing book collection, electronic resources and the journals information. Coalition form by libraries will act as a channel for cooperation. The organization, operation and funding of the consortium of libraries are an example of such common communication which could be adapted to the specific characteristics of the library. The library can have union catalogue an interlibrary lending program and other cooperation programs. In the digital library environment, all the participating libraries of the consortium with the policies and guidelines can share a series of electronic resources.

Today's digital and virtual libraries in the networked environment are finding solutions in the context of

- Metadata standards and databases design
- Usability studies and search strategies
- Information retrieval effectiveness
- Managing information technology

- Need for knowledge and skill formation of information professionals;
- Legal, ethical, cultural and behavioral aspects;
- Library collection development of digital information services.

3.6 Emergence of Consortia

The development of consortia is the outcome of the desired for resource sharing. On-line Computer Library Centre (OCLC), a well established organization initiated the sense of reaching the resources to the users globally. The efforts of OCLC further triggered with the upcoming of the other international agencies in building consortia among the libraries. Likewise, equal footing was also initiated in India which could be visualized with the National Knowledge Commission in 2006 who equally emphasized on consortia. The Govt. of India also contributed immensely by setting up a national body known as INFLIBNET under the aegis of UGC to commenced consortia based service. In parallel with the development of the consortia by INFLIBNET, other consortia in different subjects were also started by various national agencies under Govt. of India which have been discussed subsequently. However, the basic and primary objective of the consortia lies with the principle of cooperation and helping the libraries to serve the users by providing economical access to knowledge through innovations and collaboration. Others global agencies of consortia include Virginia's VIVA, Ohio's OHIOLINK having one common set up goals with regard to pooling up their financial resources for collective utilization to enhance the resource building and greater economic control over their market places.

3.7 Goals and Objectives of Consortia

▣ Goals

Consortium take a leading role in the development of a national strategy for providing the value based and authentic information for research in higher education thereby, leading to raise the profile of the institutions nationally and internationally among the research communities. The principal components in achieving the goals lie in the following objectives.

- ☞ Developing a plan for libraries' future directions..
- ☞ Considering the mission of the libraries and recognition nationally.
- ☞ Emphasizing on letting the priorities for funding within libraries and to be proactive in influencing national agendas/priorities for funding for research support.
- ☞ Influencing national agencies engaged in consortia purchase activities, in order to ensure the needs of research and scholarship remain a priority.
- ☞ Publicize and disseminate information about Libraries and its activities as widely as possible in appropriate contexts.

☞ Making appropriate responses to consultation processes.

▣ **Objectives**

The following are some of the viable objectives of the library consortia.

- Developing a co-operative and consortia solutions to the challenges faced by members, in the acquisition, processing, storage, preservation, exploitation, dissemination and delivery of information and library materials, for the benefit of their institutions;
- Establishing co-operation with other institutions to reduce the subscription cost and maximize utilization of resources;
- Enhancing technical skill of library staff in using electronic resources;
- Assuring building up the databases of the regional, national and global information for the use in future.
- Assisting the libraries in the building consortium to pursue and achieve their own institutional objectives.
- Increasing the cost benefit per subscription.
- Promoting rational use of funds and proper utilization of funds with regards to building e-resources and infrastructures.
- Ensuring optimum utilization of library resources.
- Developing technical capabilities of the staffs in operating and using electronic publication databases. (http://eprints.rclis.org/)

3.8 Characteristics of Consortia

Impact of electronic publishing and telecommunication in the libraries as already mentioned have a incredible effect which expanded the horizons of library both in collection development and functions. Library consortium development is rooted in the history library cooperative efforts and is now driven by the need to provide remote users with licensed access to electronic resources. The common characteristics of the nationwide library purchasing consortia required to be properly outlined for its effective use in library services. A consortium has been defined in many ways by different organizations where Aldrich, Bolton, and Sasaki 1998 have defined it in a different way. According to them, a consortium is a horizontal collaboration among direct competitors.

Library consortia vary in their type, goals, structure, membership, and funding (Woodswort 1991). A consortium may be a formal or informal agreement between libraries based on a common principle. For example, a consortium may be based on library type such as, academic, medical, or public. A regional consortium may be based on a geographical

principle. A statewide or nationwide consortium may incorporate all its libraries, government funded and those in private institutions. Although library consortia form to achieve shared goals, the main goals of cooperation vary of the most common goals is resource sharing through union catalogue and interlibrary loan agreement Electronic resources licensing is another goal, aiming to reduce costs per unit through formation of purchasing consortia (Shachaf, p; 2003; p.94-102) (http://eprints.rclis.org/).

The characteristics of consortia may be outlined as follows.

- ☞ Building up consortia is a complicated process as the responsibility is shouldered upon one organization who function with a group of libraries or organizations with common objectives, agreement etc. Communication and decision-making are also equally burdensome and labor intensive process. Communication among the member organizations equally put constraints on the consortia builder to make links for flow of resources.
- ☞ Policies for leveraging of resources in consortia differs from the policies rules for individual libraries in procurement of resources. The individual library with in the budgetary limits procures a countable number of publications which may include both national and international and the journals may not be immense benefit to the users. However, the libraries through consortia get access to hundreds of journals in electronic form and the users get an environment of vast array or resources with multiple choices.
- ☞ Rules promulgating for consortia need to be simple and suit to the needs of the member libraries.
- ☞ By virtue of the membership, the libraries not only get access to an ocean of resources but also economical as the disbursement of money is done by the organization and not by the member libraries. However, a small portion of the amount from the budget meant for individual libraries is deducted towards the purchasing of electronic resources directly from the publishers. This also adds another important segment of additional information as and when the publishers provide the same through links which is not available for the individual libraries while going for separate subscription as the individual libraries mostly opts to get the resources through the agents and not from the publishers directly.

3.9 Prerequisites of Consortia

Consortia have some prerequisites parameters that need to be applied before any library or organization becomes a member of consortia. The library staff may not be acquainted with

the information handling process as it requires skills, operation of software to download the resources including its scientific organization for effective dissemination. However, some of the following discussions required to be considered while going for the consortia. It is a two way of system which include both library or organization and the consortia builder.

- The organization who takes the responsibility of building consortia requires developing and sharing skills with the member libraries.
- As and when the organization acquires resources it requires to be available to the member libraries including other resources round the clock without any interruption.
- Organization requires providing adequate band width along with internet connectivity to the member libraries for effective dissemination of resources.
- In-house training to the library staffs requires to be facilitated by the organization.
- Necessary software operation for the library staffs need to be exposed clearly along with maintenance sand backup.
- The member libraries equally require developing a mind setup to accept the changes.
- The staff of the library requires meeting the challenges in the light of future perspectives.

3. 10 Trends in Library Consortia

Academic libraries have long formed consortia for sharing existing physical resources-principally books and journals held by member libraries. This is done in recognition of the fact that a group of libraries has a combined set of resources that is greater than the resources of any single member. Indeed, studies have indicated that, contrary to what might be assumed, there is great diversity among collections, and even the smallest library contributes something unique (Potter; 1986).

To expedite the sharing of resources, academic library consortia have promoted the formation of union catalogs and expedited interlibrary loan. The OCLC Online Union Catalog lends itself to supporting interlibrary loan and provides the means for a consortium to facilitate requests among its members. Consortia that link circulation systems, such as LCS in Illinois and Ohio LINK, permit users to determine the circulation status of a book at another library and initiate an online request. Courier services have been established to move materials from one library to another and high speed tele-facsimile has become common to move copies of documents either across phone lines or across the Internet (Potter; 1997; pp.416-434). Consortia in libraries have witnessed many challenges Library Consortia have gone through different phases of its development since beginning.

It has been in existence since early 1900s in the developed countries like USA and UK. In the beginning of it was in the form of library cooperative projects intended mainly to share collections and occasionally to combine acquisitions that remained intact till 1960. The real impetus for the development formal library consortia was occurred only after 1960 when automating library processes become a possibility. With this, the information of the Integrated Library Systems becomes the trend of late 1960s and early 1970s. This kind of mega consortia, generally known as Bibliographical Services or Library Networks and automation, is the strong reason for this kind of development.

The trend among consortia groups in late 1980s is the implementation of the local library systems (installation of local networks due to introduction of CD - ROMs) and diversion from mega consortia to short lived illusion of independence in the area of client services. This is completely different from the development of late 1960s where one parent institution other than the consortia member can act as the official member to which all activities and governance generally delegated. In the late 1980s and early 1990s, new consortia approach emerged as a strategic partnership with goals different from that of the library networks of the past. This new consortia moved towards new self–definition and intended mainly to protect the interests of their members despite other organizations efforts.

The popularity of World Wide Web changed the information needs of the users. The users slowly switched over their demand from print sources to electronic sources. The users felt it easy and convenient to use the same. This has further necessitated in the library due to stringent budget allocations and mounting pressures to maintain the high professional standard of customer service. Apart from the above issues, other various phenomena insisted the individual libraries to move towards increased cooperation and formation of new types of consortia during late 1990s.

3. 11 Issues of Consortia

Multiple issues are related to consortia building. Some of the vital issues have been discussed below.

- Selecting a coordinating agency to deal on behalf of entire group of participants and executing a monitoring the work.
- Specifying the libraries interested in participating and agreeing to common terms and conditions.
- Identification and negotiating of potential publishers/ vendors or aggregators to provide access under consortia purchase.
- Source of funding to meet the subscription cost.

- Legal issues involved in contracts and usage of material within the consortia
- Informing the usefulness / importance of the consortia to the heads of the institutions, Professors, Research Scholars etc.
- Identifying the necessary infrastructure for electronic access to resources.
- Issue relating to backup and archival of databases.
- Classification and selection of databases to be acquired and hosted.
- Documentation and training to staff.
- Access rights – whether to provide direct access from publisher site or to mount databases at coordinating agency.

3.12 Infrastructure of Library Consortia

Infrastructures are the prime criteria in consortia as manifold devices including computers, software, skilled personnel, building various communication technologies in the way of networking through WAN, LAN along with Internet. Primary aim of such infrastructure lies with the principle to access e-resources seamlessly to reach the end-users. Further the infrastructure is coupled with bandwidth, satellite links etc. to facilitate the flow of e-resources to the library round the clock. However, some of the important infrastructures are mentioned below.

- A library automation system includes well-equipped workstation with local library system with adequate number of computers with high speed LAN/Internet (Hardware) and requisite software. Telecommunication facility allows communication between one host to another and this is required to access the databases comprising of local, regional, national and international, access to other networks and allowing e-mail services. A variety of system functions to coordinate, manage the existing and retrieval data and digitized information in different medias such as magnetic tape, floppy disks, and computer hard discs. CD Rom Disk, scanners, CD Rom writers and DVD – ROM Discs etc. are also the part of infrastructures for consortia.
- Automating the libraries with the provision of accessing to online union catalogue and multiple electronic resources.
- Creating technically skilled trained staff to disseminate effective information service along with digitized services.
- Creating an environment and building infrastructure for e-book conversion from the traditional books.
- Providing the list of links for e-books, e-journals and other electronic materials and making availability and use of the relevant software including training on it,

- Making provision of putting high bandwidth for Internet.

3. 13 Standards for Library Consortia

The standards and protocols concern much for the librarians in most of the library consortia environment, which is beyond licensing electronic resources. Such standards include,

- Metadata Standards, Resource Description and Access for electronic publications including Dublin Core.
- Guidelines for Authority Records and References;
- Standards for Bibliographic Information Inerchange and Communication like ISO 2709, Z39.50, Z 39.71 etc.
- Resource exchange standards like, MARC-21, UNIMARC, CCF.
- Protocol standards for Resource discovery – Z – 39.50; and
- Standards for Interlibrary loan- ISO 10160/10161 (UG INF - (A-5)

The International Coalition of Library Consortia (ICOLC) has issued a set of standards and guidelines for consortium which are available at their URL site http://www.library. yale.edu.consortia. ICOLC has been in existence since1996 and it an international, informal group currently operating in more than 160 library consortia in North America, Europe, Australia, Asia, and Africa etc. The member consortia serve all type and sizes of libraries. ICOLC facilitates discussion among consortia on issues of common interest, and conducts two meetings per year in North America and one meeting per year in Europe. The organization is dedicated to keep its members informed about electronic information resources, pricing practices of electronic publishers and vendors, and other issues of importance to consortium directors and governing boards. The Coalition also meets with the information provider community to discuss product offerings and issues of mutual concern.

3.14 Participation in Consortia

Consortia are not confined to particular types of libraries. It is extended to any type of libraries like, special libraries, medical libraries, engineering libraries, research and development institutions etc. The notion of consortia remaining almost however differs from collection development of e-resources. When operated, a consortium is built up which offer an organized approach to purchase with agreed service contracts and discounts. Some consortia in the developed countries like, US, UK and developing countries like India include the following.

- CURL - Consortium of University and Research Libraries.
- CHEST - Combined Higher Education Software Team.
- NESLI - National Electronic Site licensing Initiative.

- INDEST – Indian Digital Library in Engineering, Science and Technology.
- UGC-InfoNet - University Grants Commission- Information Networking.

3. 15 Consortia - The Present Scenario

Resource sharing among the institutions has been in practice but the notion and techniques have been changed. However, the broad idea remains same. Traditional libraries employ this phenomena for the purpose of sharing the physical resources which includes books, journals etc. which however, changed in digital environment especially after promulgation of ICT in libraries due to the availability of multidimensional resources in varied forms. Consortium in this way witnessed a transformational change as the perception changed from print to electronic form of resources. The emergence of Internet, particularly, the World Wide Web (WWW) as a new media of information delivery triggered proliferation of Web-based full-text online resources. Mounting number of publishers joined to expose their publications through Internet which is a global platform accessible by one and all. This is supplemented with the idea of using it for speedy delivery of information and to achieve economy in transferring of information. The libraries and information centers are the most genuine beneficiaries of the consortia who use e-resources in varied forms to satisfy the needs of the users. It is needless to mention that, the e-resources comprises of electronic journals, on-line publications, e-books, on-line databases both national and international and infect, it receives immense benefit from this technology-driven revolution. The availability of IT-based electronic information products are exerting ever-increasing pressure on libraries, which, in turn, are committing larger portions of their budgetary allocation for either procuring or accessing web-based online full-text search services, CD ROM products and online databases. The libraries with their diminishing or at the best static financial allocations have to consider new ways to consolidate global resources amongst them in order to maximize their limited financial resources. The combination of these developments has resulted in the development of “shared subscription” or “consortia-based subscription” to journals everywhere in the world. Shared subscription or consortia-based subscription to electronic resources through the consortia of libraries, on one hand, permits successful deployment and desktop access to electronic resources at a highly discounted rates of subscription and on the other hand, it meets with the increasing pressures of diminishing budget, increased user’s demand and rising cost of journals. The library consortia, on the basis of sheer strength of the number of institutions, offer healthy business growth opportunities to the electronic publishers and thus attract the best possible price and terms of agreements. Consortia among

the libraries are global issues where in the developed countries all the leading libraries are the member of consortia (http://www.ugc.ac.in/)

Likewise, in India also many initiatives have been taken by the Govt. of India to institute such consortia through various agencies to make the resources available to the all types of libraries. This is revealed from the institution of UGC-InfoNet Digital Library Consortium which has been discussed below.

Further, in the field of Science and Technology, sporadic attempts were made by instituting the Indian National Digital Library in Science and Technology Consortium by the Ministry of Human Resource Development, Govt. of India to facilitate electronic resources to all electronic resources for IISc, IITs, NITs, RECs, IIMs and a few other institutions. All the national status organizations are the member of these consortia where the libraries of the respective institutes get an access to the electronic sources provided by the leading publishers in the world, which constitute Science Direct, Springer, ProQuest, ACM Digital Library, Engineering Village2, SciFinderScholar, MathSciNet, Web of Science, J-Gate etc. These foremost publishers provide a scope of supplying thousand of electronic journals with millions of pages for the benefit of the researcher, students, faculties and administrators through INDEST consortium.

3.16 Advantages of Library Consortia

A number of advantages are associated with library consortia. Reasons given for opting consortia are in many folds which are described as follows.

- ⇨ To make research easier for scholars including adding value based information in research,
- ⇨ Increase the speed of technological development,
- ⇨ Relief of financial constraints etc.
- ⇨ Resolving space management;
- ⇨ Reducing the preservation problems;
- ⇨ Leveraging resources by sharing existing resources or collection through virtual union catalogue and sharing of collection developments of individual library;
- ⇨ Creating an environment of use of electronic resources including the creation of digital collections and sharing the same among consortium
- ⇨ Sharing the archiving of resources;
- ⇨ Expertise sharing so as to enable other member library staffs to develop new skills and interact with a varsity of people;
- ⇨ Sharing risk enabling member libraries to undertake mega projects;

- ⇨ Enabling the member libraries to make use of books, periodicals, articles and scientific journals that are not available locally.
- ⇨ Sharing catalogues facilitating thereby to the users for wider access to a larger collection
- ⇨ Creation of CD- ROM of Union Catalog for providing access to books, videos and recordings for each institution and
- ⇨ Developing a Union List of Serials to provides access to the journal holdings of all member libraries;
- ⇨ Getting subsidy for e-journal subscription ;
- ⇨ Free online access with print subscription;
- ⇨ Enhanced communication and interaction;
- ⇨ Controlling duplication and generating means for specialized collection building;
- ⇨ Establishing communication among the libraries.

A consortium plays a vital role in Indian university libraries and success of consortia totally depends on the members of consortia. The library consortia, on the basis of good strength of participating institutions, offer strong and healthy business growth opportunities to the electronic publishers. Through library consortia, the individual libraries can offer qualitative services to their users at affordable price or free. The university libraries should also make use of the available technology to meet the expectations of user information requirements.

3. 17 University Libraries and Consortia

In India, more than 300 universities, deemed universities and few thousands of degree colleges most of them having autonomous status are covered under the purview of the UGC-InfoNet Digital Library Consortium program as the basic aim of the consortium is to provide electronic resources facilities for the faculties, researchers and student. To support the academic activities in the universities, a suitable library with adequate collection is indispensable and to built up the user-centric collection developments, library use to spent exorbitant amount on subscription of periodicals and books due to escalation of price of the printed documents. Further, this is supplemented with individual membership of the library to acquire resources either through the agent or through the publisher where, again the library pays a substantial amount. The issues lies with the principle that, library built the collections at par with the subjects being pursued in various academic departments of the university. Moreover, since the courses offered in universities are more or less same therefore, these libraries subscribe similar journals. In a way, a good number of university libraries subscribe

same journals and the funding agency in many cases is UGC. To avoid this situation the University Grants Commission established INFLIBNET (Information and Library Network) to find a solution to minimize the amount spent on periodical subscriptions. At present, the INFLIBNET is offering a variety of journals to all Indian University Libraries through UGC-InfoNet. In addition to this service the INFLIBNET is offering bibliographic consortia.

3.17.1 UGC-InfoNet

INFLIBNET, an autonomous Inter-University Centre of the University Grants Commission is functioning as a coordinating and monitoring agency of the UGC-InfoNet Project which keeps liaisoning among UGC, ERNET and universities in India. INFLIBNET is also responsible for providing training to university library professionals in the use of this network for providing variety of services to the users.

Educational Research Network (ERNET) India, a scientific society under the Ministry of Communications and Information Technology, Government of India with the partnership with the University Grants Commission set up UGC-InfoNet to facilitate the member libraries under the program to use information and communication Technology (ICT) and Internet to access e-resources. The consortia were meant for making transformation of learning environment from mono-dimensional to a multi-dimensional. UGC-InfoNet has been recognized as a boon to the higher education systems in several ways such as,

- Platform for distance learning to facilitate spread of quality education all over the country.
- Tool to distribute education material and journals to the remotest of areas in electronic form.
- Resource center for researchers and scholars for tapping the most up-to-date information.
- Medium for collaboration among teachers and students, not only within the country but also all over the world.
- Establishing Intranet for dissemination of e-resources from the library.
- Encompass entire university systems for most efficient utilization of precious network resources.
- Establishing a channel for globalization of education and facilitate the universities in marketing their services and developments.

UGC-InfoNet is an ambitious programme of UGC to interlink all the universities in the country with state-of-art technology. The network overlay on ERNET backbone and provide

Internet and Intranet services. Study reveals that, as of now, INFLIBNET is not only providing Internet Connectivity to more than 160 universities but also takes the responsibility for executing and monitoring the entire project for effective implementation. UGC InfoNet has obtained a mega successful project known as UGC-InfoNet Digital Library Consortium.

3.17.2 UGC-InfoNet Digital Library Consortium

To trace a brief history, the UGC-InfoNet Digital Library Consortium was formally launched December, 2003 by Hon'ble the then President of India, APJ Abdul Kalam soon after providing the Internet connectivity to the universities in the year 2003 under the UGC-InfoNet programme. The consortium proved to be a recipe to university libraries, which have been discontinuing subscription of scholarly journals because of "Serials Crisis" that refers to exponential and continuing increase in subscription cost of scholarly journals. The crisis is a result of rise in cost of journals much faster than the rate of inflation, increase in number of journals and the paucity of funds available to the libraries The universities were given benefit of access to e-resources under the UGC-InfoNet Digital Library Consortium in a phased manner. In the first phase that began in 2004, access to e- resources was provided to 50 universities who had Internet connectivity under the UGC- InfoNet Connectivity programme of the UGC. In the second phase, 50 more universities were added to the programme in the year 2005. So far, 160 universities out of 171 covered under 12B Act of the UGC are under the umbrella of UGC-InfoNet Digital Library Consortium who is provided with differential access to e-resources subscribed under the consortium. These e-resources cover almost all subject disciplines including arts, humanities, social sciences, physical sciences, chemical sciences, life sciences, computer sciences, mathematics and statistics, etc. The programme was wholly funded by the UGC and was executed by the INFLIBNET, Ahmadabad.

3.17.3 Current Status

The Consortium provides differential access to more than 5,790 scholarly journals and eight bibliographic databases from 23 major publishers (including scholarly societies, university presses and aggregators) to more than 125 universities. Besides access to their current issues, most journals are available with their archives from 1997 onwards. Some of the publishers like American Chemical Society, Institute of Physics, and JSTOR provide access to their contents from Vol. 1 onwards. The access to e-resources is IP-enabled for the universities covered under the Consortium. Users in the universities can browse, search, download and print full-text articles relevant to their research and academic work without any restrictions in terms of number of articles that they can download or number of simultaneous users.

Multiple users can access the databases and e-journal platforms simultaneously. The INFLIBNET Web Site (http://www.inflibnet.ac.in) hosts a search interface to search these journals, their URLs and member institutions.

3.17.4 Objectives

The major aims and objectives of the UGC-InfoNet Digital Library Consortium are to:

- ⇨ Subscribe electronic resources for the universities at a highly discounted rate of subscription and at the best terms and conditions;
- ⇨ Extend the benefit of Consortium -based subscription to all Indian universities and colleges;
- ⇨ Extend the benefit of Consortium to associate members of this Consortium;
- ⇨ Impart training to the users, librarians, research scholars and faculty members of the institutions on the electronic resources with an aim to optimize their usage;
- ⇨ Increase interaction amongst the member libraries;
- ⇨ Increase the research productivity of the institutions both in terms of quality and quantity of publications;
- ⇨ Evaluate the usage of the resources subscribed; and
- ⇨ Identify new resources that are required to be subscribed under the programme based on the availability of resources and funds.

In terms of number of users, the UGC-INFONET Digital Library Consortium is the largest Consortium in India with a vision and plan to reach out to all universities and colleges affiliated to these universities, over a period of time. Universities in India were upgraded to 2 Mbps leased line under UGC-InfoNet connectivity.

3 .18 Benefits of Consortia Based Subscriptions

Consortia allow the institutions along with the users to extract a lot of benefits. It has established as an important parameters to facilitate the users with a vast array of electronic resources. Some of the benefits have been mentioned below.

- ➢ Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost;
- ➢ The consortium, with its collective strength of participating institutions, has attracted highly discounted rates of subscription with most favorable terms of agreement. Most e-publishers responded positively to the call of the INDEST consortium. The rates offered to the consortium are lower by 50% to 90% depending upon the category of institutions.

- The research productivity of all institutions is expected to improve with increased access to international databases and full-text resources;
- The consortium is expected to trigger remarkable increase in sharing of both print and electronic resources amongst participating libraries through J-GATE Custom Contents for Consortia (JCCC) proposed for subscription for all Indian Institute of Technology (IITs) (7) and Indian Institute of Science (IISc.) Bangalore with access to National Institute of Technology (NITs).
- The consortium is proposed to be an open-ended proportion wherein other institutions can join and get the benefit of not only highly discounted subscription rates but also the favorable terms of licenses;
- Members of the consortium will also have the benefit of cap on the annual increase in the rates of subscription. While the usual increase in price of e-resources vary from10 to15% the consortium would enjoy the cap on increase in price ranging from 5% to 9%;
- The consortium have been offered better terms of licenses for use, archival access and preservation of subscribed electronic resources, which would not have been possible for any single institution; and
- Since the subscribed resources would be accessible online in electronic format, the beneficiary institutions would have less pressure on space requirement for storing and managing print-based library resources. Moreover, all problems associated with print media such as their wear and tear, location, shelving, binding, organizing, etc. would not be an issue for electronic resources.

3. 19 Library Consortia Projects in India

Likewise in developed countries, the tremendous changes in information proliferation and technologies could be visualized with the application of consortia in Indian University libraries and have shown its significant impact. Because of this, the Indian Libraries could able to afford to use the finance in other developmental projects apart from accumulating resource building through consortia. Mention may be made that for a good length of time, the library and information centers in India have been experiencing the problems of in library cooperation, document delivery and inter-library loan services, which could minimized through consortia. Many efforts have been taken by reputed organizations in Central Government sectors to resolve the problems of resources. Pioneer steps have been taken by various library networks that started operating in India with the initiation of NISSAT from the middle of 1980s. The major networks like CALIBNET (1986), DELNET (1988) and other networks were set up to share the resources. Due to increasing availability of

information in electronic and digital form, library and information centers are now showing interest to form consortium groups for better resource sharing, optimum utilization of library resources including reducing information costs, speedy delivery of documents, and to keep abreast of latest developments.

3.19.1 Trends in Library Networking in India

For effective transfer of information, library and information network communication are the only practical means for the sharing of expensive resources to provide information at optimal cost. Some of the network systems currently developed in India are:

- **VSNL Data Networks**

  It is a gateway to world data networks by Videsh Sanchar Nigam Ltd. (formerly known as Overseas Communication Service) which commenced in 1991 at Mumbai. In the same year, VSN opened up a number of new and exciting services, like X-400 based Gateway Mail Service, Store and Forward Fax Service, T-Fax service, Voice Mail Service etc.

- **Easynet**

  It was inaugurated at Chennai during July 1990, which emphasized the need to develop local databases and network them. Easynet is the world's first intelligent knowledge gateway to multiple online hosts like Dialog and others, which offer single password access to over 1,000 databases.

- **EDI Network**

  Electronic Digital Integrated network was developed by the federation of Indian Export Organization and the All India Shippers Council for International trade in 1992.

- **ERNET**

  The department electronics introduced and implemented this education and research network, linking academic and research institutions to BINET which is a major academic data network in the US, primarily used for the e-mail during 1990s.

- **INDONET**

  It is a commercial public data processing network established by CMC Ltd. In January 1990 with nodes at Kolkata, Mumbai and Chennai in the 1990s, that provides hook-on facility for hotel computer network. The enhanced network system is now called WISER (Welcomegoup's INDONET System of Enhanced Reservation). The primary objective of INDONET project was to provide a network of computer

facilities accessible to remote areas so as to deliver the benefit of information processing to a wider cross section of the users.

- **NICNET:**

  It was established by NIC in the 1990s with dour NEC S-1000 computers located at Delhi, Bhubaneswar, Pune and Hyderabad. The main objectives of the NICNET include development of necessary information systems in various sections of the economy for interactive use, promotion of information at state and national levels and establishment of a computer network with necessary communication equipments for easy access of information across the nation and ensuring optimal use of resources.

- **OSINET**

  It is network protocol software based on a subject of ISO-OSI (International Standards and Organization-Open System Interconnection) reference model that was developed by ISO in 1990.

- **PORNET**

  The Pornet through the NICNET was implemented in the Madras Port Trust building in the 1990s. A statement of the position of ships of the Chennai harbour can be transmitted in 5-10 seconds from a computer in MPT to another port office through Nicnet.

- **NELIBNET**

  North eastern library network covers the north-eastern region connecting all the documentation centers, University libraries, colleges, special and research libraries in academic institutions in the states, the central and district libraries and other information centers in the states.

3.19.2 Types of Consortia in India

The first consortium idea was mooted by IIT in 1995 to have consortium for printed journals. Then INSDOC proposed to have CSIR information consortium to cover all CSIR laboratories, but the gown is known. DESIDOC also initiated to have a consortium for Science and Technology resources in 1996 which lying dormant. The consortia of IIT, BARC tried working out consortia based subscription to e-journals which foreign publishes for 2000 without much success. The various consortiums available in India have been discussed below.

- **INDEST**

Indian National Digital Library in Engineering, Science and Technology (INDEST) which acted as the ground work of the first operational consortia in the country under the aegis of

Ministry of Human Resource Development Prof. N. Balakrishnan of Indian Institute of Science as Chair person. R. Jagadish Arora as Convener aimed to identify the gaps for providing reliable connective options for the full text electronic in form, access in Engineering and Technology in a consortia mode study possibility of cooperative electronic content creation for shared used, and strengths and weaknesses o existing information in Engineering and Technology institutions in India . The consortia may incorporate new institutions as they come up with adequate infrastructure facilities and include members who would pay with their own.

Ministry of Human Resource Development (MHRD) has set up the "Indian National Digital Library in Science and Technology (INDEST) Consortium". Under this, the ministry provides funds required for the subscription to electronic resources. A consortium based subscription to electronic resources for Technical Education system in India now called Indian National Digital Library in Science and Technology (INDEST). It is operational as of January, 2003.

It is the first open Ended Consortia. 38 major technological institutions in India (All IITs, IISc, IIMs, NITs, RECs and others) are members with three tier approach Categories I, II and III. Being an open-ended proposition, it also invites all AICTE accredited and UGC-affiliated institutions to participate in the consortia by paying a fee of Rs.1000. In case of category 1&2 members, MHRD pay for full text/database access. Others can subscribe at substantial discounts varying form 40-89%.

◈ FORSA Consortium – Forum for Resource Sharing in Astronomy

It is started in 1981. The members are Indian Institute for Astrophysics, Bangalore, National Centre for Radio Astrophysics, Nizamia Observatory, Osmania University, Hydria, Roman Research Institute, Bangalore, Physical Research Laboratory, Ahmadabad, Tata Institute of Fundamental research, Mumbai, UP state Observatory, Nainithal and IUCAA, Pune. IIAP, IUCAA, NCRA, PRL, RRL, and JNCASR libraries get Nature by airmail by paying additional negotiated fee for online access.

The Indian Astrophysics Consortium called Forum for Resource Sharing in Astronomy (FORSA) is a typical example of a homogeneous group of members wherein the libraries have a common area of interest, and establishing the consortium is slightly easier than in heterogeneous type of members. The FORSA consortium consists of five members who joined the consortium for negotiating licensing for astronomy journals, and identified a

subscription agent as a supplier of Journals. Subscriptions for both print and electronic format are paid through their supplier. The made is meant for only astronomy journals published by a particular publisher. Under the consortium, nature journal was also subscribed by six libraries, those committed to share the license fee to access the nature electronically. (Kaliammal,A : Role of ICTs in Library & Info Sc. Delhi, Authorpress, pp. 90-92.

- **IGCAR Consortium – Indira Gandhi Centre for Atomic Research**

IGCAR, Kalpakkam, Chennai. It has 12 units and 14 fields station under one umbrella organization sharing similar interests. A consortium within a single cohesive organization entity. Science Direct and Elsevier 1700journals- 2million articles – 60million abstracts – available online prior to print. Rapid access to papers on pre-participation stage.

- **CSIR**

The council of Scientific and Industrial Research (CSIR) in India has 40 scientific laboratories involved in basic and applied research in various disciplines. Many of the laboratories have well equipped libraries, and some of them act as the main information centers in different subjects functioning as consultant libraries at the national level. To augment CSIR research and development activities, NISCAIR implemented an agency for the process of providing access to globally available electronic journals to the entire S&T staff of CSIR and its constituent nits through a consortia approach. As a first step, I the recent past INSCAIR, on behalf of CSIR, has enter into an agreement with M/s Elsevier Science to access its information resource base by subscribing e-access of more and more journals published globally. CSIR consortium extended its access by creating appropriate agreements on consortium basis with the other providers of e-journals.

UOHYD Maths consortium

Consortium started by UOHYD among UOHDY, IISC, and ISI for sharing of Mathscience literature and this consortium is in operational for the last 4years. The consortium includes mathematics only as covered by MathscNet of AMS. Online access to full text of all resources of AMS is available to all academicians in these four institutions.

3.20 Conclusion

Resource sharing among the libraries has become indispensable in view of the proliferation of literature, price escalation of print documents, multi dimensional requirements of users communities pursuing inter-disciplinary research etc. This could be possible in a networked environment only. Days are gone when one library was dependent upon to get the documents through inter-library loan which was again a restricted phenomenon. Feeling the importance

of the information requirements all out measures from various academic organizations including INFLIBNET came forward to find a solution to this emerging problem. The need for sharing the resources of libraries has been recognized long back. Moreover, it is quite impossible for any library to acquire all print documents for the users. Hence, resource sharing through network became imperative thereby, giving the users option to access to vast array of information through electronic form. This became a pioneer issue for all the libraries to come close in the umbrella of network for easy dissemination of information quickly. Again reliability, authenticity etc. are some of the basic factors which promoted the library and information professionals to bring about the authentic information duly scanned and filtered for the users communities. Though sharing of resources was started with library materials, subsequently it extended its dimensions to infrastructure, human resources, etc. which are considered equally important. The development of technology augmented the formation of such networks among the libraries through consortia. With the initiatives of the national organizations set up by the Government of India for different forums, consortia among the libraries irrespective of the types could be established to bring the libraries in one umbrella for sharing of resources, use of databases, and inter-exchange of the intellectual outputs etc. in their respective organizations. Consortia not only benefited the libraries in use of e-resources but also achieved economy and sustainable developments among the academic, special libraries those could be noticed in the field of library services.

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CHAPTER – 4

Library Network and Consortia for North-East Region Central University: A Model

4.1 Model for Library Consortia

A model in general sense signifies to a representation containing the essential structure of some objects. It is also a plan or to form a pattern or a shape. It further relates to make an outlay or structure through computer programs or a set of mathematical equations. Model is a system which after creation requires to be followed which however, requires some addition, deletion, amendment etc. to make it massive success. Library consortia are also based on some model which requires being used and followed by the member libraries. Every consortia has got it's their respective model which after the approval of the competent authority is applied for the benefit of the mass. The consortia models followed in the libraries redress the problems encountered by the libraries while meeting the ever growing demands of the users. More specifically, it has been discussed in the following lines.

⇨ **Consistency and Equity of Access**

Consortia lead to gaining consistency of e-resources and guarantee the equity of access amongst a particular group of libraries constituting both sectoral and regional who are the members of the consortia. Consistency in this case mean both in terms of information access, and technological development or advancement.

⇨ **Cost-Effectiveness**

Consortia facilitate economic effectiveness in building the resources, while the library who is the member of consortia observes the principle of economy especially in developing of resources. The traditional collection developments have forced the library a substantial financial involvement including the manpower, and energy etc., while the electronic sources through consortia brought financial gain and reduced the manpower and energy. However, it requires a considerable involvement of finance at the initial state while developing infrastructures and later the same proves to be the cost-effective.

⇨ **Skill Development**

Consortia as already discussed are based on different models which need to be properly arranged to explore the sources of e-resources for the uses at large. Mention may be made that, especially the academic and special libraries develop the user-centric resources which differs from the type of materials. While, the academic libraries accentuate on developing resources in the form of e-books, e-journals, e-reports etc. the special library emphasize on e-reports on research and developments, e-information, discoveries, patents etc. Therefore, choice being the different, consortia requires to be built up according to the needs and parameters of requirements by the libraries. The libraries after being the member of the consortia groups, requires skills to download or access the resources from the respective site

of consortia organization and the librarian with the help of the technical hands organize the same according to the needs and requirements of the users. The technical persons in this regard requires different skills such as, media, network, web, digital, scientific , visual and critical (Mishra & Mishra; 2010; pp. 50) which facilitate the technical experts to make the best use of web in downloading the resources on Internet.

⇨ **Sharing of Knowledge**

Consortia happen to be a viable platform, which allows the libraries to submit the intellectual resources of the organization by way of creating the institutional repository. The notion of the institutional repository especially in digital environment has changed to digital repository. The library further takes positive steps to make the resources reach to the users through networking. Library through intranet provides the resources for the users where the bonafide members of the library get access to the e-resources of consortia in their desktop. Thus, the channelization leads to the maximum use of resources. Networking not only facilitate the librarian to share the knowledge embodied in the library inform of resources but also the users make the use of the same for adding value to their research and teaching.

⇨ **Inter-Personal Relation**

The member library through consortia is linked to the publishers or the authorized vendors of the publisher directly thereby, establishing a direct relationship between the library and the publisher or approved vendor. The library gets the resources from the publisher or vendor through the consortia organization and simultaneously gets update information on a particular journal or resources directly from the publisher or vendor that helps the library to equip with update collection of resources in a specific field. The library which do not get the resources in electronic form through the consortia can however, make a liaison with the publisher directly especially in an automated library system. For example, Encyclopedia Britannic is generally not covered under consortia because it is a reference tool, which contributes immense and valuable information for research and development. The library, however, purchase such reference tool which is of immense importance in the academic library system and after purchasing the electronic version of encyclopedia, the library is given a username and password to open the link and down load the fruitful information for the benefits of the users. Further, the publisher after amendment of the existing information with a new one immediately pass on the library to download the current information in a specific area and in this way, the library and publisher stay in one track and built the inter-personal relationship.

⇨ **Building Strength**

Through consortia, the member library gets a free hand to get access to a vast array of electronic resources and thereby, making the library with poor physical collection development to a healthy one. A library may be having a scanty collection but may be rich in electronic resources that of course depend upon the computer, networking and other infrastructures developed in the respective library. A poor library with insufficient collections keeps itself at par with the developed library through this means.

4.2 Consortia Pricing Model

The electronic resources being subscribed through consortium would greatly benefit the libraries in terms of increase in the number of electronic resources accessible to them. It will not only help to access the scholarly resources but also facilitates individual library to get access to other library resources for mutual benefit by sharing the resources amongst participating institutions. Price may differ from publisher to publisher, which is dependent on the agreement. Consortia is not suitable for less number of institution, where the percentage of discount will be minimal, where as deep discount will be offered, if more number of institutes join together, where the discount may be from 40% to 80% depending upon he databases and full text journals. For example, UGC-INFLIBNET has come up with a consortium for university libraries (UGC-INFONET).

This approach has helped to get attractive discounted rates and most of the e-publishers came up with best possible offers. It may be noted that, it was proposed for subscription for full text resources and databases for 50 universities at the initial stage. The cost of the first set of journals and databases was `.32,87,02,125/- (Rupees Thirty Two Crores Eighty Seven Lakh Two Thousand One Hundred and Twenty Five only) as per their list price while, the total cost comes to `6,04,66,619/- (Rupees Six Crores Four Lakh Sixty Six Thousand and Six Hundred Nineteen only) through consortia and thus, it saved a total amount of `26,82,35,506 (Rupees Twenty Six Crore Eighty Two Lakh Thirty Five Thousand and Five Hundred Six only). Likewise, other consortia were also built for science and technology that saved a substantial amount.

4.3 International Consortia Model

Building consortia and providing electronic resource services to the users is an indispensable criteria as no library in the world could afford to subscribe the print journals due to multiple reasons as already been discussed time and again. The libraries of the advanced countries like, USA, UK, Canada etc. also face the equal problems and constraints in acquiring

literature for their users. Consortia, therefore, is the only option for the libraries of any kind to built sound collection development in shape of electronic form and provide services in multiple ways such as, through their website on internet platform, intranet with in the organization thereby, leaving the users a wide range of options and resources to choose for their teaching and research. Hundreds of such libraries have opted to cover their libraries under the umbrella of different consortia suit to their interest and requirements. A good number of consortia are in prevalent in the globe extending their services to a good quantum of libraries. Such consortia range from informal gatherings of library directors/ administrators of the institute for the purpose of sharing information and promoting a united front to select the type of consortia and make the best use of resources thereto. Consortia available in the libraries of international scenario have been discussed below.

Some of the library consortia models are:

- **The Ohio LINK Electronic Journal Centre Experience**

The Ohio LINK Electronic Journal Center (EJL) is a tool created to improve use of scholarly journals beyond the use of print journals the EJC is an Ohio LINK operated software and hardware site designed to aggregate the electronic journals licensed from multiple publishers. It is accessible directly through title and subject category menus or traditional search form options. Ohio LINK available at http://www.ohiolink.edu has bee serving to more than 75 of the academic libraries in Ohio. The electronic journals from publishers like Elsevier, Academic Press, Project MUSE, Kluwer Academic, Springer-Verlag, John Wiley & Sons and American Physical Society provide the e-resources to the consortia.

- **Cape Library Cooperative (CALICO)**

CALICO in South Africa was established in 1992 and is a project within an incorporated body, the Adamaster Trust. The Trust is owned by the parent universities which are all located in the Cape region of South Africa. CALICO came into being for the specific purpose of providing a shared library system ((http://www.sun.ac.za/local/library/calico).

- **Co-operative Action by Victorian Academic Libraries Limited (CAVAL)**

CAVAL in Australia was established in 1978 as a not-for-profit company limited to provide service to the users. The members of the library are the universities in the state of Victoria and the state Library. CAVAL's resource sharing strategy comprises interlibrary loans, a reciprocal borrowing program, a union catalogue and a co-operative storage facility (http://www.vicnet.net.au/caval/), (Australia)

☞ **Illinois Library Computer Systems Organization (ILCSO)**

ILCSO in USA was formed in 1980 with the financial help from the Illinois Board of Higher Education. It was set up expressly for sharing of infrastructure and most prominently to built collection developments among different libraries in a sharing basis including preparation of union catalogue to support statewide access to resources. The libraries as of now has changed the dimension of services from traditional to electronic and is now providing a wide range of electronic resources services including electronic database service. However, the member libraries required to be governed under the purview of rules and regulations (http://www.ilcso.uiuc.edu).

☞ **Washington Research Library Consortium (WRLC)**

One of the most closely integrated consortia in the USA is the Washington Research Library Consortium **(**WRLC) which came in to existence in 1987. Membership comprises seven universities. Member universities shared book collections through reciprocal borrowing and interlibrary loans. Mention may be made that, an online library system contains multiple electronic resources, union catalogue and a cooperative storage facility (http://www.wrlc. org).

☞ **China Academic Library and Information System (CALIS)**

In May 1998, the China Academic Library and Information system (CALIS) project was approved by the State Development and Planning Commission of China after a two-year feasibility study by experts from academic libraries across the country. CALIS is an integrated consortium extending its service to more than 7,00,000 students spread over in 27 provinces The consortia include the electronic resources from UMI, EBSCO, Elsevier and web of science databases etc. through which the member libraries of consortia take the optimum use of such resources (http://www.calis.edu.cn/).

To discuss some important activities of CALIS, it is a nationwide academic library consortium being funded primarily by the Chinese Government and it is primarily intended to serve multiple resource-sharing functions among the participating libraries including giving an option by the member libraries for online searching, interlibrary loan, document delivery, and insist for a coordinated purchasing and cataloguing. It also insists the libraries to provide the services of the printed documents through digitization of the resources and for developing an information service network among the libraries.

The list of other international consortia has been mentioned below.

⇨ Arizona University Libraries Consortium (AULC) – USA;

⇨ Consortium of Academic Libraries in Manchester (CALIM) – UK;

- ⇨ The Council of Connecticut Academic Library Directors (CCALD) – USA;
- ⇨ Council of Prairie and Pacific University Libraries (COPPUL) – Canada
- ⇨ Missouri Research Consortium of Libraries (MIRACL) – USA;
- ⇨ Pennsylvania Academic Library Connection Initiative (PALCI) – USA;
- ⇨ UNILINC Limited (UNILINC) – Australia;

Mention may be made that, USA is often seen as the home of library consortia or "networks" as they are formally known. Regional networks developed as early as the 1930s as a means of distributing state funds for libraries. In the 1970s, OCLC (then known as the Ohio College Library Centre) was a major catalyst for the further development of these existing regional networks and new networks. Established in 1967, OCLC brokered its shared cataloguing services through regional groups such as NELINET, ILLINET, PALINET and SOLINET etc. These regional networks, often with hundreds of member institutions, also formed the central plank of OCLC governance. At the same time that OCLC developed in the USA, other networks also grew in Canada, the UK and Australia to share MARC cataloguing data Wade; pp.5-6).

There are many more international consortia viz. Consortia of University Libraries in Spain, Catalonia Consortium of University Libraries, Galician Libraries consortium, University Libraries Consortium of the Madrid Region, South Dakota Library Network etc.

4.4 Consortia Models in India

Need for consortia among the libraries was seriously felt by the libraries as well as the Government consequent upon the energetic demands from the users regarding providing e-resources from a multiple international and national journals of high impact factor. This was coupled with the rising price of the printed journals cost both national and international. This new venture came in to reality with the establishment of consortia primarily in one area which subsequently spread over to the other subjects. Various models of consortia came into existence to provide an outstanding output to the faculties, researchers and students as well. It was first implemented in science and technology stream in the research and development institutes and thereafter, broadened to the academic field in the universities. The primary focus of such consortia was to provide multiple choices of e-resources to the researchers. In India, it was implemented with a view to sharing of resources with a platform for multiple accesses to the researchers. However, initially, it was felt that, there is no common understanding for many of the libraries in India that could get benefit from the consortia from the viewpoint that the library would be adopting the means of managing information electronically and the staffs are required to handle the organization of e-resources. During the

passage of time, the necessity of consortia could be better felt by the academic libraries consequent upon the demands from the users, curtailment of fiscal allocation, abrupt rise of print subscription, non-availability of journals in right time etc. The academic libraries untidily agreed upon to build the consortia and offered themselves to be member of consortia. Very few consortia sprung up in the last two years that prevailed in the academic library system and till now the development has a positive brunt among the libraries and the users as well. Prevailing consortia models in India have been discussed below.

4.4.1 Forum for Resource Sharing in Astronomy (FORSA)

In the early part of 1980s, the library professionals working in the institutes having astronomy as one of the thrust areas of research experienced the necessity to come close together to constitute a forum of sharing of information among each other due to overwhelming growth of literature in the area of study. The matter to form a common platform of sharing of resources was mooted in 1981 at Raman Research Institute, Bangalore which was informally launched as Forum for Resource Sharing in Astronomy and Astrophysics (FORSA). Since 1989, FORSA members meet every year in conjunction with the Astronomical Society of India to give a consensus to develop consortia for the overall developments in the field of library and information services including handling of the activities in the field of astronomy/astrophysics and thus, FORSA consortia was officially recognized and constituted in 1982 where, a total number of eleven institute constituting ARIES, Bose Institute, Nizamiah Observatory, HCRI, IIA, IUCAA, NCRA (TIFR), PRL, RRI, SINP, SNBNCBS and TIFR libraries became the member of the consortia (http://ncralib1.ncra.tifr.res.in/library/). However, the magnitude of the FORSA activities was extended to the libraries having Physics and Mathematics in 2004 for sharing common interests to carry forward the aims and objectives of the consortia. Mention may be made that as of now , a total number of twelve libraries are the member of FORSA.

- **Functions**

FORSA is primarily instituted to carry out the following functions.

- Cataloging services
- Collections sharing
- Electronic content licensing
- Interlibrary loan/document delivery
- Preservation
- Training
- Union lists/shared online catalogs

4.4.2 Council of Scientific and Industrial Research (CSIR)

Council of Scientific and Industrial Research (CSIR) with its 40 laboratories dedicated to research and development in well-defined areas and around 100 field stations is the major organization under DSIR. The other institutions of DSIR are: National Information System for Science and Technology (NISSAT) and Department of Ocean Development (DOD). Many of the laboratories have well equipped libraries and some of the act as the main information centers in different subjects functioning as consultant libraries at national level. Access to electronic journals through the use of state-of-the art technology is possible in many of the libraries belonging to these laboratories. Each of the laboratories has a well established library and documentation center which is presently known as Knowledge Resource Center (KRC). This is being supported with the strategic information from the National institute of Science Communication and Information Resource (NISCAIR), which is a constituent establishment of CSIR formed with the merger of INSDOC and NISCOM. As a first step, in recent past NISCAIR on behalf of CSIR entered into an agreement with M/S Elsevier science to access its odd 1,500 e-journals and further intends to strengthen its information resource based by subscribing e-access of more and more journals published globally. CSIR consortium extended its access by creating appropriate agreements on consortium basis with the other providers of e-journals. The CSIR can take the credit being the first major and formal consortium at national level. This has been established in April 1, 2000 to benefit its 40 laboratories in India. The main objectives of CSIR consortium network project are:

- To provide CSIR science and technology personal electronic access to world S & T literature through strengthening the facilities for pooling, sharing and electronically accessing the CSIR information resources.

- To nucleate the culture of electronic access with a view to catalyzing the evolution of digital libraries (www.csir.res.in)

4.4.2.1 Use of CSIR E-Journal Consortium in NEIST

The library is subscribing to 79 foreign and 86 Indian journals in printed form regularly. It is not possible to satisfy the special type of users of KRC to provide least number of print journals. So, KRC of NEIST has access 4500 e-journals to satisfy the users demand through

CSIR e-journal consortium. All the 40 laboratories of CSIR together subscribe 400 journals only for Elsevier by paying jointly Rs.48 Lakhs per annum. Similar will be happening in the case with other publishers.

Now CSIR E-Journal consortium has negotiated with publishers and arranged for paying of access amount for subscribing from central fund of CSIR Head Quarter to make e-journal available throughout all laboratories given in the Table-18. Individual laboratory need not pay any amount for CSIR e-access.

(Table-18**:** E-Journal/Secondary Database/Patent Database Sites available to NEIST through CSIR E-Journal Consortium)

Sl.No.	Publishers	URL to Access
1.	Elsevier Science	http://www.sciencedirect.com/
2.	Springer	http://www.springerlink.com/
3.	American Chemical Society (ACS)	http://pubs.acs.org/
4.	John Wiley	http://interscience.wiley.com
5.	Royal Society of Chemistry (RSC)	http://www.rsc.org/
6.	Cambridge University Press (CUP)	http://journals.cambridge.org/
7.	Oxford University Press (OUP)	http://www.oup.co.uk/jnls/online/all.html
8.	IEEE	http://www.ieeexplore.ieee.org/xplore/dynhome.jsp
9.	WEB of Science	http://www.portal.isiknowledge.com/portal.cgi
10.	US, European, WIPO, German and Indian patents	http://www.portal.isiknowledge.com/portal.cgi & http://www.delphion.com/
11.	Nature	http://www.nature.com/nature/index.html

(Source: http://www.rrljorhat.res.in (Accessed on 10.6.2011))

4.4.3 Indian National Digital Library in Science and Technology (INDEST)

Indian National Digital Library in Science and Technology (INDEST) consortium is an initiative from the Ministry of Human Resources Development (MHRD), Government of India to provide e-resources through e-journals consortium for research and development in the field of Science and Technology. The Ministry of Human Resource Development (MHRD) set-up a Consortia-based Subscription to all electronic resources available through electronic journals for providing update technical education system in India and it was initiated on the recommendation made by the expert group being appointed by the MHRD. Indian National Digital Library in Science and Technology (INDEST) Consortium, the name was assigned for the consortium primarily focused to serve the scientific communities at

large engaged in research and development. “Shared subscription” or “Consortia-based subscription” to electronic resources from both national and international publishers through consortia of libraries is a viable strategy to increase the access to electronic resources across institutions at a minimum cost. The consortia-based subscription is also feasible for successful deployment in library services especially in research libraries to meet the pressures of users for electronic information due to multi-disciplinary research and diminishing budgetary provision, rising cost of the print journals etc. This is practically a global scenario where of constraints to get the resources The libraries all over the world are forming consortia of all types and at all levels with an objective to take advantage of current global network to promote better, faster and more cost-effective ways of providing electronic information resources to the information seekers.

The library consortia, on the basis of sheer strength of numbers of institutions, offers healthy business growth opportunities to the electronic publishers and thus attracts the best possible price and terms of agreement in a win-win situation for both. The collective strength of consortia members facilitates the libraries to get the benefit of wider access to electronic resources at affordable cost and at the best terms and conditions. Moreover, the technology has changed expectations of researchers, their patience, and their willingness to accept services that are available on demand. The Web-based electronic resources are an apt answer to the expectations of researchers.

❖ **Operation of (INDEST) Consortium**

The Ministry of Human Resource Development (MHRD) has kindly agreed to release the funds required for subscription to electronic resources for IISc, IITs, NITs and a few other institutions directly to the Consortia Headquarters set-up at the IIT Delhi. The consortium headquarters would function under a National Steering Committee for inter-institutional coordination and for taking decisions on policy issues under the overall policy direction of the Government of India. While, the expenditure on electronic resources proposed for subscription under the consortium for selected institutions would be met from the funds made available by the MHRD, the consortium being an open-ended proposition, welcomes institutions to join the consortia on their own for sharing maximum benefits it offers in terms of lower subscription rates and better terms of agreement with the publishers. All electronic resources being subscribed shall be available from the publisher’s Website. Local hosting of resources has not been considered at this stage.

Membership of the consortium is open to any private or Government-funded Engineering / Technological/ Educational institution/ University for one or more electronic resources. The new members would be required to sign an agreement with the INDEST Consortium as well as with the publishers of electronic resources that they wish to subscribe. The consortium would also charge a one-time entry-fee of Rs.1, 000.00 and a processing fee on each resource being subscribed. The consortium offers the best possible price advantage ranging from 25% to 95% (Average > 80% +) through its pricing agreements with publishers as well as terms of agreement for various electronic resources. Moreover, the consortium also provides technical help and arranges for in-house training for optimal usage of resources subscribed.

The INDEST consortium is the most ambitious initiative taken up so far in the country in the area of Engineering and Technology discipline (http://www.library.iitb.ac.in/indest/index.html)

4.4.4 Indira Gandhi Centre for Atomic Research (IGCAR)

Indira Gandhi Centre for Atomic Research (IGCAR) is the second largest establishment of the Department of Atomic Energy. It is next to Bhabha Atomic Research Centre, Trombay, was set up at Kalpakkam, 80 KMs south of Madras now called Chennai in 1971 with the main objective of conducting broad based multi-disciplinary programs of Scientific Research and Advanced Engineering directed towards the development of sodium cooled Fast Breeder Reactor (FBR) Technology in India. This is part of the second stage of Indian Atomic Energy Programme, which is aimed at preparing the country for utilization of the extensive thorium reserves and providing means to meet the large demand for electrical energy in 21stcentury. Over the period of time, the centre established comprehensive R & D facilities which covered the entire spectrum of FBR technology related to Sodium Technology, Reactor Engineering, Reactor Physics, Metallurgy and Materials, Chemistry of Fuels and its materials, Fuel Reprocessing, Reactor Safety, Control and Instrumentation, Computer Applications etc. and it developed a strong based library system in providing research oriented information in a variety of disciplines related to this advanced technology. A modern Library comprising 62,000 volumes of books, 28,400 back volumes, about 785 journals and 1.95 lakhs reports in all disciplines caters to the technical needs of the Scientists and Engineers of the institute under discussion. The centre being one of the premiere institutions in the field is also equipped with a computer division making links through eight nodes to the users for use of library resources to promote research in their respective field of interest along with other facilities to access the e-resources.

4.4.5 UGC-InfoNet Consortium

The University Grants Commission -InfoNet (UGC-InfoNet) e-Journal consortium happens to be befitting organization in providing e-resources to the libraries of higher education both at the college and university level. This was an initiative undertaken by the UGC to facilitate free access to scholarly journals and databases in all fields and disciplines by the research and academic community across the country. All universities who are under the purview of UGC have been provided UGC-InfoNet connectivity and access to scholarly e-Journal and databases. More than 2,000 scholarly journals and databases in electronic form were made available during 2004 and this number has increased to more than 4,500 full text e-journals since January 2005. As of May 2006, 122 universities are accessing resources from the programme. The access is based on IP range. This effort has had a noticeable impact on the research and academic community.

The e-subscription initiative under UGC-InfoNet is expected to trigger remarkable increase in sharing of both print and electronic resources amongst university libraries through one of the gateway portal being identified. The gateway portals provide customized solution not only to access the resources online but also access resources of other libraries participating in the consortium. The consortium headquarters (INFLIBNET) is assigned to function as a resource center with an aim to cater to the needs of its members for resources not accessible online electronic media or are available in print media with subscribed resources accessible online in electronic format the member libraries would have less pressure on space requirement for storing and managing print-based library resources. Moreover, all problems associated with pint media such as their wear and tear, location shelving, binding, organizing etc. would not be an issue or electronic resources (http://www.inflibnet.ac.in/).

4.4.6 Indian Institute of Management (IIM) Libraries Consortia Model:

The Indian Institute of Management (IIM) Digital Library is a Digital library Network System based on intranet technology to provide the IIM community comprising of faculties, students and staffs online and web enabled access to the information resources available in all the IIMs without any barriers of time and distance. The basic operating principle of this system is not only concerned with decentralization acquisition, but also decentralization of processing of information with an cost effective way including the manpower and technical operation. This however, works on the environment of centralized collection development and proper and utmost utilization of the resources. The factors mentioned below influenced much upon the establishment of the IIM Digital library systems are for:

- Online access to the digital sources of information among all the IIMs.;
- Bridging the gap between information resources rich and resources deficient libraries;
- Providing equal access to all the information at all time irrespective of the types of users and time ; and
- Minimizing the transaction costs and time of sharing information resources among IIMs.
- The factors that facilitated the IIM Digital Library System are (http://www.tifrcl.res.in/-libws)
- IIM Library Consortia approach;
- Low cost technology for conversion, processing and organization of digital resources;
- Improved and reliable bandwidth for information sharing on the net; and
- Synergy of library and computer services.

4.4.7 Health Science Library and Information Network Consortium

Health Science Library and Information Network (HELNET) was an initiative of Rajiv Gandhi University of Health Science (RGUHS), Karnataka. It is the first medical library consortium in the country, launched on 15th March 2003. The objective is to set up a network of libraries of the colleges affiliated to the RGUHS to promote resource sharing and digitization of library resources. Under the HELINET scheme, the members could access to around 600 scholarly international biomedical journals from 24 leading publishers at about ⅓ (one-third) price of their print subscriptions. Moreover, the member libraries also are facilitated with getting access to the current journals as well as archive i.e. the back-volumes of journals for a period of 7-10 years. The RGUHG experienced an expenditure of more than Rs.2 crores for establishing of a consortium on a cooperative e-access model and subscribed to Elsevier's Science Direct, Ovid Biomedical Collection, Annual Reviews Biomedical Suite, J-Gate Custom Content for Consortia (JCCC@INDEST) and J-Gate.

4.5 Consortia Models

Model is defined as a standard disseminating information with accuracy.. Practices involved in establishment of models depend upon the infrastructures with the employment of skilled and technology oriented manpower to resolve the problems encountered while accessing information with authenticity and reliability. This is further based on the principles of user oriented requirements. In most of the subject areas models works as a guidelines where research is done for the improvement of such models. Library and Information Science as a subject is also no exception to it. Library services being the user centric, establishing a

definite model is a stupendous task. And as such, there is no single approved model for a library consortium. Especially in the field of library services, consortium model depend upon the requirement of the type of electronic journals and membership which are still found to be lacking in Indian libraries. It is also a fact that a single consortium cannot serve all classes of users due to their varied nature of subjects for all types of general institutions, research stations etc. Moreover, academic disciplines also do not confine to a single stream. This is the reason why operation of library services for a multiple users irrespective of disciplines is next to impossible. This, however, promoted many national and international agencies to resolve the issues and as such, they came into a consensus for operating various models for different academic streams. The models attached to the library services for different streams have however, discussed in previous chapters which, clearly indicate the operations of different consortia. Further, taking the type of the library in to account, the consortium model is decided by the respective library. The general academic disciplines in the level of universities and colleges and especially for the steams of Arts and Humanities, the University Grants Commission has taken a pioneer step in establishing consortia through the Information and Library Network known as UGC-INFLIBNET e-Journal consortium which is serving in a widest range to meet the varied requirements of the users which has already been discussed. Further, seamless access to such consortia in all parts of the country is also an issue. The issue is prominent especially in North-East region of India where nine central university libraries including Sikkim are operating mainly due to their strategic locations. This is further, aggravated due to the poor internet connectivity, failure of service providers, lack of infrastructures and skilled manpower etc. Initially, library consortia were most prominent in the academic sector. To meet out the above emerging problems, it has become necessary to institute a separate library consortia to serve the user communities in North-East for all academic disciplines especially in the level of universities.

Library consortia as the notion implies do not perform for a single library, which however, requires to be strengthened with the partner libraries seeking information through consortia. Allen and Hirshon (1998) has suggested three potential partners for libraries wishing to participate in a consortium (i) Information Providers i.e, the Publishers (ii) Service Providers i.e, the Vendors. Other Libraries such as museums, art galleries, and educational groups also can be the partner of such consortia. Membership is a growing phenomenon for library consortia as the other individual libraries in near vicinity get the opportunity to access the benefit of e-journals. Therefore, with various potential partners and types of libraries, consortia can also evolve from one model to another as their members become more

comfortable with each other and develop a collective agenda. Basically, consortia models are grouped into two such as, (i) Proposed Models and (ii) Observed Models.

4.5.1 Proposed Model

Proposed models basically are the anticipated models. Many library scientists from various angles have proposed such models for smooth access of information. Various models of consortia as proposed by the renowned consortia experts are discussed below (Pal, Mandal & Chatterjee; 2003; pp.254-271).

- ☞ O'Connor in 1999 suggested four models that are predominantly based on how the consortia are funded such as, (i) Off the Top, (ii) Get on with It, (iii) Let's Help Ourselves, (iv) Do it our Way.
- ☞ Allen and Hirshon in 1998 viewed that each consortium is based predominantly on the governance structure, whether formal or informal, centralized or decentralized. The point of discussions for the consortium is based on, (i) Loosely knit federation, (ii) Multi-type/ Multi state network, (iii) Tightly knit consortium, and (iv) Centrally funded statewide consortia.
- ☞ Helmer in 1999 remarked a wide variety of models of library consortia based on the following characteristics such as, (i) those formed by the Government mandate, (ii) License electronic resources, (iii) Offering of services with legal status. He further viewed that, a central office requires to be operated as a nodal point with minimum manpower which may function with or without central funding.
- ☞ In 1999, Haavisto 1999 opined licensing consortia in terms of the management of consortium with agreement policies. He, however, suggested that a consortium can be managed either by (i) a member of the consortium, or (ii) a new legal entity founded by the partners, or (iii) an outside agent.

4.5.2 Observed Model

Based on the observation from the descriptions of consortia in Library and Information Science literature, consortia model can be categorized in to the following different model:

- ➢ **By Sector**

  Here, the libraries are categorized in to their types and functions that who intends to participate in the consortium. The notion of the sector either may be single limiting to the state or national library environment, Multi and Mega.

- ➢ **By Funding Source**

  The funding sources are distinguished by the way how consortia are funded whether, national or internal or combination of both.

- **By Governance/Organizational Structure**:

  The categorization is based on either the formal or informal structures. The governance of the consortium however, depends upon the type of structures. The formal organization structure is different from the informal one as in the formal structure, the governance is controlled with a central body with a dedicated staffs while, the informal sector does not constitute the same and it works on the team spirit notion within the organization or a group of member libraries where the member libraries locate a control place and they form the guidelines for operations of the co-operative acquisition, resource sharing, sharing of manpower and technological sharing.

- **By Specific Interest**

  Libraries due to their locations functions in a multi-dimensional way which may be serving to the users either promotion of research and development in academic institutions, science and technology etc. Thus, the libraries taking the types into account facilitate the services to meet the requirements of general as well as specific group of users. Predominant interest or special interests of the members are satisfied through the libraries that unite in the consortium umbrella. The libraries are determined according to their types as already mentioned and thus identified by extending service to the target audience either by discipline or by Government through monographs or electronic information.

4.6 Promotion of Library Automation and Networking in Nort-East Region (PLANNER) –Consortia PLACON Model – a Draft Proposal

A library consortia model through PLANNER has already been proposed earlier known as Promotion of Library Automation and Networking in North-East Region Consortia (PLACON). Pal, Mandal and Chatterjee (2003; 253-276) proposed a model for consortia initiates in North East.

4.6.1 The proposal

Consequent upon the emergence of ICT based environment in libraries and to sustain the pressure of diminishing budget, increased users' demand, raising cost of electronic resources, and complex technological requirements in libraries, consortia based subscription of electronic resources has become inevitable. It is also a positive solution to the emerging problems arising out the proliferation of resources in a multidimensional ways. Today no library is self-sufficient and can exist alone without networking. Progress through partnership has become a buzzword at the down of new millennium. The proposal invites the North

Eastern Regional Libraries of India towards formation of a 'consortium' to consolidate the Electronic Resources for online access and to develop library services exploiting those resources. Straightaway, the consortia will come into effect through an active participation of the "PLANNER–2003" organizing group, and will ensure better faster and more cost-effective ways of providing electronic resources to the clientele. Moreover, the collective strength of the participating member of the consortia facilitates the North Eastern Regional Libraries (NERL) to get the benefit of wider access to electronic resources at affordable cost and at the best possible terms and conditions. The proposed initiative will be recognized as PLANNER CONSORTIA (PLACON) and will be implemented through the major projects; Project-I: Development of Information Infrastructure and Project-II: Formation of the Consortia.

Primarily, this initiative was meant to bring the attention of participating institutions or organizations of the North Eastern Region of India to obtain optimum benefits of this consortium. Then with an open-ended proposition, the proposal invited the attention of other research and academic institutions having a common interest to join in the consortium. The PLACON would host wide variety of web- based electronic resources and should be the member of national (like INDEST) and international (like ICOLC) to enable better access to information resources to its authorized users. According to the proposal the consortium headquarters would function as a resource center, coordinating center which was proposed to be stationed with central administration including the staffs and funds. It was further proposed to monitor the access as well as other promotional activities. Organizing committee who will work on behalf of the consortium were proposed to be given the responsibility to explore the location and institution for establishing its' headquarter in a convenient place for better communication and infrastructure facilities, within the North Eastern States preferably, at IIT, Guwahati or North-Eastern Hill University campus, Shillong. Finally the 'consortium' would function under a Steering Committee having board of members in order to take the decisions on various issues, like policy issues, policy direction, license negotiation, membership, generating the funds, subscriptions, consolidation of resources, project implementation, cost estimation, cost realization, quality assurance, etc. The 'consortium' needs he authorization of the Heads of the 'Institutes' and requires induction to ensure its success.

4.6.2 Mission of PLACON

Mission proposed in the conference was that, the members would collaborate to promote advances in library services through optimal use of information resources, technologies, collective expertise, and buying power.

4.6.3 Basic Objectives of PLACON

The basic objective as proposed was a collaborative arrangement towards the optimum utilization and enhancement of the resources and towards minimizing the expenditure by consortia-based subscription of electronic resources in the North Eastern Region India (NERI). Other objectives also were reflected through "Memorandum of Understanding" (MoU) between the members of PLACON. Discussions in the proposed model were made in view of the following characteristics for good objective as discussed below.

- ❖ Achievement Oriented: where from and where to go;
- ❖ Activity Oriented: what, who, why, how, etc.;
- ❖ Operation Oriented: authority, execution, etc.;
- ❖ Resource Oriented : IT and intelligence, human, monetary;
- ❖ Output Oriented : quality, quantity;
- ❖ Assessment Oriented: cost, service, efficiency, etc.; and
- ❖ Priority Oriented: unbiased, preferred relations, etc.

4.6.4 Membership

The proposed model, however, defined the membership issue also. It also focused on the procedure of getting the membership of such consortia. It proposed that, all the academic libraries, Research Libraries and Learned societies of the North Eastern Region of India will be the member of the library consortia. After successful implementation of this initiative, any member beyond the geographical boundaries will be appreciated to participate. The discussions were, however, fruitful as it brought the attention of the outside members having relatively common interest and needs and even by induction.

The Consortium as suggested would have four categories of membership. These are:

- ✓ University Libraries under UGC InfoNet
- ✓ Libraries in Research institutions
- ✓ Technical Institutions/Engineering College or Departments institutions
- ✓ Learned Societies involved in academic activities; but are not limited to: fully and partially affiliated business farms, commercial laboratories and private departments. The board may create additional categories of membership and specify their levels of

participation. Membership in the Consortium shall be limited to institutions that meet the membership criteria, and by application.

Member libraries are required to meet all the criteria outlined below, bit these are not comprehensive. They are also strongly encouraged to meet the rules and procedures as will be describe in the Consortium documents. All membership applications would be reviewed by Management Committee and would be approved by the Board of Directors upon the recommendation of Management Committee. In reviewing the applications the reciprocal resource sharing benefits to be derived by the Consortium's current members, as well as by the applicant, will be taken into account. The same authority will have the right to consider or terminate the membership for the sake of the 'Consortium'. To consider for the membership in the consortium, the libraries need to meet the following criteria.

- The library must be in a publicly funded academic/ research institution or learned societies involved in academic/research activities or AICTE-accredited or UGC-affiliated institutions or approved by reputed learned body, as the case may be.
- The library's parent institution must be located within the geographical area defined y North Eastern of India, in priority; and not confined to the 'Region' itself but extended to geographic boundary of India.
- The library must provide

PLACON as proposed is simple, efficient and highly cost effective. The basic principle of his system is highly centralized and therefore, requires a separate source of funding agency, which can be from either the State or Central Authority or others. It was further proposed in the program that, a part of the funds will be utilized for operating the consortia while, major can be invested for acquiring power of the consortium and members can get better pricing benefits in their consortia-based subscriptions. Even the consortia more likely to have dedicated staffs for performing the ongoing routine works, provided headquarters (member convener) is not good enough to realize the pressure of the consortia. However, the operating principle of these consortia will be under the principle of decentralized acquisition, decentralized processing but not on centralized access/utilization. Not only this model structure will help to provide access to online electronic resources available in the consortium but also will facilitate the individual libraries to get access to other-library resources by sharing of library resources among the participating institutions. This proposed model is an efficient and cost-effective.

4.6.5 Governance and Maintenance

The Consortium will function under the Board of Directors, Management Committee, Subcommittees, Task forces and Working groups for monitoring, coordinating and for taking policy decision which, however, will be operated through its Headquarters set-up in the North Eastern Region of India.

✓ **Board of Directors**

The Board of Directors as proposed in the consortium will consist of three directors where, the Director of the INFLIBNET Center (or nominated member of the INLIBNET Director) will act as the Chief Executive and sole authority of the consortium. The other two additional directors will be responsible for implementation and coordination, who either will be appointed or selected/elected or nominated preferably, one from PLACON Consortium members and another from other consortia, who is directly involved in consortia activities in other region of India. The term for additional directors as proposed shall be two years, but may also continue to act for further terms. The board further, will be responsible for overall supervision and shall guide the operation of the consortium and serve as a liaison with the other national and international consortium supports like INDEST and ICOLC respectively. The directors will be responsible not only to promote the vision of the consortium but also to provide strategic leadership and courage by establishing overall directions and policies and by appointing the Management Committee, reviewing the annual goals, evaluating the overall effectiveness of the consortium's activities in relation to its vision, external (centralized) funding, etc.

✓ **Management Committees**

The Management Committee shall consist of 4-6 members and will be selected by the Board of Directors or elected by the consortia constituent members and will serve or two years in one independent terms. They will be responsible for specific functions viz. membership negotiation, Online and Electronic Theses and Dissertation services, electronic resources subscription negotiation, Web interface and access control, Manpower development and induction, etc. For the purpose of management committee may hold one or more subcommittees. The Management Committee will work under the direct supervision of the board with accountability to the board, to advise and assist the consortium Executive Director to meet the mission of the consortium, formulating new initiatives and objectives, recommending policy to the board and framing standing and ad-hoc sub-committees as required.

✓ **Sub-Committees**

The nominated members and member representatives will form the Sub-committee by the participating institutions. Sub-committee will function under the direction of management committee to perform specific function. Actually, they will follow-up the actions and responsible or attending all general meetings of the consortium as sub-committee members or on behalf of their institutions as member-representative. They should promote the mission of the consortium by extending help to the task-force and working groups. The duration of their meeting however, depends upon the fixing schedules from time to time by the management committee.

✓ **Task Force and Working Groups**

The task force and working groups work on behalf of their individual institutes who will be under the direction of the library authority. They are responsible in i) identifying and create the users demands, ii) function together to satisfy the potential need of the users, iii) forward the consortia related interests/needs to management committee through sub-committee. The task force and working groups purposively are required to attend the general meetings of the consortia to effectively make use of the resources acquired through consortia and required to participate in training, workshop, symposium organized by the consortia for upgrade.

4.6.6 Strategic License Agreement

Licensing agreements between the information creator and information provider has become a vital issue in view of the upcoming of electronic information where, the publishers act as an information creator and libraries as information provider or disseminator. With the introduction of electronic information a wide range of conflicts between publishers and libraries have started to occur which resulted the librarian to face with challenging assignments like, signing the licensing agreements, where the information generator (via a secure network) and the information purchaser come close together to make arrangement, deal-by-deal, resource-by-resource. However, the task of negotiating licenses is becoming more complicated with diverse nature in delivery modes, access possibilities, and spiraling pricing practices (concessions) to electronic resources by the publisher/vendors. Therefore, the type of agreement between information provider and library consortia and between the library consortia and consortia members can have a major impact on the consortium's effectiveness. Haavisto identified the minimum contents of a library consortium agreement (between the 'Consortia and Members') are, partners, purpose, acquired resources, usage rights, share costs, legal practices, responsibilities, unexpected situations, terms and termination, etc. This consortium would provide strength to its members, to negotiate with

electronic publishers for the best possible price and rights. Agreements should be made to provide access the licensed resources either directly through publisher's site or through the mirror site created by the consortium, depending on the cost, communications, connection speed, geographical locations and number of constituent members, etc. Consortia members may have to form 'sub-consortia', to pay the subscription fee (obviously discounted) or as per their requirement. In view of the best terms and conditions of License Negotiation (between the Information provider and Consortia), the PLACON-Board of Directors and Management Committee would take care of the following issues such as, subscription period, price protection, payment methods (pat/full), licensed materials (format, delivery, updates, interfaces), access method, domain names, network speed and security, archiving options, usages, statistics, untimely the reputation of the information provider. Other general terms and conditions should also be considered as usual.

4.6.7 Cost of Consortia Participation

The consortium desires to enable its' potential members to use the rights, subject to terms and conditions of the members license. This consortium ensures the best possible prices to acquire a wide dimension of resources that can be acquired with a shared cost with other members which again depend on the number of the participants in this consortium. Here the participation cost will have two parts, i) Membership Cost i.e. platform fee – a fixed amount based on type of members and ii) subscription cost i.e. content fee with 50-70% discount based on electronic subscriptions required to particular member. The proposed model explains that while, the membership cost will be utilized to organize the general meetings with the members and other means to take care of the members such as, Training, Consulting individual library problems etc., the subscription cost will be utilized to organize as part to subscribe the electronic resources required for the members. It is necessary to mention that the other cost necessary for the consortium which constitute a major part of the subscription, communications, web site maintenance, creation of mirror site, consortia member services, resource up-gradation, etc. will be utilized from the external funds. Other central government institutes to strength the consortium will be used for cost-efficiency will predominantly fund a good chunk of the external funds and cost-effectiveness so that, the participation cost will be nominal, national realistic in compare to the consortia benefits and will be highly affordable to the members.

4.7 Proposed Consortia Model for North-East

The UGC-INLIBNET provides nationwide access to e-resources through UGC-InfoNet Digital Library Consortium. E-resources are accessible through IP address provided by the

Internet Service Provider. In most of the places including North-East, BSNL is the Internet Service Provider. E-resources are accessible by the member libraries of the consortium through Internet directly. Universities, colleges situated in North-East still face problems while accessing e-resources from the consortium through Internet due to many problems as mentioned in the analysis.

Further, lacking of the awareness, proper strategies, infrastructures, adequate resources, expertise, budgetary constraints, and technical man-power supplemented with consistent problems in internet connectivity, poor bandwidth and discrete signals caused serious disturbances in acquiring the resources in most of the libraries of the North-East. These constraints further aggravated for the strategic locations of the States in North-East encircled with mountains causing thereby, not only the non-receipt of resources in the libraries situated in far-flung areas from the mainstream of the state capitals of North- East but also affected seriously the research and developments including the faculty development programs in the college levels. However, the libraries in the cities of the North-East get the benefit of various consortia in an irregular basis. Hence it has become the primary issue for both the types of libraries i.e, libraries situated far from the main city of the respective state in North-East and libraries in the city as well. Many initiatives, however, have been taken by the State Governments, Central Government as well as the UGC-INFLIBNET to make reach the consortia benefits by improving the situations. The efforts of the Mizoram State Government seem to be remarkable in view of the much initiatives being undertaken time and again. It is clearly evident from the initiatives of the State Government in promoting the activities especially in the higher education level and the Government is also committed to implement it. It is clearly visualized from the reports of the North Eastern Council and Human Resource Development, Govt. of India (http://www.spacemart.com/) that, the students in India's North East will soon have satellite-based educational facilities. While, three states such as, Tripura, Mizoram and Nagaland have been included in the first phase of the hi-tech facilities using the services of EDUSAT, a dedicated satellite for education launched in 2004, the second phase includes all the private schools. According to K.C. Bhattacharya, Director of the Northeastern Space Application Center, a number of remarkable following developments in higher education could be materialized. This shows the activities of the State Government.

- ☞ Educational program through satellite would reach some of the most interior and inaccessible hilly areas of Tripura, Mizoram and Nagaland through video-conferencing;
- ☞ There will be a hub and a studio each in the three states.

- ☞ Tripura and Nagaland will each have 30 satellite educational facilities and Mizoram 31;
- ☞ These States will act as resource centers which will be located in blocks, higher secondary and middle schools, district institutes of education and training;
- ☞ Reception terminals will be installed in each center;
- ☞ The EDUSAT services which was launched in 2004 by the Geosynchronous Satellite Launch Vehicle will be made available in the remaining states of the region - Assam, Manipur, Meghalaya, Arunachal Pradesh and Sikkim - by the end of March 2007;
- ☞ There will be specialized teachers at the uplink station or the hub and lessons taught would reach hundreds of students in the remote centers through satellite signals;
- ☞ The teachings in the studio can be seen and heard in the classrooms on large screens or big television sets with cameras and audio equipment available at both ends for communication;
- ☞ The teachers will be able to hear the students who will be visible to all the other learners in various centers, creating an atmosphere of a virtual classroom;
- ☞ The new venture is expected to bring down the dropout rate among school students in the region, besides helping teachers to enhance their knowledge base;
- ☞ The Indira Gandhi National Open University and ISRO have been jointly working to develop a satellite-based educational network since 1993.

Like the initiatives of the State Government, the UGC- InfoNet also has taken positive measures to reach the consortia benefits in all the higher education institutions. However, the only university in Mizoram is one of the beneficiaries of UGC- InfoNet e-journal Digital Library Consortium.

The proposed model is at par with the benefits extended by the e-journal Digital Library Consortia of UGC- InfoNet and includes all the academic libraries in North Eastern Region. The proposed consortia model will facilitate access to electronic resources where the investigator proposed a Nodal Centre where the centre will accumulate all the e-resources and a State Nodal Centre preferably in the Central University of each state capital will be created who will not only acquire the e-resources but also disseminate the same to the Sub-Nodal Centers. Further, all the State Nodal Centre will be connected to all the academic libraries of the colleges and resources electronically will be shared. Thus a network can be established from the college level to the university, university to the central centre and from central centre to the main centre i.e, the INFLIBNET. The scholar have proposed this model which however, requires establishing proper networking with the involvement of the State

Governments, Central Government, Service Providers, expertise hands, computer professionals etc. In such a case, the ERNET can work as a central agency i.e, Nodal Centre. The e-resources thus, collected by them, will be further channelized to the colleges situated in near vicinity of the university and the colleges situated in the far-off areas will be linked through the colleges situated in the intermediary way and infrastructures will be developed and stationed to speed up the e-resources to reach the far-off located colleges and thus, a network from the central centre can be established to make a free flow of e-resources. Further, a sharing of resources also can be feasible in such a network system. The universities and affiliated colleges under these universities of the North-East will be under the umbrella of the proposed consortia and the respective libraries whether colleges or universities will be beneficiaries. The proposed model will facilitate in accumulating vast amount of electronic resources, collaborate, and promote e-resources on the web for access to member institutions from its headquarters.

The proposed model is simple, efficient and highly cost effective. The basic principle for this system will be highly centralized. Therefore, it requires a separate source of funding agency either from the concerned State Government or Central Government or both including the NEC and other sources. While, a part of these funds will be utilized for operating the consortia, other can be diverted in building the infrastructures, devices, manpower, technical hands etc. Further, the directions from the State and Central Governments need to be passed to the respective head of the institutes for smooth operation of the consortia. A proposed model of the library consortia especially for the North-East has been proposed below for clear understanding the issue. The proposed model of library consortia pertaining to the North-East has been outlined in **Diagram-1** appended in the end of the chapter.

The structure of the proposed model of the Library Consortia to be implemented in the North East for effective use of electronic resources among the universities and colleges under the purview of UGC- InfoNet Digital Library Consortium is elaborately discussed below where,

- ☞ The UGC- InfoNet will act as the headquarters for providing electronic resources to the universities and colleges covered under UGC- InfoNet Digital Library Consortium Program;
- ☞ A Nodal Centre will be constituted preferably at Guwahati, the gateway to North-East which can be identified as Regional Headquarters and act as a Nodal Centre where, all the electronic resources being subscribed by the UGC-InfoNet Digital Library Consortium for the universities and colleges can be accumulated through Internet for onward transmission of the resources to various states in North-East.

- ☞ The Nodal Centre will be responsible to establish connectivity through Internet with high bandwidth among all the nine central universities in all the eight states who can be designated as Sub-Nodal Centre-1 in the respective state and the same has been reflected vividly in the **Diagram-1.** The central universities as discussed will act as the Sub-Nodal Centre-I and will be responsible in disseminating the e-resources to the colleges covered under the program through intranet. Further, one of the colleges situated in the state capital of each state will be identified to act as the Sub-Nodal Centre-2 which will be connected with the respective Sub-Nodal Centre-1 through Internet. Moreover, it will be more preferable if the identified college as Sub-Nodal Centre-2 is situated in the intermediary way with the colleges situated at the far-flung areas. Such identified college will be responsible in facilitating the e-resources to the far-off located colleges through internet. Such colleges can be well connected preferably through the wires for free flow of resources and information. However, taking the distance of the college into account, another college situated bit far away from the Sub-Nodal Centre-2 also can be identified as Sub-Nodal Centre-3 which will facilitate the e-resources to the other colleges. Those colleges can be linked with Sub-Nodal Centre-3.

In this way, a total network among the college libraries, university libraries, Nodal Centers with the UGC- InfoNet can be established. Moreover, this will facilitate other college and university libraries to access the e-resources provided they become the members of such library consortia.

This will facilitate not only the user the electronic resources cover under the consortium effectively but also will drastically reduce the library budget as most of the college library subscribe almost the same journal titles. It can be mentioned further that, due to the stringent budget allocations to the colleges by the Government, the college libraries are not in a position to subscribe journals and hence, the students and teachers are deprived of getting the benefits of the resources. Through this mega project, the students and faculties of the respective colleges, universities can have a better opportunity to access exhaustively the e-resources and use the same for their reading, teaching, and research.

4.7.1 Administration of Library Consortia in view of the Proposed Model

Proposed model of the library consortia requires proper management to facilitate the use of electronic resources, man-power development, infrastructure building, responsibilities with the universities and college authorities. It has been further categorized in to different components as discussed below.

4.7.2 Management Structure

The management structure of the proposed model will be operative under the supervision of various committees where the persons already engaged both in the universities and colleges will be shouldered with additional responsibilities including recruitment of skilled and technical manpower to be stationed in various nodal centers, sub-nodal centers. However, they will be responsible to the individual college authorities who in turn, will be responsible to the sub-nodal agencies. Networking through Internet, Intranet and cable connectivity among the universities, colleges and other nodal centers can be built up by the technical manpower for speed, safety and security, free flow of electronic resources and regular maintenance. The management committee will consist of the following:

- **Governing Council:**

  The governing council members will be the highest body who will act as decision making body to run the proposed model. The governing council members will constitute the officials of UGC-INFLIBNET, ERNET, Central Universities of all the eight states and the principals of the respective colleges covered under the umbrella of UGC-INFLIBNET Digital Library Consortium. Further, it will constitute with officials of the State and Central Government agencies. However, this has been reflected below in detail.

  - Director, UGC-INFLIBNET;
  - Director, ERNET;
  - Vice-Chancellors of all nine Central Universities;
  - Principals of all the colleges covered under the program;
  - State Government authorities;
  - Officials of BSNL etc.

  Further, the governing body can hold meetings with the respective State Governments periodically for getting nod from the authorities. A periodical meeting will resolve any issue arising out of implementation of such consortia.

- **Governing Board:**

  The board will consist of subject experts and provide regular inputs to the council.

- **Committees:**

  Under the Governing Board, various committees can be formed to facilitate the implementation of such consortia smoothly. Important committees that can be constituted include Negotiation Committee, Financial Committee and Experts Committee, Advisory Committee, Maintenance Committee etc.

4.7.3 Objectives

The following are the objectives of the proposed model.

- ☞ Control and reduce costs in the library;
- ☞ Achieve cost-effectiveness of the journals;
- ☞ Resource sharing through a network environment;
- ☞ Sharing licensing issues with each other;
- ☞ Promotion of use of e-resources among the universities and colleges covered under the program in the in North East region;
- ☞ Avoid duplication of subscription of e-resources and promote the rational use of funds;
- ☞ Optimum utilization of electronic resources in the educational institutes;
- ☞ Creating an ICT environment among the colleges;
- ☞ Proper utilization of library budget in getting the electronic and traditional journals not being covered under the consortium;
- ☞ Better negotiation for purchase of electronic journals with vendors;
- ☞ Creating an environment of skilled manpower development;
- ☞ Promote better, faster and more effective ways of providing electronic information resources to the information seekers;
- ☞ Ensuring of continuance of the periodical subscription;
- ☞ Reduce the cost of access to electronic journals to member's institution and share the expenditure;
- ☞ Bring awareness and explore the benefits of existing consortia;
- ☞ Increase the efficiency of intellectual developments through papers by the faculties of the universities and the colleges etc.;
- ☞ Encouraging research and development among the institutions;
- ☞ Efficient collection development among the college libraries etc.

4.8 Conclusion

Library consortia play a pivotal role not only in disseminating the electronic resources to the member libraries of the universities and colleges effectively but also in a cost effective way. The problem of budget, which is constantly a hindrance to the promotion to the library activities can well, be resolved in obtaining the useful and authentic information resources and thereby, the library can built user-centric resources to meet their constant demands. The proposed model, as suggested above, will facilitate the college and the university libraries for

getting access to the e-resources as most of the libraries situated at a far off place in a hilly region can get the resources so that, all round and sustainable development can be achieved and the money spent by the intuitions in getting the resources can be well utilized.

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CHAPTER- 5

Electronic Licensing

5. Introduction

Licensing is concerned with agreement between the originator and the user with certain terms and conditions applicable to both the parties and it requires being strictly adhered to at the time of implementation. Licensing stipulates viable terms and conditions vividly which needs to be thoroughly outlined in writing. The provider and the beneficiary are expected to have a threadbare study of the terms and conditions before agreeing in principle which can be materialized by putting signature. A set of rules and regulations are required to govern license which needs to be accepted in principle by both the provider and acceptor. Any contravention to the terms and conditions by both or any of the party will be subject to the court of law. The resources may be of any kind which includes, goods, learning resources, publications etc. which allow the subscriber through licensing to use the products and for that, an agreement established through writing mode between them is followed in strictly by both the parties. Licensing especially in library connotes to the use of intellectual materials produced by the publisher or vendor who is licensed by a group of publishers to market their products and the library who uses the resources acts as a consumer. The consumers, however, differ from library to library. The library being the social institutions is meant to impart service without any profit as the basic principles of the library is that, it is non-profitable. Therefore, the library which is a service institution, use of the resources created by the publisher and provides the same to the users. The library thus acts a facilitator of resources. The publisher may directly supply the intellectual resources to the library or supply the same through any established organization under terms and conditions. Library as an individual member also can go for subscription directly from the publisher especially when the resources are not available through any other mode and is essential for the users. Especially, the library in such a situation goes for subscribing to the electronic resources where, the provider allows access directly from their site by giving the user name and password. Consequent upon the prevailing of ICT in library, the library subscribe to a good number of resources from a wide range of publishers to satisfy the varied interest of the users. In this perspectives, the library as a body goes for making an agreement with the publisher through internet so as to impart service to a multiple number of users and the publisher after agreeing in principles as would be stipulated by the library allows to use the resources by giving link to access the same including downloading on internet. However, the library pays the charge to access the resources which seem to be high for an individual member. Therefore, the library acquires the e-resources through any established organization designated as a body that is responsible to acquire the e-resources on behalf of the member libraries. In this perspectives, the designated

body require a group of libraries to be the member of such organization so that, collectively the resources can be acquired by the body to disseminate the common resources to the individual library through the networking effectively. In this situation, the individual library has to go for licensing agreement with the provider of such resources which will be used strictly by the users of the library. Thus licensing stipulates strict regulations and it is a legal document for the library to use the resources.

5.1 License

Acquiring a good chunk of information in the university and research libraries in digital formats with the application of ICT has become imminent to promote research and developments, which thereby, cause to an exponential growth of information in the libraries. These practically become a challenging job for the libraries for obtaining license from the respective publishers to use the resources. Chief among these new challenges is crafting agreements with information owners that adequately assure libraries will continue to provide users with comprehensive and timely access to information in digital formats. Because of several unique properties of digital information, agreements that govern the acquisition and maintenance of traditional paper collections are inadequate in the digital information context. Unlike paper materials, digital information generally is not purchased by the library, rather it is licensed by the library from information providers. A license usually takes the form of a written contract or agreement between the library and the owner of the rights to distribute digital information.

As many librarians responsible for collections development know the issues relating to licensing agreements which are often are complex and lengthy documents are filled with esoteric and unfamiliar terms such as indemnity, severability and force majeure (www.library.yale.edu/~llicense/intro.shtml). The information providers including the librarians are supposed to be aware of the licensing agreements. Such as the Yale University has prepared example of such an Analysis of Licensing Agreements for Digital Information, which includes a collection of common terms usually, found in licensing agreements, along with a discussion of the pros and cons of specific language in such agreements.

The creation and dissemination of digital information has resulted in a number of unique challenges. One of the more complex aspects of electronic resources is the license agreement. A license is a contractual agreement between the rights holder and the library, which clearly defines the license grants, and the rights of using the resources are clearly spelled out in the agreement. Any rights not specified in the license belong to the information owner. The information provider's terms are often not beneficial to the libraries long-term interests or to

those of the scholarly community. The library has a responsibility to try to negotiate agreements that respect the rights and privileges of users as well as the provider. The library in principle abides by to all terms within vendor licensing agreements. The Libraries also promotes the observance of the licensing conditions by educating the staffs and users as well about the restrictions and permissible use of the resources.

5.2 Overriding Principles

The Association of Research Libraries (ARL) (www.arl.org), a nonprofit organization has extensive research intuitions in US and Canada has formulated certain licensing principles. The Library follows the principles consistently keeping in view the value and objectives of the organization. The ARL in 1997 formulated the principles for licensing electronic resources and the components laid down in the document are discussed below. (www.arl.org/sc/marketplace/license/principles.html).

- ☞ There should be a clear indication in the license agreement regarding the use of the contents or access of materials for a specific period.
- ☞ It also requires indication whether permanent or temporary license is provided to access the documents including the length of time for accessing the same.
- ☞ The license agreement requires spelling out clearly the identification of the resources to which the beneficiary will access. It must not put any restriction nor abolish the right to access which, however, will be allowed to download, copy, printing the resources according to copyright provision.
- ☞ Recognition needs to be given to both the parties about the intellectual property rights.
- ☞ The license should also clearly mention the accessing to the type of resources and further, it requires a clear indication to the licensee about the unauthorized access of resources.
- ☞ A license agreement should not hold the licensee accountable for illegal uses of the licensed resource by its users, as long as the licensee has implemented reasonable and appropriate methods to notify its user-community of use restrictions.
- ☞ The licensee should be willing to undertake reasonable and appropriate methods to enforce the terms of access to a licensed resource.
- ☞ The licensee should be responsible for establishing policies in the library for the users to access the authorized resources from the publishers' site.

- In case of violation to the guidelines as prescribed by the library, the licensee requires taking of some measures with the users and the licensee ensures to stick to the guidelines.
- The licensor, however, may allow some time to the licensee incase of infringement to the terms of agreement. In such case, the licensee may take some remedial measures after proper investigation into the matter.
- A license agreement should not require the use of an hallmark system that is a barrier to access by authorized users.
- The licensor also needs to allow to copy, downloading resources when it is permanently allowed to the licensee.
- Downloading to such permanent resources must be used by the licensee for archival purpose which may be used in future.
- If a licensor does not permit the licensee to download for preservation then, it should clearly indicate the agency or the organization responsible for such archival of resources and conditions must be stipulated therein the way to get the archival copy. This phenomena needs to be clearly spelled out in the agreement.
- The terms of a license should be considered fixed at the time the license is signed by both parties. If the terms are subject to change (for example, scope of coverage or method of access), the agreement should require the licensor or licensee to notify the other party in a timely and reasonable fashion of any such changes before they are implemented, and permit either party to terminate the agreement if the changes are not acceptable.
- A license agreement should require the licensor to defend, indemnify, and hold the licensee harmless from any action based on a claim that use of the resource in accordance with the license infringes any patent, copyright, trade-mark, or trade secret of any third party.
- The routine collection of use data by either party to a license agreement should be predicated upon disclosure of such collection activities to the other party and must respect laws and institutional policies regarding confidentiality and privacy.
- A license agreement should not require the licensee to adhere to unspecified terms in a separate agreement between the licensor and a third party unless the terms are fully reiterated in the current license or fully disclosed and agreed to by the licensee.
- A license agreement should provide termination rights that are appropriate to each party. (American Association of Law Libraries) (http://www.arl.org.)

5.3 Legal issues

Consequent upon the price hike in journals both print and electronic, the library as already discussed to be member of the consortia group to access the e-resources for wider academic benefits. However, it is done within the purview of certain rules and regulations and legally viable. Many legal issues like licensing, access of e-resources, pricing, Intellectual Property Rights are important which are associated with the parties i.e, the publishers and the library. This, however, needs a threadbare analysis before agreeing upon to the consortia rules. Developments in digital technology allowed the libraries to download and amass the data without any geographical boundary. In such a scenario, the Copyright Act became indispensable as most of the software allow copying the text, images, diagrams etc. from Internet without recognizing to the originator of information. Copyright became essential to control the infringement, which protects the author's right against misuse of information by others. It falls within in the ambit of IPR. Along with the electronic resources, computer software and databases etc. were also brought under purview of copyright.

While the Intellectual Property is concerned with shaping the research value through knowledge, copyright signifies to protect the reproduction by others knowledge created by the artists, writers, authors, intellectuals, publishers who are of such intellect. This is a control mechanism both for publication and the original creator for benefits using others knowledge. The copyright, however, may not be confined to the academic communities but also is extended to the art and music. Therefore, it has become the need of the hour that all the LIS professionals need to know adequately about the copyright and IPR. Further, the library before giving consent must be aware of the legal issues well in advance and copy of the same needs to be sent to all the libraries those who are willing to be the member of consortia.

It is important for all librarians to familiarize themselves with the current state of public information legislation in their region as stipulated below as it affects the scope of services to be offered for sharing this information with their patrons (www.ifla.org).

- Digital Reference and Freedom of Information/Local Culture.
- National Information Policies--What is the political landscape?
- Public Information Legislation.
- Related Legislation.
- Copyright.
- Privacy and confidentiality issues.

- Licensing Agreements.
- Consortia Relationships

5.4 License Agreement and Commentary

Licensing for use of the electronic resources is one of the primary concerns. As discussed earlier, it must be made in between the two parties. In library, the librarian on behalf of the organization acts as one of the parties while, the publisher or the provider of the resources act as another party and an amicable agreement in papers is signed. Previously, one such license model is available known as Lib-license Model License Agreement (LMLA), which was prepared to assist information professionals, executives, and others regularly acquiring digital materials, database content for educational purposes. The objective of this LMLA is to present information professionals with a sound and realistic template of the key issues involved in negotiating a license to acquire or use database content. Internationally recognized Lib-license Model License Agreement (http://www.library.yale.edu/~llicense) developed by Yale University, a private Ivy League University in US is used in most database licensing situations. It however, has been drafted with a particular focus on licensing issues in higher education. The terms LMLA's terms and conditions are based on United States common and statutory law, and it presumes the licensor or publisher will make the information available through a password- or otherwise protected Web site for one year.

5.5 Features of Library License Model & License Agreement

The license agreement significantly differs from publisher or vendor. However, efforts are done to standardize the same for easy implementation. Mention may be made that, the International Coalition of Library Consortia (ICOLC) and the Association of Research Libraries (ARL) have suggested some viable model of while accepting the license agreement. Model licenses are generally developed by groups which include representatives of both the parties such as publisher and the library (Crutis; 2005; p.163). Further, Crutis (2005; 163) has discussed the model licenses which are categorized in to four components and can be implemented in the libraries. The four types of model licenses are intended for (i) Academic Libraries, (ii) Academic Library Consortia, (iii) Public libraries, and (iv) Corporate and Special Libraries. Likewise, the Yale University Library has also proposed copyright guidance and license, which is an internationally accepted model especially while using electronic resources in the library. (http://www.library.yale.edu.). The transition to electronic content licensing issued in 1997 by the Yale University (http://www.library.yale.edu/) clearly

depicts issues relating to license. There are multiple features of this model. Some of the features are highlighted below

- **Nature of Materials**

  The materials that are to be used by the library spread over different subjects need to be properly covered under the license agreement which requires to be spelled out clearly as licensed materials and or licensed materials.

- **Grant of License**

  Licensor i.e., the publisher or the authorized agents of the publisher grant permission to the licensee i.e, the library a non-exclusive access to use the licensed materials and the right to provide the licensed materials to authorized users. This means that, the license is granted by the publisher to the library i.e, the authorized user to use the materials being specified under the agreement.

- **Ownership**

  The licensee i.e., the library and its authorized users acknowledge that the licensor or its suppliers retain ownership of the title to the copy right of the licensed materials and trademarks, if any or service marks related to the licensed materials. Ownership of the licensed materials may be subject to terms, conditions or exceptions set forth elsewhere in the agreement.

- **Fees and Payment**

  The library shall pay the publisher for use of the licensed materials pursuant to the terms and condition as would be stipulated in the agreement. Yale University Library, however, has mentioned below one of the examples of such a license.

  Example: "Library license editors suggest that these issues be negotiated and addressed in writing as an Appendix to the main Agreement. Pricing models vary widely in database licensing contracts, including a fee per use of the Licensed Materials, a fee based on the number of Authorized Users, a periodic subscription fee or a fee based on the number of Full-Time Equivalent (FTE) students, faculty, employees or persons served by the License. Additionally, the payment term may be for less than one year, one calendar year, one fiscal year (typically July 1 through June 30) or for multiple years. For these and other reasons, the LMLA does not include a model."

- **Authorized Users**

  The library requires declaring the types of users and the list of such users for accessing the resources and it should be clearly spelled out in the terms and conditions

in the agreement made between the publisher and the library. The Licensor i.e, the publisher and Licensee i.e, the library define the authorized users as follows.

- The authorized users of the library are either full time or part-time irrespective of their physical locations;
- List of full time and part-time employees of the library
- List of the faculties, staffs, affiliated researchers and independent contractors of the organization regardless of their physical location; and
- List of patrons not affiliated with licensee i.e, the library but physically present in the library known as walk-ins also are included to use the licensed materials;
- The library and the authorized users of the library may access or use the licensed materials in the ways that are consistent with the terms and conditions of the agreement and the Copyright Act of 1976.

Further, the purpose for which the licensed materials are to be used needs to be clearly specified in the agreement. This includes,

- **Electronic Reserves**

  The library and its authorized users may use a reasonable portion of the licensed materials for use in connection with specific courses of instruction offered by the university or college or the institution.

- **Education and Training**

  The library and its authorized users may extract or use information contained in the database for educational, scientific, or research purposes, including extraction and manipulation of information or images for the purpose of illustration, explanation, example, comment, criticism, teaching, research, or analysis.

- **Electronic Links**

  The publisher will provide a password to the library that sets the users' name by itself or proxy-protected hyperlinks from the website of the publisher to access the web pages or the web site of the licensed materials.

- The library may make reasonable changes in the appearance of such links or in statements accompanying such links as the publisher reasonably requests such changes.

- **Catching**

  The library and its authorized users must ensure the efficient use of such local digital copies of the licensed materials with the help of an appropriate browser or other software.

- **Scholarly Sharing**

  The library and the authorized users may transmit to a third party colleague in hard copy or electronically, minimal, insubstantial amounts of the Licensed Materials for personal, scholarly, educational, scientific, or research uses. In addition, the authorized users have the right to use with appropriate credit, figures, tables and brief excerpts from the licensed materials in the authorized user's own scientific, scholarly and educational works. However, the licensee i., the library is not permitted to resell such information for any purpose under any circumstances.

- **Interlibrary Loan**

  The licensee i.e, the authorized library is permitted to provide reasonable amount of data and or information covered under the licensed materials to the other libraries or academic institutions on requests through interlibrary loan arrangements.

- **Delivery**

  The publisher provides by itself or makes ways and means the availability of the licensed materials to the library through telecommunications, network or Web-based connections between one or more of licensor's physical, online, or virtual locations, and one or more of licensee's authorized physical, online, or virtual locations.

- **Access and Authentication**

  The publisher allows the library and its authorized users to have access to the licensed materials pursuant to the terms, conditions, directives and or specifications. Example of such an agreement is placed below.

  Example- Lib-license editors suggest that these issues be negotiated and addressed in an appendix to the main agreement. This includes pricing models, access, and authentication specifications, which vary widely in, database licensing contracts. The options included in access are mentioned below.

  - IP addresses (both authenticated and non-authenticated)
  - Proxy servers
  - Passwords
  - Public keys or certificates
  - Developing protocols

  These access and authentication specifications typically may require the expertise of Networking Professionals, Information Security Specialists, and Chief Information Officer of the library or the institute, Database Administrator, System Administrator etc.

◈ **Restriction**

The publisher and the library both agree to abide by the principles meant for the restricted use of the licensed materials. Restrictions to use of the materials include,

☞ **Unauthorized Use**

The library shall not intentionally or unintentionally permit anyone of the user other than authorized users to use the licensed materials.

☞ **Modification of Licensed Materials**

The library does not have any right to modify or create a derivative work of the licensed materials without the prior permission of the publisher.

☞ **Removal of Copyright Notice**

The library does not have any right to remove, obscure or modify any copyright or other notices included in the licensed materials.

☞ **Commercial Purpose**

Use of the licensed materials is prohibited for commercial purpose.

◈ **Licensor Performance Obligations**

The publisher agrees that its performance always will meet or exceed the standards of commercial reasonability under the agreement's governing law. Additionally, the publisher agrees to the following performance standards.

☞ **Availability of Licensed Materials**

The publisher stipulates a time limit to access to the licensed materials for the library and its authorized users.

☞ **Documentation**

One of the conditions of the licensing agreement is that, the publisher will explore all possible resources in complete form and with update information provide the operational documentation to the library and its authorized user in digital formats. Additionally, i.e, the publisher will make this documentation available in a location on its web site which does not require the authorized users to log in, use, or otherwise access the licensed materials.

☞ **Support**

The publisher further not only requires to provide the activation or installation support in the systems of the library with whom the agreement will be initiated but also giving assisting for implementation of publishers' software, if any. The publisher moreover is required to offer reasonable levels of continuing support to assist library and its' authorized users in using the licensed materials. In the event of encountering access

problems, the librarian requires to intimate the publisher through the e-mail, telephone or fax within the period of contract to resolve the problems.

☞ **Training**

The publisher will provide necessary training to the technical staff of the library for using the licensed materials including the software designed by the publisher or the software used in designing the information. Training in a regular interval is essential for the library staffs to make the best use of the licensed materials including the software amended or update by the publisher. In addition, the training is required to be imparted by the publisher directly on internet or physically by the authorized agency of the publisher provided the publisher is located away from reach of the library.

☞ **Quality of Service**

Imparting of qualitative service in the libraries has become one of the prime components. All out efforts have been going on down the ages by the librarians with the help of computer professionals, information scientists etc. to provide quality service by way disseminating authentic, reliable and scalable information to the clienteles and it has become more prominent in view of the multifarious, multifaceted information requirements from users' communities. Quality in no case can be compromised and with that notion, the library professionals are tussling to find out various means to make the need based service to the users. In this perspective, the publisher is required to use reasonable efforts to ensure that the server or servers of the library and the authorized users have sufficient capacity and rate of connectivity to provide with a quality of service comparable to current standards in the online information provision industry. Moreover, uninterrupted service is required to be provided by the publisher. However, sometimes the library has to bear the problem of access to the e-resources due to periodical maintenance of the server, software installation or testing, loading or making available additional licensed materials by the publisher. The problem of access is also coupled with the link failure, network problem as these are beyond the purview of the publishers' control. In case the publisher is aware of any technical problem before hand, than it must be reported to the library the interruption time for access the e-resources. Further, the publisher may schedule brief unavailability periods, but will do so only where, a) it has given at least 48-hour notice, and b) in ways and at times that minimize inconvenience to library and its authorized users regardless of when notice has been given.

☞ **Problems of Access to Licensed Materials**

If the licensed materials fail to operate, display, load or render in conformance with the terms of the agreement than the library shall immediately intimate the publisher where, he has to act upon immediately to resolve the problems for accessing the licensed materials. In the event of non-compliance to resolve the issues within a reasonable time by the publisher, the library may ask the publisher to reimburse the amount proportionately for the time that the library or the authorized users have not accessed the licensed materials.

☞ **Notification of Modifications of Licensed Materials**

Changes like, deletion, addition, modification, format etc. of any licensed materials is likely to occur by the publisher to provide consistent and effective access of the licensed materials. In such cases, the publisher is required to notify the library for any such changes. If any of the changes, modifications, or migrations renders the licensed materials substantially less useful to the library or its authorized users, the library or its authorized users may treat such modifications as a material breach subject to the term and renewal provisions of the agreement.

☞ **Completeness of Content**

The publisher is required to inform the librarian incase of any discrimination of contents in the electronic version than the print version. In such cases, the publisher is ought to make necessary compliance with the content errors or omissions and assure the correctness of the on-line version

☞ **Withdrawal of Licensed Materials**

The publisher holds the ownership to withdraw either any item or any part from the licensed materials. This, however, happens when the publisher ceases the publication of any literature. In such cases, the publisher notifies the library and the authorized users about the non-availability of such on-line version. When the library feels the withdrawal of publication hampers to the need of the users, than the library may discontinue the service from the publisher.

☞ **Updates**

It is one of the conditions of the agreement that, the publisher must provide the update information relating to the licensed materials to the library and authorized users.

☞ **Disabilities Compliance**

The publisher is required to comply with the supporting software or devices such as large print interfaces, voice-activated input, and alternate keyboard or pointer

interfaces in a manner consistent with the guidelines for the web accessibility and its contents

☞ **Usage Data.**

Conditions require to be stipulated in the agreement to provide the usage data/ statistics to the library and its authorized users in a regular interval by the publisher for using the licensed resources provided by the publisher. The data/ statistics should be in conformity with the guidelines predetermined in the Statistical Measures of Usage of Web-Based Indexed, Abstracted and Full Text Resources (November 1998), being adopted and approved by the International Consortium of Library Consortia.

☞ **Licensee Performance Obligations**.

The performance by the library towards the use of the licensed resources must be based on the terms and conditions. Further, the library and its authorized users are required to abide by the performance standards.

☞ **License Terms Notice**

The library is required to notify the authorized users about the list of the licensed resources including terms and conditions associated with it where, the authorized users are required to strictly adhered to while accessing the resources.

☞ **Protection from unauthorized Use**

The library further is required to use reasonable efforts to inform the authorized users the restrictions while using the licensed resources. In case of infringement to the terms and conditions by either party i.e, the library or the authorized users or both will be punished in the following ways subject to cancellation or on the use of the licensed materials. In the event of any authorized user makes an unauthorized use of the licensed materials, the parties may take the following actions as a cure:

- → The publisher may terminate either the library or the authorized user or both from access to the licensed resources; or,
- → The publisher may terminate the access of the Internet Protocol (IP) address (s) which will restrict the library and the authorized users to access the resources; or,
- → The library on the request of the publisher may terminate the access facility to the licensed resources for the authorized users.

☞ **Maintaining Confidentiality of Access Passwords**

Access to the licensed materials is to be controlled through using the passwords. The publisher shall issue log-on identification numbers and passwords to each authorized

user and use reasonable efforts to ensure that the authorized users do not divulge their numbers and passwords to any third party. The library shall also maintain the confidentiality of any institutional passwords provided by publisher.

☞ **Mutual Performance Obligations**

In addition to their respective and specific performance obligations both the publisher and the library agree to pursue the performance standards.

☞ **Confidentiality of User Data**

The publisher and the library including the authorized users agree to maintain the confidentiality of any data relating to the usage of the licensed materials. Such data may be either used solely by the library including the authorized users for the academic purposes or may be provided to third party in aggregate form. Raw usage data including but not limited to information relating to the identity of specific users and/or uses shall not be provided to any third party.

☞ **Implementation of Developing Security Protocols**

The library and the publisher both shall cooperate to take the measures in implementing the security and control protocols and also the procedures as would be developed during the term of the agreement.

◈ **Term & Renewal**

☞ **Agreement Term**

The agreement will come into force from the beginning of the academic calendar of the date from which it is agreed upon to commence.

☞ **Renewal**.

The agreement also will specify the period of the validity and can be renewed immediately before the expiry of the validity period. However, both the parties such as the library and the publisher may agree upon for the grace period with in which the renewal can be done. Either party may intimate the other for renewal of the subscription to continue the access of the licensed resources.

☞ **Early Termination**

If either party believes that it has breached any obligations under the agreement or if publisher believes that the library has exceeded the scope of the license, such party shall notify the other party of the alleged breach party in writing. The breaching party shall have to enter the time period from the receipt of notice to cure the alleged breach of contract and notify the non-breaching party in writing that cure has been effected. If the breach is not cured within the cure time, the non-breaching party shall have the

right to terminate the agreement without further notice. Once the publisher would specify the agreement ends by early termination due to some reason as or otherwise the publisher terminates the access for the licensed resources to the library and its authorized users, the library and the authorized users still retain the agreement conditions and request the publisher to provide links to access the resources. This, however, need to be specifically spelled out by the publisher the reason for not allowing access. In such cases in spite of the request from the library, if the publisher does not provide any link the library can ask for return of the amount paid earlier for the subscription to the resources.

- **Refunds**

In the event of early termination permitted by the agreement, the library shall be entitled to get a refund of any fees or pro-rata portion thereof, paid by library for the remaining period of the agreement from the date of termination.

- **Archives**

  - **Use of Archival Resources**

Except for termination, the publisher grants the library nonexclusive, royalty-free, perpetual license to use the licensed resources. The publisher also allows the library to participate in the archiving of one complete copy of the licensed resources so as to use such archived resources in the event of discontinuation of service.

- **Warranties & Indemnification**

The publisher who provides the license to the library warrants the following:

- The publisher owns the responsibilities of all necessary legal and equitable rights, permissions, or clearances of the licensed resources and grants permission to the library and the authorized users for use of the same and this is clearly reflected in the agreement. Neither the library nor the authorized user is allowed to infringe the copyright.
- The publisher assures of supplying defect free resources to the library covered under the agreement from the date of contract.
- Neither party shall be liable for any indirect, special, incidental, punitive or consequential damages, including loss of data, business interruption, or loss of profits that arises from the use of the Licensed Materials, or inability to use the licensed resources.

- The publisher makes no representation or warranty, and expressly disclaims any liability with respect to the content of any licensed resources including errors or omissions contained therein, defamation, infringement of rights of publicity, privacy, trademark rights, moral rights, or the disclosure of confidential information.
- The publisher makes no warranties with respect to hindrances caused to the licensed resources for any computer virus, worm, time bomb, logic bomb or other such computer program. The publisher further express disclaims any warranty or representation to authorized users, or to any third party and it becomes the sole responsibility of the library.
- Both the publisher and the library agree to indemnify and hold harmless the other party for any loss, claims, damages, awards, penalties, or injuries incurred by any third party (including reasonable attorney's fees) that arise from any alleged breach of the indemnifying party's representations and warranties retain till the indemnifying party is promptly notified of any such claims. The indemnifying party shall have the sole right to defend such claims from its own expenses.

◈ **Assignment and Transfer**

- Neither party may assign, directly or indirectly all or part of its rights or obligations under the agreement without the prior written consent of the other party. Party may unreasonably neither withhold nor delay such written consent.

◈ **Governing Law**

The agreement shall be interpreted and construed according to the laws and will be governed under the courts located in convenient to publisher and the library**.**

- **Dispute Resolution**

In the event any dispute or controversy arising out of or relating to the agreement, the parties agree to exercise their best efforts to resolve the dispute as soon as possible. The parties shall without delay continue to perform their respective obligations under the agreement which are not affected by the dispute. If the publisher and library cannot resolve their dispute after reasonable efforts and within a reasonable period of time, the parties agree to resolve the dispute using one of the following methods in lieu of litigation.

◈ **Methods of Dispute Settlement**

Multiple following methods can be applied for the settlement of the dispute arising between the publisher and the library.

☞ **Mediation**

The publisher and the library may submit their dispute to a neutral, non-binding negotiating agency or party prior to the commencement of arbitration, litigation, or any other proceeding before trail. The parties to the dispute or claim agree to act in good faith to participate in mediation and identify a mutually to accept the version of the negotiating agency or party. If both the parties cannot agree upon a mediator, each party shall designate a mediator of their own and the two mediators shall select a third mediator who shall act as the neutral mediator in resolving the issues. The publisher and library will share equally in the cost of the mediator(s) and commit to resolve the issue with a least possible time before seeking to any other dispute, legal remedy or equitable remedy. If the mediation is successful, its resolution will be documented by a written agreement executed by both the parties. If the mediation does not successfully resolve the dispute or claim, the mediator shall provide written notice to both the parties. At this point, the publisher and the library may seek another alternative form of resolution of the dispute or claim consistent with the remaining terms of the agreement and othe**r** legal rights and remedies, or commence litigation.

☞ **Arbitration**

If mediation does not resolve a controversy or dispute between the publisher and library, the parties shall resolve the dispute by binding arbitration in accordance with the Commercial Arbitration Rules of the concerned country. However, the dispute can be resolved according to the Arbitration Association of the country belonging to the publisher from where the resources are being supplied. The parties shall select mutually acceptable adjudicator to resolve the matter. However, if the decision of the adjudicator is not acceptable to either of the party then, each party will separately select individual referee who will refer the differences of opinion to the third referee. The arbitration shall take place at a location that must be having reasonably equidistance from both of the parties or otherwise mutually agreed upon by the parties. All relevant documents, materials, and information in the possession relating to claim, dispute by each party shall be made available to the other party for review and copying before the notice of arbitration is served. The arbitrator(s) shall not have the authority, power or right to alter, change, amend, modify, add or subtract from any provision of the agreement or to award punitive damages. The arbitrator shall have the power to issue mandatory orders and restraining orders in connection with

the arbitration. The award rendered by the arbitrator shall be final and binding on the both the parties and judgment may be entered thereon, in any court having jurisdiction. The agreement to arbitration shall be specifically enforceable under prevailing arbitration law. During the continuance of any arbitration proceeding, the parties shall continue to perform their respective obligations under the agreement.

- **Amendment**

No modification or claimed waiver of any provision of the agreement shall be valid except by written amendment signed by authorized representatives of publisher and the library.

- **Severability**

If any provision or provisions of the agreement shall be held to be invalid, illegal, unenforceable or in conflict with the law of any jurisdiction, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

- **Notices**

All notices given pursuant to the agreement shall be in writing and shall be sent to the contract addresses as noted in the agreement. Preferably, all notices requires to hand delivered, or may be sent by registered or certified mail, return receipt requested or through e-mail with a copy of the draft to be retained by both the parties. If any notice is sent by facsimile, confirmation copies must be sent by mail or hand delivery to the specified address.

5.6 Consortia Licensing

The library advances teaching, learning, and research in its role as aggregator of numerous support functions for these endeavors. Specifically, an academic research library consolidates institutional funds for purchase of materials and for the staff to select, acquire, organize, and interpret those materials. Academic research libraries are funded in such a way that their own patrons are not charged for services at point of use. Information charges are built into the institutions' budgets and operations and the costs are, at least in their specifics, "transparent" to the users. This is as true for electronic as it has been for traditional information (Okerson, https://www.amacad.org/publications/trans10.aspx).

The academic library makes all efforts to build a healthy resource collection to meet the multiple demands of the users. In addition to the traditional resources, the library gathers the electronic resources as well due to prevailing of ICT in the libraries. With regard to the price, the electronic products also keep in same footing like traditional resources and for a single

library, it is almost out of reach due to stringent budget allocation. As budgets become rigid, libraries look towards consortia as a way of reducing costs by subscribing as a group to commonly used databases, relying on the economics of scale to bring prices down. Furthermore, consortia licensing serves as the better where, the larger partners bears the cost for the smaller ones. The technological capacity of the group frequently jumps to that of the most advanced partner. Consortia licensing also reduces the strain for the library with regard to the duplication of effort to get the resources, developing a single contract, negotiating for getting user oriented customized products, implementation, publicity, problem solving, and training. Consortia are also more likely to be able in utilizing the expanded resources among the membership, add value to the products that they purchase. Electronic publishing through CD-ROM has always been recognized as a viable means of publishing and distribution, rather than retrieval. Libraries have stretched the retrieval capabilities of the little discs right to the limits of the network and in many cases, transferred the resource to hard disks to impersonate more closely to the on-line system that they really wanted. As a member of a consortium, a library is more likely to afford for access to a flexible client/server search and retrieval system, preferably on Internet.

Consortia licensing being a legal entity, bylaws are necessarily to be clarified before entering to consortia decision. Conducting meetings at a regular interval make easier the process of consortia decisions. In deciding on any joint purchase, decision-making will be easier if there are clear goals and priorities for the group, e.g. priority is given to products serving undergraduates/public/ researchers, or priority is given to products which require minimal implementation effort, for instance, access via the internet using a standard browser.

The best way to start negotiations is to ask for a free trial or offer to be a beta test group for an evolving product. This should be free to members of the consortium, except for their local investments of people's time and the use of existing hardware at each site. If members and their local users are satisfied with the product, the group should begin with the planning for negotiations, especially for the products that are useful. In the process of the decision, amount is to be clearly ascertained by the library, which will follow with a draft contract and ask invoice accordingly from the vendor or the publisher. Preferably, the library insists on a dedicated sales representative of the publisher to whom the consortium's negotiators will direct all communications and questions explain the major issues and concerns. It is also important to try to find out if other organizations or consortia have signed licenses recently or are in a similar negotiating phase. This, however, is a monotonous job to obtain the information and for this, Internet grapevine and informal networks may be the best way to

resolve the issue. Generally, the publishers or the vendors are reluctant to disclose such information as they see this as weakening their bargaining position (Reenen) (www.unm.edu/)

In Indian perspectives, the INDEST (Indian National Digital Library in Science and Technology) Consortium leveraged its union strength to negotiate with the publishers of electronic resources for the best possible subscription rates and terms of licensing. Mention may the made that, the following three types of licensing strategies were negotiated with the publishers.

① Consortium Licensing for the Core Group

The expenditure on electronic resources recommended for subscription by the expert group for 38 member institutions is met from the funds allocated by the Ministry of Human Resource Development (MHRD), Government of India to the consortium headquarters at IIT, Delhi. A number of resources subscribed under the consortium are exclusively negotiated only for the core group. The rates of subscription and terms of licenses agreement for these resources would be applicable only to the core group as, the resources are not open for others. The resources that include in the consortium are,

⇨ ISI Web of Science,

⇨ Elsevier's Science Direct,

⇨ Academic's Ideal Library and

⇨ CAS's SciFinder Scholar.

② Consortium Licensing for the other Institutions

Consortium, being an open-ended proposition, invites other AICTE accredited engineering colleges and institutions and UGC-affiliated universities and colleges to join in the consortium to take advantage of highly discounted rates of subscriptions and favorable terms of license agreement that are negotiated with the publisher of subscribed resources. The consortium has negotiated with a number of publishers wherein other engineering colleges and institutions can join in it. The rates of subscription applicable to these institutions for various resources are either the same as paid for the core group of institutions or even lower. The resources that are open for other institutions to join include,

⇨ EIL Online,

⇨ Springer's Link,

⇨ UMI's ABI/INFORM,

⇨ ACM Digital Library,

⇨ UMI's Applied Science & Technology Plus,

⇨ EI COMPENDEX,

⇨ INSPEC on EI Village,

⇨ AMS's MathSciNet,

⇨ Informatics' JGATE and

⇨ JCCC.

③ Operation

The consortium would operate through its headquarters set up at IIT, Delhi with the funding by the Ministry of Human Resource Development (MHRD). MHRD allocates finance for,

(i) Subscription to electronic resources for institutions, and

(ii) To meet the operation cost of the consortium.

All electronic resources being subscribed shall be available from the publisher's website directly. Local hosting resources, however, have not been considered at this stage. The consortium functions with the following responsibilities under a national steering committee set up under the chairmanship of Prof. R.S. Sirohi, Director, IIT, Delhi.

⇨ Ensuring inter-institutional coordination;

⇨ Examination of terms of licenses for electronic resources being subscribed under the consortium;

⇨ Firm-up terms and conditions of ordering and payment for the electronic resources through the consortium;

⇨ Looking into the possible changes in access rights, mode of subscription and last minute changes in the number of licenses, etc., before the actual placement of the orders for subscription;

⇨ Establishing workgroup on different subjects with an aim to improve the functioning of consortium as well as to identify new resources and to evaluate the existing resources; and

⇨ Take all measures to propagate the consortium with an aim to attract new members in the consortium.

5.7 Strategy of Consortia Licensing

Given the fact that no additional funding is available, the libraries will have to change the strategy and implement a number of changes in order meet the current crisis and at the same time take advantage of the new opportunities offered by scientific publishing and consortia licensing. It is a common feature these days that national library authorities or university agencies establish programmes such as Electronic Libraries Programmes, National Electronic Library programmes etc. Those programmes have often seed money to help Libraries to enter

the new age by subsidizing the first generation of consortia licenses or national licenses. On the contrary, the seed money is expected to pay off in the sense that the library will be able to provide more, better, faster and cheaper and sustainable services with meager budget in the future. In this process, the libraries require to change themselves and reengineer their services and operations in a way to meet all demands of the users with healthy collection developments. The library must-in cooperation with other libraries develops and implements a strategy consisting of a combination of the following features,

- ➲ Reducing the paper work and adapt to the situation of handling the information electronically and change the mind setup to acquire the electronic mode of information.
- ➲ Preparing an adjustment among the in-source technical staff not only in carrying out varied functions of the library in electronic mode but also create an environment of minimum paper works.
- ➲ Imparting training in skill development among the library staffs to work in the new environment.
- ➲ Taking initiatives by the management authorities in consortia building with the other libraries in the region thereby, opening a scope of the library for recognition in national and international level.

5.8 Advantages of Consortia Licensing

Licensed based consortia have a multiple advantages for the member libraries. Some of the advantages can be highlighted as follows.

- ☞ Licensed based consortia act as a single-window service with multiple electronic resources for a large number of universities with their diverse research and academic interest;
- ☞ Consortia with its collective strength of participating institution libraries attracts highly discounted rates of subscription with most favourable terms of agreement for a wider range of e-resources. Most of the publishers providing links to a varied number of resources have responded to slash drastically the rate of their subscription depending upon the category of institutions and e-resources;
- ☞ Consortia allow the users a convenient shape of instant access to a wide dimension of e-resources both current and archived without any incremental costs;
- ☞ It improves the existing library services and reduces the subscription cost of library resources;

- ☞ The research productivity of beneficiary institutions is expected to improve with the increased access to international databases and full-text resources;
- ☞ Consortia trigger remarkable increase in sharing of both print and electronic resources amongst participating library through J-GATE Custom Contents for Consortia (JCCC);
- ☞ Consortia does not have any binding to enroll the regular universities or the educational institutions but also allows the private universities and other institutions to join in the program with same discount rate of subscription;
- ☞ Since the subscribed resources are accessible online in electronic format, the beneficiary institutions have less pressure on space requirement for storing and managing print-based library resources. Moreover, problems associated with print media such as, wear, tear, location, shelving, binding, organizing, etc. are not an issue for electronic resources;
- ☞ Regardless of the location of the licensee, license allows access to all types of users provided it is defined clearly in the agreement;
- ☞ Provides easy user-friendly interface to download, print the e-resources.

5.9 Disadvantages of Consortia Licensing

Consequent upon the licensing with the publishers for e-resources, which include, e-books, e-journals etc., the library at large gets the benefit to access the resources. Though plethoras of resources in electronic form are available which facilitate the users with multiple choices, still there are some disadvantages of this consortia licensing. The library after being agreed to access the consortia based e-resources, encounters multiple problems such as,

- ☞ Networking, where the library has to depend upon the technician or the computer professionals for rescue;
- ☞ The publisher from his side when does not provide link to the databases, the librarian feels helpless. The only option left out for the librarian is to send the request through e-mail to provide links.
- ☞ Bandwidth problems lead to in-accessibility of e-resources;
- ☞ The publisher at any point of time discontinues providing the links;
- ☞ Sometimes, the publishers discontinue publishing a journal that may be both print and electronic form. In such case, before expiry of the period of license for a particular e-journal, the publisher may request the librarian either to stop access and or may request the librarian to access some new journals that may be irrelevant to the users. This leads to create chaos in the library and affects teaching and research.

- ☞ Lack of permanent structure makes it difficult for a consortium to establish a long-term relationship with the third party.
- ☞ Unavailability of user-friendly interface creates problems in accessing the e-resources, which is required to be provided by the publisher;
- ☞ The license needs to be clearly mentioned about the provision of the extension of new technology adopted by the publisher and access to the same requires being provided to the beneficiaries i.e, the licensee failing which, the users get stacked in accessing and downloading the information.
- ☞ When the content stability both in single and in aggregated resources are not guaranteed, the libraries faces problems as the customer needs notification in case of some changes.
- ☞ The library also confronts problems when the privacy is not protected and duly respected and is intervened by the intermediaries or the information provider.
- ☞ Problems faced by the library are also due to the non-receipt of the usage (as opposed to user) data from the networked information provider as per the agreement;
- ☞ When the license does not cover the provision for affordable, perpetual access to the licensed information by some suitable and workable means, the library come across with problems.

The other issues relating to the disadvantages of consortia licensing also signify to the following issues (Froben; 1998)

- ➢ Incompatibility of technical standards;
- ➢ Neglect of the user need for access to information independent of the provider;
- ➢ Threatening of the right to copy and to inter-library loan used in the printed world;
- ➢ High charges for electronic access;
- ➢ Connection of non-cancellation clauses with on-line access;

5.10 Consortia Licensing Models.

The electronic source especially e-journals are available through web at varying price models. Models available in various forms are discussed below.

- ⇨ **Title by-title subscription Model**

  Most of the libraries subscribe the journals especially in print form. The only concession library use to get through this model is for special issues or package. In such case, a special discount price is being offered by the publisher for those library who subscribes few journals in package form such as, Physical Review from American Physical Society/AIP or all publications like ASPP, IEEE.

⇨ **Print Plus Model**

The print plus model operates in the situation where the publisher along with the print version also brings out the electronic version of the documents. In such cases, the pricing of the electronic journal product is expressed as an "add-on" to the price of the print product or the price quoted is linked to a "no-print cancellation" clause in the contract.

⇨ **Electronic Plus Model**

The electronic journals are supplied as the base price and the price for print copies are added to that base price. ICOLC argues for keeping the purchase of the print copies as optional, the best price for the electronic content is not more than 80% of the price for the electronic-plus-print, and the combined electronic and print price is not higher than current print-only prices.

5.11 Conclusion

Copyright and Licensing are two important components while using the resources. Many international organizations, universities, educationist have a great concern over the two issues. However, many universities of internationally repute have formulated their own licensing provisions under which the user accepts to the same and link to access such resources are provided by the publisher through IP address in his proxy server. Generally the IP address is provided to the library. Any other user trying to access the resources outside the library i.e, if the library is not connected with the user or the user forgets the IP address, then resources cannot be accessed. This is done for security reason. The consortia providers also likewise go for a licensing agreement with multiple publishers and vendors where, the consortia provider acts as the user i.e, the first party and the publisher or the vendor as the second party. Further, while signing the agreement, the consortia provider spells out clearly the number of libraries who will be using the consortia based e-resources. Generally the price is determined by the publisher or the vendor based on individual subscription of the e-journal or bundle subscription of e-journals. Further, the respective library that uses the consortia becomes a member of such group and signs agreement with the consortia provider to access the e-resources who, however, use the resources according to the guidelines of copyright. Cox (2000; pp.8-17) however, suggested that, copyright has become an unsatisfactory and unpredictable mechanism for establishing relationship between the publisher and the library. He further, viewed that, the contracts confer predictability and clarity and remove the uncertainties inherent in the interpretation and application of copyright law.

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CHAPTER- 6

Data Analysis, Findings

6.1 Introduction

E-resources are having a pragmatic value in promoting research and development and it is the need of the hour for the researchers. The researchers including the faculties among the universities whether state or central is admiring consortia being one of the viable sources of e-resources. This is also more important for the students' communities for their teaching and other academic assignments. E-resources being the need of the hour are more up-to-date, and can be accessed anywhere, crossing all geographical limitations. Various search techniques can be applied to get access the consortia based e-resources especially from the member organizations and add value in research activities. Apart from the consortia based e-resources, there has been a rapid urge of the user community to get more and more information online. The development of ICT devices, the rapid rise of electronic databases, and modern e-book technologies have altogether changed the entire scenario of information seeking of the user communities. The user attitude to information is gradually shifting from printed documents to electronic resources and thus, it has become an important area of research for the information professionals in India. The scholar for analysis and draw inferences obtained data relating to the research topic of all the central universities.

Data analysis and findings are crucial for a scientific study and for that the scholar has taken relevant data obtained through the filled-in structured questionnaire for analysis and draw conclusions. Analysis refers to the computation of certain measures along with searching for patterns of relationship that exist among data groups. The analysis of data in a general way involves a number of closely related operations, which are performed for the purpose of summarizing the collected data and organized in coherent manner to facilitate the respondents to answer the questions. Analysis is the product of insight into the total situation, paying upon the assembled facts and giving them a general significance. Its validity depends more upon general sense, experience, knowledge, intelligent and honesty of the researcher than upon conformity to any set existing rules.

It may be mentioned that in the analysis, calculation of the percentage (%) has been rounded to the next digit for convenience viz, less than .5 is rounded to the previous digit while, .5 and above is rounded to the next digit.

6.2 Analysis by Responses

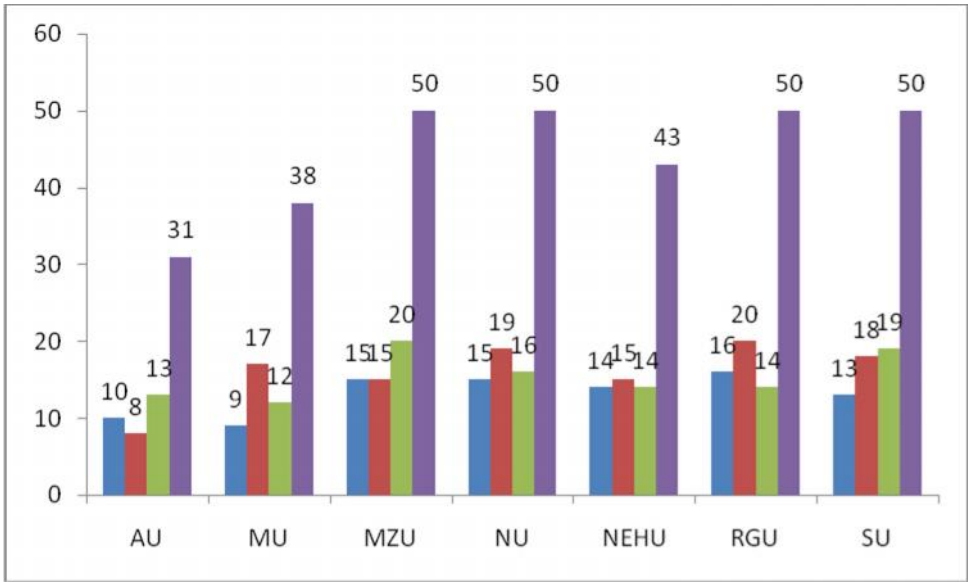
The scholar circulated the questionnaires to the users comprising of the faculties, research scholars, students and others of all the 9 (Nine) Central Universities in North-East out of which, the users of 7 (seven) central universities responded the questionnaires and as such, the response rate comes to 78%. The scholar circulated 50 questionnaires to each university

as below irrespective of the type of users. The scholar has mentioned below in Table- 19 supplemented with Graph- 13 the category of users of each university who responded the questionnaire for a clear understanding.

(Table-19: List of Responses)

Sl.No.	University	Category of users			Total	Questionnaire circulated	%
		Faculties	Research Scholars	Students			
1	AU*	10	08	13	31	50	62
2	MU*	09	17	12	38	50	76
3	MZU*	15	15	20	50	50	100
4	NU*	15	19	16	50	50	100
5	NEHU*	14	15	14	43	50	86
6	RGU*	16	20	14	50	50	100
7	SU*	13	18	19	50	50	100
Total		**92**	**112**	**108**	**312**	**350**	**89**

*AU- Assam University, *MU- Manipur University, *MZU- Mizoram University, *NU- Nagaland University, *NEHU- North Eastern Hill University, *RGU- Rajiv Gandhi University, *SU- Sikkim University.



(Graph-13: List of Responses)

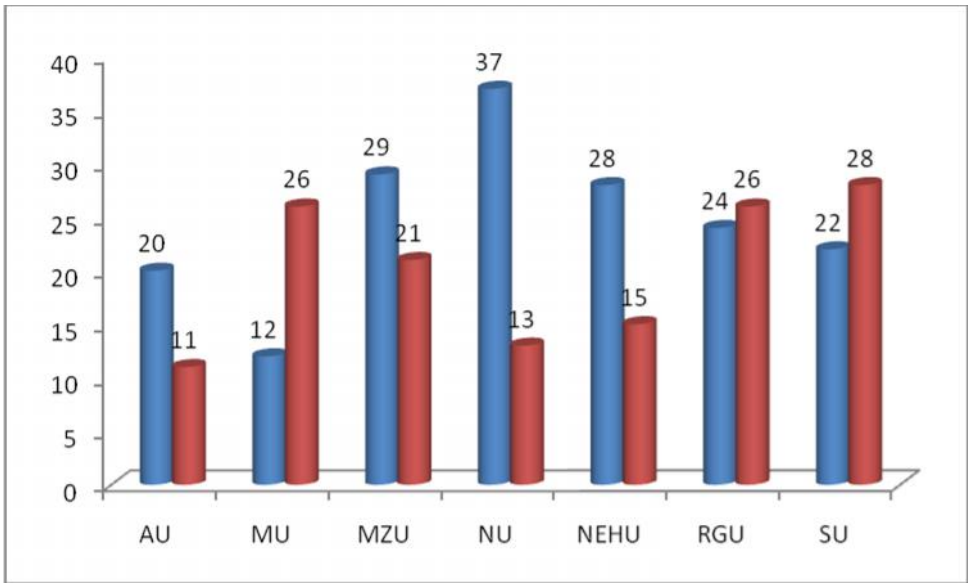
Analysis of the Table-19 reflects that, MZU, NU, RGU & SU have responded 100% followed by the responses from NEHU (86%), MU (76%) and AU (62%) respectively. Further, out of three category of users, the Research Scholars have responded more i.e, 112 compared to the Students and Faculties which constitute 108 and 92 respectively. It may be further deduced that, altogether in total there was 89% of responses to the questionnaires. Thus, the total respondents irrespective of the types of users come to 312 out of 350 that constitute 89% leaving behind the non-respondents 38 in total, which comes to 11%.

6.3 Analysis by Sex

Analysis by sex of the present study from among the responded to the questionnaire has been discussed below in Table-20 supplemented with Graph- 14 for clear understanding. The analysis has been done taking into account the sex, which comprises Male and Female of the universities under study.

(Table- 20: Analysis by Sex)

Sl.No.	University	Male	%	Female	%	Total
1	AU	20	65	11	35	31
2	MU	12	32	26	68	38
3	MZU	29	58	21	42	50
4	NU	37	74	13	26	50
5	NEHU	28	65	15	35	43
6	RGU	24	48	26	52	50
7	SU	22	44	28	56	50
	Total	**172**	**55**	**140**	**45**	**312**



(Graph- 14: Analysis by Sex)

While analyzing the data relating to the number of respondents by sex obtained through the questionnaire of the universities under study placed in the above table it could be revealed that, a total number of 172 are the male which constitute 55% and the maximum compared to the 140 female who responded the questionnaire and it constitute 45%. Both the groups of the responded, however, comprise faculties, research scholars and the students. This shows that, the willingness of both the groups to put forth the information relating to the libraries of various universities taken under study.

6.4 Visit of Library

Visit of library irrespective of the type of users is a mandatory to elicit information, various academic assignments etc. The data relating to the visit of library obtained by the scholar of various universities through the questionnaire has been placed in the Table- 21 which reflects the percentage of the visitors and constitute all three groups of users as already mentioned earlier. The scholar, however, sought the information relating to the visit of library through two options i.e, 'Yes' and 'No'.

(Table-21: Visit of Library)

Sl.No.	University	Yes	%	No	%	Total
1	AU	31	10	00	00	31
2	MU	37	12	01	08	38
3	MZU	47	16	03	23	50
4	NU	50	17	00	00	50
5	NEHU	40	13	03	23	43
6	RGU	44	15	06	46	50
7	SU	50	17	00	00	50
	Total	**299** 96%		**13** 4%		**312**

Continuous visit to library happens to be one of the major achievements for the library, which shows that, the libraries are having the value, added information as well as the reading materials including the effective services. This indicates clearly from the above table that, the users comprising of faculties, research scholars and the students responded well from the libraries under survey and it is interesting to note that, 299 users in total visit the library that constitute 96 % in total while, a meager number of users do not visit the libraries and it is only 13 numbers in total that constitute 4%. This further visualizes that, the libraries are imparting valuable libraries services both in print and electronic form that is a commendable step for the libraries. Moreover, the library services are imparted effectively due to the availability of qualified librarians and other professionals in the libraries under survey. Further, it is interesting to note that out of 7 libraries covered under study, NU and SU comprise the highest number of respondents i.e, 50 (17%) each followed by the respondent rate of 47 (16%) and RGU 44 (15%) respectively. However, overall there is a positive sign among the users who visit the library for various purposes leaving behind few who do not visit.

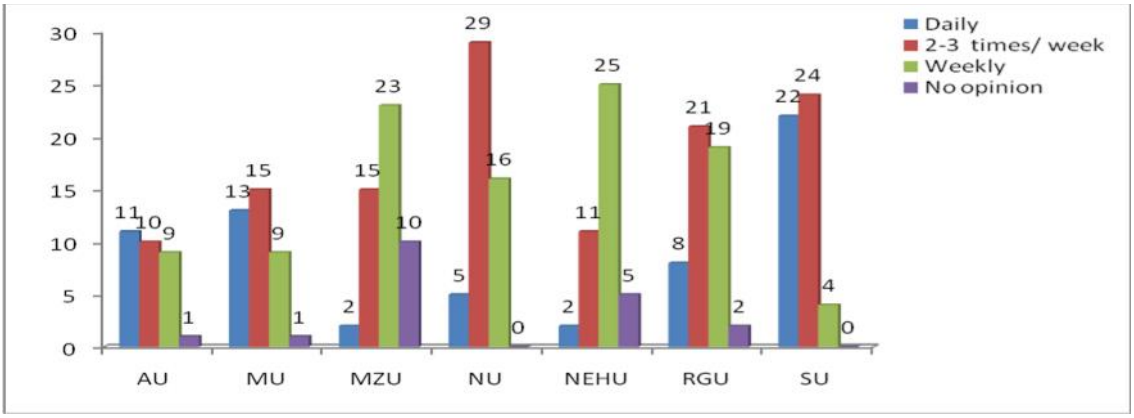
6.5 Frequency of Visit to the Library

Frequency of visiting the library is also one of the major components to assess the library. The scholar has mentioned in the following Table- 22 the frequency of visit to the libraries by

the users of the universities under discussion and is supplemented with the Graph- 15 for a clear understanding of the facet.

(Table-22: Frequency of Visit to the Library)

Sl.No.	Frequency	University							Total	%
		AU	MU	MZU	NU	NEHU	RGU	SU		
1	Daily	11	13	02	05	02	08	22	63	20
2	2-3 times/ week	10	15	15	29	11	21	24	125	40
3	Weekly	09	09	23	16	25	19	04	105	34
4	No response	01	01	10	00	05	02	00	19	6
	Total	**31**	**38**	**50**	**50**	**43**	**50**	**50**	**312**	**100**



(Graph- 15: Visit to Library)

Analysis of the above table that shows the frequency of visit to the library of the universities covered under study reflects that, 125 number of users comprising of faculty members, research scholars and the students stands at the apex that form 40% who visit the library 2/3 times per week followed by 105 (34%) number of users that visit the library weekly and 63 (20%) number of users who visit the library daily. However, 19 numbers of users in total that constitutes 6% in total did not prefer to give their response. This is a encouraging step of the users and infect, the users whether the faculties, research scholars and the students might have been engaged in other academic assignments and due to want of time they may not be in a position to visit the library regularly. However, this is an accepted phenomenon.

Further, while analyzing the frequency by the university wise it could be revealed that, the number of users of SU are at the apex i.e, 22 followed by 13 number of MU visitors and 11 number of AU visitors who visit the library daily and thus, keep first, second and third position respectively. Moreover, the users of MU are 29 followed by 24 for SU and 21 for RGU where the users visit the library 2/3 times per week. It is interesting to note that, the

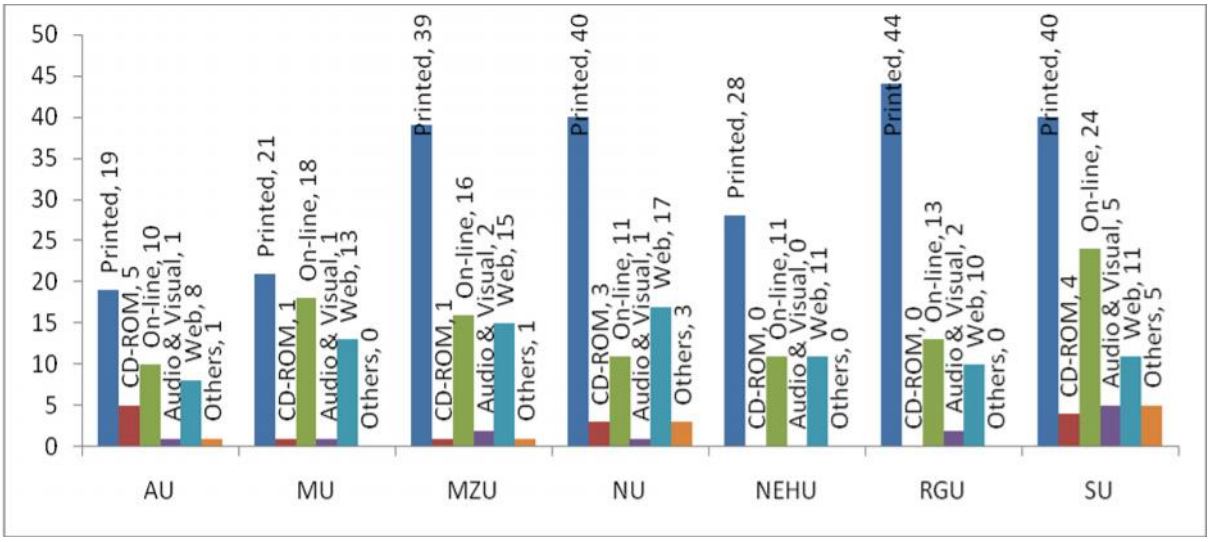
weekly visitors are more in NEHU i.e, 25 followed by 23 in MZU and 19 in RGU. There may be several factors associated with the users who are not in a position to visit the library due to the factors as discussed.

6.6 Information Sources

Information gathering and dissemination is one of the prime services of the library where the users are attracted to use the library provided they facilitate the users with required information. The library as such takes all out measures to provide the need based and useful information to its clientele. The scholar attempted to ascertain the use of most preferred resources from among the users of the libraries undertaken under the purview of the study of various universities and mentioned the same in the questionnaire. After obtaining the questionnaire, the scholar has placed below the data relating to the facet in Table- 23 supplemented with Graph- 16 for clear understanding the field. It may be further noted that, the questions being the multiple choice, the number of respondents can not be restricted to the the total number i.e, 312.

(Table-23: Preference of Information Source)

Sl.No.	**Information Source**	**AU**	**MU**	**MZU**	**NU**	**NEHU**	**RGU**	**SU**	**Total**
1	Printed	19	21	39	40	28	44	40	**231** 51%
2	CD-ROM	05	01	01	03	00	00	04	**14** 3%
3	On-line	10	18	16	11	11	13	24	**103** 23%
4	Audio & Visual	01	01	02	01	00	02	05	**12** 3%
5	Web	08	13	15	17	11	10	11	**85** 19%
6	Others	01	00	01	03	00	00	05	**10** 2%
	Total	**44**	**54**	**74**	**75**	**50**	**69**	**89**	**455**



(Graph-16: Preference of the Information Sources)

Providing the right information sources to the right user at right is also equally the important function of the professionals in the library. The choices of information sources, however, differ from user to user due to type of academic pursuit i.e, teaching, learning, research, writing of term paper etc. The scholar submitted the question to the users of the different universities and the data relating to the facet tabulated above reflects that, the highest number of users i.e, 231(51%) opined for print resources as the most preferred source followed by 103 (23%) numbers who favored for on-line resources and 85 (19%) numbers users privileged for web resources. Less number of users, however, put their options for using CD-ROM 14 (3%), Audio & Visual 12 (3%) etc. as the preferred shape of information resources. Further, the users have given more than one options according to their choice for gathering information and thus the number comes to 455 instead of 312 and accordingly, the analysis has been out of a total number of 455 instead of 312. This further signifies that, the users are slowly getting inclined to use the print and electronic information resources that are a healthy sign for both the users and the libraries under study.

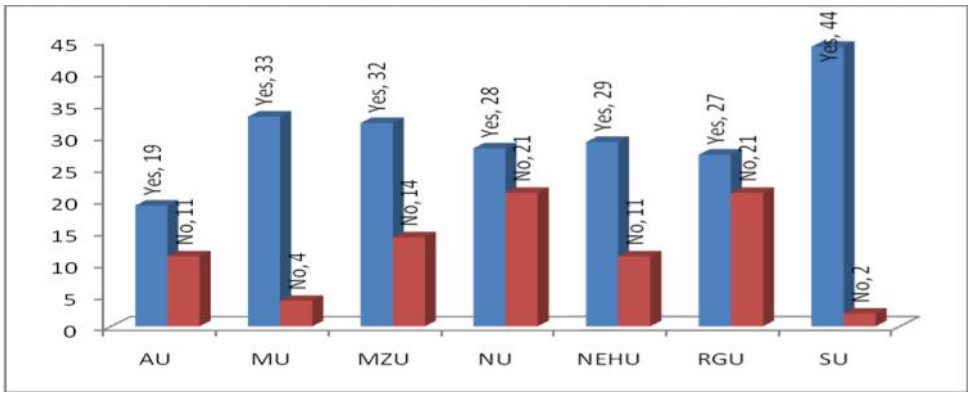
6.7 Use of Electronic Resources

Electronic resources have a pragmatic value for the users who access from various modes. E-resources are becoming important information resource in today's electronic environment, as they are more up-to-date, and can be accessed anywhere, crossing all geographical boundaries. Through various search techniques, electronic resources provide extensive links to explore additional resources or related content. Such resources add value while conducting Research and Development activities. There has been a rapid urge of the user community to get more and more information online. Data relating to the use of electronic resources were

put by the scholar through the questionnaire, which has been placed in Table- 24 supplemented with Graph- 17 for a clear visualization of the discussions.

(Table-24: Use of Electronic Sources)

Sl.No	University	Yes	%	No	%	Total
1	AU	19	9	11	13	30
2	MU	33	16	04	5	37
3	MZU	32	15	14	17	46
4	NU	28	13	21	25	49
5	NEHU	29	14	11	13	40
6	RGU	27	13	21	25	48
7	SU	44	21	02	2	46
	Total	**212** 72%		**84** 28%		**296**



(Graph- 17: Use of Electronic Sources)

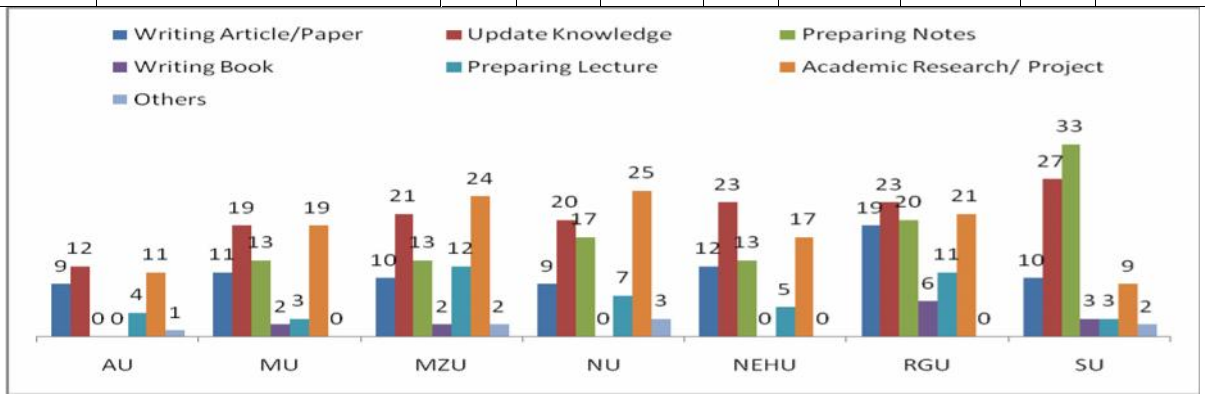
While analysing the data placed in the above table it reflects that out of 312 , 296 users responded to the questionnaire while, 16 number of users did not view any option. Out of the responded users that constitute 296, a total number of 212 (72%) are in favour of the electronic resources while, 84 number of users which comes to 28% are negative in their approach. Further, 44 (21%) users of SU followed by 33 (16%) of users of MU and 32 (15%) users of MZU stand at the priority list respectively for giving cognizence to use the electronic resources which is again a healthy sign and also signifies the effort of the respective library who provide the electronic services alongwith other services. Still much efforts are required to be taken by the other libraries to orient the users for use of the electronic resources.

6.8 Purpose of using the e-resources

Data relating to the purpose of using of electronic resources by the users comprising of faculties, research scholars and the students of various universities covered under study is placed in the Table- 25 coupled with Graph- 18 for a clear distinction of the component.

(Table- 25: Purpose of using of e-resources)

Sl.No.	Purpose	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1	Writing Article/Paper	09	11	10	09	12	19	10	**80** 15%
2	Update Knowledge	12	19	21	20	23	23	27	**145** 28%
3	Preparing Notes	00	13	13	17	13	20	33	**109** 21%
4	Writing Book	00	02	02	00	00	06	03	**13** 2%
5	Preparing Lecture	04	03	12	07	05	11	03	**45** 9%
6	Academic Research/ Project	11	19	24	25	17	21	09	**126** 24%
7	Others	01	00	02	03	00	00	02	**08 2%**
	Total	**37**	**67**	**84**	**81**	**70**	**100**	**87**	**526**



(Graph- 18: Purpose of using of e-resources)

The users irrespective of the type of various universities covered under study use the electronic resources for multiple purpose and hence, could not be restricted to the responded questionnaire i.e, 312 in total rather it exceeded to 526 and accordingly analysis is drawn. As choice of electronic resources are many, 145 (28%) number of respondents preferred to use the e-resources to update their knowledge followed by 126 (24%) number of respondents who use the electronic resources for carrying out their Research Projects and 109 (21%) of respondents preferred to preparing the notes. This is, however, a recognised step for the users of the university libraries and this shows that, the respondents irrespective of the types who are used to information technology for downloading and using of electronci resources.In all the cases, the users prefer the library as the platform to perform the multiple academic works.

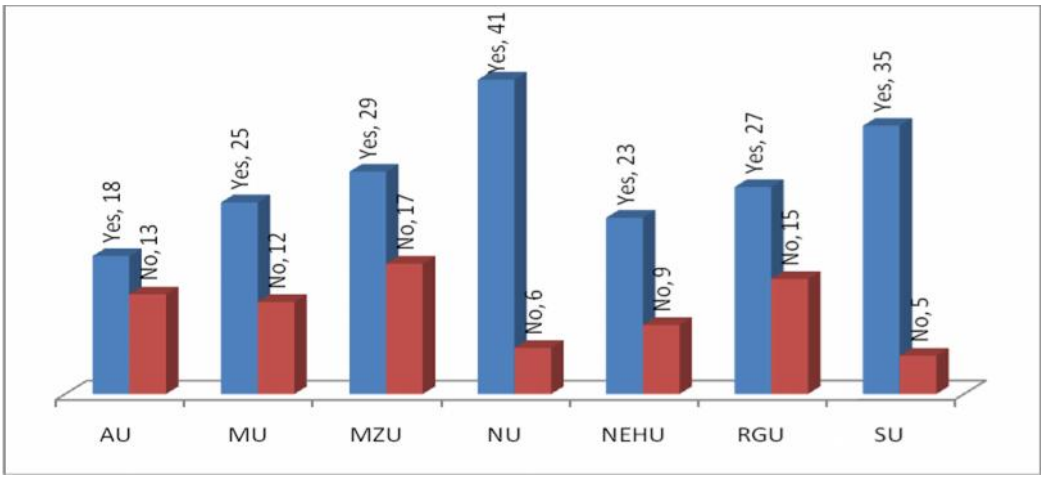
6.9 Use of UGC InfoNet Digital Library Consortium and INDEST Consortium

UGC InfoNet Digital Library Consortium and INDEST Consortium happen to be most viable platform to access the electronic resources especially for research and development.

Therefore, the scholar formed the same as a component of the questionnaire to ascertain from the users whether they use the same. Data relating to the component is placed below in Table-26 supported with Graph- 19 for clear understanding the phenomena.

(Table-26: Use of UGC InfoNet Digital Library Consortium and INDEST Consortium)

Sl.No	University	Yes	%	No	%	Total
1	AU	18	9	13	17	**31**
2	MU	25	13	12	16	**37**
3	MZU	29	15	17	22	**46**
4	NU	41	21	06	8	**47**
5	NEHU	23	12	09	12	**32**
6	RGU	27	14	15	19	**42**
7	SU	35	13	05	6	**40**
	Total	**198** 72%		**77** 28%		**275**



(Graph- 19: Use of UGC InfoNet Digital Library Consortium and INDEST Consortium)

Analysis to the above table reflects that, out of a total number of 312 respondents, 275 respondents comprising of the faculties, research scholars and students responded to the question, which comes to 192 (72%) leaving behind a non-respondent rate to the question 77(28%). Moreover out of the 275 respondents, a good chunk of respondents i.e, 198 (72%) in total access both UGC InfoNet Digital Consortium and the INDEST. It could further revealed that out of 198 respondents who are in a positive bent of mind to access the consortium services, NU constitutes the maximum i.e, 41 (21%) followed by SU i.e, 35 (13%) and MZU 29 (15%) and thus stands in the ranking order as first, second and third respectively. It is surprising to note that, a good number of respondents viewed negative which may be due to the fact that, either they are not aware of the services or may be able to access to poor connectivity or not adequate services. Therefore, adequate training requires

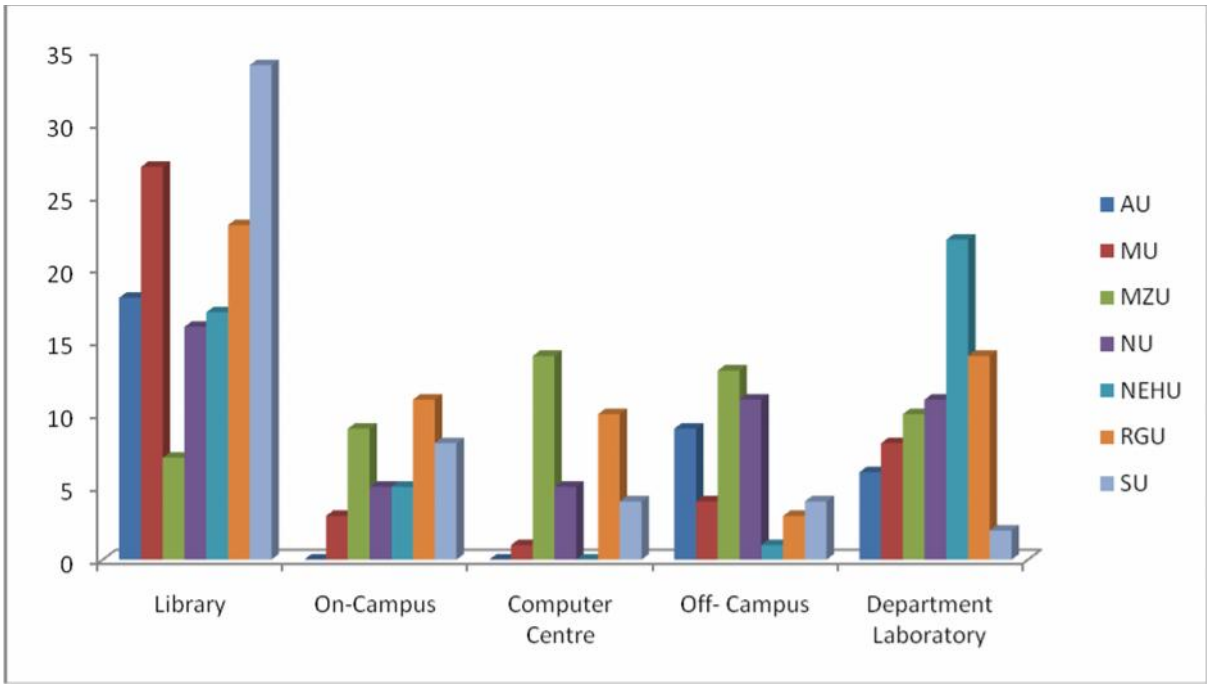
imparting to all types of users by the library to make them aware of such services that are being provided by the libraries under study.

6.10 Place of Access of UGC-InfoNet and INDEST Consortium

Place of access happens to be one of the dominating factors which reflects not only the services of the library but also the skills embodied among the library staff. Therefore, the scholar submitted this as one of the components of the questionnaires and the data relating to the same is placed below in Table- 27 supplemented with Graph- 19 for a clear vision of the issue.

(Table- 27: Place of access UGC-InfoNet and INDEST Consortium)

Sl.No.	Purpose	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1	Library	18 13%	27 19%	07 5%	16 11%	17 12%	23 16%	34 24%	**142**
2	On-Campus	00	03 7%	09 22%	05 12%	05 12%	11 27%	08 20%	**41**
3	Computer Centre	00	01 3%	14 41%	05 15%	00	10 29%	04 12%	**34**
4	Off- Campus	09 20%	04 9%	13 29%	11 24%	01 2%	03 7%	04 9%	**45**
5	Department Laboratory	06 8%	08 11%	10 14%	11 15%	22 30%	14 19%	02 3%	**73**
	Total	**33**	**43**	**53**	**48**	**45**	**61**	**52**	**335**



(Graph- 20: Place of Access of UGC-InfoNet and INDEST Consortium)

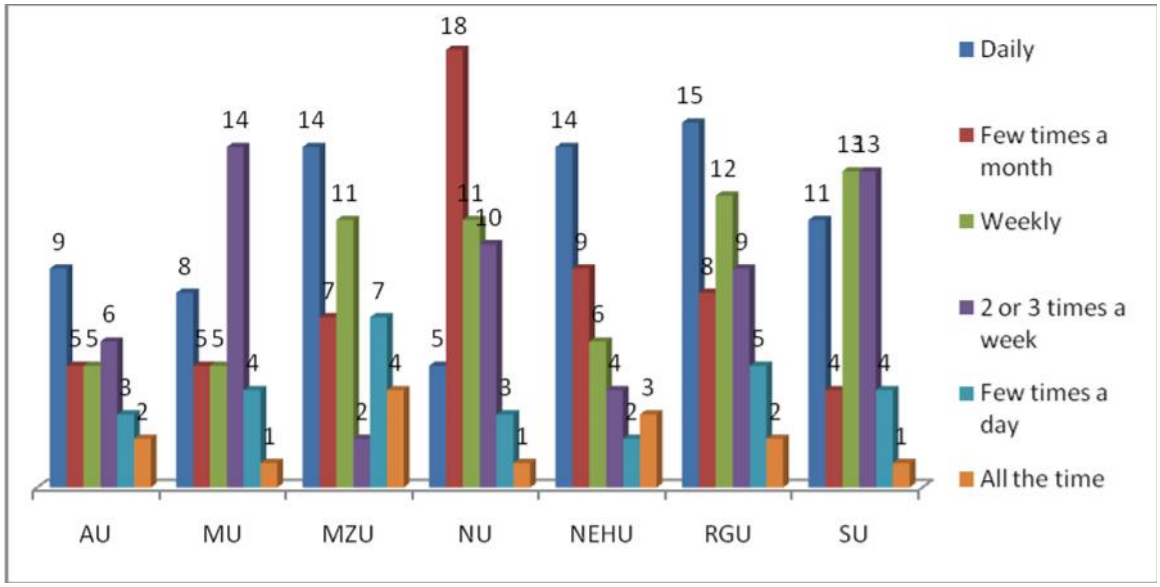
Analysis of the above component mentioned above in Table- 27 reflects that, maximum number of users prefer library as the right platform to access the UGC-InfoNet and INDEST Consortium reason being that, the library subscribes to various electronic journals through consortium and the library facilitates the service to the users which is a commendable step of the library. The users through are 312 in total have given the option for more than one and thus, it comes to 335 and accordingly analysis has been drawn. Out of 335 users, 142 users have given library as the option. Further, out of 142 users, 34 users of SU constituting 24% followed by 27 users (19%) of MU and 23 users (16%) of RGU prefer library as the access centre. This reveals that the library provides adequate internet facilities to the users to access the consortium based electronic resources. Moreover, the users prefer other modes of access of the electronic resources from consortium. Out of the five different components, the library happens to be most preferred centre for UGC-InfoNet and INDEST Consortium followed by the Department Library and Off Campus respectively. It could be visualized from the above table that, the users prefer the Department Library as the second highest access centre where out of 335 users, 73 users in total prefer the Department Library to access the electronic resources. Further, out of 73 users, 22 users (30%) of NEHU followed by 14 users (19%) of RGU and 11users (15%) of NU preferred the Department Library as the access centre for consortium based electronic resources. This determines the fact that connectivity to all the academic departments is provided by the library for the widest benefit of the consortium service. The users equally put emphasis to access the consortium-based resources through Off Campus mode and this is possible due to the wi-fi connectivity. The above table further reveals that, out of 45 users, 13 users (29%) of MZU followed by 11 users (24%) of NU and 9 users (20%) of AU favoured the Off-campus mode to access the consortium based resources. This is however, is a commendable step and efforts require to be made by the library to facilitate with wi-fi connectivity throughout the campus along with round the clock facility for consortium-based services.

6.11 Frequency of Use of e-resources

This is another important segment of the questionnaires and data relating to the the frequency of the use of e-resources provided by the users is discussed below in Table- 28 followed with the Graph-21 for a clear understanding the component. The component was seggregated into six broad headings.

(Table- 28: Frequency of use of e-resources)

Sl.No.	Purpose	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1	Daily	09 12%	08 11%	14 18%	05 7%	14 18%	15 20%	11 14%	**76** 26%
2	Few times a month	05 9%	05 9%	07 13%	18 32%	09 16%	08 14%	04 7%	**56** 19%
3	Weekly	05 8%	05 8%	11 17%	11 17%	06 10%	12 19%	13 21%	**63** 21%
4	2 or 3 times a week	06 20%	14 24%	02 3%	10 17%	04 7%	09 16%	13 22%	**58** **20%**
5	Few times a day	03 11%	04 14%	07 25%	03 11%	02 7%	05 18%	04 14%	**28** 9%
6.	All the time	02 14%	01 7%	04 29%	01 7%	03 21%	01 7%	01 7%	**14** 5%
	Total	**30**	**37**	**45**	**48**	**38**	**50**	**46**	**295**



(Graph- 21: Frequency of use of e-resources)

Frequency determination of the use of e-resources equally is an important componet to ascertain the usability ratio and accordingly data relating to this facet has been compiled in the above table. Mention may be made that, out of 312 respondents, 295 prefered to opine their views on the question which comes to 95% and 5% in total did not prefer to answer the question. However, analysis presented in Table- 28 reflects that, 76 number of users constituting 26% out of 295 who are the regular visitor to the libraries under study followed by 63 number of users and 58 number of users who visit the library weekly and 2 or 3 times a week and thus, it constitute 21% and 20% respectively. Further, out of 50 respondents of RGU, 15 users (20%) who visit the library in a regular basis followed by MZU and NEHU where 14 users (18%) each visit the library. 11 number of users of SU constitute 14% who

visit library daily. Thus, in the ranking order of daily visitors to the libraries under study, RGU stands at the first followed by MZU and NEHU in second and SU in third. Still efforts need to be initiated by the faculties to assign the students with library oriented academic work so that the students regularly visit the library and get access to e-resources. Further, the libraries also need to provide them new services which may attract the users to visit the library in a regular basis.

6.12 Users' Awareness for e-resources

This is also equally an important constituent to determine the use of e-resources by the users of the libraries under study which are having adequate infrastructures to handle e-resources. The scholar mentioned this facet in the questionnaire and data relating to the same has been put forth below in Table-29.

(Table- 29: Awareness approach of e-resources)

Sl.No.	Purpose	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1.	Through Membership	01 3%	02 5%	06 12%	04 8%	09 21%	11 22%	07 14%	**40** 13%
2.	Through Information Bouchure of library	04 13%	01 3%	02 4%	05 10%	01 2%	08 16%	06 12%	**27** 9%
3.	Through Collagues	09 29%	19 50%	13 26%	16 32%	19 44%	13 26%	10 20%	**99** 32%
4	Through library website	13 42%	10 26%	17 34%	10 20%	09 21%	07 14%	12 24%	**78** 25%
5.	Through library staff	02 6%	06 16%	07 14%	09 18%	03 7%	10 20%	14 28%	**51** 16%
6.	Other sources	02 6%	00	05 10%	06 12%	02 5%	01 2%	01 2%	**17** 5%
	Total	**31**	**38**	**50**	**50**	**43**	**50**	**50**	**312**

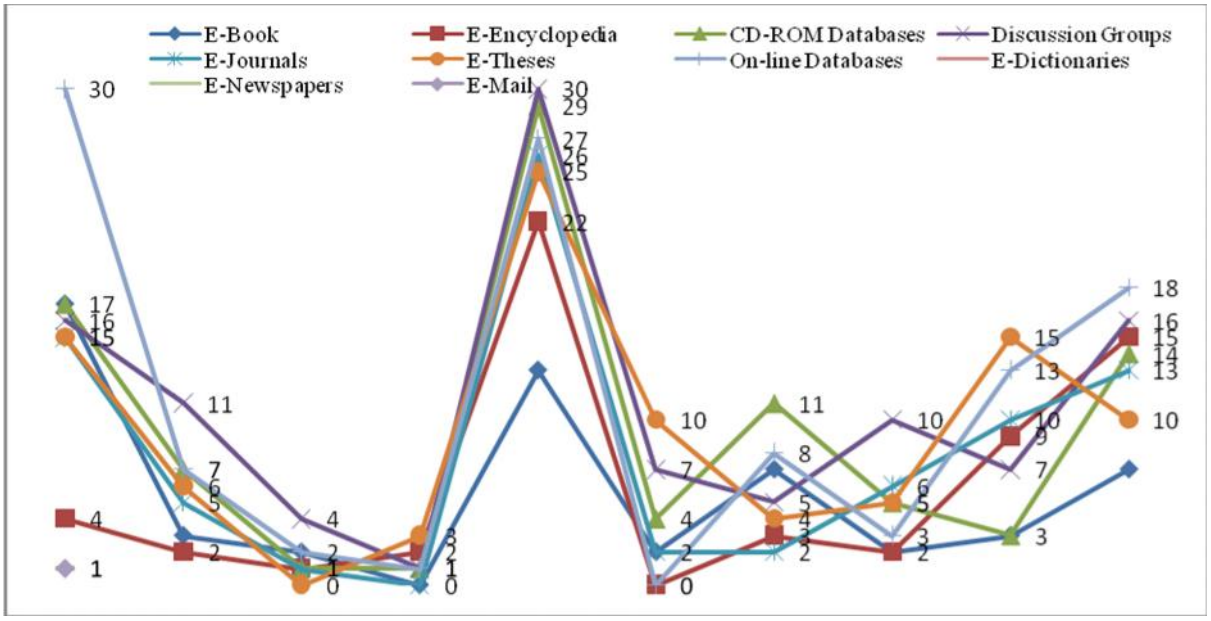
While analyzing the above table it revealed that out of total respondents of 312, 99 users that formulate 32% viewed that, they are aware of the e-resources through their colleagues that seem that they have a proper communication among each other. This is followed by 78 users (25%) who viewed that they get information of e-resources through their library websites which is again positive step of the library and 51 users (16%) opined that the library staffs are the link who aware about the e-resources. Further, while analyzing the university wise, it could be found that out of 100% respondents from MZU, NU, RGU and SU, 19 users (44%) of NEHU are aware of the e-resources from their colleagues which however, differs with MZU where 17 users (34%) get the information through the library website. This is a welcome step for both the library and the users as well who are aware of the e-resources.

6.13 Type and Use of e-resources

There are many types of e-resources and the types have been grouped broadly under 10 different groups as under. Data relating to the facet have been tabulated under Table- 30 supplemented with Graph- 22 for clear understanding.

(Table- 30: Type and Use of e-resources)

Sl.No.	Description	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1.	E - Book	17	4	17	16	15	15	30	**114** 19%
2.	E - Encyclopedia	03	02	07	11	05	06	07	**41** 7%
3.	CD ROM Databases	02	01	01	04	01	00	02	**11** 2%
4	Discussion Groups	00	02	01	01	00	03	01	**8** 1%
5.	E- Journals	13	22	29	30	26	25	27	**172** 29%
6.	E- Theses	02	00	04	07	02	10	00	**25** 4%
7.	Online Databases	07	03	11	05	02	04	08	**40** 7%
8.	E-Dictionaries	02	02	05	10	06	05	03	**33** 6%
9.	E-Newspapers	03	09	03	07	10	15	13	**60** 10%
10.	E-mail	07	15	14	16	13	10	18	**93** 16%
11.	Total	**56**	**60**	**92**	**107**	**80**	**93**	**109**	**597**
	Mean	5.6	6	9.2	10.7	8	9.3	10.9	59.7
	Standard Deviation	5.50151	7.2111	8.82924	8.35397	8.16497	7.42443	10.85715	52.03428



(Graph-22: Type and Use of e-resources)

Analysis to the Table- 30 regarding type and use of e-resources visualizes that, the users of the libraries covered under study have given their multiple options of the use of e-resources for more than one and thus, it comes to 597 instead of 312 in total. Therefore, analysis has been done out of 597 instead of 312. Analysis shows that, e-journals happen to be the most preferred resources compared to other types of e-resources. 172 options by the users of various universities have been given which constitute 29% in total for e-journals followed by 114 options (19%) for e-books and 93 options (16%) for e-mail and thus, ranks first, second and third respectively. This is primarily due to availability of e-journals through consortia, which are extended to the users comprising faculties, research scholars and students of the universities under study. Further, the users are being facilitated with e-resources through networking which are reaching to the faculties to their desktops. However, other uses get a free hand to download e-resources from both the computer centre and the libraries of the respective universities. This is a positive and constructive step of the libraries under study. However, the users also get information about the e-resources and use the same through other options as already described. This reflects the consciousness of the users to use the consortia based e-resources. It could further deduced that, the mean value of SU comes to 10.9 while, for NU, it is 10.7 and RGU 9.3. Correspondingly, the standard deviation of SU, NU, and RGU are 10.85715, 8.35397 and 7.42443 respectively.

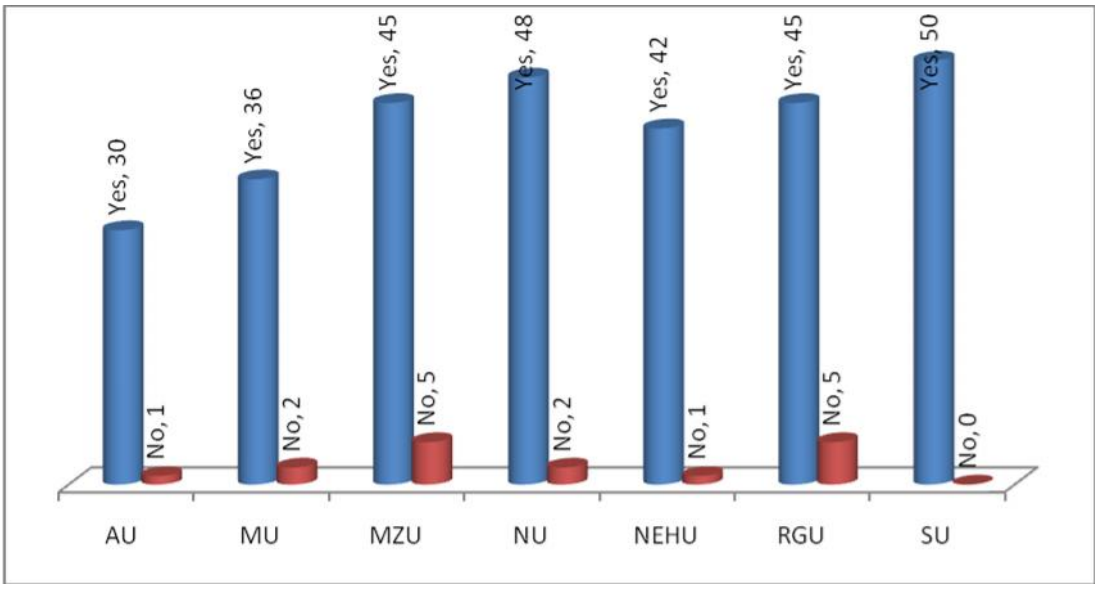
6.14 Internet Access

Internet access has become one of the mandatory parameters for the users and the data relating to the internet access being provided to the users by different university libraries have

been placed in Table- 31 where, the users were asked to view their option. Table also has been supplemented with Graph- 23 for clear understanding of the facet.

(Table-31: Internet Access)

Sl.No	University	Yes	%	No	%	Total
1	AU	30	10	01	6	**31**
2	MU	36	12	02	13	**38**
3	MZU	45	15	05	31	**50**
4	NU	48	16	02	13	**50**
5	NEHU	42	14	01	6	**43**
6	RGU	45	15	05	31	**50**
7	SU	50	17	0	0	**50**
	Total	**296** 95%	**99.99 or 100**	**16** 5%	**100**	**312**



(Graph-23: Internet Access)

Analysis of the Table-31 reflects that out of 312 users, 296 (95%) respondents have given a positive view while 16 respondents (5%) opined negative. However, from among the respondents, SU tops the list in internet access by the respondents followed by NU and MZU & RGU. To make it more clear it can be deduced that out of 296 respondents, 50 respondents (17%) of SU viewed positive followed by 48 respondents (16%) of NU and 45 respondents (15%) each in MZU and RGU and thus, SU stands at the apex followed by NU in second and MZU and RGU in third position respectively. This highlights the commendable steps among the users who are best known to internet access. Further, the library also takes adequate steps to facilitate the users with internet access.

6.15 Span of Internet Use

Experience counts much and more the use of technology more the perfection. Therefore, the scholar tried to ascertain the span of internet use and mentioned the question in the

questionnaire. Data relating to the facet was obtained by the scholar that has been placed below in Table- 32.

(Table- 32: Span of Internet Use)

Sl.No.	Span	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1	< 1 year	1	3	7	2	3	5	2	**23** 7%
1.	>1- <4 years	11	19	16	27	15	23	25	**136** 44%
2.	>4 -<7 years	7	11	8	10	11	8	7	**62** 20%
3.	>7	12	5	19	11	14	14	16	**91** 29%
	Total	**31**	**38**	**50**	**50**	**43**	**50**	**50**	**312**
	Mean	7.75	9.5	12.5	10	10.75	12.5	12.5	78
	Standard Deviation	4.99166	7.18795	5.91608	6.16441	5.43906	7.93725	10.14889	47.65851

Analysis of the Table- 32 reflects that out of 312 respondents, a major chunk of respondents i.e, 136 (44%) are used to internet having an expericne of more than one year but less than 4 years followed by 91 users (29%) having an span of internet use more than 7 years and 62 users (20%) opined that they are having an experience from more than 4 years but less than 7 years respectively. This further reflects that, MZU happens to be the primere university where 19 users are having an experience of internet use for more than 7 years followed by 16 users of SU and 14 each from NEHU and RGU respectively. This shows the efficiency and acquaintenance of the users to the internet use along with the time span. The users in such a circumstances carryout their work individually with proper guidance and this is more useful to the users while accessing e-resources. It could be deduced from the analysis that, the mean value of the span of internet use is parallel in MZU, RGU and SU which comes to 12.5 followed by 10.75 in NEHU and 10 in NU. Though the mean value of MZU, RGU and SU are same, the standard deviation differs as, the standard deviation for SU is 10.14889 followed by 7.93725 in RGU and 7.18795 in MU.

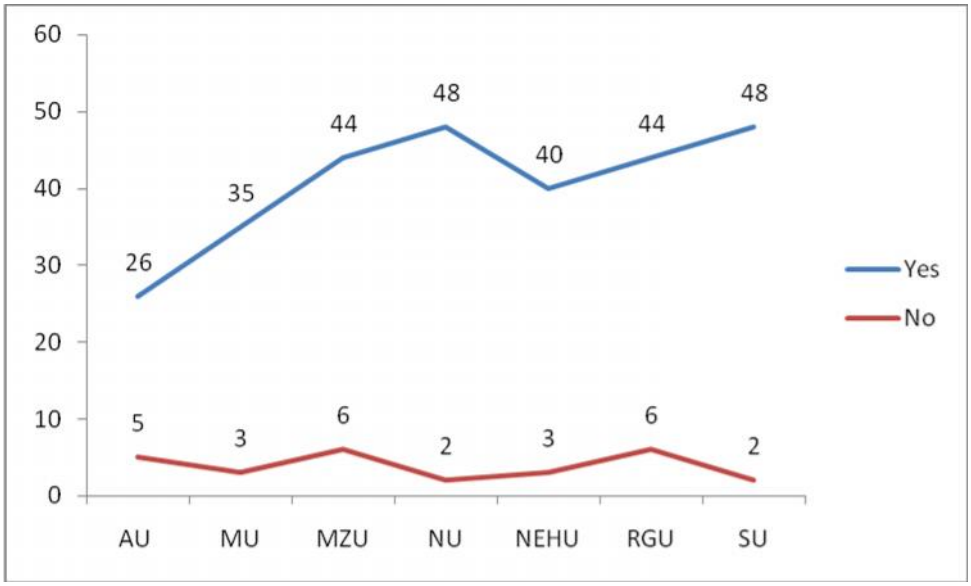
6.16 Use of OPAC

On-line Public Access Catalogue OPAC) is one of the important parameters to ascertain the library holdings. Therefore, to determine whether the users are used to OPAC, the scholar submitted the facet in the questionnaire to opine their views as all the university libraries under study are automated and they allow the users to search the documents through OPAC.

Data relating to the component of the libraries under study are placed in Table- 33 supported with Graph- 24.

(Table-33: Use of OPAC)

Sl.No	University	Yes	%	No	%	Total
1	AU	26	9	05	19	**31**
2	MU	35	12	03	11	**38**
3	MZU	44	15	06	22	**50**
4	NU	48	17	02	7	**50**
5	NEHU	40	14	03	11	**43**
6	RGU	44	15	06	22	**50**
7	SU	48	17	02	7	**50**
	Total	**285** 91%	**99 or 100**	**27** 9%	**99 or 100**	**312**
	Mean					
	Standard Deviation					



(Graph- 24: Use of OPAC)

Analysis of the Table- 33 visualizes that out of 312 respondents, 285 (91%) users viewed that they are used to OPAC and search the documents in the respective library though OPAC while, 27 users (9%) did not view. This is again an admirable step for both the users and the library that the users are used to technology to search the documents from the library. Further, it could be noticed that, out of 285 respondents, 48 (17%) respondents each of NU and SU search the documents through OPAC followed by 44 users (15%) each from MZU and RGU and 40 users (14%) from NEHU and thus, stands first, second and third respectively. This shows the efficiency of the library staffs who provide the update information through OPAC and facilities are available through Intranet to the faculties for accessing the library on their desktop.

6.17 OPAC Access Podium

It is understood from the above deliberations that, libraries under survey are providing OPAC facilties to the faculties and to ascertain the podium through which they access is a major concern. Therefore, the scholar tried to reveal this component through the questionnaire and the data relating to the facet has been discussed in Table- 34. The scholar to determine the choice of platform, has categorised into three headings as below and the respondents were requested to put most prefered choice in any one of them.

(Table- 34: OPAC Access)

Sl.No.	Podium	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1.	Library	12 39%	19 50%	20 40%	27 54%	18 42%	23 46%	27 54%	**146** 47%
2.	Online through Internet	7 23%	11 29%	11 22%	11 22%	11 23%	12 24%	7 14%	**70** 22%
3.	Department Computer	12 39%	8 21%	19 38%	12 24%	14 33%	15 30%	16 32%	**96** 31%
	Total	**31**	**38**	**50**	**50**	**43**	**50**	**50**	**312**

While analyzing the Table-34 it was pointed out that, out of 312 respondents in total, major chunk of respondents i.e, 146 (47%) have given their choice to access directly from the library while, 96 respondents (31%) viewed to access through their department computer i.e, the personal PC that is connected through intranet with the library of the respective university and 70 (22%) preferred to access through internet. This clearly indicates that, the respondents encounter problems to access the OPAC from other options other than the library due to bandwidth and connectivity problem.

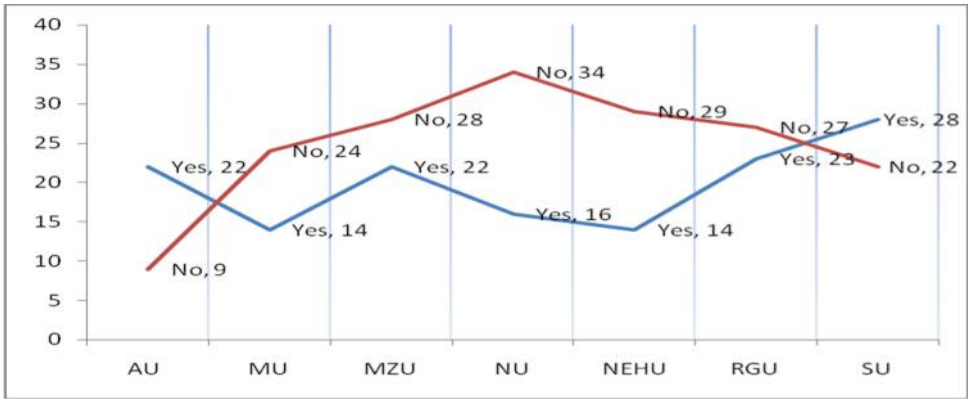
6.18 Satisfaction/ Dissatisfaction of Library Services

Rapid proliferation of information, overgrowth of information resources and multifarious needs of users posed critical challenges for timely information to the users by the library. Measuring satisfaction and dissatisfaction among the users is critical to adjudicate. The scholar therefore, placed the question before the users with two variables such as, yes and no. Data relating to the component is mentioned below in Table- 35 supplemented with Graph-25.

(Table-35: Satisfaction/ Dissatisfaction of Library Services)

Sl.No	University	Yes	%	No	%	Total
1	AU	22	11	9	8	**31**
2	MU	24	12	14	12	**38**
3	MZU	35	18	15	13	**50**
4	NU	34	17	16	14	**50**
5	NEHU	29	15	14	12	**43**
6	RGU	27	14	23	20	**50**

7	SU	28	14	22	19	**50**
	Total	**199** 64%	**101 or 100**	**113** 36%	**98**	**312**



(Graph-25: Satisfaction/ Dissatisfaction of Library Services)

Analysis of the Table-35 shows that out of 312 respondents of various universities covered under study expressed their satisfaction over the services which constitutes 199 respondents (64%) while, 113 (36%) respondents viewed negative. Further, while going for a university wise calculation to know the rate of satisfaction of various universities out of a total number of 199 who responded, 35 numbers (18%) of MZU followed by 29 (15%) from NEHU and 28 nos. (14%) each for SU and RGU respectively expressed their satisfaction on library services and thus, the university libraries of MZU, NEHU and both SU and RGU constitutes first, second and third order in ranking respectively. This shows that, even if the a good chunk of users viewed satisfaction of the library services, still efforts are required to made by the librarian and other library professionals to attract the users for using the library.

6.19 Satisfaction of Use of e-Resources

E-resources play a pragmatic role in providing the most update and useful information to the users for academic assignments especially when the user retrieves from the most authentic and reliable website. This is more prominent in the university libraries as the libraries subscribe to the various consortiums and thus to know the rate of satisfaction among the users, the scholar submitted this as a component in the questionnaire and the data relating to the same is placed below in Table- 36.

(Table- 36: Satisfaction/ Dissatisfaction of Use of e-Resources)

Sl. No.	Rate of satisfaction on e-resources	AU	MU	MZU	NU	NEHU	RGU	SU	**Total**
1.	Excellent	03 10%	02 7%	07 24%	03 10%	05 17%	05 17%	04 14%	29 9%
2.	Moderate	04 4%	23 21%	20 18%	16 15%	15 14%	20 18%	12 11%	110 35%

3.	Good	16 13%	07 6%	18 15%	16 13%	17 14%	19 16%	29 24%	122 39%
4.	No comment	08 16%	06 12%	05 10%	15 29%	06 12%	06 12%	05 10%	51 16%
	Total	**31**	**38**	**50**	**50**	**43**	**50**	**50**	**312**

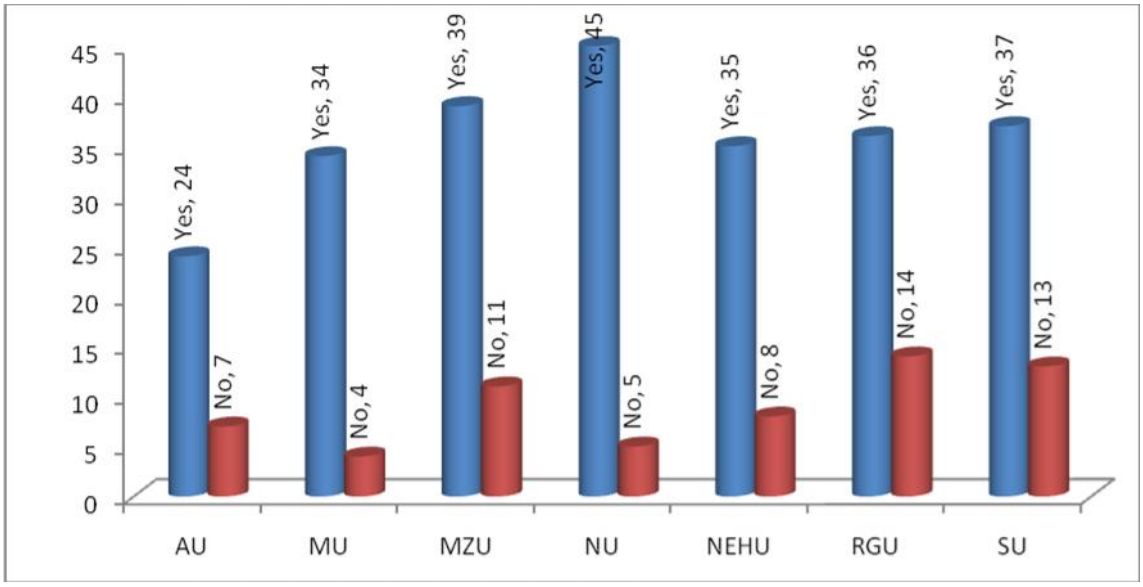
Table-36 after analysis indicates out of four variables that, out of 312 respondents 122 resopondents constituting 39% of various university libraries under study expressed 'good' while, 110 respondents (35%) viewed the e-resources service as moderate and 29 (9%) respondents opted as excellent. It is surpring to know that, 51 respondents (16%) did not feel to put their comment. It may be viewed from the analysis that, e-resources service is still infant stage and necessary steps require to be promoted by the library for the use of e-resources. Other causes may also be associated with such a view from the respondents such as bandwith problem, access problem, function of networking etc. which may be sorted out by the respective library to facilitate the users to use the e-resources. However, in general the users feel satisfied and they have ranked the library services as good. Initiatives and majors need to be promoted by the libraries to be ranked as excellent.

6.20 Problems in Accessing e-Resources

As pointed out in the above table that, there may be multiple problems while accessing the e-resources in the libraries. To determine the problems encountered by the users while accessing the e-resources, the scholar mentioned this as a component under two variables in the questionnaire and the users were asked to opine their view. Data relating to this component is placed under Table-37 supplemented with Graph- 26 to have a clear understanding the facet.

(Table- 37: Problems in Accessing e-Resources)

Sl.No.	**University**	**Yes**	**%**	**No**	**%**	**Total**
1	AU	24	10	07	11	**31**
2	MU	34	14	04	06	**38**
3	MZU	39	16	11	18	**50**
4	NU	45	18	05	08	**50**
5	NEHU	35	14	08	13	**43**
6	RGU	36	14	14	23	**50**
7	SU	37	15	13	21	**50**
	Total	**250**	**80**	**62**	**20**	**312**



(Graph- 26: Problems in Accessing e-Resources)

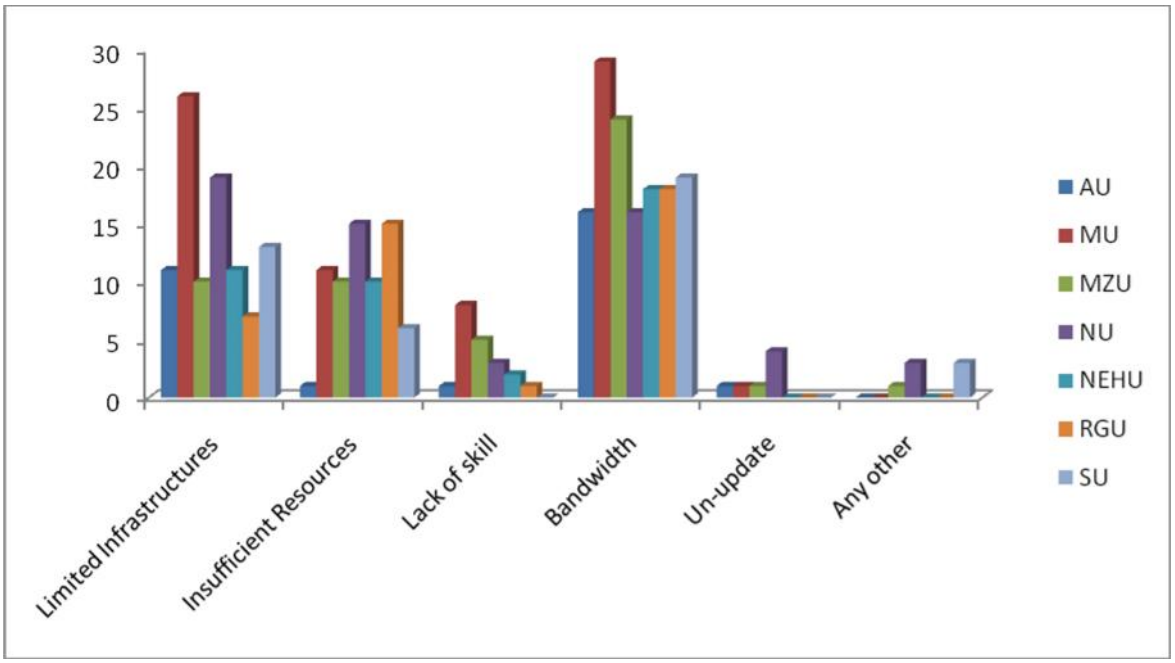
Analysis of the Table- 37 visualises that out of 312 respondents, quite a major respondents that comes to 250 constitutes 80% opined positive i.e, they face probems while, 62 respondents constituting 20% viewed negative which means that they do not find problems while accessing e-resources. It is surprising to note that, out of the respondents who encounter problems in various university libraries, 45 (18%) resopondents of NU followed by 39 (16%) respondents of MZU and 37 (15%) respondents of SU face the problems which of course is not a healthy sign for the libraries which again requires some measures among the university libraries to reduce the problems.

In addition to the above parameter, the scholar submitted a supplement question to ascertain the exact troubles encountered by the users while accesssing the e-resources and the question is gouped under six different variables as mentioned in the following Table- 38 under the caption Type of Problems. This is supplemented with Graph- 27.

(Table: 38: Types of Problem in accessing e-Resources)

S.No	Types of Problem	AU	MU	MZU	NU	NEHU	RGU	SU	Total
1.	Limited Infrastructures	11	26	10	19	11	07	13	**97** 28%
2.	Insufficient Resources	01	11	10	15	10	15	06	**68** 19%
3.	Lack of skill	01	08	05	03	02	01	00	**20** 6%
4.	Bandwidth	16	29	24	16	18	18	19	**149** 42%
5.	Un-update	01	01	01	04	00	00	00	**10 3%**

6	Any other	00	00	01	03	00	00	03	**08 2%**
	Total	**30**	**76**	**51**	**60**	**41**	**53**	**41**	**352**



Graph- 27: Types of Problem in Accessing e-Resources

It is a genuine problem that almost in all the university libraries, the academicians including students and research scholar encounter while accessing e-resources and therefore, radical measures need to be pursued to resolve the issue. Analysis of the above table shows that, out of the total 312 respondents of various university libraries covered under study, major respondents i.e, 149 (42%) viewed the bandwidth as the problem followed by 97 (28%) respondents who talked about the limited infrastructures and 68 (19%) number respondents opined insufficient resources.

6.21 Findings

After due analysis of the questionnaires placed under different tables as noted above, interacting with the users, and while browsing the other sources of information concerning to the present study of all the seven universities, the scholar deduced with the following findings.

☞ Table-19 after due analysis reflected that, MZU, NU, RGU & SU have responded 100% followed by the responses from NEHU (86%), MU (76%) and AU (62%) respectively. Further, out of three category of users i.e, Faculties, Research Scholars and the Students, the Research Scholars have responded more i.e, 112 compared to

the Students and Faculties which constitute 108 and 92 respectively. Thus, the total respondents irrespective of the types of users come to 312 out of 350 that constitute 89% leaving behind the non-respondents 38 in total, which comes to 11%.

☞ While analyzing the visit of library placed under Table-21 it could be deduced that, 299 users in total visit the library that constitute 96 % in total while, a meager number of users do not visit the libraries and it is only 13 numbers in total that constitute 4%. Further, it is interesting to note that out of 7 libraries covered under study, NU and SU comprise the highest number of respondents i.e, 50 (17%) each followed by the respondent rate of 47 (16%) and RGU 44 (15%) respectively. However, overall there is a positive sign among the users who visit the library for various purposes leaving behind few who do not visit the library.

☞ Frequency of visit to the library as a component of the questionnaire was analyzed in Table- 22 which reflected that, 125 number of users comprising of faculty members, research scholars and the students stand at the apex that form 40% who visit the library 2/3 times per week followed by the weekly visitor of 105 users (34%) and regular (daily) visitor of 63 (20%) number. This is an encouraging step of the users and infect, the users whether the faculties, research scholars and the students might have been engaged in other academic assignments and due to want of time they may not be in a position to visit the library regularly. Further, university wise analysis depicted that, the number of users of SU are at the apex i.e, 22 followed by 13 number of MU visitors and 11 number of AU visitors who visit the library daily and thus, keep first, second and third position respectively. Moreover, the users of MU are 29 followed by 24 for SU and 21 for RGU where the users visit the library 2/3 times per week. It is interesting to note that, the weekly visitors are more in NEHU i.e, 25 followed by 23 in MZU and 19 in RGU. There may be several factors associated with the users who are not in a position to visit the library

☞ Information gathering and dissemination is one of the important services of the library and the facet under the caption ‘Information Sources’ was analyzed in Table-23 which revealed that, the highest number of users i.e, 231(51%) opined for print resources as the most preferred source followed by 103 (23%) numbers who favored for on-line resources and 85 (19%) respondents privileged for web resources. Less number of users, however, put their options for using CD-ROM 14 (3%), Audio & Visual 12

(3%) etc. as the preferred shape of information resources. Further, the users have given more than one options according to their choice for gathering information and thus the number comes to 455 instead of 312 and accordingly, the analysis has been out of a total number of 455 instead of 312. This further signifies that, the users are slowly getting inclined to use the print and electronic information resources that are a healthy sign for both the users and the libraries under study.

- ☞ Electronic Resources in the present environment have become a necessity that adds value over and above the print resources. Analysis of the data relating to this component placed in Table-24 revealed that, out of 312 , 296 users responded to the questionnaire and out of the same, a total number of 212 (72%) are in favour of the electronic resources while, 84 number of users which comes to 28% are negative in their approach. Further, 44 (21%) users of SU followed by 33 (16%) of users of MU and 32 (15%) users of MZU stand at the priority list respectively for giving cognizence to use the electronic resources which is again a healthy sign and also signifies the effort of the respective library who provide the electronic services alongwith other services.

- ☞ Purpose of using the electronic resources equally is significant and analysis is drawn from total respondents of 526 instead of 312 reasons being that, the users preferred multiple choices. Table-25 after analysis revealed that, out of 526 as a choice of electronic resources 145 (28%) number of respondents preferred to use the e-resources to update their knowledge followed by 126 (24%) number of respondents who use the electronic resources for carrying out their Academic Research Projects and 109 (21%) respondents preferred to preparing the notes. This is, however, a recognised step for the users of the university libraries and this shows that, the respondents irrespective of the types who are used to information technology for downloading and using of electronci resources.In all the cases, the users prefer the library as the platform to perform the multiple academic works.

- ☞ UGC InfoNet Digital Library Consortium and INDEST are recognised as the most indispensable platform to access the e-resources as most of the respondents are aware of such consortium. This is revelaed from the analysis of the Table- 26 that, out of the 275 respondents, 198 (72%) respondents in total access both UGC InfoNet Digital Library Consortium and the INDEST. It could further revealed that out of 198

respondents who are in a positive bent of mind to access the consortium services, NU constitutes the maximum i.e, 41 (21%) followed by SU i.e, 35 (13%) and MZU 29 (15%) respectively. It is surprising to note that, a good number of respondents viewed negative which may be due to the fact that, either they are not aware of the services or may be able to access to poor connectivity or not adequate services. Therefore, adequate training requires imparting to all types of users by the library to make them aware of such services that are being provided by the libraries under study.

☞ Place of access the UGC InfoNet and INDEST Consortium are crucial to determine. Analysis of the Table- 27 focused that, maximum number of users prefer library as the right platform to access the UGC-InfoNet and INDEST Consortium reason being that, the library subscribes to various electronic journals through consortium and the library facilitates the service to the users which is a commendable step. Moreover, the users prefer other modes of access of the electronic resources from consortium. The study further revealed that, the users prefer the Department Library as the second highest access centre to access the electronic resources. The users further, put emphasis to access the consortium-based resources through Off Campus mode and this is possible due to the wireless frequency (wi-fi) connectivity. This is however, is a justified claim and efforts need to be initiated by the library to facilitate the consortium based e-resources access through wi-fi connectivity throughout the campus round the clock.

☞ Ascertaining about the frequency of the use of e-resources is another important segment. It was deduced from the Table- 28 that, out of 312 respondents, 295 prefered to opine their views and thus, 76 (26%) number of users out of 295 are the regular visitor to the libraries under study followed by 63 (21%) number of users and 58 (20%) number of users who visit the library weekly and 2 or 3 times a week. Thus, in the ranking order of daily visitors to the libraries under study, RGU stands at the first followed by MZU and NEHU in second and SU in third. Still efforts need to be initiated by the faculties to assign the students with library oriented academic work so that the students regularly visit the library to access the e-resources.

☞ Users' awareness about the e-resources depends upon proper communication between the users and the library. It could be inferred from the analysis of Table- 29 that, 99 respondents (32%) are alerted about e-resources through their colleagues and it seems

that they have a proper communication among each other. This is followed by 78 users (25%) who viewed that they get information of e-resources through their library websites which is again positive step of the library and 51 users (16%) opined that the library staffs are the link who aware about the e-resources. Further, while analyzing the university wise, it could be found that out of 100% respondents from MZU, NU, RGU and SU, 19 users (44%) of NEHU are aware of the e-resources from their colleagues which however, differs with MZU where 17 users (34%) get the information through the library website. This is a welcome step for both the library and the users as well who are aware of the e-resources. Still much effort requires to be initiated by the library to orient the users about the e-resources so as to enhance the access rate.

☞ Analysis to the types of most frequently and preferred source of e-resources placed under Table-30 revealed that, e-journals happen to be the most chosen resources compared to other types of e-resources. Total number 172 options by the users of various universities have constitute 29% in total for e-journals followed by 114 options (19%) for e-books and 93 options (16%) for e-mail. This is primarily due to availability of e-journals through consortia, which are extended to the users comprising faculties, research scholars and students of the universities under study. Further, the users are also being facilitated with e-resources through networking which are reaching to the faculties to their desktops. However, other uses get a free hand to download e-resources from both the computer centre and the libraries of the respective universities. This is a positive and constructive step of the libraries under study. However, the users also get information about the e-resources and use the same through other options as already described. This reflects the consciousness of the users to use the consortia based e-resources.

☞ Analysis to the component 'Internet Access' placed under the Table- 31 divulged that out of 312 respondents, 296 (95%) respondents have given a positive view and out of that, 50 respondents (17%) of SU viewed positive followed by 48 respondents (16%) of NU and 45 respondents (15%) each in MZU and RGU respectively. This highlights the commendable steps among the users who are best known to internet access. Further, the library also takes adequate steps to facilitate the users with internet access.

- ☞ Understanding about the technology counts much and more the use of technology more the perfection. This fact was analysed under the caption 'Span of Internet Use' placed in Table-32 which disclosed that out of 312 respondents, a major chunk of respondents i.e, 136 (44%) are used to internet having an expericne of more than one year but less than 4 years followed by 91 users (29%) having an span of internet use more than 7 years and 62 users (20%) opined that they are having an experience from more than 4 years but less than 7 years respectively. This further reflected that, MZU happens to be the primere university among other universities where 19 users are having an experience of internet use for more than 7 years followed by 16 users of SU and 14 each from NEHU and RGU respectively. This shows the efficiency and acquaintenance of the users to the internet use along with the time span. The users in such a circumstances carryout their work individually with proper guidance and this is more useful to the users while accessing e-resources.

- ☞ OPAC is one of the useful platforms through the users can locate the documents as these are arranged in to classified order. However, other searching facilities are available in OPAC such as, Author, Title, Subject, Keywords etc. It could be inferred from the analysis of the Table- 33 that, 285 (91%) users viewed that they use OPAC and search the documents in the respective library. This is again an admirable step for both the users and the library that the users are used to technology to search the documents from the library. Further, it could be noticed that, out of 285 respondents, 48 (17%) respondents each of NU and SU search the documents through OPAC followed by 44 users (15%) each from MZU and RGU and 40 users (14%) from NEHU respectively. This shows the efficiency of the library staffs that provide the update information through OPAC and Mizoram University and NEHU libraries facilitate this service for the faculties to access OPAC through their desktop on Intranet.
- ☞ It was determined from the analysis of the Table- 34 that, major respondents i.e, 146 (47%) opted for the library as the mode of OPAC access while, 96 respondents (31%) revealed that they prefer to access from their department computer as intranet connectivity is available and 70 (22%) preferred to access through internet. This clearly indicates that, the respondents encounter problems to access the OPAC from other options other than the library due to bandwidth and connectivity problem.

- ☞ Measuring satisfaction and dissatisfaction among the users is critical to adjudicate. However, analysis of the Table-35 disclosed that, 199 (64%) respondents out of 312 of various universities covered under study expressed their satisfaction over the services while, 113 (36%) respondents viewed negative. Further, while going for a university wise calculation to know the rate of satisfaction of various universities out of a total number of 199 who responded, 35 numbers (18%) of MZU followed by 29 (15%) from NEHU and 28 nos. (14%) each for SU and RGU respectively expressed their satisfaction of the library services. This shows that, even if the a good chunk of users viewed satisfaction of the library services, still efforts are required to made by the librarian and other library professionals to attract the users for using the library.

- ☞ While assessing the satisfaction about the use of electronic resources it revealed from Table-36 that, out of 312 respondents 122 resopondents constituting 39% of various university libraries under study expressed 'good' while, 110 respondents (35%) viewed the e-resources service as moderate and 29 (9%) respondents opted as excellent. It may be inferred that, e-resources service is still infant stage and necessary steps require to be promoted by the library for the use of e-resources. Other causes, however, may be associated with such an opinion from the respondents such as bandwith problem, access problem, function of networking etc. Initiatives and majors need to be promoted by the libraries to be ranked as excellent.

- ☞ With regards to the problems associated the use of electronic resources placed in Table-37, a major population groups i.e, 250 (80%) encounter their tribulations i.e, the problems which of course is not a healthy sign for the libraries and again requires some measures among the university libraries to reduce the problems. Further, it was inferred from Table- 38 that, bandwidth, infrastructures, and insufficient resources are some of the prominent problems encountered by the respondents while accessing the e-resources which precipitated to serious threat in research activities.

6.22 Testing of Hypothesis

After due analysis of the data obtained through the questionnaire both from the librarian and the users, the scholar tabulated and drew inferences relating to each facet. It was deduced from the analysis that, uses of e-resources in the library under study have enhanced the

research activities in the university. And thereby, the hypothesis number 1 formulated earlier comes true.

H_1- With regard to the hypothesis-1, it is revealed from the analysis that all type of users irrespective of the categories whether student, research scholar or teacher prefer to use e-resources for various academic activities due to easy accessibility, accuracy, authenticity, speed etc. Networking in this sphere is indispensable for accessing the e-resources. It could be ascertained from the study that, networking especially in the North-East region is a continuous problem which affects the dissemination of information by the libraries. And hence, hypothesis formulated in the study comes true.

H_2- Collection Development is a major concern in the university library. It is one of the major activities of the collection strength of the library. There is a radical change in the collection development in the library due to the application of information and communication technology. Further, the library could not able to build a healthy collection development primarily due to the availability of multiple print and e-resources, shrinking budget allocations, and ever-growing demands of the users. Further, compared to the print resources, the users are more prone to the electronic resources for its easy availability through gateways, open access, etc. which added constraint on the part of the library to meet the requirements of the users. Therefore, the library could not find any alternative to satisfy the needs of the users other than to acquire e-resources through consortia that not only added value in collection developments of the library but also the users could get multiple e-resources. From the analysis, it is proved that, library consortia added substantially to provide e-resources and hence, hypothesis formulated above comes true.

H_3- As already discussed, networking is compulsory for accessing to e-resources with high bandwidth. The consortia-based e-resources further are extended through LAN from the library to all the academic departments. Therefore, a viable networking system in the library is required. The study shows that, due to network connectivity problems, and constant breakdown of the Internet Service Provider, e-resources are not accessible. This has become a major concern for both the university and the consortia provider and hence, the hypothesis formulated that, the library consortia requires a viable networking system in the library is proved correct.

H_4- The INFLIBNET provides the connectivity to the libraries through IP-based bandwidth from the Internet Service Provider. E-resources are accessible through IP

address provided by the BSNL, the Internet Service Provider. Due to connectivity failure of Internet in the North-East for its strategic location, e-resources are not accessible which affects the research. It was inferred from the study that, most of the universities in the North-East face the same problem as viewed by the users. Hence, hypothesis formulated on the fact that, failure of network connectivity causes serious problems in research is correct.

H_5- It is an admitted fact that, library consortia is imminent for acquiring electronic information resources and it covers a wide range of journals electronically accessible from global publishers which, however, do not covers many international journals on various subjects. Even if, there is a wide range of consortium to meet the requirements of Science, Mathematics, Engineering, Statistics etc., it is not possible for an individual library to be the member of each consortium and access the electronic journals and books. Hence, there cannot be a consensus that comprehensively electronic information is available from one consortium. This leads the library to acquire electronic information directly from the publisher that is not cost-effective. Hence, hypothesis formulated that consortia provides comprehensive electronic information is not true.

7.1 Suggestions

Suggestions from the users are considered as constructive as the users feel for the improvement in all directions of the library services and hence, cannot be restricted to one angle. The users are the real target group of the library and therefore, suggestions precipitate to new services in the library. The scholar below places suggestions received by the users from various university libraries covered under study comprehensively to act upon it and implement in the respective library. However, the suggestions have been grouped under different headings.

✪ **Consortia**

☞ The libraries require being the member of all consortia groups to get the e-resources for the wider benefit of the users as the university imparts multidiscipline subjects and academic departments carry inter-disciplinary research.

☞ Consortia based e-journals must reach the faculties, research scholar and students to their personal computer round the clock.

☞ Library requires taking measure to promote the use of e-journals through both Intranet and Internet.

☞ Uninterrupted supply of consortia service will enhance the research productivity.

☞ Apart from the consortia based services, the library requires taking to subscribe on-line journals, which are not covered under the consortia.

☞ Web of Science, Science Citation Index, and Social Science Citation Index requires to be available in the university library through consortia with access link to all the users.

✪ **Networking**

☞ The respective library needs to build up campus wide networking to facilitate the users better amenable to the electronic resources.

☞ It is a commendable step for INFLIBNET to enhance the speed to 1GB to access the consortia based e-resources but due to the strategic location of the various states in North East, still interruption persists while accessing consortia based e-resources and hence, there is a dearth of establishing a Regional Network to optimize the use of e-resources.

☞ The library does not have any network system of its own and as it uses institutional LAN, server, etc., separate network connectivity must be facilitated to increase the speed of network connectivity inside the library and the university as whole.

✪ **Internet**

☞ The university library needs to provide the internet connectivity through wi-fi so that the users can take the best use of the library especially during the holidays and off hours.

☞ BSNL happens to be the internet provider and due to link failure most of the time, the research work hampers and hence, private organizations need to be promoted for supply the round the clock internet connectivity.

☞ Internet speed is a major concern in North-East and measures need to be taken to enhance the speed of the Internet.

☞ The library must provide free Internet service to all types of users including the consortia services.

✪ **Digitization**

☞ Initiatives must be taken by the university libraries to digitize the documents for easy access to the materials keeping in view the copyright rules.

☞ Digitization must not be restricted to the current documents which however, may be extended to atlas, maps, charts etc.

☞ There should be a time bound program to complete the digitization process.

✪ **E-Resources**

☞ E-resources have got a pragmatic value for teaching and research. Hence, apart from subscribing to e-journals, e-books need to be available to the user communities with proper license so as to download the same for reading and research.

☞ E-resources collection needs to be strengthened in view of shrinking budget allocations.

☞ The library needs to make licensing agreement with the publishers so as to avoid any future complicacies.

☞ Electronic Theses and Dissertations must be available in the round to the users both in the library and inside campus.

☞ Collection development of e-books, e-journals especially in the field of humanities and social sciences disciplines including databases, electronic theses and dissertations need to be more strengthened

☞ Library requires extending the users training to the changing technology including the academic department so as to make the optimum benefit of e-resources.

✪ **Computer**

☞ The users must be facilitated with sufficient systems with internet connectivity in the library and in all the academic departments for easy access to electronic resources.

☞ Adequate numbers of computers need to be available in the library to access OPAC.

☞ Sufficient access points must be provided by the library in the campus to access the e-resources.

✪ **Infrastructure**

☞ Adequate infrastructure need to be built up in the library to avoid any future complicacies.

☞ Adequate devices also equally must be available in the library in view of the changing technology.

✪ **Training**

☞ Regular training is required to create more awareness among the users to use the e-resources.

☞ In the changing scenario of library services, seminars, workshops regularly need to be organized in the library for both library professionals and the users.

7.2 Conclusion

From the foregoing discussions it could be inferred that, in the changing information scenario, consortia plays a pragmatic role in the libraries to facilitate authentic, reliable, sustainable, value oriented information not only in promoting education but also in research and development. Libraries in the present helm of information explosion and sporadic rise in the print editions could able to realize not only the importance of consortia but also create a harmonic environment for working together to accomplish the crucial works. It is also understood that, all out measures have been taken by the various national organizations to provide optimum resources to the libraries and information centre covering a wide range of source materials both nationally and across the globe. Consortia, as an organization extends spacious assortment of electronic resources in multidimensional areas such as science, commerce, humanities, social science etc. from the national and international publishers. Consortium basically comprehends full text e-journals, e-bibliographic resources, e-books, e-archives of resources, national and international databases etc. which facilitate the libraries to provide the electronic resources to the users who access seamlessly through their computers. The consortia, however, performs well provided there is an adequate number of infrastructures, technically skilled manpower and more specifically the users who are the

real target group for all the libraries. However, the consortia fails to operate in the environment as specified below (Hangsing, Saraf, Nath; 2003; p.290).

- ☞ Lack of Complete Automation;
- ☞ Lack of Adequate Resources;
- ☞ Absence of any culture of inter-library lending;
- ☞ Relative isolation from the main stream;
- ☞ Absence of any kind of union catalogue of libraries;
- ☞ Un-availability of web environment;
- ☞ Lack of leadership- initiation;
- ☞ Lack of acceptance to the changing situation;
- ☞ Inadequate users awareness;
- ☞ Problems in Networking etc.

As already discussed, consortia operates in the libraries provided the library becomes a member of the consortia group. It is also discussed that, the consortia-based subscription provide a wide assortment of electronic resources which adds value to the library resources in multiple ways such as,

- ⇨ Cost-effectiveness;
- ⇨ Optimal utilization of finance;
- ⇨ Creation of a digital library atmosphere;
- ⇨ Building a sound and technical skilled professional;
- ⇨ Opening of new avenues in service segments such as, Document Delivery Services, Current Awareness and Selective Dissemination of Information;
- ⇨ Content Management;
- ⇨ Content Developer;
- ⇨ Cost sharing for technical and training support;
- ⇨ Archival Access;
- ⇨ Preservation of information resources;
- ⇨ Database designing etc.

However, consortia are not free from the disadvantages those have been discussed in the chapters. However, to specify some of them, there are also adequate problems that persist in the consortia. The problems can be highlighted as under.

- ➢ Absence of a print copy of journal;
- ➢ Involvement of huge amount at the initial stage of implementation;
- ➢ Providing adequate regular training to the professionals along with the users;

- Technology emulation;
- Investments in licensing for use of the electronic journals especially from the international publishers;
- Copyright;
- Lack of infrastructures;
- Unreliable telecommunication links and insufficient bandwidth;
- Function of Networking;
- Absence of skilled personals;

Having said that, in India many types of consortia are operating which, however, discussed in the foregoing chapters. However, to point some of them, the open consortia, closed group consortia, centrally funded consortia, Shared-budget consortia are prominent which operate in Indian libraries and information centre both state and central organizations. In the entire consortia model, the publishers take the initiatives to provide the resources through electronic means to the organizations who want to subscribe the same. Most of the publishers take the license from small publishers who publish the journals and in one platform the journals are available. In such a situation, the publishers around the globe form their own consortia and distribute the journals and e-books among them and then allow the organizations who take a lead to subscribe the same on behalf of the university and other libraries. This reduces the budget of the individual library that instead of subscribing to the journals especially in electronic form get alliance with the consortia providers.

From the aforesaid discussions it could be inferred that, many constructive proposals have been initiated by the scholars and discussed in the national forum. The discussions have a realistic approach as North East, due to its strategic location in Indian soil needs special consortia model as proposed by the scholar which on application, would benefit the academicians for research and development. This also will facilitate the students to get and use of electronic resources, thereby, it will not only enhance the usage statistics of e-resources but will prove value based investments.

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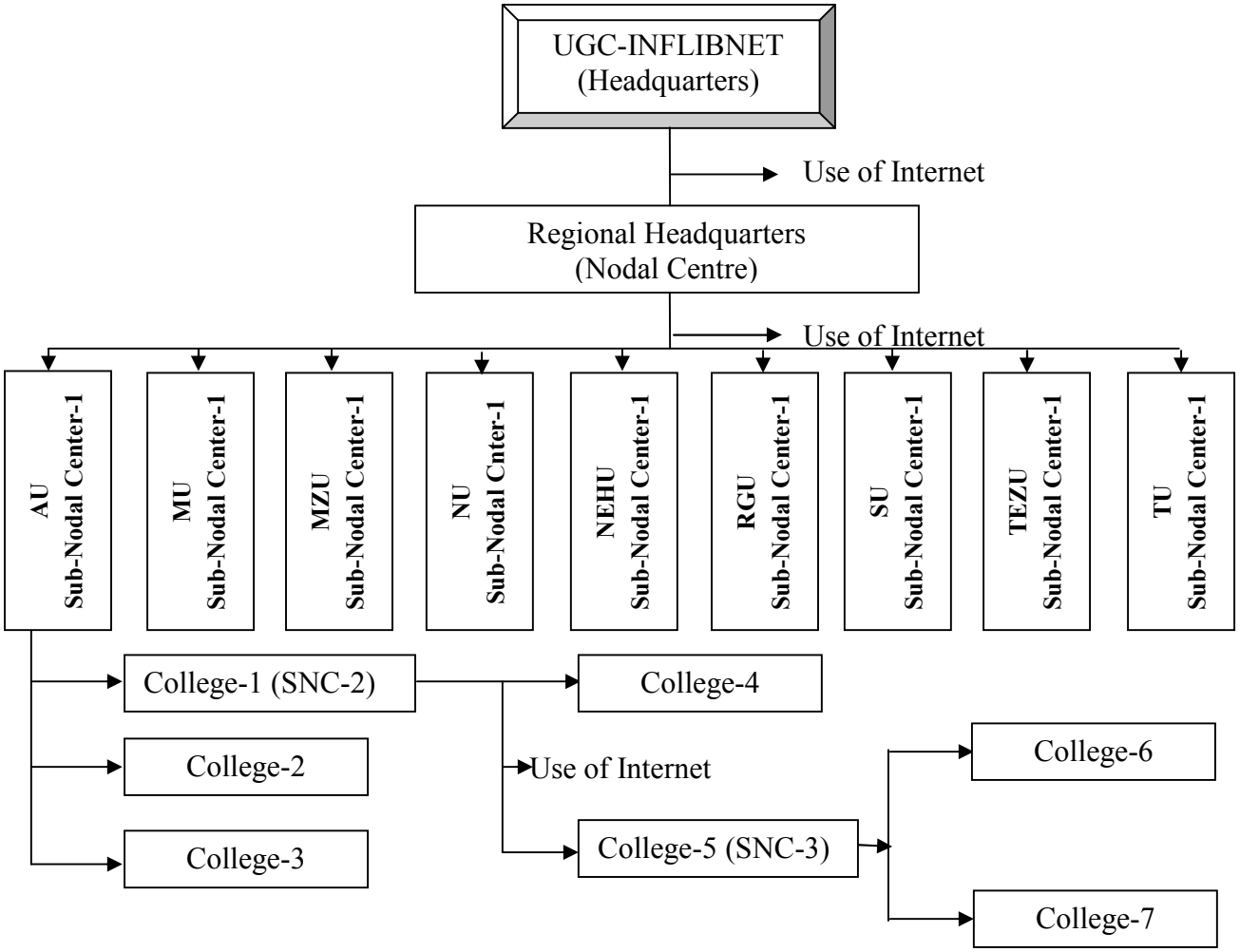
Appendices



(Abb. –SNC-1- Sub-Nodal Centre-1, SNC-2- Sub-Nodal Centre-2, SNC-3- Sub-Nodal Centre-3)

Sl.No.	Abbreviation	State	Location of Consortia Headquarters	Place
1	AU	Assam	Assam University	Silchar
2	MU	Manipur	Manipur University	Imphal
3	MZU	Mizoram	Mizoram University	Aizawl
4	NEHU	Meghalaya	North Eastern Hill University	Shillong
5	NU	Nagaland	Nagaland University	Kohima
6	RGU	Arunachal Pradesh	Rajiv Gandhi University	Itanagar
7	SU	Sikkim	Sikkim University	Gangtok
8	TEZU	Assam	Tezpur University	Tezpur
9	TU	Tripura	Tripura University	Agartala

(Diagram- 1: Outline of the Proposed Model for Library Consortia in North-East)

Address and Information of Central Universities of North East Region **Appendix-I**

Description		Address/ Information
Central Library, North-Eastern Hill University		
☞ Establishment year	:	1973
☞ Web Address	:	http://www.nehu.ac.in/library
☞ E-Mail	:	idamajaw@yahoo.co
☞ Phone	:	91-0364- 2721251
☞ Working hours of the library	:	8 AM-7PM
☞ Library software	:	Libsys
Central Library, Manipur University		
☞ Establishment year	:	1980
☞ Web Address	:	www.manipurniv.ac.in
☞ E-Mail	:	thkhomdon@rediffmail.com
☞ Phone	:	0385- 2435046/ 2435098
☞ Working hours of the library	:	8AM to 7PM.
☞ Library software	:	Libsys
Central Library, Mizoram University		
☞ Establishment year	:	2001
☞ Web Address	:	www.mzu.ac.in
☞ E-Mail	:	lib.mz@gmail.com/lib_mzu@rediffmail.com
☞ Phone	:	91-0389- 2330677/2330640
☞ Working hours of the library	:	9AM to 5PM.
☞ Library software	:	Total Library Software
Central Library, Rajiv Gandhi University		
☞ Establishment year	:	1984
☞ Web Address	:	www.rgu.ac.in)
☞ E-Mail	:	maltesh.motebenur@gmail.com
☞ Phone	:	0360- 2277094/ 2277573
☞ Working hours of the library	:	9AM to 7PM.Mon to Fri (9:30 to 5:00) Sat.
☞ Library software	:	Libsys
Central Library, Assam University		
☞ Establishment year	:	1995
☞ Web Address	:	www.assamuniversity.ac.in
☞ E-Mail	:	Assam.univgmai.com.
☞ Phone	:	03842-270887
☞ Working hours of the library	:	9:00AM -5: PM.
☞ Library software	:	SOUL

Central Library, Tezpur University

- Establishment year : 1994
- Web Address : www.tezu.ernet.in
- E-Mail : library@tezu.ernet.in
- Phone : 91-3712-267007/8/9 extn. 3222
- Working hours of the library : 9:30AM to 5:00PM
- Library software : Libsys

Central Library, Nagaland University

- Establishment year : 1994
- Web Address : http://www.nagauniv.org.in
- E-Mail : -
- Phone : 0369-2268242/2268248
- Working hours of the library : 9:30AM to 5:00PM.
- Library software : SOUL

Central Library, Sikkim University

- Establishment year : 2nd July 2007
- Web Address : http://www.sikkimunivesity.in
- E-Mail : 2admin@sikkimniversity.in/ sikkimunivesity@gmail.com
- Phone : Fax.+91-03592-251438 and 03592-251438
- Working hours of the library : 9:30AM to 6PM.
- Library software : Slim

Central Library, Tripura University

- Establishment year : 1987
- Web Address : http://www.tripurauniv.in
- E-Mail : tucentrallibrary@gmail.com
- Phone : 0381-237909/97/98
- Working hours of the library : 9:30AM. to 6: 00PM.
- Library software : SOUL

Appendix-II

Q U E S T I O N N A I R E

on

A Study of an Integrated Library Network and Consortium of Central University Libraries in the North-East Region

The respondent is requested to put (✓) mark in the space provided in each question or provide information wherever necessary. You are kindly requested to use separate sheet wherever applicable**.**

1. Name of the respondent: _____

   with e-mail address _____

2. Category to which you belong : (a) Student ☐ (b) Faculty Member ☐

   (c) Research Scholar ☐ (d) Others ☐

3. Sex: Male ☐ Female ☐

4. Name of the Department: _____

5. Do you visit the library? Yes ☐ No ☐

   If yes, frequency of visit to Library Daily ☐ 2-3 times a week ☐ Weekly ☐

   No response ☐

6. Which information sources you prefer to use?

   Printed ☐ Online sources ☐ Web sources ☐

   CD-ROM ☐ Audio/Video Tapes ☐ Others _____

7. Are you using the electronic resources of the libarary? Yes ☐ No ☐

8. Purpose of using the e-resources: Writing an article/ paper ☐ Writing a book ☐

   Update knowledge ☐ Preparing Lecture ☐

   Research Work ☐

   Others (please specify) _____

9. Which e-resources you like most to use?

   CD-ROM ☐ DVDs ☐ Floppy Diskettes ☐

E-journals ☐ Bulletin Boards ☐ E-books ☐

Others (Please specify)_____

10. Are you using the UGC Infonet Digital Libaray Consortium and INDEST Consortium?

Yes ☐ No ☐

11. Which place you use or prefer to use to access e-resources?

Library ☐ Computer Center ☐ Department Laboratory ☐

On Campus Location ☐ Off Campus Location ☐

12. Do you have a Department Library? Yes ☐ No ☐

13. Do you access the library from the Dept. Yes ☐ No ☐

14. How often you use e-resources?

Daily ☐ Weekly ☐ Few times a day ☐

Few times a month ☐ 2-3 times a week ☐ All the time ☐

15. What is your awareness approach about e-resources?

Through Membership ☐ Through Libarary website ☐

Through information brochures of library ☐ Through libarary staff ☐

Through colleuges ☐ Other Sources _____

16. Type of e-resources frequently used by use

E-book ☐ E-journals ☐ E-dictionaries ☐

E-encyclopedias ☐ E-thesis ☐ E-newspapers ☐

CD-ROM Databases ☐ Online databaes ☐ E-mail ☐

Discussion groups ☐

Any other (please specify) _____

17. Do you access Internet? Yes ☐ No ☐

If yes, from how many years you are using Internet

1-4 years ☐ 5-7 years ☐ More ☐

18. Are you using the OPAC? Yes ☐ No ☐

19. What is your OPAC access point?

In Library ☐ In Department Computer ☐

Through online over Internet ☐ Others _____

20. Do the library provide any special services regarding e-resources? Yes ☐ No ☐

If yes, please specify _____

20. Is the library provding the required e-information? Yes ☐ No ☐

21. Are you satisfied by the library e-resources services? Yes ☐ No ☐

22. How do you rate your satisfaction? Excellent ☐ Good ☐

Moderate ☐ No comment ☐

23. Do you face any problem in accessing the e-resources? Yes ☐ No ☐

If yes, what are those problems?

Limited number of machines ☐ Slow Internet speed ☐

Resources are not sufficient ☐ Information is not up to date ☐

Do not understand the process ☐ any other (Please specify) _____

24. Does your library provide any training to use the e-resources? Yes ☐ No ☐

If Yes, are you satisfied by the training? Yes ☐ No ☐

25. Whom do you want to give the training?

Library personnel ☐ Publishers ☐ Computer specialists ☐

26. Any other information you would like to contribute:

_____

_____

_____

27. Any suggestion you would like to share for development of the e-resources services in the library and increase its efficiency?

_____

_____

_____

Date_____ Signature of the Respondent

Appendix - III

QUESTIONNAIRE

on

A Study of an Integrated Library Network and Consortium of Central University Libraries in the North-East Region

The respondent is requested to put (✓) mark in the space provided in each question or provide information in the space provided in the questions or may use separate sheet wherever necessary.

A. GENERAL

i. Name of the Library: _____

ii. Year of establishment: _____

iii. Name of the Librarian: or Library in-charge _____

iv. Web Address of Library (if any): _____

v. E-Mail of the Library _____

vi. Phone No. of the Library _____

1. LIBRARY COLLECTIONS

1.1 Please specify the type of resources available in the Library.

Sl.No.	Form of Documents	Yes	If yes, please mention number	No
1.	Books			
2.	Back volumes			
3.	Current Journals			
4.	Theses/ Dissertations			
5.	Reference Tools			
6.	Conference Proceedings			
7.	Technical Reports			
8.	Periodicals/Journals (Indian)			
9.	Periodicals/Journals (Foreign)			
10.	Standards			
11.	Patents			
12.	Drawings			
13.	Maps			
14.	Translated Articles			
15.	Audio-Video Cassettes			
16.	CD-ROMs			
17.	Magnetic Tapes/Floppies			
18.	Micro Card			
19.	Micro Film			
20.	Micro Form			
21.	Micro Fiches			
22.	Online operating facilities			
23.	Any other (Please specify)			

3. Please mention number of Journals being subscribed for different Departments under the University

Sl.No.	Department	Indian	Foreign	Total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

4. No. of e-Journals subscribed for different Departments under the University

Sl.No.	Department	Indian	Foreign	Total
1				
2				
3				
4				
5				

5. Total books procured for different Departments

Sl.No.	Department	Indian	Foreign	Total
1				
2				
3				
4				
5				

6. No. of e- books procured for different Departments

Sl.No.	Department	Indian	Foreign	Total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

7. No. of other e-resources available in the library. (Please specify)

Description of e-resources	Total number of e-resources

8. LIBRARY BUILDING

8.1. Do you feel that Library has adequate space to provide the various types of services to the clienteles? Yes ☐ No ☐

8.2. Do you think that the number of seats provided in the library is adequate to meet the Scientists/ Research Scholars of NEIST? Yes ☐ No ☐

8.3. Do you provide Research Cubical/ Research Carrels/ Scientists of the NEIST? Yes ☐ No ☐

8.4 Does the Library has its own building? Yes ☐ No ☐

9. PROCESSING OF LIBRARY MATERIALS

9.1. How much time is usually taken by your library to process the books after arrival and make them available to the users? ☐

a. One week; ☐
b. Two weeks; ☐
c. One month; ☐
d. More than one month. ☐

9.2. Which scheme of classification do you follow in the library?

a. DDC; ☐
b. CC; ☐
c. UDC. ☐

9.3. Which Physical form of catalogue do you follow?

a. Card; ☐
b. Ledger. ☐

9.3. Which catalogue code do you use in the library?

a. CCC;
b. AACR-1;
c. AACR-2;
d. Any other (Please mention) _____

10. READER'S SERVICE

10.1. What are the total working hours of the library?

a. Week days; ☐
b. Sundays. ☐

10.2. Does the library remain open during holidays and vacation? Yes ☐ No. ☐
If no, please state the reasons.

10.3. Which charging system do you follow?

a. Browne; ☐
b. Newark; ☐
c. Two card system of Ranganathan; ☐
d. Any other system (Please specify) _____

10.3. What type of issue system do you like?
a. Electronic Method
(If electronic method, please state the reason)
_____
_____

b. Traditional Method ☐

10.4. Do you provide active Reference service to the readers ☐es ☐
No
If yes, please state the method of disseminating of services
a. Through document; ☐
b. Through electronic form; ☐
c. Through any other media (Please state) ☐ _____

11. Do you provide Documentation Service? Yes ☐ No ☐

12. Do you provide any bibliographic/ Current Content Service? Yes ☐ No ☐

13. Do you provide e-content service? Yes ☐ No ☐

14. Is your library automated? Fully ☐ Partially ☐

14.1 If partially, which sections are computerized?

Acquisition ☐
Cataloguing ☐
Circulation ☐
Serial control ☐
Back volume ☐
Text book ☐
Any other (please specify) _____

14. Which library software do you use?

- Libsys ☐
- CDS/ISIS / WINISIS ☐
- SLIM++ ☐
- SOUL ☐
- TLMS ☐

Any other (Please specify) _____

15. On which server the library software has been installed?

Library ☐ Institute's computer center ☐

16. Who is managing the library software?

Library and Inf. Professional ☐ Computer Professional ☐

System Analyst ☐ Any other (please specify) ☐

17. Does your institute have a website? Yes ☐ No ☐

If yes, who is hosting the your website (Please specify) _____

18. Has your library got an independent LAN or is a part of campus network?

Independent ☐ Part of campus network ☐

If it is independent, or part of campus network, what are all the equipments and cables used for LAN connection in the library?

- **Cabling:**
  - CAT5 ☐
  - Enhanced CAT5 ☐
  - Fiber optic cable ☐
- **Hub:**
  - Manageable ☐
  - Unmanageable ☐
  - Cisco ☐
- **Router:**
  - Motorola ☐

Any other (please specify) _____

- **Bridge:**

  LAN bridge network interface cards: 32 Bit/16 BIT, PCI _____

- **Switches**

  10/100 MBPS _____

- Any other (*please specify*): _____

19. How do you spread out your institute's campus LAN?

- To all Departments ☐
- To Central Library ☐
- To All Labs/Centers/Units ☐
- To the entire campus including hostels ☐
- To the individual rooms of all students ☐
- To all Faculties and officers residences ☐
- Any other _____

20. Are your campus network and library network connected to internet? Yes ☐ No ☐

If yes, please specify your Internet Service Provider (ISP)

- ERNET(ex: ac.in, edu.in, res.in) ☐
- VSNL ☐
- NICNET ☐
- Any other _____

21. Type of internet connection is being used in the library, departments, students' halls and residences.

21.1 Library

Dial-up ☐

Leased ☐

Radio link ☐

Cable network ☐

V-sat ☐

Any other _____

21.2. Departments

Dial-up ☐

Leased ☐

Radio link ☐

Cable network ☐

V-sat ☐

Any other _____ _____

21.3 Student's halls/rooms

Dial-up ☐

Leased ☐

Radio link ☐

Cable network ☐

V-sat ☐

Any other _____

21.4 Residence

- Dial-up ☐
- Leased ☐
- Radio link ☐
- Cable network ☐
- V-sat ☐

Any other _____

21.5 Bandwidth of library network

- <=1.0 Mbps ☐
- >1.0 to <=2.0 Mbps ☐
- >2.0 Mbps to <=4.0 Mbps ☐
- >4.0 Mbps to <=6.0 Mbps ☐
- >6.0 Mbps and above ☐

c. Is your library a member of any library networks, and a part of any consortium in India?

21.6 Library Networks:

- DELNET ☐
- CALIBNET ☐
- BONET ☐
- MALIBNET ☐
- INFLIBNET ☐
- Any other _____

21.7 Consortium:

- INDEST ☐
- CSIR ☐
- UGC-Info E-journals ☐
- Any other _____

22. What are all the e-resources (*full-text and bibliographic databases*) subscribed for you by INDEST/ CSIR/UGC Info net consortium?

22.1 Full-text databases:

- Science Direct ☐
- ACM Digital Library ☐
- IEEE Online ☐
- Springer link ☐
- Proquest ☐
- ASME ☐
- ASCE ☐
- Nature ☐
- ASTM journals and Standards ☐
- Standards (CD/intranet) ☐
- J-Gate ☐
- JCCC ☐
- Any other _____

22.2 Bibliographic databases:

- Engineering village2 (*Compendex & INSPEC*) ☐
- Web of sciences ☐
- Chemical Abstracts ☐
- Any other _____

22.3 Does your library subscribe to any e-databases from any library consortia? If so, whether payment is made out of its own budget or from consortium? (Please specify in detail)

23. Amount spent by your library for subscribing electronic resources during the year?

- 2003-2004 Rs._____
- 2004-2005 Rs._____
- 2005-2006 Rs._____
- 2006-2007 Rs._____
- 2007-2008 Rs. _____
- 2008-2009 Rs. _____

24. What are all the Networked Services provided by your library?

Services	YES	NO
▪ Electronic Data Interchange (EDI)	☐	☐
▪ Automated Cataloguing	☐	☐
▪ Automated Circulation	☐	☐
▪ Virtual Reference	☐	☐
▪ E-CAS	☐	☐
▪ Online Databases	☐	☐
▪ CD-ROM/DVD	☐	☐
▪ Electronic Thesis and Dissertations (ETD)	☐	☐
▪ Multimedia Databases (audio and video etc.)	☐	☐
▪ Standards (CD-ROM or intranet version)	☐	☐
▪ Internet facilities	☐	☐
▪ E-mail	☐	☐
▪ Video and Teleconferencing	☐	☐
▪ Facsimile transmission (Fax)	☐	☐
▪ Videotext or Teletext	☐	☐
▪ E-learning	☐	☐
▪ E-publishing	☐	☐
▪ Web-based document delivery	☐	☐
▪ Support	☐	☐
▪ Any other services _____		

*Note: If the answer is **No** the subsequent related questions are need not be answered (filled-in)*

25. If your library provides Electronic Data Interchange (EDI) services, please tick mark the area(s) covered.

- Ordering of library materials ☐
- Budgeting ☐
- Any other services _____

26. If your library provides automated library catalogue services, please tick mark the type of service(s)?

- ◈ OPAC ☐
- ◈ WebOPAC ☐
- ◈ Both ☐
- ◈ Any other services _____

27. If your library provides automated circulation services, please tick marks the area(s) covered and specify the daily transactions of books.

- Check-in ☐ No._____

- Check-out ☐ No._____
- Renewal ☐ No._____
- Reservation ☐ No._____
- Inter-library loan ☐ No._____
- Any other services _____

28. If your library provides virtual reference service, which media you usually use to deliver the services? (Please tick mark and specify number of queries attended per day).

- Online assistance ☐ No._____
- E-mail assistance ☐ No._____
- Telephone assistance ☐ No._____
- Any other services _____

29. Does the library provide the following services?

- Current contents ☐
- E-SDI ☐
- Alert ☐
- New arrivals ☐
- Any other services _____

30. If your library provides online information access, please tick mark the type of materials provided access.

- E-books ☐
- E-journals ☐
- Abstracting databases ☐
- Open access journals (free) ☐
- Any other services _____

31. Does the library provides CD-ROM services, please tick mark the type of service(s).

- Standalone ☐
- Networked ☐
- Both ☐
- Any other services _____

32. Does the library provides Internet facilities, please provide the following data.

- No. of PCs connected_____
- Type PCs used (ex. *P1, P2, P3, P4*)____
- No. of users accessing per day _____

33. If your library provides communication network services, please tick mark the type of service(s) available

- E-mail ☐
- Telephone ☐
- Facsimile (fax) ☐
- Voice mail ☐
- Videotext ☐
- Teletext ☐
- Any other services _____

34. If your institute provides personal e-mail facilities, please tick mark the category of users who use this facility:

- Teaching ☐
- Scientists ☐
- Teachers ☐
- Research scholars ☐
- Non-Teaching ☐
- Any other _____

35. Does the library provides e-learning/education services, please tick mark the type of service(s)

- Desktop (stand-alone) ☐
- CD-ROM/DVD ☐
- Audio and video cassettes ☐
- Intranet ☐
- Internet or online ☐
- Any other services _____

36. If your library provides electronic conferencing services, please tick mark the type of service(s) provided.

- Audio and video ☐
- Telephone ☐
- Both ☐
- Any other services _____

37. If your library provides e-publishing services like

- Library news bulletin ☐
- Library new letters ☐
- Reports ☐
- Any other _____

38. Does the library provides access to web-based document delivery services through JCCC, please specify the number of requests (*based on print documents*) received from INDEST Consortium per month_____

39. Does the library provides any support services, please tick mark the type of assistance in accessing electronic resources.

- User orientation/education ☐
- User Training ☐
- Staff Training ☐
- Any other means _____

40. Has your library initiated digitization process? Yes ☐ No. ☐

(If yes, please specify the type of documents, software and format for digitizing documents)

40.1 Types of documents:

Books (rare*, out of print, public domain*) ☐
Journals ☐
Thesis and Dissertations ☐
Question papers ☐
Any other _____

40.2 Type of software is being used:

- Omni page pro ☐
- Fine reader ☐
- Any other_____

40.3 Type of format is being:

- PDF ☐
- TIFF ☐
- HTML ☐
- DOC ☐
- Any other_____

41. Please provide the infrastructure facilities available in the library.

- No. of Computers ___
- No. of Scanners ___
- No. of Barcode ___
- Scanners ___
- No. of Printers ___

- No. of Photocopiers ___
- No. of Fax Machines ___
- No. of Telephones ___
- No. of TVs ___
- No. of VCP/VCRs ___
- No. of Projectors ___

42. Is your Library use RFID Yes ☐ No ☐

If yes, please mention for what purpose (please tick)

1. Security ☐
2. Self check out ☐
3. Self check in ☐
4. Misplace shelve ☐
5. Any other specify _____

43. Is your library having fire security/ fire alarm system Yes ☐ No ☐

44. Is your library having humidity control system for books? and bound volumes Yes ☐ No ☐

45. Is your library having CD/ DVD Server system for replicating / storing data available in the library's CD/ DVD Yes ☐ No ☐

46 Is your library providing separate area/ space for accessing E- contents? If yes, how many number Computers are provided. Yes ☐ No ☐

Date: _____

Signature of the Librarian

N.B. The Librarian is requested to place any other information pertaining to the Library in a separate sheet.

Appendix-IV

LIST OF UGC INFONET e-JOURNAL VENDORS

Sl.No.	Name of the Vendor	Sl.No.	Name of the Vendor
1	IEEE XploreR Digital Library	17	MathSciNet (AMS)
2	Web of Science	18	Nature
3	Oxford University Press(OUP) (01 Journal) Free Trail Till 31 Dec. 2010	19	Portland Press
4	Taylor & Francis	20	Royal Society of Chemistry
5	Institute of Physics	21	SIAM Journals
6	Annual Reviews	22	Jstor Journals
7	Annual Reviews (Bioinformatics)	23	American Society for Microbiology (ASM) (12 online Journals)
8	Springer Link	24	LIPPINCOTT Williams & Wilkins (LWW)/ OVID (21 journals)
9	Blackwell	25	Science Direct (375 journals)
10	Emerald	26	American Chemical Society (ACS) (37 Journals)
11	Cambridge University Press	27	American Society for Biochemistry & Molecular Biology
12	Project Muse	28	American Association for Cancer Research
13	JCCC	29	Informa Healthcare (TAYLOR & FRANCIS)
14	Institute of Studies in Industrial Development (ISID	30	Society for General Microbiology
15	American Inst. of Physics	31	Cold Spring Harbor Laboratory Press
16	American Physical Society	32	American Association for the Advancement of Sciences