Journal of Knowledge Management Studies

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Journal of Knowledge Management Studies

Aims and Scope

The Journal of Knowledge Management studies provide perspectives on topics relevant to the study, implementation and management of knowledge management. The journal contributes to the development of both theory and practice in the field of knowledge management. The journal accepts academically robust papers, topical articles and case studies that contribute to the area of research in, and practice of knowledge management. Journal covers the following topics

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5. Knowledge creation, retention, sharing and transfer

6. Knowledge databases and repositories

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9. Learning organization and organizational learning

10. Techniques and methods for managing knowledge and communication

11. Using information technology to develop knowledge and communication management

12. Practical implementations of knowledge and communication management

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Contents

Use of Internet by the Students and Faculty members of Management Institutions in Delhi and NCR

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A B S T R A C T

In recent years, Internet and electronic resources have become most popular sources of information for the researcher scholars, teachers, professionals and students. The present study was designed to find out the necessity and usage of Internet by the students and faculty members of management institutions in Delhi and N.C.R The survey was conducted by using the questionnaire method to collect the data about awareness of electronic journal/portals, place of access of internet, importance of internet, the purpose of using internet, frequency of use of internet, impact of e-resources /services through internet on academic work, etc. The findings revealed that nearly all the users have access to the Internet, know how to use it and it affords them the opportunity of applying ideas gained from the use of Internet-based information to improve their work activities. The study revealed that most of the students and faculty members were using the Internet to search for materials for study, research work, e-mail/chatting and for finding relevant information in order to enhance their academic work. Majority of the students and faculty members were using internet on daily basis.

Keywords—Internet-based information, Information utilization, Use of internet, e-resources, internet services.

INTRODUCTION

In recent times, computer are being used for a number of applications, ranging from communicating to each other from remote corners of the world to gathering information, downloading software, playing games etc. The Internet is slowly emerging as a low-cost medium for information dissemination. The use of Internet in libraries is rapidly increasing and is changing the traditional functions and services of the libraries. Internet is being used as an efficient medium for access, storing and disseminating of information worldwide.

Internet has revolutionized the world of information. It is one of two technological innovations that have greatly influenced the development of communication strategies and practices in both the general and the business communities of the world. The first was the invention of the printing press, Gutenberg's invention served to democratize the possession and transmission of texts, made the production of books

much easier and cheaper than the manuscript method it replaced. The Internet provides new horizons for the researcher. A potentially vast population of all kinds of individuals and groups may be more easily reached than ever before, across geographical borders. Internet is moving to be single most significant phenomenon offering never-ending opportunities. The use of Internet in libraries is rapidly increasing and is changing the traditional functions and services of the libraries. Internet is being used as an efficient medium for access, storing and disseminating of information worldwide.

Some of the internet resources and services useful for the libraries are:

1. Access to various Internet resources
2. Access to Online Catalogs of Libraries (Online Public Access Catalogue)
3. Access to various LIS networks
4. Downloading of bibliographical records
5. Access to E-Books/Journals/Databases
6. Online acquisition/ordering of Library material
7. Online reservation of Library material
8. Resource sharing through union catalogues
9. Reference sources
10. Discussion groups
11. News groups
12. Databases
13. Distance Learning
14. Internet as an Information system

OBJECTIVES

Some of the objectives of this study are to:

- Identifying the purpose for which students and faculty members use the Internet;

- Identifying various access points to Internet;

- Find out the Frequency of internet use by the students and faculty members

- Find out preference to use internet /website /electronic resources

- Find out places of access to e-resources through internet

- Find out importance of use of internet for getting subject/ professional information

- Find out quality of information acquired from internet on World Wide Web (WWW)

- Find out impact of e-resources /services through internet on academic work

METHODOLOGY

The aim of this study was to analyses the present situation , therefore ,it was decided to conduct the study in the form of a survey using basically questionnaire and interview methods for gathering data. The data required for the study has been collected through primary sources. Primary data was collected through questionnaire supplemented by personal interview, discussions and interaction with the students, faculty members and librarians. A total of 30 reputed management institutions in Delhi and NCR were selected. Total of 500 questionnaires were administered among the students and faculty members to collect the primary data. The response rate to the questionnaire excluded response received at the stage of pretesting. Some of the questionnaires were rejected, some were partly filled and some were left blank. Finally 340 questionnaires found suitable for the study, 120 from faculty members and 220 from the students. The study was carried out to find out the use of internet by the students and faculty members of management institutions of Delhi and NCR.

### Data analysis and discussion of results

Use/browse of internet

The internet has now become a very important source used for education and research .Use of internet access to information can stimulate changes and create an environment that makes learning more meaningful and responsive. The users are now more dependents upon the internet services. Table 1 shows that maximum number 210 (95.4%) of students have been using internet and its services. Whereas only 10(4.5%) of students mentioned that they are not using /browsing internet for their information seeking activities. On the other hand 108(90%) of faculty members of management institutions were using /browsing internet. The result shows that maximum number of students and faculty members were using /browsing internet for their information seeking activities. We can say that internet is vital tool used by the students and faculty members for their information search. It is revealed that internet is highly used by majority of the students and faculty members .It also shows that use /browse of internet was utilize by students much more than the faculty members.

N=340 ,N1=120, N2=220   **Table 1 : Use /Browse of Internet**

| Uses Internet	Students		Faculty Members	
	No.	%	No.	%
Yes	210	95.4	108	90
No	10	4.5	12	10
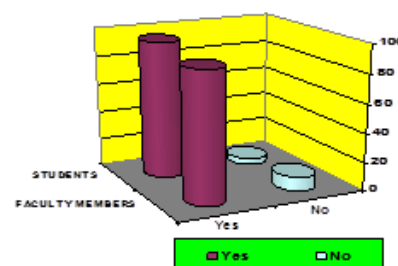
Use of library website

A library website is a website that provides a library with a space to share its services. The user get library services in automatic way by the use of library website .It provides easy delivery of library services to users. A website may allow users to interact and collaborate with each other . A library may make use of the internet website in a number of ways. Some specialized search engines such as Google Scholar offer a way to facilitate searching for academic resources such as journal articles and research papers. In addition to the website itself, libraries must focus on creating and offering interactive services throughout the site.

Table 2 shows that 134(60.9%) of students and 82(68.3%) of faculty members used library website and 86(39%) of students and 38(31.6%) of faculty members are not using it. This implies that there is a significant variation among the users as far as the visiting of their library website page is concerned .The result shows that out of total 340 users,216(63.5%) responded and have visited library website where as the remaining 124(36.4%) did not avail this facility. Its show that majority of the students and faculty members visited library website .It also show that use /browse of internet was utilized by students much more as compared to the faculty members.

N=340 ,N1=120,N2=220

Table 2: Visited library Website

Library Website	Students		Faculty Members	
	No.	%	No.	%
Yes	134	60.9	82	68.3
No	86	39	38	31.6
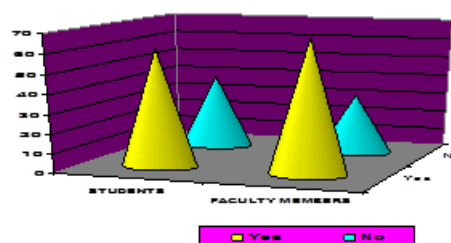
Awareness of electronic journals/portals

Respondents were asked to mentioned the electronic journals/portals available freely/free access. Table 3 shows that 71(32.2%) of students were aware of electronic journal/portals and 149(67.7%) of students were not aware of freely access of e-journals/portals. As far as faculty members are concerned 43(35.8 %) of faculty members were aware of freely available electronic journals /Portals and 77(64.1%) of faculty members were not aware of open access journal / electronic journals /Portals .The result exhibits that majority of the students and faculty members were not very much aware of electronic journals /portals ,that list electronic journals available freely/free access
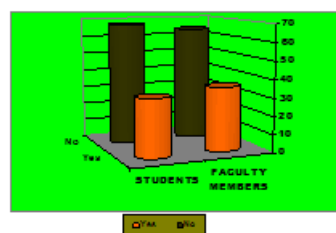
Prefer to use internet/website/electronic resources

Internet is exclusively using for searching the library's holdings and selected electronic databases. Internet provides information beyond the confines of the library's collection. User were asked to mentioned the preferences they use for internet/ website/ electronic resources. Table 4 shows that

N=340 ,N1=120,N2=220   **Table 3 : Awareness of Electronic Journals/Portals**

| Awareness	Students		Faculty Members	
	No.	%	No.	%
Yes	71	32.2	43	35.8
No	149	67.7	77	64.1

160(72.7%) of students prefer for downloading the information and copy to CD/pen drive whenever they use internet/website /e-resources .It is followed by70(31.8%) of students using for taking printout and 30(13.6%) prefer to use for only reading purpose whereas in case of faculty members 69(57.5%) use for downloading the information and copy to CD/pen drive whenever they use internet/website /e-resources .It is followed by 44(36.6%) of faculty members using for taking printout and 22(18.3%) of faculty members were using internet for only reading purpose .It can be concluded that majority of the students and faculty members prefer to use internet /website/electronic resources for the purpose of downloading the information.

N=340 ,N1=120,N2=220   **Table 4: Prefer to use internet /website/electronic resources**

Preference	Students		Faculty Members	
	No.	%	No.	%
Download the information and copy to CD/pen drive	160	72.7	69	57.5
Takes Print Out	70	31.8	44	36.6
Only Reading	30	13.6	22	18.3
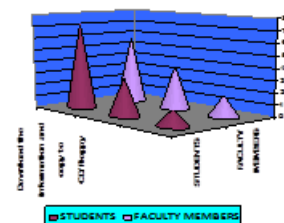
Purpose of internet use

Purpose of use of WWW internet connection, provides access to information beyond the physical confines of the library. One of the significant research questions was to explore the purpose for which they are using the internet. The users use internet for various purposes such as for e-mail, finding relevant information, career development, research purpose, communication, educational, entertainment etc. If it is properly used, it helps to increase knowledge and keeps on self-abreast of the latest developments in their area of interest. Regarding the purpose of Internet use, the analysis of table 5 shows that Internet is highly used by majority 148(67.2%) of the students for their study purpose while 110(50%) were using for e-mail/chatting. It is followed by 97(44%) using for the purpose of carrier development, 96(43.6%) of students using for the purpose of search /find articles and for information. In case of faculty members majority of 52 (43.3%) of faculty members also used internet for the purpose of research work, it is followed by 48(40%) of faculty members using internet for finding relevant information, 47(39.1%) of faculty members were using for the purpose of e-mail/chatting. Further

42(35%) of faculty members using internet for the purpose of carrier development, 40(33.3%) of faculty members using for search /find article and information. It can be concluded that the main purpose of using internet by the students is study /research and e-mail chatting and faculty members using internet mainly for the purpose of study/research and for finding relevant information in their area of interest.

Kaur (2000)1 conducted a survey regarding the use of Internet of facility at the Guru Nanak Dev University, Amritsar. The study indicated that 100% of the respondents used the Internet for sending e-mail and 82% for World Wide Web (WWW), 67.5% of the respondents used the Internet for primary information, 38% for secondary and only 15% used it for consulting OPACs. A majority of the respondents, i.e. 75.6%, faced the problem of slow connectivity. The results of the study further showed that more than 80% of the respondents felt that in comparison to traditional documents, the Internet was time saving, easy to use, more informative, more useful and more preferred source of information.

Madhusudhan (2007)2 conducted a survey on Internet used by research scholars at Delhi University, which revealed that most respondents used search engines more than subject gateways or web directories to locate information. Negative attitudes as well as conservatism act as barriers to effective Internet use.

Kumar and Kaur (2004)3 had studied the use of internet by teachers and students in Shaheed Bhagat Singh College of Engineering and Technology. The major findings of the study are: a majority of the respondents use the internet for educational purpose. The study of Chinnasamy (2011)4 also shows that majority 57.69% of the respondents used the Internet for educational purposes, followed by 21.92 % for communication purposes, 14.23 % for research purposes, while 6.15 % of the respondents admitted that they also used the Internet for entertainment purposes. This study exhibits that the majority of the respondents mainly used the Internet for educational purposes while the least number of respondents used the Internet for entertainment purposes.

All the above studies shows that majority of the users use internet for educational purpose and less for other purposes.

N=340 ,N1=120,N2=220

Table 5: Purpose of Internet use

Purpose of Internet Use	Students		Faculty Members	
	No.	%	No.	%
Email /Chatting	110	50	47	39.1
Finding Relevant Information	81	36.8	48	40
Career development	97	44	42	35
Entertainment	86	39	28	23.3
Study /Research work	148	67.2	52	43.3
Read Newspaper/magazine (online)	42	19	25	20.8
Search /find article and information	96	43.6	40	33.3
Chat online with friends	63	28.6	43	35
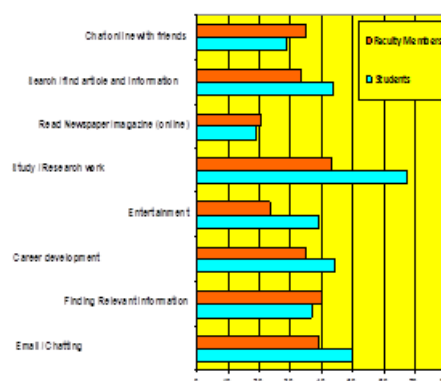
FREQUENCY OF INTERNET USE

The question was asked to the respondents to find out how often the students and the faculty members are using the internet. The results of table 6 shows that maximum 148 (67.2%) of respondents use internet on daily basis. It is occasionally using by 22 (10%) of students, 15 (6.8%) of students were using internet once in a week and 17 (7.7%) students using it once in a month followed by 06 (2.7%) students using it as and when required.

In case of faculty members 70 (58.3%) used internet on daily basis followed by 17 (14.1%) faculty members were using internet occasionally whereas 15 (12.5%) of faculty members used as and when required, followed by12 (10%) faculty members using internet once in a week. It can be concluded that the majority of the students and faculty members are using internet on daily basis for their information seeking activities.

Rajeev and Amritpal (2004)[5] in their study "Use of Internet by teachers and students in Shaheed Bhagat Singh College of Engineering and Technology" concluded that: Majority of the users of the college use the internet services daily. Study of Chinnasamy[6] also shows that 61.54 % of the respondents used the Internet daily, followed by 21.54 % used it 2–3 times a week and 10.77 % use it 2-3 times in a month. Only 6.15% used the Internet once in a month.

The study of Kaur[7] also shows that maximum number of respondents use internet daily followed by 2/3

time a week. 170 (45.45%) undergraduates use internet services daily, followed by 155 (41.44%) 2/3 time a week, 15 (4.01%) once a week and 34 (9.09%) occasionally.204 (82.59%) postgraduates responded for daily use of internet services, 34(13.77%) 2/3time a week, 1 (0.40%) once a week and 8 (3.24%) used occasionally. Same way 101 research scholars (77.10%) use internet daily, 19 (14.50%) occasionally. Faculty's response in using internet was daily by 55 (94.83%) and 3(5.17%) for 2/3 time a week. It has been found from the above studies that maximum users make use of internet services daily for their information seeking activities.

N=340 ,N1=120,N2=220   **Table 6: Frequency of Internet Use**

Frequency	Students		Faculty Members	
Daily	148	67.2	70	58.3
Once in a week	15	6.8	12	10
Once in a month	17	7.7	1	0.08
Occasionally	22	10	17	14.1
As and when required	6	2.7	15	12.5
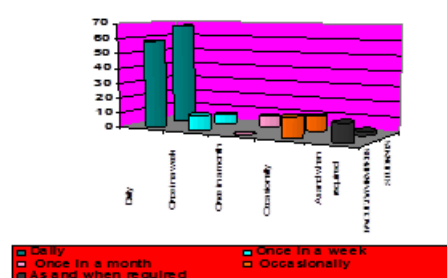
PLACES OF ACCESS TO E-RESOURCES TROUGH INTERNET

The user were asked to mentioned the places where they use to access the e-resources through internet. The user can access the e-resources from various places such as from their respected departmental library, home, hostel, cyber cafe etc. It is clear from the table 7 that 158 (71.2%) of students and 59 (49.1%) of faculty members prefer to use search engines as source of accessing the desired information. It is followed by 137(62.7%) students and 57(47.5%) of faculty members prefer to access the required information from the library and it is further followed by 111 (50.5%) of students and 32 (26.6%) of faculty members prefer to access the e-resources at home. Minimum number of 12 (5.5%) of students and 2 (1.6%) faculty members access e-resources from the hostel.

The results shows that hostel, off campus location were used very less as compared to other places for accessing the e-resources. The results of the table shows that search engine, library and home as place of access of internet were used maximum by the students and faculty members for accessing e-resources.
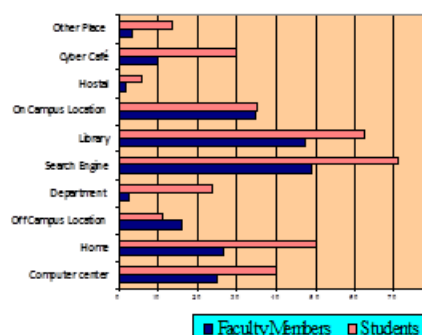
Quality of information acquired from internet on world wide web (www)

Users are getting information from the web at the click of a button however they must filter substandard information before they can use quality content. Respondents were asked to mention the rate and quality

N=340 ,N1=120,N2=220   **Table 7: Place of access to e- resources**

Places of Access of of e-resources	Students		Faculty Members	
	No .	%	No.	%
Computer center	88	40	30	25
Home	111	50.5	32	26.6
Off-campus location	26	11.2	19	15.8
Department	51	23.8	3	2.5
Search engines	158	71.2	59	49.1
Library	137	62.7	57	47.5
On-Campus Location	79	35.1	42	35
Hostel	12	5.5	2	1.6
Cyber café	64	29.9	12	10
At Other Place	30	13.4	4	3.3

of information acquired from internet on www. Table 8 shows that majority 136(61.8%) of the students mentioned that the quality of WWW is high, whereas 76(34.5%) of students mentioned that it is of good quality and only 08(3.6%) students felt that quality of WWW is poor. In case of faculty members 64(53.3%) are felt that it is of high quality whereas 51(42.5%) of faculty members felt it is of good quality and 04(3.3%) were felt quality of information acquired from internet is of poor quality.

It can be concluded that majority of students and faculty members find that information they acquired from internet on World Wide Web (WWW) is of high quality.

N=340 ,N1=120,N2=220   **Table 8: Quality of information acquire from internet on World Wide Web (**WWW)

Quality	Students		Faculty Members	
	No.	%	No.	%
Poor	8	3.6	4	3.3
Good	76	34.5	51	42.5
High Quality	136	61.8	64	53.3
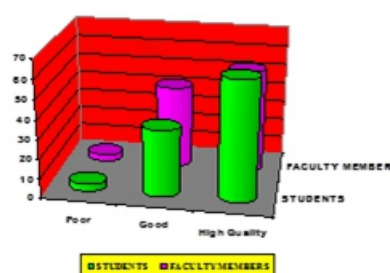
IMPORTANCE OF USE OF INTERNET FOR GETTING SUBJECT/ PROFESSIONAL INFORMATION

Respondents were asked to indicate the importance of use of internet for getting subject/professional information. Table 9 shows that 129(58.6%) of students and 63 (52.5%) of faculty members are felt that internet use are most important for their work followed by 82(37.2%) of students and 43(35.8%) of faculty members felt that internet use is more important, 06(2.7%) students and 09(7.5%) of faculty

members felt that internet use are less important for their work and only 03(1.3%) of students and 05(4.1%) of faculty members felt that it is not at all useful for getting subject/ profession information. It shows that majority of the students and faculty members felt that internet is most important for getting information related to subject /profession.
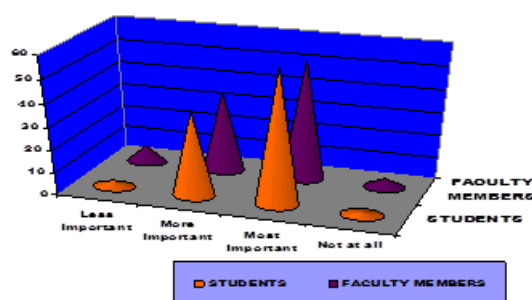
N=340, N1=120, N2=220   **Table 9: Importance to use of Internet**

Importance	Students		Faculty Members	
	No.	%	No.	%
Less Important	6	2.7	9	7.5
More Important	82	37.2	43	35.8
Most Important	129	58.6	63	52.5
Not at all Important	3	1.3	5	4.1

Impact of e-resources /services on acdemic work

Table 10 shows the impact of e-resources /services on academic work. It is clear from the table that 126(54.5%) of students and53(44.1%) of faculty members use e- resources for the purpose of access to current and up to date information. Majority 125 (56.8%) of students and 48(40 %) of faculty members use e-resources because they save their time, 114 (51.8%) of students and 35(29.1%) of faculty members use e-resources because they help them to get right information at right time followed by 83(37.7%) students and 44(36.6%) of faculty members access to e-resources because they get wider range of information.

The results shows that majority of the students and faculty members use e-resources for the purpose to access current and up to date information. They preferred to use e-resources because they help them to get right information at right time, and faster access of information.
The study of Mulla8 also supported the findings of this study. He stated that users mainly access to e-resources to get current and up-to-date information for faster access and for wider range of information.

N=340, N1=120, N2=220   **Table 10: Impact of E-resources on Academic work**

Impact of e-resources	Students		Faculty Members	
	No	%	No	%
Access to current and up to date information	126	54.5	53	44.1
Easier access	86	39	48	40
Faster access of information	88	40	38	31.6
Access to wider range of information	83	37.7	44	36.6
Improvement in information access & retrieval	78	35.4	22	18.3
Improved referencing skills	86	39	25	20.8
Increased quality in research output	61	27.7	18	15
Save the time	125	56.8	48	40
Get right information at right time	114	51.8	35	29.1
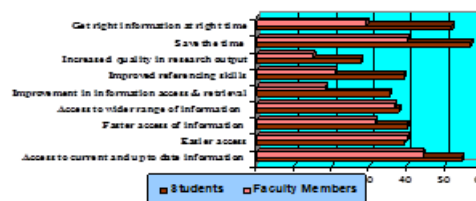
CONCLUSION

The Internet as medium of communication is useful in higher education. The results shows that majority of the students and faculty members used internet for various purposes .The students use internet mainly for the purpose of their study and the faculty members mainly use the internet for the purpose of research work. They visited library website frequently. Majority of students and faculty members were not aware of electronic journal/portals. Majority of the students and faculty members prefer to use internet/website for downloading the information and copy to CD/pen drive for academic and research purpose. User felt that information acquired from internet on World Wide Web (WWW) is of high quality . Importance to use internet are most important for getting information related to subject/profession. It can be used in different places according to the convenience of the user and availability of access facility. Students and faculty members of management institutions in Delhi and NCR were preferred to use internet daily for their information seeking activities.

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Use Of E-Resources Through Consortia: A Boon To Users Of North East University Libraries

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A B S T R A C T

The rapid growth and development of ICT have brought changes in the modes and methods of information storage, retrieval and transmission. Resource sharing has been one of the most prominent principles for supporting the library service. The increasing price of electronic journals, high price of books and low library budget along with the traditional print subscription are some of the important factor which lead the library to resource sharing, networking, coordination and consortia. Library consortia are one of the best means of resource sharing of e-resources. This paper discusses about the concept of resource sharing through consortium and describes the basic requirements for joining a consortium. This paper tries to highlight about the consortia initiatives in India and how this facility has been extended to North- eastern University libraries through the accessing of e-journals under UGC-INFONET e- journal consortium and Del-CON. This paper attempts to discuss about the consortia as a resource sharing activities. This paper reflects the challenges of university libraries of North- east region in accessing information through consortia and the current usages of various e- resources.

Keywords—Consortia, e-resources, Resource- sharing, North-east.

1. INTRODUCTION

Change is the law of nature and it is very apparent in the present day library culture. Technological revolution in academic libraries have changed the ways in which today libraries are using fine information like e- resources to a large extent. A few decades back Lancaster talked about the "paperless society." R.G. parashwar stated in his one book that "paperless society is a distance dream. That day has gone when it was only a dream. Electronic medias like floppy discs, magnetic taps, CD-ROM, DVDs etc. and online e-resources are slowly replacing the physical hard volumes of books and journals. The concept and mode of presentation is changing from static text based to graphic, hypertext, audio, video, multimedia etc. In this changing library situation, collection development of e-resources has been a great concern for almost all the library.

2. E- RESOURCES

An electronic resource is any information that the library provides access to in an electronic format. The library has purchased subscriptions to many electronic information resources in order to provide you with access to them free of charge. E-resources are that electronic product that delivers a collection of data, be it text, image collection, multimedia product like numerical, graphical mode for commercially available for library and information center's. These may be delivered on CD-ROM/ DVD, over the internet so on. An electronic resource is defined as a resource which requires computer access or any electronic products and numerical and graphical or time based, as a commercially available title that has been published with an aim to being marked. Hence to cope with the present situation, libraries are shifting towards new media, namely electronic resources for their collection development that the demands of users are better fulfilled. The e-resources on magnetic and optical media have a vast impact on the collection of university libraries. These are more useful due to their inherent capabilities for manipulation and searching.

2.1. Types of E-resources

The resources are basically divided in to two main parts are.

1. **Online e-resources, which may includes:**
   - E-journal(full text and bibliographic)
   - E-books
   - Online databases
   - Websites

2. **Other electronic resources are:**
   - CDROM
   - Diskettes
   - Other portable computer databases.

3. ADVANTAGES OF E-RESOURCES

There are many advantages of electronic resources. Such as

3.1 It allows remote access.

3.2 It can be used by many users simultaneously

3.3 It is interactive and allows interaction between author / publishers and users.

3.4 It provides timely access to documents.

3.5 The e-resources can be subscribed in a consortia format too, thus cutting down the cost of reaping the same benefits e.g. N-list consortia for college libraries in India.

3.6 The e-resource can contain a vast amount of information, but more importantly the materials can consist of mixed media e.g. images, videos, audio, animation which could not be replaced in print.

3.7 It supports searching capabilities.

3.8 It does not require physical processing. It can also solve the problems of missing issues of journals.

4. UNIVERSITY LIBRARIES OF NORTH EAST REGION

Before independence of India, there were only 16 colleges in North eastern region, majority were located in Assam. The establishment of first university at Guwahati in January 1948 gave a real boost of the expansion of higher education. At present there are 4 state and 10 central universities in North East Region. 15 state private universities and one deemed university. Total nos. of universities in North East region is 30.

State- wise number of universities in North- East is as under.

State	No. of Universities				
	Central	State Govt.	State Private	Deemed	Total
Arunachal Pradesh	1	-	-	1	2
Assam	2	4	1	-	7
Manipur	2	-	-	-	2
Meghalaya	1	-	6	-	7
Mizoram	1	-	1	-	2
Nagaland	1	-	2	-	3
sikkim	1	-	4	-	5
Tripura	1	-	1	-	2

Source: UGC Annual Report 2010-11

5. CONSORTIA INITIATIVES IN INDIA

Due to the wide variation in electronic information consumption by different libraries, the consortia based library acquisition has not so far reached significant level in our country. Library consortia have come up in India too. They are as follows:

5.1 NKRC (CSIR- DST)

5.2 Indian National Digital Libraries in Science and Technology (INDEST).

5.3 INFONET Project of UGC- Health Sciences, Library & Information Network (HELINET).

5.4 CSIR E- journal Consortium.

5.5 DAE Library Consortium.

5.6 IIM Library Consortium.

5.7 DeLCON (DBT Electronic Library Consortiums)

Here we are going to discuss some of the important Consortium in India:

NKRC (CSIR- DST):

Established in 2002

Operation and Headquarter- NISCAIR, New Delhi

Funding –CSIR&DST

Number of participating Institution: 65

Serving to about 10,000 users

INDEST- AICTE:

Established in 2003

Operation/ Mgt. HQ- IIT Delhi

Nature- S&T, Humanities and Social Sciences

Access to about 12000jls =6 databases

DRDO Consortia:

Established in 2007, Came in existence Jan. 2009

Funding- DRDO

Nature- S&T and Others

Number of participating institutions-50+DRDO institution

Serving to about 7,000+users.

DELCON

DeLCON established in 2009. Its operating Headquarter is NBRC, Gurugaon. It get funding from DBT, Govt. Of India. Number of participating Institutions are 33(14DBT, and 18 NER institutions. Access to 917 jls plus SCOPUS database. DeLCOn E- Library Consortium subscribes are available from the publisher's website. In North 18 Universities participating in DeLCON programme. List of participating Universities are listed below:

1.   Assam University, Silchar. Full text Resources 20 nos.

2.   College of Veterinary Science, Assam Agricultural University.

3.   Gauhati University.

4.   Dibrugarh University, Assam.

5.   Indian Institution of Technology. Guwahati(IITG)

6.   Institute of Bio resources and Substantial Development. Imphal

7.   Manipur University, Manipur.

8.   Mizorum University

9.   Nagaland University.

10.   North- East Institute of Science and Technology.   Jorhat

11.   North- Eastern Regional Institute of Science & Technology. NERIST, Arunachal Pradesh.

12.   North- Eastern Hill University(NEHU), Shillong

13.   Rajib Gandhi University, Arunachal.

14.   Sikkim University, Sikkim.

15.   St. Antanys College, Shillong.

16.   Tezpur University, Tezpur.

17.   D. M. College of Science, Manipur.

18.   College of Veterinary Science, Mizoram.

6. UGC INFONET DIGITAL LIBRARY CONSORTIUM:

The UGC INFONET Digital Library Consortium is a major initiative of University Grant Commission (UGC) to bring qualitative changes in academic libraries in India. It was formally launched in December, 2003 by honourable Dr. A P J Abdul Kalam, the then President of India. It is a national initiative for providing access to scholarly electronic resources including full text bibliographic databases in all subject disciplines to academic community in India. It is the largest consortium in India with a vision to reach out to all universities and colleges affiliated to the universities. The consortium provides current as well as archival access to more than 5,000 core and peer-reviewed journals and nine bibliographic databases in different disciplines from 23 publishers. The access to all major e- resources was given to 50 universities in first phase in 2004. It has now been extended more than 157 universities in three different phases. During the last few years, effective implementation and execution of this programme has made it as one of the largest and successful consortium around the world. Under the programme, over 4500 high quality peer reviewed priced full text scholarly journals in Science and Technology, Social Science and Humanities are provided free of cost to 157 universities through UGC

-INFONET infrastructure. Centre has developed a website of UGC- INFONET Digital Library Consortium. Users can get information about the UGC-INFONET Digital Library Consortium, e-resources, details of member universities, user help guides and usage statistics, etc.

E-resources made available under UGC-INFONET:

American Chemical society (ACS)

http://pubs.acs.org/about_category.html

American Institution of Physics(API)

http://www.aip.org

Annual reviews

http://arjournals.annualreview.org

Biological Abstract (BA)

http://webspris3.silverplatter.com/cgi-bin/erl.cgi

Cambridge University press Journals

http://journals.cambridge.org

Encyclopaedia Britannica

Http://searcheb.com

Institute of Physics (IOP)

http://www.iop.org

JSTOR

http:// www.jstor.org

Nature

http://www.aip.org

Project Muse Journals

http://muse.jhu.edu/journals/

Royall society of Chemistry

http://www.rsc.org/is/journals/jl.htm

Science online

http://www.sciencemag.org/

SciFinder Scholar

http://www.aip.org

7. ACCESSIBILITY OF E- JOURNAL CONSORTIUM TO THE UNIVERSITIES OF NORTH-EASTERN STATES:

Access to electronic resources requires good ICT infrastructure, availability of satisfactory number of PCs in network environment and good speed of INTERNET connectivity. If any factor of this is not available, these facilities remain unutilized. Statistics reveals that most of the universities in the region are not desired use off e-journals due to some or other region. The North- Eastern States comprising of eight states where 550 colleges and 16 universities are there. Out of 16 universities only 11 universities are covered under UGC-INFONET E-journal Consortium. These universities were given more than1700 full text journals from different publishers. The accesses to e-resources to the colleges are in pipeline and it is extending. Considering the diversity of resources required and ICT infrastructure available in 11 universities in North –East, these universities have been covered in different phases. The first phase universities were given access to entire resources whereas second phase universities were given access to less resource. The list of e-resources accessible to various universities was given below:

Phase 1: Gauhati University, Manipur University, North –East Hill University and Tezpur University are covered under phase 1

Phase 11: Assam University, Dibrugarh University, Nagaland University, Rajiv Gandhi University (Arunachal) and Tripura University are covered under phase 11 of the consortium.

Phase 111: Mizoram University and Sikkim University are covered under phase 111.Under the UGC –INFONET programmed, internet connectivity of all these universities have been upgraded. The types of connectivity and the bandwidth provided to the universities are listed below:

Sl.nos.	Name of the University	Types of Connectivity
1	Assam University, Silchar	SCPC 512 kbps.
2	Dibrugarh University Dibrugarh, Assam	SCPC 256 kbps.
3	Gauhati University,Guwahati, Assam	LL 512kbps.
4	Manipur University, Manipur	SCPC 256 kbps.
5	Mizoram University,Mizoram	BB 512 kbps.
6	Nagaland University,Nagaland	SCPC 512kbps.
7	North- East Hill University, Shillong	LL 1Mbps.
8	Rajiv Gandhi University, Arunachal	SCPC256 kbps.
9	Sikkim University, Sikkim	2 Mbps.
10	Tezpur University, Tezpur	SCPC 256 kbps.
11	Tripura University, Tripura	SCPC 256 kbps.

SCPC: Single Channel Per Carrier; LL: Leased Lined; BB: Broad Ban

CONCLUSION

The advent of e-publishing has brought a revolution in journals publication, subscription as well as access to the scholarly literature. However, more steps to be taken to improved e- journal usages. INFLIBNET regularly organizes awareness programmes about its activities and resources. This awareness programme has had positive impact on all members of the scholarly community of the Country. The consortium provides current as well as archival access to core and peer- reviewed journals in different discipline. The age of is at the doorsteps to prove the library cooperation locally, regionally, nationally and internationally. Consortia based subscription has brought considerable benefits to the academic community in India in general and academic community of North – Eastern Region in practical. With globalization of education and competitive research the demand for the journals has increased over the year. Due to insufficient funds, libraries have not been forced to discontinue the scholarly journals, which have great impact to the users. In order to provide the current literature to academic world; UGC has initiated the UGC- Info net Digital Library consortium. Timely imitative of UGC is a big boon to academic circle in the country, which enables them to access large number of scholarly journals from reputed publishers , aggregators and society publications. Although Library Consortium are successfully implementing in develop countries, developing countries like India does not have a very rich tradition of consortia arrangement or resource sharing. For establishment of better consortium, interrelating intellectual access are all distinct steps moving towards the 21st century library. Librarian should seriously re think and reinitiate consortium movement like western countries for maximum utilization of resources at a reduce cost, time and space, thereby to provide better and effective services to its users.

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Comparison of Content Management System (CMS) to Develop Library Web Site: An Overview

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A B S T R A C T

CMS is a software program that not only maintaining web sites, but also inherently carry variable information about a site structure and content model. It manages textual and multimedia content faster and easier. In this information age, the demands of Open Content Management Software are continuously increases with growing popularity. These software's are now in a position to offer an alternative to commercial products. There are various Content Management Softwares available now a day's based on their various functionalities. In information technology literature, most discussions of content management focus on managing comprehensive web sites and/or web collaboration tools. Till now, no standards were officially published for what a CMS should be and what the critical requirements a CMS should address. This paper discusses about evaluation criteria to choose right Open Source Content Management Software and a comparative study among those content management software such as Joomla, Wordpress and Drupal. This study also attempts to analyze and comprise popular Content Management Software on the basis of their various usages, performance, graphical flexibility, structural flexibility, search engine optimization, security, etc.

Keywords—Content Management System (CMS), Library Website, Joomla, Wordpress, Drupal.

INTRODUCTION

The introduction of Web 2.0/ Web 3.0 has been a tremendous innovation in the web community. Since the last decade, when most web sites were developed to publish static information, they have evolved steadily and ubiquitously to serve dynamic and complex web content and business functions. With the growing popularity of web sites and web applications, the web aligned with e-business models started to emerge, which relies on server-side programs executing business logics hosted on application servers to generate the dynamic HTML as per each user request (Ravi et al., 2009). Moreover, in response to the increasing amount of content to be managed and its scatteredness throughout organizations have resulted in the growing popularity of content management products (Grahlmann et al., 2010). To

provide organizations with and their marketing communications department in particular the flexibility to publish dynamic and personalized content on the web, a specific type of content management product software evolved called web content management system (WCMS). A WCMS is product software which can be tailored and customized by means of configuration and will lead to a CMS-based web application (Souer et al., 2007). Most dynamic web sites utilize some sort of WCMS to support the organization with their online business because it allows them to create web initiatives in a time- and resource-efficient way based on standardized components. Emerging from these new capabilities are popular new activities such as blogging, and blogging in turn facilitates novel social interaction (Nardi et al., 2004). More recently a popular trend is micro-blogging, where users describe their activities as a current status which can be distributed on the web or through mobile devices. Twitter is a popular example of a micro-blog, which enables users to connect, interact and stay in contact, sharing their lives within their community (Java et al., 2007). In Twitter users post short, but frequently updated messages about their activities. Content management systems have evolved to become wikis where any user has the ability to add, edit or remove information. Beyond text, other media is involved in Web 2.0 activities, with photo and music sharing and editing. In this environment there is increasing amounts of user generated content, and this presents some challenges in terms of quality management, content classification and organization.

CONTENT MANAGEMENT SYSTEM (CMS): CONCEPT

A content management system is software that is used to support the creating, updating, publishing, translating and retiring the digital information. It allows editors from various website to easily share and content technology. Rosenfeld and Morville (2002, p. 221) say that "Content analysis is a defining component of the bottom-up approach to architecture, involving careful review of the documents and objects that actually exist. What's in the site may not match the visions articulated by the strategy team and the opinion leaders. You'll need to identify and address these gaps between top-down vision and bottom-up reality." A CMS is a fairly new concept. No standards were officially published for what a CMS should be and what the critical requirements a CMS should address. In information technology literature, most discussions of content management focus on managing comprehensive web sites and/or web collaboration tools. The exact definition of "content management" tends to be ambiguous due to the phrase having different meanings across various subject disciplines. Boiko defines content management as a process of collecting, managing and publishing content (Boiko, 2002, p. 67). A knowledge management company states that CMSs are a key way of managing and delivering business knowledge.

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CONTENT MANAGEMENT SYSTEM: NEED FOR LIBRARY

Traditionally content is classified through a taxonomy, which ensures that related content can be located together. Managing taxonomy is more difficult when the content is produced minute by minute throughout the world, in multiple languages, using varied media, to different quality levels, by a huge, diverse population. One accepted way of classifying this content is to pass the responsibility for classification over to a community, along with the responsibility for creating and maintaining the content. The community then decides where the content belongs, normally through "tagging". Here, rather than using a taxonomy, a folksonomy is generated (Mathes, 2004; Gruber, 2007). Content Management System can help to:

- Create and Publish content in a standard format without needing to know HTML or other languages;
- Co-ordinate the work of teams of authors and editors (e.g by ensuring that only one person is editing any individual content item at one time);
- Control the branding and quality of content (e.g. by ensuring that the correct style sheets are applied, and that changes to the content are approved before they are published);
- Reuse the same content item in multiple different sites and formats.

As library websites have evolved over the years, so has their role and complexity. In the beginning, the purpose of most library websites was to convey basic information, such as hours and policies, to library users. As time passed, more and more library products and services became available online, increasing the size and complexity of library websites. Many academic library web designers found that their web

authoring tools were no longer adequate for their needs and turned to CMSs to help them manage and maintain their sites. For other web designers, the choice was not theirs to make. Their institution transitioned to a CMS and required the academic library to follow suit, regardless of whether the library staff had a say in the selection of the CMS or its suitability for the library environment. So, it becomes essential for librarian to design their own library web site by using CMS that one need to start publishing content, promoting library and community events, integrating OPAC search on site, etc.

CONTENT MANAGEMENT SYSTEMS: FEATURES

Wordpress

WordPress started in 2003 with a single bit of code to enhance the typography of everyday writing and with fewer users than you can count on your fingers and toes. Since then it has grown to be the largest self-hosted blogging tool in the world, used on millions of sites and seen by tens of millions of people every day. Everything can be seen in it, from the documentation to the code itself, was created by and for the community. WordPress is an Open Source project, which means there are hundreds of people all over the world working on it. (More than most commercial platforms.) It is also free to use it for anything from home page to a Fortune 500 web site without paying anyone a license fee and a number of other important freedoms. (https://wordpress.org/about/). WordPress was born out of a desire for an elegant, well-architectured personal publishing system built on PHP and MySQL and licensed under the GPL. It is the official successor of b2/cafelog. WordPress is modern software, but its roots and development go back to 2001. It is a mature and stable product. (http://codex.wordpress.org/History). In addition, over 60 millions websites are using WordPress which shows just how popular it is. WordPress offers many advantages to those looking to create a website, including the following:

> Easy to Install: Many web hosting companies offer automatic installation of WordPress sites, which means you can have a new site up and running in well under five minutes. Even with manual installation, you can create a new site in less than a half hour.

> Customizable: WordPress has significantly more plug-ins, themes and other customizations available for it than any other CMS. This is largely because it is the most popular, so the designers of these items almost always create them for WordPress.

> Free: WordPress is free to install and use for anyone who wants it. There are also thousands of free plug-ins and themes available to choose from. There are also paid themes and plug-ins, which some people will want to use, but they are not required, especially not for beginners.

> Community Support: With millions of people using WordPress, there are a lot of people out there to help you through any problems you may have. Several websites are set up by users offering free support to other WordPress website owners.

But, WordPress isn't perfect in every way. Some common complaints about WordPress are that if the site grows too large, it can require significant server resources to keep up.

JOOMLA

Joomla is a class of Open Source CMSs written in PHP scripting language and uses MySQL database for the backend. Compared to Drupal, Joomla is fairly new and is gaining popularity among users because of many aspects, including ease of usability and extensibility. There are around 4500 extensions and modules available to enhance the functionality of the core Joomla package. Joomla can be installed and run on Linux, Windows or Macintosh OS. It is distributed under GPL and is free to use. Advanced components of Joomla 1.5 are built using Model-View-Controller (MVC) design pattern. The standard release of Joomla contains the basic features such as blogs, RSS feeds, caching, search functionality, printable versions of pages, create and manage menus, administer the system and support for language internationalization. Joomla keeps content in its database to provide dynamic formatting. Web pages can be presented in unique format preferred by different visitors and different computers as they are not static files. Joomla templates are composed of XHTML block and in line tagged element. The theme manager interacts with data collectors and Menu manager in particular pattern. The whole system is made up of three types of pages: Sections, Categories and Articles.

 (http://www.wilsonmar.com/joomla.htm)

Other reasons people choose Joomla include:

➢ Social Networking: This is perhaps the biggest benefit of Joomla. Of the three, Joomla makes it the easiest to create social networks. Social networks can be a powerful asset for many sites, and with Joomla, you can have one up and running extremely quickly and easily.

➢ Commerce Sites: If you want to set up an online store; that is also very simple with Joomla. While it is certainly possible with Drupal and WordPress, Joomla makes it faster and easier, and has more native support for these types of things.

➢ Not too Technical: Joomla has, in many people's opinion, found that middle ground between the ease of managing a WordPress website, and the power of a Drupal site. Most people will be able to run a great Joomla site without any significant technical support, though there may be some issues which you'll need to reach out for help on.

➢ Help Portal: Joomla offers a great help portal for asking questions and getting technical support. It isn't going to be as fast or extensive as the community based support pages of WordPress, but it is quicker (and cheaper) than technical support most people get for Drupal.

➢ Free: Like Drupal, Joomla is free to use on your own web servers, but there is no option to have it hosted for free like WordPress offers.

Many Joomla users love Joomla because it is powerful, yet easy to use. Joomla has done an excellent job at combining the benefits of WordPress and Drupal, and adding in some great features of its own.

DRUPAL

Drupal is an Open Source CMS written in PHP and uses MySQL, PostgreSQL or MS SQL for database. Drupal can be setup on Linux, Windows or Macintosh OS. It is distributed under GPL ("GNU General Public License") and is free to download. The architecture of Drupal is designed in such a way that the three different layers work independently and correlate with each other to give the final output. These three layers are the content which forms the website, the application algorithm that organizes this content for presentation, and the representation layer which is incorporated by the Drupal theme system. The webpage that comes to a viewer's browser goes through a sequential process in which Drupal modules take all the relevant content from the databases and then the theme gets ready for the final presentation. Unlike Joomla, Drupal's architecture does not follow the design pattern of MVC but instead follows the Presentation-Abstraction- Control (PAC) (http://www.w3schools.com/js/).

Some of the most significant benefits to Drupal include the following:

➢ Technically Advanced: Drupal is the most technically advanced of these three content management systems. It doesn't use nearly as many system resources as WordPress, so people won't have to worry about upgrading to a more expensive hosting option as quickly. Improved

➢ Performance: Drupal pages typically load more quickly, and have faster response times than those made with WordPress or Joomla. Of course, as you add in plug-ins and make other changes, this can quickly change.

➢ Customizable: Drupal is easy to customize with many different plug-ins, themes and other configurable options. For those with sufficient programming knowledge, it is possible to edit even the root files of the program, making it the most flexible of the three content management systems.

➢ Free: You can download the Drupal software for free, and install it on your own hosting server. There is no option to have a website hosted on Drupal servers, however, so you will need your own web hosting available to run the site. You'll also need your own domain name, which typically costs money.

Drupal is the most powerful content management system out of the box, but with that power comes some additional difficulties for the website owner.

Wordpress, Joomla and Drupal: Comparative Analysis

An active and knowledgeable community plays vital role in open source software. By posting the

problem to the site one can judge the community on the basis of quality of responses. All three CMS have strong and active community with lots of support from forums and IRC. Also paid support of developers is available for all three systems.

Based on these parameters a comparative table has been given as follows:

Table-1: Comparison chart

CMS Evaluation	Wordpress	Joomla	Drupal
Accessibility and Search Engine	Good	Best	Ok
Community/ Web 2.0 Functionality	Best	Good	Best
Content management capability	Good	Best	Good
Ease of Hosting and Installation	Best	Best	Best
Ease of setup	Best	Good	Good
Ease of use: Content Editors	Best	Good	Good
Ease of use: Site administrator	Best	Good	Good
Extending and Integrating	Best	Best	Best
Flexible	Best	Less	Best
Flexible	Best	Less	Best
Graphical Flexibility	Best	Best	Best
Optimization			
Powerful	Best	Best	Best
Quality of free plugins	Less	Ok	Best
Security	Ok	Good	Good
SEO- capability	Good	Good	Best
Structural Flexibility	Good	Good	Best
Support/ Community Strength	Best	Best	Best
Theme choices	Less	Best	Good
User Roles and Workflow	Ok	Best	Good

CONCLUSION

Organization can use open source CMS to manage their contents effectively and efficiently with the features like personalization and web administrative functions. While choosing best suitable open source CMS for the organization one has to study it in detail. Analysis of various features of open source CMS can often enhance decision making. A stable, cost-effective, flexible CMS which fulfills the organizational needs is an ideal choice. Open-source CMS facilitate user to control overall content management solution. It provides freedom to program custom modules according to the needs. For basic site which contains few pages and less number of users, wordpress and Joomla are the best options. They are useful for blogs and forum sites. Drupal and is suitable for complex site with more number of pages and multi-contributors.

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Library Services Provided by the Central Libraries of Jawaharlal Nehru University and Indian Institute of Technology, Delhi: A Study

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A B S T R A C T

Present paper is an attempt to study and compare the services provided by the central libraries of Jawaharlal Nehru University, Delhi and Indian Institute of Technology, Delhi. Paper explores the services provided by the libraries of both institutions and furthermore provides suggestions for the libraries.

Keywords—IIT, Delhi; JNU, Delhi; Library Services; RFID etc.

INTRODUCTION

Libraries always have been recognized as service-oriented institutions and library services are one of the important activities for any library. In simple words library service can be defined as the facilities provided by the libraries for the use of the documents and the dissemination of information. Now with the emergence of Information and Communication Technology (ICT), ways of facilitating the users and providing them services have changed significantly. So it is imperative to study what kind of services libraries are providing and what users' want. The present study is being carried out with the following objectives:

- ❖ To identify the services provided by the libraries selected for the study.
- ❖ To carry out the comparative study of libraries selected for the study.
- ❖ To examine the satisfaction level of the libraries under study.
- ❖ To know about the services intended to provide in future.

LITERATURE REVIEW

The improved library services or the facilities provided to users denotes and determine the value of libraries. Numerous studies have been conducted on library services for instance Balaji B. and Kumar (2011) find that using the current web development technologies and deploying for mainstream web information services is not widespread as web information services are yet to take off widely in

academic libraries. The majority of university libraries are found to be working in the conventional library settings and the diffusion rate of web information services is relatively low. Bardoni and Colagrossi (2000) describe some concepts concerning the creation of a library's unified network and its unified information system, based on innovative technologies for the distribution of the largest number of advanced services to an increasing number of users. Boadi and Williams (1983) discussed about the automation experience of library and information services in developing countries and further recommendations also discussed. Brophy (2000) discusses that as libraries and information services address the needs of users in an increasingly networked environment, there is a need for theoretical models to underpin research, development and practice. The characteristics and roles of traditional libraries and information services are described, and a variety of predictions about their future are examined. Heaton, Nozero and Starkweather (2002) discuss the issues involved in the planning for Research and information services at the lied library. Jimba and Oladele (1997) analyses the problems of a veterinary library in Nigeria which uses a CD-ROM to offer services to its clients. And further conclude with some suggestions and recommendations toward overcoming these problems in developing countries. Kaijage (1993) discusses about the information services provided to the visually impaired university students in Tanzania and further recommends some provisions to provide better services. Kaur and Rani (2008) finds that librarians/professional staff have positive attitudes towards the marketing of library and information services and products and admit that each library should have a mission statement and a full time professional to handle marketing-related activities; but in practice, no library under study has its own loge, mission statement or a specifically designated personnel for marketing-related activities. Rani and Kaur (2005) assess the attitude of the professional staff working at Guru Nanak Dev University Library towards the concept of marketing, information services and products. A questionnaire was prepared for the purpose. The findings of the survey reveal that the attitude of library staff towards different aspects of marketing is positive. On the basis of the findings some suggestions have been made to improve the situation. Madhusudhan (2008) discusses the marketing concept and the marketing of library and information services and products in Goa University Library. Madhusudhan and Nagabhushanam (2012) highlight the current state of web-based library services against which they can benchmark their own web-based library services by university librarians in India. They will also learn how the unique web-based library services enhance the quality of web-based library services in web 2.0 environment and suggests the new approaches for effective use of web-based library services. McGettigan, (2013) discusses that Edinburgh library and information services have undergone a period of fundamental and wide reaching change to ensure it is fit for purpose in the 21st century. And also he discusses about the city of Edinburgh's library and information service delivering a new model for libraries across the city, based on strategic approach. Nazero and Finley (2005) find the reality of living in the new facility, Lied Library, proved to require changes not

envisioned during the planning phase. Lied library is not a static environment. Allocation of space and way servies are provided to customers continue to evolve. Rehman (1991) discusses about the national infrastructure of library and information services in Arab Countries like as far as the library services are concerned, how the developments have taken place.

METHODOLOGY

In order to accomplish the above set of research objectives, librarian of both universities were personally contacted during the January 2014 to March 2014 and given a questionnaire with a letter explaining the purpose and objectives of the study and asked for their co-operation. Both the librarians showed great enthusiasm and on the basis of the responses received data is presented in the form of tables and analyzed by using a simple method of calculation.

Data Analysis and Interpretation

Following is the analysis of the questionnaires.

Table 1: Establishment year

SN	Library	Year of Establishment
1	JNU	1969
2	IIT, Delhi	1961

Table 1 reveals the fact that IIT, Delhi is the oldest, established in 1961 between JNU Library and IIT, Delhi Library.

Table 2: Library Timings

Library Name	Summer	Winter	Sunday
JNU	24x7	24x7	✓
IIT, Delhi	9 AM to 12 PM	9 AM to 12 PM	✓

Table 2 shows that JNU library is providing its services 24x7 and on the other side IIT, Delhi providing its services from 9 AM to 12 PM whole year.

Table 3: Library Budget of Last Five Years

Year	JNU (Amount in Rs.)	IIT Delhi (Amount in Rs.)
2009-2010		Rs. 70000000 (Aprox.)
2010-2011		Rs. 70000000
2011-2012	Didn't disclose the budget	Rs. 71721671
2012-2013		Rs. 85012088
2013-2014		Rs. 96981896

Table 3 indicates that JNU didn't reveal their budget, where on the other hand the IIT, Delhi is getting a handsome amount of budget.

Figure 1: Total Budget of Last Five Years
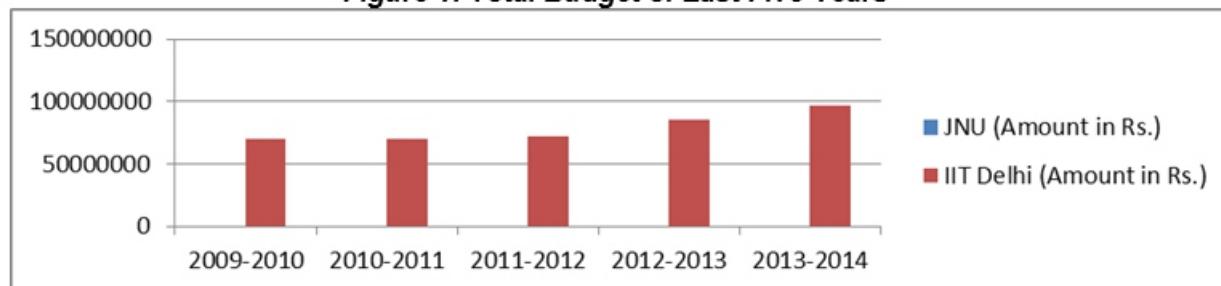
Table 4: Budget Allocation

Library	Academic Year	Description	Books	Periodicals	Reference Books	Non Book Materials	Any Other
JNU	2009-10	Print					
		Electronic					
	2010-11	Print					
		Electronic					
	2011-12	Print					
		Electronic	**Neither JNU nor IIT, Delhi libraries provided this**				
	2012-13	Print	**information.**				
		Electronic					
	2013-14	Print					
		Electronic					
IIT, Delhi	2009-10	Print					
		Electronic					
	2010-11	Print					
		Electronic					
	2011-12	Print					
		Electronic					
	2012-13	Print					
		Electronic					
	2013-14	Print					
		Electronic					

Table 4 reveals the fact that neither JNU library nor IIT, Delhi library disclose their budget allocation for print and electronic information sources.

Table 5: Staff Strength

Library	Professionals	Semi-Professionals	Attendants	Others
JNU	27	29	23	-
IIT, Delhi	20	05	10	-

Table 5 indicates that JNU library is having a very good staff strength compare to IIT, Delhi.

Figure 2: Staff Strength
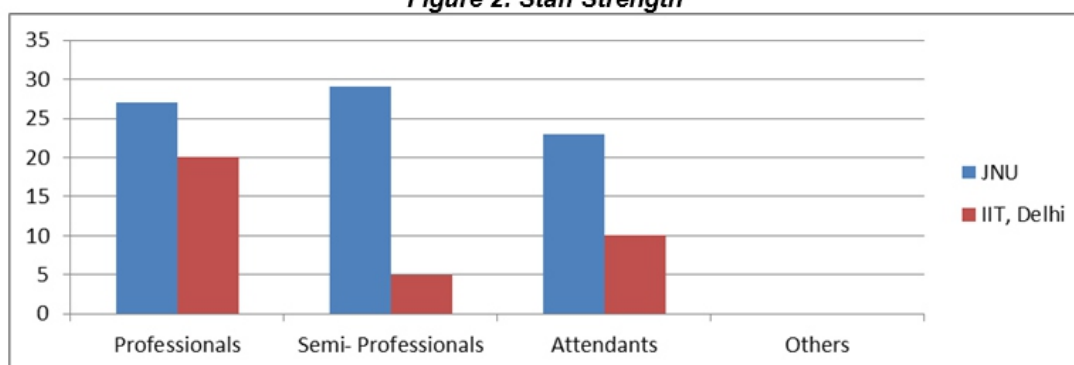
Table 6: Type of Access

Library	Open Access	Closed Access	Both
JNU	×	×	✓
IIT, Delhi	✓	×	×

Table 6 indicates that JNU library is providing both the types of access, open and closed access and IIT, Delhi is providing open access completely.

Table 7: Processing of Library Materials

Library	Cataloguing	Classification
JNU	AACR II (2nd Rev.), MARC, and Dublin Core	DDC
IIT, Delhi	AACR II (2nd Rev.), MARC, and Dublin Core	CC and UDC

Table 7 indicates that JNU and IIT, Delhi library are following AACR II (2nd Rev.), MARC and Dublin Core for Cataloguing and for classification JNU library is using DDC where IIT, Delhi is using CC and UDC.

Table 8: Classification/Cataloguing Procedure

Library	Manual		Web Based		Any other	
	Classification	Cataloguing	Classification	Cataloguing	Classification	Cataloguing
JNU	✓	×	×	✓	×	×
IIT, Delhi	×	✓	×	×	Both manual and web-based	×

Table 8 indicates that JNU library is classifying the documents manually and IIT, Delhi is doing classification of documents manually and web-based. And for cataloguing JNU library is using web-based only and IIT, Delhi is doing manually.

Table 9: Library Software for Automation

Library	Software Name
JNU	VIRTUA
IIT, Delhi	LibSys

Table 9 shows that JNU library is using VIRTUA software and IIT, Delhi is using LibSys software.

Table 10: RFID Use

Library	Use of RFID
JNU	✗
IIT, Delhi	✓

Table 10 indicates that IIT, Delhi library is the library between JNU and IIT, Delhi, using RFID technology to provide the better services to its users.

Table 11: Services through RFID

Services	JNU	IIT, Delhi
Self check-out service	✗	✓
Self check-in (book drop) service	✗	✓
Theft deduction	✗	✓
Find misplaced reading material	✗	✓
Sorting, inventory of documents	✗	✓
Stock verifications procedures	✗	✓
Security control facilities	✗	✓
Video surveillance facilities	✗	✓
People counter service	✗	✓
Smart card issuance service	✗	✓

Table 11 reveals the fact the IIT, Delhi is providing all the services listed by using RFID technology.

Table 12: Institutional Repository Service and Software Using

Library	Institutional Repository	Software using
JNU	✓	DSpace
IIT, Delhi	✓	DSpace

Table 12 reveals that both the libraries are using DSpace software to develop their institutional repository.

Table 13: Consortia Membership

Library	JNU	IIT, Delhi
UGC-INFONET Digital Library Consortium	✓	×
INDEST-AICTE Consortium	×	✓
CeRA	×	×
ICMR	×	×
HELNET Consortium	×	×
IIM Consortium	×	×
CSIR-DST Consortium (NKRC)	×	×
FORSA Consortium	×	×
Any Other (Pl. specify)	×	×

Table 13 indicates that JNU library is the member of UGC-INFONET Digital Library Consortium whereas IIT, Delhi is the member of INDEST-AICTE Consortium.

Table 14: Library Networks Membership

Library	JNU	IIT, Delhi
ADINET	×	×
CALIBNET	×	×
NICNET	×	×
DELNET	✓	✓
INFLIBNET	✓	×
MYLIBNET	×	×
Any Other (Pl. specify)	×	×

Table 14 clearly shows that JNU library is the member of DELNET and INFLIBNET both whereas IIT, Delhi library is the library with membership of DELNET only.

Table 15: Access to Print Sources

Library	JNU	IIT, Delhi
Library Catalogue	✓	×
OPAC	✓	✓
Web OPAC	✓	✓

Table 15 shows that JNU library is providing access to print sources through all the ways i.e. library catalogue, OPAC, and web OPAC whereas IIT, Delhi library is providing through OPAC and web-OPAC.

Table 16: Access to E-resources

	JNU	IIT, Delhi
Access within library	✓	✓
Remote Access and through Campus network	✓	✓
Internet	✓	✓

Table 16 reveals that both the libraries providing access to e-resources within library, remote access and through campus network and internet.

Table 17: Access technology used

	JNU	IIT, Delhi
IP address based	✓	✓
Proxy server based	✗	✓
Any other (Pl. Specify)	✗	VPN Based

Table 17 reveals that JNU is using only IP based technology whereas the IIT, Delhi library is using IP based technology, proxy server based, and VPN based technology.

Table 18: Service Charges

Library	JNU	IIT, Delhi
Accessing of e-resources	✗	✗
Downloading Information	✗	✗
Printing	Don't Provide	Don't Provide
Photocopy	✓	✓

Table 18 describe that both the libraries charge for photocopy service and don't provide printing facility to its users.

Table 19: Library Collection

	JNU		IIT, Delhi	
	Print	Electronic	Print	Electronic
Books	263271		185068	24226
Foreign Journals	5500 approx.		110000 (Bound Volumes)	15000
Indian Journals				
Abstracting/Indexing Journals/Databases				
Thesis/Dissertations	16923		4700	
Reference Sources	7668			
Audio/Video	534		51553	
Standards/Specifications	-	-		
Technical Reports	-	-		
Conference Proceedings	-	-		
Patents	-	-		
Any other (Pl. specify)	5000			

Table 19 reveals the fact that JNU library is richer in collection as compared to IIT, Delhi library.

Table 20: Library services

Services	JNU		IIT, Delhi	
	Manual	Computerized	Manual	Computerized
Lending Service	✓	✓	✓	✗
Catalogue Service	✓	✓	✓	✗
Reservation Service	✓	✓	✓	✓
Document Delivery Service	✓	✓	✓	✓
Referral Service	✓	✓	✓	✗
Digital Library Service	✗	✓	✗	✓
Bibliography Service	✗	✓	✓	✓

Indexing Service	✗	✓	✓	✓
Abstracting Service	✗	✗	✗	✓
Literature Search Service	✓	✓	✓	✓
Newspaper Clipping Service	✗	✓	✗	✓
RFID	✗	✗	✗	✓
Institutional Repository Service	✗	✓	✗	✓
Database Searching	✗	✓	✗	✓
Portal Based Service	✗	✓	✗	✓
Consortia Based service	✗	✓	✗	✓
Network Based/CD-ROM Search Service	✗	✓	✗	✓
CAS/SDI Service	✗	✓	✗	✓
Translation Service	✗	✗	✗	✗
Reprographic Service	✓	✓	✓	✓
Internet Access	✗	✓	✗	✓
Any other (pl. specify)	Special service to visually challenged scholars have been provided with laptops and other necessary software besides full infrastructure lab in the library		News Bulletin Service	

Table 20 clearly shows that both the libraries JNU and IIT, Delhi are proving their services to users by manually and using digital technology.

Table 21: Future Plans

Name of the Library	Future Plans
JNU	To implement RFID
IIT, Delhi	More web 2.0 based and enhanced RFID services

Table 21 reveals the fact that JNU library is planning to implement RFID in near future whereas IIT, Delhi is planning to use more web 2.0 based and enhanced RFID services.

FINDINGS

On the basis of the present study the major finding are as (i) It is found that IIT, Delhi library was established previously than JNU; (ii) It is found that between both the libraries IIT, Delhi library is using the RFID technology to provide its services to the users; (iii) It is found that JNU library is having the Helen Keller Unit for proving the computer services to the visually impaired students; (iv) It is found that JNU library is richer in context of collection and staff strength; (v) It is found that both the libraries are providing photocopy services to their users for which both the libraries charge from users; (vi) It is found that JNU library is providing its services 24x7 and on the other side IIT, Delhi providing its services from 9 AM to 12 PM whole year; (vii) It is found that JNU didn't reveal their budget, where on the other hand the IIT, Delhi is getting a handsome amount of budget; (viii) It is found that JNU library is providing both the types of access, open and closed access and IIT, Delhi is providing open access completely; (ix) Study reveals the fact that JNU and IIT, Delhi library are following AACR II (2nd Rev.), MARC and Dublin Core for Cataloguing and for classification JNU library is using DDC where IIT, Delhi is using CC and UDC; (x) Reveals that JNU library is classifying the documents manually and IIT, Delhi is doing classification of documents manually and web-based. And for cataloguing JNU library is using web-based only and IIT, Delhi is doing manually; (xi) It is found that JNU library is using VIRTUA software whereas on the other hand IIT, Delhi is using LibSys software; (xii) It is found that both the libraries are using DSpace software to develop their institutional repository; (xiii) Study reveals that JNU library is the member of UGC-INFONET Digital Library Consortium whereas IIT, Delhi is the member of INDEST-AICTE Consortium; (xiv) Study finds that JNU library is the member of DELNET and INFLIBNET both whereas IIT, Delhi library is the library with membership of DELNET only; (xv) Finds that JNU library is providing access to print sources through all the ways i.e. library catalogue, OPAC, and web OPAC whereas IIT, Delhi library is providing through OPAC and web-OPAC; (xvi) Study reveals that JNU is using only IP based technology whereas the IIT, Delhi library is using IP based technology, proxy server based, and VPN based technology; (xvii) Study finds that both the libraries JNU and IIT, Delhi are proving their services to users by manually and using digital technology; (xix) It is found that JNU library is planning to implement RFID in near future whereas IIT, Delhi is planning to use more web 2.0 based and enhanced RFID services.

Apart from all these it can be suggested on the basis of above findings that both the libraries are providing their best services to the users in their own way, it is very difficult to find out the problems. But, still on the basis of study some suggestion are as follows:

1. JNU library must start using RFID technology to provide improved services to its users.

2. IIT, Delhi library must start some specialized services for visually impaired students as JNU library is providing.

CONCLUSION

The present study was conducted with the purpose of comparison of the two libraries i.e. JNU and IIT, Delhi. But it is very difficult to pick up the best library, because both the libraries are providing their best services to users and using the information and communication technology. One side, IIT, Delhi library is using RFID technology for services and on the other side JNU library is using the information technology to provide specialized services to visually impaired students. In short, it can be concluded that it would be injustice to other library if we pick one best library between these two, because both the libraries are providing services and also trying very hard for best and improved services to their users. Only it can be said for both the libraries are leading libraries of the country.

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Environmentally Sustainable Transport (EST): A Case of Mass Rapid Transportation System of Delhi

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A B S T R A C T

There is growing interest in the concepts of sustainability, livability, sustainable development and sustainable transport. Sustainability balances economic, social and environmental goals and objectives (goals are general desired outcomes, objectives are specific, measurable ways to achieve goals), including those that involve indirect and long-term impacts. Livability refers to the subset of sustainability objectives that directly affect community members. They generally share the same objectives, but often with somewhat differing perspectives and priorities. For example, both justify efforts to reduce pollution, although sustainability often focuses on climate change emissions while livability focuses on local air and noise pollution. Mass transport systems are needed to support sprawling growth in urban India. Inadequate MTSs have led to a rise in the use of personal vehicles, causing an increase in road congestion, delays, fuel use and environmental pollution.

INTRODUCTION

Delhi has a population of 18 million of which DTC and Delhi Metro together carry around 6.45 million passenger trips per day (36% of cities population use these modes of public transport). Attracting remaining 44% of cities population to justify the statement of '80% trips by public transport by 2020' in the recent Master Plan of Delhi, is a big challenge in itself. With the expanding Metro Rail facility, it is assumed that additional ridership of 2 million will be attracted by 2016. But what about DTC? The question about DTC attracting ridership is doubtful considering the above statistical analysis of its performance. DTC, being one of the best option for mass transport in Delhi after metro rail, has to undergo series of reforms in order to provide good service to passengers along with taking measures towards cost cutting. There may be several reasons associated with huge deficits of DTC which needs to be addressed in order to make itself financially sustainable for future. Delhi is and will remain the administrative capital city of India and therefore the capital region has to have better and efficient public transport system as it is directly associated with the national image. Usage of cleaner fuel starting from unleaded petrol, usage of LPG, CNG variants of vehicles particularly compulsion of CNG based mass transportation by Delhi Transport Corporation and then development of Metro Rail project contributed to reduction in air pollution by mass transportation.

ENVIRONMENTALLY SUSTAINABLE TRANSPORT: DEFINITION, CRITERIA, GOALS AND TARGETS

Consistent with the broad definition of sustainable development (WCED, 1987), the specification for a sustainable transport system requires that the movement of people and goods is provided in an environmentally, socially, and economically viable way; mobility for any purpose is to be considered as a means rather than an end. Environmentally sustainable mobility implies changes in behaviour and new innovative approaches at all levels of society and sectors of the economy.

Important prerequisite for realising an EST system in the long term are conformity with ecological limits (critical levels and loads) and the prevention of pollution.

A sustainable transport system is one that

- provides for safe, economically viable, and socially acceptable access to people, places, goods, and services;
- meets generally accepted objectives for health and environmental quality (e.g., those concerning air pollutants and noise put forward by the World Health Organization);
- protects ecosystems by avoiding exceedences of critical loads and levels for ecosystem integrity, e.g., those adopted by the UNECE for acidification, eutrophication, and ground level ozone; and
- does not aggravate adverse global phenomena such as climate change, stratospheric ozone depletion, and the spread of persistent organic pollutants.

Alternatively, an environmentally sustainable transport system is one where transportation does not endanger public health or ecosystems and meets needs for access consistent with (a) use of renewable resources below their rates of regeneration, and (b) use of non-renewable resources below the rates of development of renewable substitutes.

The Guidelines on Environmentally Sustainable Transport

The EST Guidelines

Guideline 1. Develop a long-term vision of a desirable transport future that is sustainable for environment and health and provides the benefits of mobility and access.

Guideline 2. Assess long-term transport trends, considering all aspects of transport, their health and environmental impacts, and the economic and social implications of continuing with 'business as usual'.

Guideline 3. Define health and environmental quality objectives based on health and environmental criteria, standards, and sustainability requirements.

Guideline 4. Set quantified, sector-specific targets derived from the environmental and health quality objectives, and set target dates and milestones.

Guideline 5. Identify strategies to achieve EST and combinations of measures to ensure technological enhancement and changes in transport activity.

Guideline 6. Assess the social and economic implications of the vision, and ensure they are consistent with social and economic sustainability.

Guideline 7. Construct packages of measures and instruments for reaching the milestones and targets of EST. Highlight 'win-win' strategies incorporating, in particular, technology policy, infrastructure investment, pricing, transport demand and traffic management, improvement of public transport, and encouragement of walking and cycling; capture synergies (e.g., those contributing to improved road safety) and avoid counteracting effects among instruments.

Guideline 8. Develop an implementation plan that involves the well-phased application of packages of instruments capable of achieving EST taking into account local, regional, and national circumstances. Set a clear timetable and assign responsibilities for implementation. Assess whether proposed policies, plans, and programmes contribute to or counteract EST in transport and associated sectors using tools such as Strategic Environmental Assessment (SEA).

Guideline 9. Set provisions for monitoring implementation and for public reporting on the EST strategy; use consistent, well-defined sustainable transport indicators to communicate the results; ensure follow-up action to adapt the strategy according to inputs received and new scientific evidence.

Guideline 10. Build broad support and co-operation for implementing EST; involve concerned parties, ensure their active support and commitment, and enable broad public participation; raise public awareness and provide education programmes. Ensure that all actions are consistent with global responsibility for sustainable development.

Internationally agreed goals, guidelines, and standards—such as those defined by WHO and adopted by the European Union, the UNECE Convention on Long-Range Transboundary Air Pollution, and the UN Framework Convention on Climate Change—have been used to operationalise this definition and to set goals and long-term environmental and health targets.

Climate change presents an imperative challenge for all nations. The Kyoto Protocol is an international agreement supported by the United Nations Framework Convention on Climate Change (UNFCCC) whose central feature is the requirement that countries limit or reduce their greenhouse gas (GHG) emissions.

The protocol provides market-based instruments such as the Clean Development Mechanism (CDM), which allows emission reduction (or emission removal) projects in developing countries to earn certified

emission reduction (CER) credits; each credit is equivalent to 1 metric ton of carbon dioxide (CO2) and can be traded and sold.

There are few CDM projects in the transportation sector because public transportation projects involve large-scale investments with long gestation and payback periods. Delhi Metro Rail Corporation (DMRC) is the first railway and metro rail project in the world and only the second project in the transportation sector to be registered with UNFCCC for GHG emission reduction. DMRC chose regenerative braking technology, which reduces the demand for electricity by up to 33% over the conventional electro-dynamic-rheostatic braking technology. The carbon credits produced through the offsetting of emissions from coal-fired power generation have been purchased by Japan Carbon Finance Ltd (JCF).

Growing Need for Transport and Skyrocketing Emissions

Carbon dioxide, a product of fossil fuel combustion, accounts for 95 percent of transportation GHG emissions. Two sectors, electricity and heat generation and transport, produced two-thirds of global CO_2 emissions in 2008. Transport, the second-largest sector, represented 22% of global CO_2 emissions in 2008.

1. Transport contributes one-fifth of the increase in global emissions to 2030, growing from 6.4 Gt (gigatonnes) in 2006 to 8.9 Gt in 2030.

2. In the United States, transportation activities (excluding international bunker fuels) accounted for 32 percent of CO_2 emissions from fossil fuel combustion in 2008.

3. In India, the transport sector emitted 142.04 million tons of CO_2 in 2007, which is approximately 12.9% of the total emissions. Road transport, being the dominant mode of transport in the country, accounted for 87% of the total CO_2 equivalent emissions from the transport sector.

4. With the growth in the economy, there has been a need for more transportation and thus more emissions. The metro system of mass transport is the sustainable solution for mitigating GHG emissions accrued though reduction of personal vehicle use and energy efficiency in rolling stock.

Sustainable Transport: Energy Efficient, Low on Emissions

Metro trains are energy-intensive by virtue of their inherent service requirement of start, accelerate fast, attain maximum speed, and stop at every station a kilometer apart within 85 to 90 seconds. Energy cost accounts for 5 to 15% of the operating cost of most metros. In DMRC, energy cost represents almost 30% of operating cost, and auxiliary loads account for 50% of this because of an adverse ratio of underground stations. Traction accounts for about 60 to 80% of total energy consumption in a metro

system. The quantity of energy consumed by trains is influenced by a wide range of factors, which can be categorized as (1) design of network, (2) design of trains, and (3) service planning operations. Hence, optimization of overall system design is essential to control consumption of electricity and lower emissions.

Delhi Metro Rail Corporation (DMRC) is changing the face of transportation in that city with the launch of its Metro Rail project. The DMRC's mission is to cover the New Delhi area with a metro rail network, planned in four phases, with a target date of 2021 for completion of the last phase. It consists of a network of underground, at-grade, and elevated infrastructure. Developmental projects such as this often result in environmental degradation, but DMRC broke from that pattern by implementing an Environmental Management System (EMS) as per ISO 14001 standard; it was awarded ISO 14001 certification for environmentally friendly construction practices. It is the second metro system in the world, after the New York subway system, to achieve this standard and the first to receive it in the construction stage.

This milestone was achieved through DMRC's determination to adopt environmentally-friendly construction practices, striking a balance between preventing ecological degradation and minimizing inconvenience to the public. The work was facilitated by the U.S. Agency for International Development and the Confederation of Indian Industry. The environmental policy adopted by DMRC highlights the organization's commitment to promote environmental conservation and its efforts to create environmental awareness among DMRC employees, contractors and metro users.

Description of Challenge and Statement of Problem or Need

The ISO 14001 standard has been adopted in the construction of Phase 1 and Phase 2 of the Delhi Metro Project. Challenges faced while designing and implementing EMS ISO 14001 during construction are described below.

Loss of Green Cover

No endangered species or forest area existed along the MRTS alignment or its corridors. Most of the trees, which were planted along the roads decades ago, provided clean air and acted as carbon sinks. Loss of green cover could affect the local ambient air quality, temperature, and humidity levels adversely. The primary concern was to reduce the environmental degradation in the name of development.

Dust Generation

Fugitive emissions and dust generation from construction activities such as transportation of earth, loading and unloading of material, and movement of heavy machinery such as compactors, rollers, water

tankers, and dumpers were a visible challenge. The level of suspended particulate matter (SPM) was high within a few meters from the source within and around the site from the earthwork activities and material handling.

Soil Erosion and Disposal

Runoff from unprotected excavated areas, quarry sites, and underground tunnel faces can result in excessive soil erosion, especially in areas where excavation is susceptible to erosion. The excavation of soil is done mainly for cut and cover and tunneling and foundations. The soil left over after the filling is a challenge because of the extent of the project.

Solid Waste

The range of solid waste during construction is varied, including large quantities of earth, construction spoils (concrete, bricks) waste materials such as metal, scraps, plastic, and paint scrap (from utilities, welding and electrical works, and contractor camps). Leakage from used lube oil, paint, and chemical containers could be a potential source of water pollution.

Impact from Noise

The baseline noise levels are likely to increase during the preconstruction and construction phases of the activities involving site clearing and construction operations. During construction, there may be high noise levels as a result of pile driving and the use of compressors and drilling machinery. Diesel generator (DG) sets, vent shafts, and loading and unloading activities all contribute to the increase in the ambient noise level.

Impact on Water Quality

Water requirement for the construction are met from bore wells along the route alignment. Spillage of earth, used water from stone crushing, oils and greases, sewage waste, chemicals, and concrete agitator washings can pollute water if they leach into surface and the underground water. High total suspended solids is a primary concern in regard to water quality, considering its use in washing, dust suppression, and other construction activities.

Impact on Air Quality

Air pollution is due mainly to fugitive emissions and dust generation from various construction activities and vehicular emissions. During the construction phase, SPM is expected to be the main pollutant associated with the earthwork activities, vehicular movement, and material handling.

Description of Solution and Metrics For Success

Elaborate environmental impact assessment studies have been conducted for every segment in both phases of the project. Environmental management and monitoring plans were established to manage the environmental impacts arising from the project.

Compensatory Afforestation

Through refinement of the alignment and the moving of smaller trees, DMRC succeeded in reducing environmental degradation. Because an extensive amount of green cover is affected during the site-clearing operation (the construction phase), a manual count of the existing trees on every median has been carried out to identify the number of the trees that are likely to be affected and/or cut during the construction phase. For every tree cut during construction, the DMRC is planting ten trees as compensatory afforestation. The Metro has undertaken compensatory afforestation with an 83 percent survival rate at Isapur, Najafgarh, Kakraula, and other sites. It is paying for the planting and fencing of indigenous tree species in two other sites. DMRC's environmental policy statement emphasizes conservation and enhancement of green cover.

Dust Control

SPM is reduced by installing dust screens and hoardings alongside the construction area and doing regular water sprinkling during material movement. Full-height fences, barriers, and barricades were erected around the site to control dust during excavation. During transportation of debris and muck from construction sites, trucks were covered and loaded with sufficient free boarding space left at the top to avoid spills through the tailboard or sideboards.

Mitigation of Soil Erosion and Proper Disposal

Mitigation measures include planning, timing of cut and fill operations (postponed during monsoons), and revegetation. The blasting technique should be consistent not only with the nature and quality of the rock but also with the location of the blasting. Techniques to minimize dust and prevent fly rock are used. The excavated soil is used for backfilling or is transported in covered trucks to designated disposal sites or low-lying project areas that are compressed and leveled.

Solid Waste Management

To reduce construction spoils, the layouts of batching plants and casting yards are designed for the smooth flow of unloading and stacking of the aggregates, reinforcement and cement, transportation of concrete, and casting, stacking, and loading of the segments on the trucks. The rest of the waste is segregated and sold to authorized recyclers. The waste management program with designation of areas

for segregation and temporary storage of reusable and recyclable materials is maintained by the contractors at the site.

Noise Control

Noise control can be achieved by means of automation, protective devices, noise barriers, soundproof compartments and control rooms, and job rotation. A site-specific noise-monitoring control plan guides noise management and alters the scheduling to minimize noise. For elevated corridors, a track structure without ballast is supported on two layers of rubber pads to reduce noise and vibrations. In addition, baffle wall for the parapets has been constructed up to the rail level to reduce sound levels.

Water Management

Wastewater from the construction site is not discharged from the site into water bodies by the contractors. Any water obtained from dewatering systems installed in the works is reused for construction purposes or discharged to the drainage. Adequate sanitary facilities and appropriate refuse collection and disposal systems are maintained. All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system.

Air Quality Control

Air quality monitoring system at few locations in Delhi also indicated high pollution levels in Delhi, at some locations which are even higher than National Ambient Air Quality Standards prescribed by Government of India, Central Pollution Control Board as seen the image here. "The daily travel trips are expected to explode from 15 million today to 25.3 million in 2020. If no further action is taken to radically improve public transport, walking and cycling, then Delhi by 2021 will gasp for breath, pay unacceptable fuel costs and spew warming gases like never before." Says Ms. Anumita Roychowdhury, CSE. (The Hindu, June 7 2012). Recently Delhi was reported to have air pollution even higher than that recorded in Beijing. Delhi ranks 8th in the report of top 100 cities of world with worst air quality published by World Health Organization in 2011.

Vehicles and machinery are be maintained regularly so that emissions conform to national and state ambient air quality (AAQ) standards. Periodic checks are undertaken, and remedial measures, including replacement, are carried out if required. Construction plants and equipment are maintained and operated so that recognized international standards for emissions are met. Based on the emission factors for parameters such as SPM, sulfur dioxide, and nitrogen dioxide, the pollution load is calculated and regularly monitored. Construction sites are watered down to suppress dust during handling of

excavation soil and debris and during demolition. Water sprinkling, hoardings, dust screens, and so on, are used. Emissions are controlled during transportation as well.

Ideas and Thought Process

A common problem encountered on different corridors was lack of environmental awareness among engineers and managers of DMRC who were involved in day-to-day construction activities. This was solved through regular environmental training programs.

The major concerns during the construction stage were poor housekeeping by the contractors and unauthorized use of the easily available natural resources and other available infrastructure such as roads and water resources. This could result in degradation of ambient air quality, water resources, and the land environment around the construction sites and the workers' camp. Improper management of earthwork and bridge construction activities would disrupt the natural drainage and increase soil erosion.

Environment management programs and the planning and designing of the alignment and structures have been mitigating negative impacts. Most of the work on the ground is undertaken by consortia of contractors; hence, the most effective means of operation control during construction to achieve minimal environmental degradation has been adequate provision of environmental clauses in work contracts and efficient contract management. For instance, stringent guidelines were established for environmental management, safety, housekeeping, and traffic control in the contracts. The project implementation unit records an end-of-construction mitigation checklist to monitor the implementation of the mitigation actions before releasing the final payment for any work contract.

Next Steps and Discussion

The lessons learned in the execution of Phase 1 of the project are being utilized and implemented in Phase 2. For instance, implementation of rainwater harvesting in the depot is informed by the experience in Phase 1. During the construction of Phase 1, a need for a water treatment plant was felt because of waste of untreated water; this issue has been taken up in Phase 2. DMRC highlights its commitment to enhance green cover in its environmental policy; it has made provisions for developing green cover in some stations in Phase 2 apart from the compensatory afforestation that has been undertaken. A common recycling plant for all construction waste, steel, and scrap is another green initiative. DMRC reduced the amount of cement required for making concrete and replaced it with fly ash. For instance, during the construction of the underground line from Kashmiri Gate to Central Secretariat, 30% of the cement was replaced with fly ash. Through design alterations such as reducing the size of metallic couplings in the underground section, DMRC claims to have reduced consumption of steel by 5,000 metric tons. Most

of these environment friendly practices are proposed to be or are implemented on a small scale initially, to be increased and continually improved in the next phases.

The Road Ahead

Delhi Metro is the first railway project in the world to be registered by the United Nations Framework Convention on Climate Change (UNFCCC) under the Clean Development Mechanism (CDM), which will enable it to claim carbon credits. The certification report was produced by the Germany-based validation organization TUV NORD on February 22, 2009. That organization conducted an audit on behalf of the UNFCCC and found that DMRC prevented the emission of 90,004 tons of carbon dioxide from 2004 to 2007 by adopting regenerative braking systems in Delhi Metro trains. Certified emissions reductions (CERs) during the construction phase could be envisaged for future phases with environmentally friendly practices. Green Metro Stations is yet another initiative being undertaken in consultation with the Energy and Resources Institute (TERI) for establishing environmentally friendly techniques for energy consumption and preservation. The design would utilize climatic factors such as wind loads, use of solar energy, and air movement patterns; utilize natural light; recycle wastewater; harvest rainwater; and utilize minimal water during construction.

Comment on The Wider Applicability of Results

Experience with and expertise in rolling out environmentally friendly construction practices are being utilized by other metro projects in several other corridors across the country. Delhi Metro is a trendsetter for upcoming metros in Hyderabad, Kochi, Pune, and Bangalore and has drawn interest internationally. The environmental management initiatives undertaken during the construction and operation phases of the Delhi Metro rail project have become examples for replication. DMRC recently received its first international consultancy assignment for special assistance on a project implementation study for the Jakarta Mass Rapid Transit system in Indonesia.

A shift from cars to public transportation has been the focus of DMRC, which has taken initiatives such as feeder and shuttle buses connecting stations and far-flung regions of the capital and providing car parking lots close to stations. The DMRC has submitted a (CDM) proposal to the Ministry of Environment and Forests to earn carbon credits for the "modal shift" of metro commuters as tail-end emissions of such vehicles contribute to global warming. The logic behind this move is that metro commuters are preventing carbon emissions by using metro rail for transport instead of private cars.

CONCLUSION

It can be concluded that EST is attainable, although only with a broad-based and concerted commitment. Many countries working on how this can be done developed a broad variety of policy instruments and strategies capable for achieving EST. The instruments addressed technological breakthroughs, mobility management, and awareness raising and education. In most cases, the proposed packages of instruments included regulations (e.g., emissions standards and limit values), economic instruments (e.g., fuel and road pricing and fiscal incentives), changes in infrastructure investment policies, and land-use planning. Information and education to raise public awareness about the problems and possible solutions and alternatives played a key role in the proposed strategies. The most important challenges lie in the acceptability of the goals, targets, and strategies and their component instruments. Issues of acceptability are best addressed by careful phasing of the application of instruments across the whole implementation period until 2030. Issues of effectiveness are best addressed by careful monitoring of the effects of instruments and appropriate adjustment of the vigour of their implementation.

Present transport practices have a formidable momentum that has deep psychological, social, and technological characteristics. Lack of relevant knowledge is itself a major barrier to attainment of EST, whether technical knowledge that could enable needed improvements in vehicles, fuels, and infrastructure or, even more, knowledge about human behaviour and societal organisation that could help policy-makers secure needed changes. Two things are required. One is a better understanding of how to make potential future distress relevant to present circumstances; the other is a more appealing vision of sustainable transportation.

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